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Vision
To be the best multi-super specialty hospital in India

Mission

<table>
<thead>
<tr>
<th>Care</th>
<th>To provide superior quality health Care using Innovative and Modern technologies to Save lives.</th>
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<tbody>
<tr>
<td>Innovation</td>
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<tr>
<td>Modern Technology</td>
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<tr>
<td>Save Lives</td>
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</tr>
</tbody>
</table>

Values
- Patient's well-being: It will be our topmost priority
- Adopt and encourage ethical practices
- Comply with all applicable laws and regulations
- Provide a safe and comfortable working environment to employees and associates
- Embrace technology and innovation in the delivery of healthcare
- Provide socially responsible and safe healthcare
It has been a tradition for outstanding healthcare organizations in developed countries to comprehend a conclusive yearly outcome book. Although India grades a vast and diverse patient pool, treated by a proficient medical fraternity, it unfortunately lacks evidence based guidelines for its patients with various pathologies.

As a modest beginning, to promote quality improvement and a health care audit within the organization, CIMS has come forth with its maiden Outcome Book.

CIMS has been diligent about checking its outcomes and has concentrated on areas requiring improvement along with maintaining established highest standards of patient care. The focus includes every category, every quality measure, and every aspect of how patients fare under CIMS care, culminating in the patient's best health care experience. The hospital monitor's patient satisfaction scores and works constantly to improve upon them regularly.

CIMS Outcome Book is a comprehensive summary of followed process measures, volume measures and clinical outcome measures besides encompassing a review of the latest conducted in-house innovations and technologies from August, 2010 when CIMS commenced its operations. Although reporting all outcomes for all treatments provided at CIMS Hospital is beyond the capacity of this book, adequate comprehensive details have been included at large; and we intend to increase variables of these outcome measures consequently.

In this inaugural edition we are covering most of our invasive, interventional, surgical, critical care specialities. In our forthcoming years, we will come out with internal medicine, it's sub specialities and other areas of care at CIMS.

We hope these data, though a drop in the ocean would be of value to the entire healthcare fraternity and Indian healthcare system at large.
Dear Colleagues,

Thank you for your interest in Care Institute of Medical Sciences (CIMS) 2010-2011 outcomes. With a mission of CIMS to provide superior quality healthcare using innovative and modern technologies to save lives, it has become essential to vigorously review and evaluate ourselves as quality health care providers on a global platform.

In preview of the same, this year we are glad to publish our journey of medical sciences in the form of an Outcome Book which measures various outcomes in an advanced cardiology and multispecialty setup.

Transparency in publishing the measured outcomes is an unsaid social corporate responsibility and commitment to our patients.

I, on behalf of the Board of Directors, am grateful for the collaborative efforts of CIMS's highly qualified interventional cardiologists, cardiothoracic surgeons, cardiac anaesthesiologists and support staff who harbor a sincere desire to deliver high quality care to the patients and whose overwhelming support has made this venture possible. We also express our gratitude to all the contributors, the editors and the staff of CIMS for working in synchrony to publish this outcome book in time. This outcome book would not have been a reality without their dedicated efforts.

Dr. Milan Chag, our Managing Director is a great humanitarian, a loyal friend, a person driven for perfection and excellence with total commitment to quality and honesty. He is an incredible and outstanding doctor. I trust him to the core. Without him, CIMS will be nowhere and if given a choice, you could any day trade me for another Milan Chag.

Dr. Anish Chandarana, our Executive Director is an excellent, fantastic workaholic person with special dedication and perseverance towards his work. His determination to achieve our goal has been admirable. He is highly important to our performance at CIMS, especially his involvement in quality and patient care.
Our Founding Directors are all outstanding people and they all have one thing in common: an absolute sense of mission. Dr. Hemang Baxi, Dr. Urmil Shah, Dr. Ajay Naik, Dr. Dhiren Shah, and Dr. Satya Gupta are special and great people who, with years of sacrifice and hard work, have made this demanding task look much easier and manageable. They have done a fantastic job with an exceptional performance over the last few years. I can vouch that it will be near impossible to find such a group of friend's and partners as my guide. They are just phenomenal and sensational!

Dr. Ashit Jain, Mr. Kirti Patel, Dr. Kamlesh Pandya and Prof. Dilip Mavlankar are our outside directors who time and again help us with our vision and mission.

CIMS hopes to set a platform to lead in the years to come and this Outcome Book will provide an insight into CIMS hospital’s medical activities. My gratitude to Prof. Parloop Bhatt to help me with this momentous effort in her spare time.

On behalf of CIMS family and Board of Directors,

Sincerely,

Dr. Keyur Parikh
Chairman
Care Institute of Medical Sciences
Ahmedabad
Board of Directors

Dr. Milan Chag
Managing Director

Dr. Anish Chandarana
Executive Director

Dr. Hemang Baxi
Director

Dr. Urmil Shah
Director

Dr. Ajay Naik
Director

Dr. Satya Gupta
Director

Dr. Dhiren Shah
Director

Dr. Ashit Jain
Director

Mr. Kirti Patel
Director

Dr. Kamlesh Pandya
Director

Dr.(Prof.) Dilip Mavlankar
Director

At CIMS... we care
It all began some ten years ago......

Several doctors and a dream.

To establish and create a world-class health care institute in the heart of Ahmedabad.

Ten years later and with more hands joining in, the dream has finally come to fruition.

Care Institute of Medical Sciences (CIMS). A premier multi-super specialty hospital backed with the latest in technology and human power.

Founded to provide international quality health care services, CIMS as an institute aims to set standards which will be emulated and followed.

The entire team of CIMS is dedicated to only one purpose: to create and give the best to the patients.
Care Institute of Medical Sciences (CIMS) is a 150-bed multi-super specialty hospital located in Ahmedabad, India on the Science City Road with a 175-bed expansion plan in progress and an aim to be 300 plus bed hospital by 2015.

Spread over 17000 square yards, CIMS is a spacious and state-of-the-art Green building designed to provide medical services and nursing care of the highest standards in all branches of medicine and surgery.

CIMS is a union of the best medical minds and the latest technology backed by an excellent infrastructure to deliver highest standards of international healthcare.

Established and backed by respected and leading medical experts to provide a complete range of outpatient and indoor patient diagnostic and treatment services, CIMS is a commitment to provide the right and safe medical care to each patient who entrusts their lives in its care.

Founded to be a centre of excellence in medical care, training and education along with clinical research, the entire team of medical, para-medical, nursing, volunteer and administrative staff work in close co-operation to take care of the patient in a compassionate manner.

CIMS Hospital is composed of over 1000 full time and visiting multi-specialty consultants, over 1000 staff (over 300 nurses) and over 5.5 employee/bed ratio (the highest in India) to provide quality service to all types of patients.
### Departmental Overview

#### Patient visits*  
- **OPD**: 20,933  
- **IPD (Admissions)**: 11,732  

#### Beds  
- **ICU**: 71  
- **General Ward**: 24  
- **Twin Sharing**: 18  
- **Single Room**: 18  
- **Cath Hold**: 6  
- **Dialysis Unit**: 4  
- **Emergency Room**: 4  
- **Suite Room**: 4  
- **OT Holding Room**: 2

#### Surgical Procedures  
- **Cardiac**: 1,313  
  - **CABG**: 900  
  - **Valvular**: 117  
  - **CABG + Valvular**: 23  
  - **MICS**: 75  
  - **Hybrid**: 08  
  - **Pediatric Surgery**: 190  
- **Orthopedic**: 261  
- **General**: 130  
- **Trauma**: 113  
- **Gastrointestinal**: 102

### Cardiovascular Medicine Procedures

#### Invasive Cardiology  
- **Diagnostic Cardiac Catheterization**: 6,532  
- **Interventional Cardiac Procedures**: 2,207

#### Electrophysiology  
- **Electrophysiology Studies and RF Ablation**: 362  
- **3D Mapping and RF Ablation**: 14

#### Device Implants  
- **Pacemakers**: 118  
- **Defibrillators**: 17  
- **CRT**: 23  
- **CRT-D**: 16

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*upto March, 2012*
At CIMS, 1251 non-cardiac surgeries of varying grades were performed along with 1313 cardiac surgeries totalling 2564 in all.

CIMS Hospital houses 8 operation theatres which have -

- 4 seamless OTs with class 100 laminar airflow
- Automated doors
- LED OT lights
- Centralized medical gas system
- Anti-static vinyl flooring prevents infection
- Pendant system with electric and gas points
- OT holding area for pre and post-operative immediate care.
- Extensive use of stainless steel for rust free long life
- Equipped with wide range of attachments for various patient positions
- Use of sterile instruments at all times
**Standards of Operation Theater:**
- To prevent infiltration of non-purified air into the operating theater by filters
- Air flow pattern that carries contaminated air away from the operating table
- Antifungal paint application
- Comfortable environment for the patient and operating team
- Convenient & uninterrupted personal movements inside the OT
- Safe zone creation in the OT for safe location of sterile instruments and disposables
- Sunlight and greenery seen through OT sealed windows, thus providing a compliant ambience to the staff working for long hours
- Camera system to relay live operation videos to a place where other doctors or patient's relative can watch

**Appropriateness of Surgical Process Include:**
- Prophylactic antibiotic received within 1 hour prior to surgical incision
- Appropriate guidelines on antibiotics created to prevent nosocomial infections
- Surgery patients with appropriate preparation of patient and operative part
- Surgery patients with recommended venous thromboembolism prophylaxis ordered
- Cardiac surgery patient with controlled 6 am postoperative serum glucose
### Abbreviations

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<thead>
<tr>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>AAA</td>
<td>Abdominal Aortic Aneurysm</td>
<td>B2M</td>
<td>Beta-2-Microglobulin</td>
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<td>AAD</td>
<td>Anti-Arrhythmic Drugs</td>
<td>BDG</td>
<td>Bi-Directional Glenn</td>
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<tr>
<td>ABG</td>
<td>Arterial Blood Gas</td>
<td>Beta-Hcg</td>
<td>Beta-Human Chorionic Gonadotropin</td>
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<tr>
<td>ACC</td>
<td>American College Of Cardiology</td>
<td>BIMA</td>
<td>Bilateral Internal Mammary Artery</td>
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<td>ACEI</td>
<td>Angiotensin-Converting Enzyme Inhibitors</td>
<td>BLS</td>
<td>Basic Life Support</td>
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<tr>
<td>ACS</td>
<td>Acute Coronary Syndrome</td>
<td>BMS</td>
<td>Bare Metal Stent</td>
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<tr>
<td>ADP</td>
<td>Adenosine Diphosphate</td>
<td>BNP</td>
<td>Brain Natriuretic Peptide</td>
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<tr>
<td>ADR</td>
<td>Adverse Drug Reaction</td>
<td>BPM</td>
<td>Beats Per Minute</td>
</tr>
<tr>
<td>AF</td>
<td>Angina Frequency</td>
<td>BPH</td>
<td>Benign Prostatic Hyperplasia</td>
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<tr>
<td>AFP</td>
<td>Alpha-Fetoprotein</td>
<td>BPM</td>
<td>Beats Per Minute</td>
</tr>
<tr>
<td>AHA</td>
<td>American Heart Association</td>
<td>BPU</td>
<td>Balloon Pulmonary Valvuloplasty</td>
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<tr>
<td>AICD</td>
<td>Automatic Implantable Cardioverter</td>
<td>BSI</td>
<td>Blood Stream Infection</td>
</tr>
<tr>
<td>ANA</td>
<td>Anti Nuclear Antibody</td>
<td>BTK</td>
<td>Below The Knee</td>
</tr>
<tr>
<td>APTT</td>
<td>Activated Partial Thromboplastin Time</td>
<td>BVS</td>
<td>Bioresorbable Vascular Scaffold</td>
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<tr>
<td>AR</td>
<td>Aortic Repair</td>
<td>CABG</td>
<td>Coronary Artery Bypass Grafting</td>
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<tr>
<td>ARB</td>
<td>Angiotensin II Receptor Blocker</td>
<td>CAD-TVD</td>
<td>Coronary Artery Disease –Triple Vessel Disease</td>
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<td>ARDS</td>
<td>Acute Respiratory Distress Syndrome</td>
<td>CAG</td>
<td>Coronary Angiography</td>
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<tr>
<td>AS</td>
<td>Angina Stability</td>
<td>CAMC</td>
<td>Cardiac Arrhythmia Management Centre</td>
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<td>AS</td>
<td>Aortic Stenosis</td>
<td>CAP</td>
<td>Community-Acquired Pneumonia</td>
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<tr>
<td>ASD</td>
<td>Atrial Septal Defect</td>
<td>CBC</td>
<td>Complete Blood Count</td>
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<td>ATA</td>
<td>Anterior Tibial Artery</td>
<td>CBD</td>
<td>Common Bile Duct</td>
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<td>ATLS</td>
<td>Advanced Trauma Life Support</td>
<td>CCA</td>
<td>Common Carotid Artery</td>
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<td>ATP</td>
<td>Adenosine Triphosphate</td>
<td>CCB</td>
<td>Calcium Channel Blocker</td>
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<td>ATP</td>
<td>Anti Tachycardia Pacing</td>
<td>CCF</td>
<td>Congestive Cardiac Failure</td>
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<td>AVF</td>
<td>Arterio Venous Fistulas</td>
<td>CCS</td>
<td>Canadian Cardiovascular Society</td>
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<td>AVM</td>
<td>Arterio Venous Malformation</td>
<td>CCU</td>
<td>Critical Care Unit</td>
</tr>
<tr>
<td>CDH</td>
<td>Congenital Diaphragmatic Hernia</td>
<td>CCM</td>
<td>Community Care Unit</td>
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At CIMS... we care
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CDSCO</td>
<td>Central Drugs Standard Control Organization</td>
</tr>
<tr>
<td>CEA</td>
<td>Carcinoembryonic Antigen</td>
</tr>
<tr>
<td>CEA</td>
<td>Carotid Endarterectomy</td>
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<tr>
<td>CECT</td>
<td>Contrast Enhanced Computed Tomography</td>
</tr>
<tr>
<td>CFA</td>
<td>Common Femoral Artery</td>
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<td>CHD</td>
<td>Coronary Heart Disease</td>
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<td>CHD</td>
<td>Congenital Heart Defect</td>
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<td>CIMS CON</td>
<td>Care Institute Of Medical Science Conference</td>
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<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
</tr>
<tr>
<td>COMMANDO</td>
<td>Combined Mandibulectomy And Neck Dissection Operation</td>
</tr>
<tr>
<td>CPAP</td>
<td>Continuous Positive Airway Pressure</td>
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<tr>
<td>CPK-MB</td>
<td>Creatine Phosphokinase Muscle Brain</td>
</tr>
<tr>
<td>CPK-T</td>
<td>Creatine Phosphokinase Total</td>
</tr>
<tr>
<td>CPT-I</td>
<td>Carnitine palmitoyltransferase I</td>
</tr>
<tr>
<td>CPT-II</td>
<td>Carnitine palmitoyltransferase II</td>
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<tr>
<td>CRF</td>
<td>Case Record Form</td>
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<tr>
<td>CRF</td>
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<tr>
<td>CRP</td>
<td>C- Reactive Protein</td>
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<td>CRPS</td>
<td>Complex Pain Region Syndrome</td>
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<td>CRT</td>
<td>Cardiac Resynchronization Therapy</td>
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<td>CRT- D</td>
<td>Cardiac Resynchronization Therapy Defibrillation</td>
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<td>CS</td>
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<td>Cerebro Spinal Fluid</td>
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<td>CT Angiography</td>
<td>Computed Tomography Angiography</td>
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<td>Central Venous Catheter</td>
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<td>CVD</td>
<td>Cardio Vascular Disease</td>
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<td>D And C</td>
<td>Dilatation And Curettage</td>
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<td>DAPT</td>
<td>Dual Antiplatelet Therapy</td>
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<td>Diastolic Blood Pressure</td>
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<td>Direct Current</td>
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<td>Dual Chamber Pacemaker</td>
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<td>DES</td>
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<td>Direct Laryngo Bronchoscopy</td>
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<td>Electro Cardiogram</td>
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<td>Extra Corporeal Membrane Oxygenation</td>
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<td>Estrogen Receptor</td>
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<td>ERCP</td>
<td>Endoscopic Retrograde Cholangiopancreatography</td>
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<td>ESR</td>
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<td>ESWL</td>
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<td>ETT</td>
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<td>Endovascular Aneurysm Repair</td>
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<td>Cyclophosphamide</td>
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<td>FDA</td>
<td>Food And Drug Administration</td>
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<td>FDP</td>
<td>Fibrin Degradation Products</td>
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<td>Glucose Transporter Type 4</td>
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<td>Glycoprotein</td>
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<td>GUCH</td>
<td>Grown Up Congenital Heart Disease</td>
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<td>HADS</td>
<td>Hospital Anxiety and Depression Scale</td>
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<td>High Density Lipoprotein</td>
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<td>High Frequency Oscillation Ventilation</td>
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<td>Health and Human Services</td>
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<td>Holmium Laser Enucleation of Prostate</td>
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<td>IABP</td>
<td>Intra Artrial Blood Pressure</td>
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<td>IABP</td>
<td>Intra Aortic Balloon Pump</td>
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<td>ICA</td>
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<tr>
<td>ICD</td>
<td>Implantable Cardioverter Defibrillator</td>
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<tr>
<td>ICER</td>
<td>Incremental Cost Effectiveness Ratio</td>
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<tr>
<td>ICMR</td>
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<td>IDET</td>
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<td>ITT</td>
<td>Insulin Tolerance Test</td>
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### Abbreviations

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<td>IVUS</td>
<td>Intra Vascular Ultra Sound</td>
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<td>KSF</td>
<td>Knowledge and Skills Framework</td>
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<td>KUB</td>
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<td>pCO₂</td>
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<td>PCV</td>
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<td>PET-MRI</td>
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<td>pO₂</td>
<td>Partial Pressure of O₂</td>
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<td>QALY</td>
<td>Quality-Adjusted Life Year</td>
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<td>QoL</td>
<td>Quality of Life</td>
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<td>RA</td>
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<td>Ready to feed</td>
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<td>Right Ventricular Outflow Tract</td>
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<td>SBP</td>
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<td>Superior Labral Anterior-Posterior</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>SCD</td>
<td>Sudden Cardiac Death</td>
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<td>SCM</td>
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<td>SGOT</td>
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<td>Superior Mesenteric Vein</td>
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<td>SOP</td>
<td>Standard Operating Procedures</td>
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<td>SPECT</td>
<td>Single-Photon Emission Computed Tomography</td>
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<td>SpO&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Saturation of Peripheral Oxygen</td>
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<td>SSI</td>
<td>Surgical Site Infection</td>
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<tr>
<td>SSV</td>
<td>Small Sephanous Vein</td>
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<td>STEMI</td>
<td>ST Segment Elevation Myocardial Infarction</td>
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<tr>
<td>SVD</td>
<td>Single Vessel Disease</td>
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<td>SVR</td>
<td>Surgical Ventricular Restoration</td>
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<td>TAPVC</td>
<td>Total Anamalous Pulmonary Venous Return</td>
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<tr>
<td>TCPC</td>
<td>Total Cavo-Pulmonary Connection</td>
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<td>TID</td>
<td>Thrice A Day</td>
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<td>TEE</td>
<td>Transesophageal Echocardiogram</td>
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<td>TENS</td>
<td>Transcutaneous Electrical Nerve Stimulation</td>
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<td>THR</td>
<td>Total Hip Replacement</td>
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<td>TIBC</td>
<td>Total Iron-Binding Capacity</td>
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<td>Total Knee Replacement</td>
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<td>TLH</td>
<td>Total Laparoscopic Hysterectomy</td>
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<td>Tread Mill Test</td>
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<td>TOF</td>
<td>Tetralogy of Fallot</td>
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<td>Transobturator Tape</td>
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<td>TRISS</td>
<td>Trauma and Injury Severity Score</td>
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<td>Treatment Satisfaction</td>
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<td>Thyroid Stimulating Hormone</td>
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<td>United States Food and Drug Administration</td>
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<td>Ultrasonogram</td>
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<td>Ureteroscopic Lithotripsy</td>
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<td>Urinary Tract Infection</td>
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<td>Ventilator Associated Pneumonia</td>
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<td>VDD</td>
<td>AV Dual Chamber Synchronous Pacemaker</td>
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<tr>
<td>VF</td>
<td>Ventricular Failure</td>
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<tr>
<td>VIU</td>
<td>Visual Internal Urethrotomy</td>
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<td>VP</td>
<td>Venticuloperitoneal Shunt</td>
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<td>VSD</td>
<td>Ventricular Septal Defect</td>
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<td>VT</td>
<td>Venticular Tachycardia</td>
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<tr>
<td>VVI</td>
<td>Venticular Demand Pacemaker</td>
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<tr>
<td>VVIR</td>
<td>Dual Sensor Venticular Demand Rate</td>
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<td>WHO</td>
<td>World Health Organization</td>
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</table>
CIMS is a multi-speciality tertiary care centre established by a group of eminent cardiologists who collectively have performed more than over 40,000 percutaneous procedures and over 15,000 cardiac interventions together, over the last 27 years; highest cumulative experience in India in patients with both simple and complex ischemic heart disease.

### Cardiology

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<th>Type of Procedure</th>
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<tr>
<td>PCI</td>
<td>2,207</td>
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Data comparison of door-to-balloon time (interval starts with the patient's arrival in the emergency department, and ends when a catheter guide wire crosses the culprit lesion in the cardiac cath lab) presents CIMS Hospital comparable to ACC and AHA guidelines as well to Cleveland Clinic and Stanford Hospital.

*Cleveland Clinic: http://my.clevelandclinic.org/Documents/outcomes/2010/outcomes-hvi-2010.pdf,
PCI Mortality Rate

As per international guidelines, patients presenting with non-ST-segment elevation, ACS should be treated according to the risk of progression to myocardial infarction (MI) or death. Immediate (<2.5 h) or early (<48 h) coronary angiography and PCI are advised, particularly in patients with elevated troponin levels or diabetes mellitus.

The rate of mortality among patients undergoing PCI procedures at CIMS Hospital was 0.78 which was comparable to mortality at Cleveland Clinic.

*http://content.onlinejacc.org/cgi/content/full/59/24/2221.pdf
**Cleveland Clinic: http://my.clevelandclinic.org/Documents/outcomes/2010/outcomes-hvi-2010.pdf

The rate of mortality among patients undergoing PCI procedures at CIMS Hospital was 0.78 which was comparable to mortality at Cleveland Clinic.
At CIMS, our well experienced interventional cardiologists with technical expertise perform majority of procedures through radial approach as compared to femoral approach.

In the radial approach:
- Ease of catheter passage even in overweight or obese patients.
- The patient does not require post-procedural immobility up to 4 to 5 hours.
- Early ambulation and PCI can be performed as a day care procedure.

According to AHA guidelines (2011) of PCI, compared to femoral access, radial access decreases the rate of access-related bleeding and local vascular complications.
Majority of patients who underwent catheterization were of age group of 51-60 years followed by 61-70 years.

Proportion of males undergoing catheterization was higher as compared to females.
Prevalence of hypertension and diabetes was high among patients undergoing cardiac catheterization.

At CIMS, single vessel angioplasty performed was more common as compared to double vessel and triple vessel angioplasty, irrespective of patients implanted with drug eluting stents or bare metal stents.

LAD & diagonal arteries were the culprit in 50.23% of patients who underwent PCI followed by RCA/PDA/PLV in 27.36% of patients, LCX/OM in 20.26% of patients and LMCA & Graft/Int memory arteries in 0.49% & 1.66% of patients respectively.

[LAD- Left Anterior Descending, RCA- Right Coronary Artery, PDA- Patent Ductus Arteriosus, LCX- Left Circumflex Artery, LMCA- Left Main Coronary Artery, OM- Obtuse Marginal PLV- Posterior Left Ventricular]
At CIMS, a total of 2797 stents were implanted of which 1683 were Drug Eluting Stents (DES) and 1114 were Bare Metal Stents (BMS).

Second generation Drug Eluting Stents being thinner, more flexible and more biocompatible polymers show increased efficacy and safety in terms of reduced stent thrombosis and rate of restenosis.

At CIMS, we have implanted 99.5% US FDA (and DCGI) approved stents for the treatment of ischemic heart disease.
Clinical Situations Associated With DES or BMS Selection Preference

<table>
<thead>
<tr>
<th>DES Generally Preferred Over BMS (Efficacy Considerations)</th>
<th>BMS Preferred Over DES (Safety Considerations)</th>
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<tbody>
<tr>
<td>■ Left main disease</td>
<td>■ Unable to tolerate or comply with DAPT</td>
</tr>
<tr>
<td>■ Small vessels</td>
<td>■ <strong>Anticipated surgery requiring</strong> discontinuation of DAPT within 12 months</td>
</tr>
<tr>
<td>■ In-stent restenosis</td>
<td>■ High risk of bleeding</td>
</tr>
<tr>
<td>■ Bifurcations</td>
<td></td>
</tr>
<tr>
<td>■ Diabetes</td>
<td></td>
</tr>
<tr>
<td>■ Long lesions</td>
<td></td>
</tr>
<tr>
<td>■ Multiple lesions</td>
<td></td>
</tr>
<tr>
<td>■ Saphenous vein grafts</td>
<td></td>
</tr>
</tbody>
</table>

[DAPT - Dual Antiplatelet Therapy]

At CIMS, a total of 1683 Drug Eluting Stents were implanted.
We have also used bioresorbable vascular scaffold (BVS) system stents, pericardium covered stents and various newer modalities as part of DCGI approved clinical trials.

[DES- Drug Eluting Stent, BMS- Bare Metal Stent, PTCA- Percutaneous Transluminal Coronary Angioplasty]
CIMS follows latest ACC and AHA practice guidelines (2011). As per guidelines, all patients at CIMS who underwent percutaneous coronary interventions were prescribed aspirin, clopidogrel/prasugrel and statins.

**AHA Guidelines:**
Administration of high dose of statin is reasonable before PCI to reduce the risk of peri procedural MI (level of evidence: A for statin naive patient, B for those on chronic statin therapy)

At CIMS, process measures for Acute MI includes:
1. PCI received within 90 minutes of hospital arrival
2. Administration of aspirin on arrival
3. ACEI/ARB given for left ventricular systolic dysfunction
4. Beta-blockers and Aspirin prescribed at discharge
5. Smoking cessation advice provided, where applicable
6. Overall appropriateness of care

**Drugs Prescribed Among Patients Undergoing Angioplasty**
Case Presentation: A 73 year old non-diabetic man presented with breathlessness, perspiration, and severe chest pain at CIMS. The patient had history of hypertension and his creatinine was 1.2mg/dl. Admission medications were aspirin (150 mg OD), clopidogrel (75 mg OD), atorvastatin (80 mg OD), and nicorandil (10 mg TD).

Diagnosis and Management: Echocardiographic evaluation revealed severe LVEF of 30% with apical aneurysm. CAG showed narrowing of the LMCA with 70% stenosis. LAD had 95% stenosis and LCX artery had 80% stenosis. The RCA showed 100% occlusion in proximal site. CABG was recommended. However, the patient refused for CABG; thus a decision was made to undergo PCI.

After standard preparation and local anaesthesia, a 6 French sheath was positioned into the right femoral artery. PTCA plus stenting of LAD and LCX ostium was done successfully using kissing balloon technique (post stenting) along with LMCA with desired clinical outcome.
**Case Presentation:** A 78 year old non-diabetic male patient from Tanzania presented himself at CIMS hospital with complaints of mild chest heaviness, shortness of breath and fatigue on mild exertion. He had history of hypertension since 3 years.

**Diagnosis and Management:** After clinical and ECG evaluation, patient was diagnosed with unstable angina. Angiography report indicated Severe Double Vessel Disease (Complex LAD, R1 bifurcating lesion). Patient was recommended PTCA (Percutaneous Transluminal Coronary Angioplasty) plus stenting of LAD and RAMUS. The patient was operated under local anaesthesia and loading and maintenance dose of anticoagulant, nikoandil and nitrates were administered. Successful PTCA with stenting of LAD and RAMUS lesion was done using DES (Drug Eluting Stent) with good end results. Patient was discharged in hemodynamically stable condition.
Case Presentation: A 68 year old male patient, presented with severe chest pain of 4 days duration with no association of diabetes, hypertension or dyslipidemia. He was known to have cirrhosis of liver for the past many years. His ECG revealed gross ST-T changes. He was admitted at a periphery hospital for medical management. He was given all possible anti-ischemic medications without any relief. He was an ideal candidate for coronary angiography followed by revascularization to relieve his symptoms. In view of cirrhosis of liver, the patient was denied coronary angiography due to increase risk of bleeding.

Diagnosis and Management: At CIMS, he was diagnosed with severe unstable Angina Class III B2. Should he not undergo coronary angiography and immediate revascularization, the patient was at risk of developing major fatal cardiac event (Myocardial infarction, Ventricular tachycardia, Ventricular Fibrillation or sudden cardiac death) at any moment. After explaining all due risks, he was taken for coronary angiography. Angiography revealed critical left main stenosis and the patient was advised to undergo coronary artery bypass surgery at the earliest. General anaesthesia by the anaesthetist during CABG surgery was not advised. Only option left was to perform angioplasty of the left main vessel. Left main vessel angioplasty was done successfully on the same day without use of any major anesthetic agents (Angioplasty does not require general anaesthesia). He remained hemodynamically stable during the procedure and was stable during the entire three days stay in hospital. His severe anginal pain disappeared immediately after angioplasty. At six month and one year follow up, the patient was free from angina pain and is living a healthy life.

Discussion: Traditionally, the treatment of choice for critical left main stenosis used to be coronary artery bypass surgery. For the past one decade, angioplasty of the left main vessel has emerged as an alternative to bypass surgery in a select group of patients. It can be safely done at a very advanced high volume Centre by an experienced cardiologist for very selective patients. Long term follow up data are good for the left main angioplasty in a selected group of patients.
Case Presentation: A 68 year old male patient, known case of Diabetes Mellitus since 10 years, presented at CIMS with complaints of chest pain and breathlessness on walking since 1 year, which had increased in intensity since last 4 days.

Diagnosis and Management: 2D echo showed normal LVEF of 60%. CAG revealed critical lesions in LCX (non-dominant, proximal 90%, distal 30% plaque), RCA (dominant, proximal 80% lesion) and LAD (proximal 99% lesion) and the patient was advised CABG or multi-vessel PCI for the same. The patient underwent successful PTCA plus stenting of LCX, RCA and LAD lesions using drug eluting stents (DES) with good end result in a single procedure. Selection of revascularization strategies in patients with less complex coronary anatomy (syntax score less than 22) deserves further consideration and should be weighed as per risk benefit rationale and patient preference.
Cardiology Investigation at CIMS aids in the appropriate diagnosis of cardiovascular diseases.
Fractional Flow Reserve (FFR)

- Myocardial FFR is an index to measure functional severity of coronary stenosis.
- The measurement of FFR has been shown to be useful in assessing whether or not to perform angioplasty or stenting on "intermediate" blockages.
- FFR is a guide wire-based procedure that can accurately measure blood pressure and flow through a specific part of the coronary artery.
- FFR is done through a standard diagnostic catheter at the time of a coronary angiogram.
- FFR identifies culprit lesion in case of multivessel disease.

FFR Procedure
The stenosis is crossed with an 0.014" pressure guidewire for recording the trans-stenotic pressure, and administering a maximum hyperaemic stimulus.

Benefits
- FFR is a specific index for the epicardial stenosis and therefore better indicates to what degree a patient can be helped by revascularization.
- FFR is independent of changes in heart rate, blood pressure, and contractility.
- FFR takes into account the contribution of the collateral flow.
- FFR can be applied in multivessel disease and for serial lesions within one vessel.
- FFR evaluates optimum stent deployment.

At CIMS, state-of-the-art Fractional Flow Reserve (FFR) is used.

- FFR : normal value of 1.0 in every patient and coronary artery
- FFR > 0.75 means the blockage is not severe enough to limit blood flow to the heart
- FFR < 0.75 means that the blockage is severe enough to limit blood flow to the heart and should be opened, if possible
At CIMS, Rotablator is used when:
- The plaque is felt to be too difficult to flatten against the artery wall with just PTCA.
- The plaque appears to have a large amount of calcium present in it and does not move easily.
- The plaque is too long or starts where the artery begins.
- The artery has too much plaque, which needs to be removed before another procedure.
- The artery is felt to be small for other procedures.
- A PTCA and/or stent has been done before and the lesion has reclosed.

A rotablator is a miniature drill capped with an abrasive, diamond-studded burr. The rotablator is used in a type of catheter-based procedure called rotational atherectomy. Rotational atherectomy is a minimally invasive treatment that is sometimes used to pulverize hardened plaque within a coronary artery.

Rotational atherectomy (Rotablation) represents one of the alternative devices to treat complex coronary artery stenosis. Rather than increasing luminal diameter by arterial stretching and plaque fracture as with balloon angioplasty, rotablation debulks atherosclerotic plaque. The basic physical principle is differential cutting.

Rotablator is threaded over a guidewire through the catheter that is used to inject dye at the blockage site. The tip of the rotablator is coated with very tiny pieces of diamond crystals. Air pressure is used to power and rotate the tip at very high speeds against the plaque. Short bursts of power will be used to rotate the tip up to 190,000 rpm. This will grind or break the plaque down into very small particles. 95% of the particles generated by the Rotablator are less than 5 microns. The dust is flushed downstream in the blood with IV fluids to be cleaned up and removed by the body’s natural defenses. The diamond crystal tip will grind only the plaque because it is firmer and more rigid than the soft flexible tissue of the artery itself.
Case Presentation: A 84 year old male patient, known case of hypertension, diabetes mellitus, and ischemic heart disease since year 2002 and with a surgical history of PTCA to LAD complained of chest pain with breathlessness and was admitted at CIMS.

Diagnosis and Management: 2D Echo suggested LVEF of 50% and hyperkinesia of infero-posterior wall. Baseline coronary angiography showed critical lesion (dominant with mid 70-80% lesion; distal 80-90% lesion) in left circumflex artery and patent stent in left anterior descending artery. Rotablation of left circumflex artery was performed and calcified lesion in LCX was debulked followed by adjunctive stenting using drug eluting stent. A 1.25 mm rota link burr was used with rota link advancer. Special care was taken to avoid vessel spasm or slow flow, hypotension and bradycardia. Post procedure hospital course was uneventful. Patient was discharged in hemodynamically stable condition.
Renal Denervation

The quest for newer therapeutic approaches to safely and effectively manage hypertension continues and expands to the reappraisal of concepts such as renal denervation. The Simplicity catheter delivers radio frequency waves to 4–6 locations in each of the two renal arteries, aiming to disrupt the nerves and lower BP. In this newly developed approach, a catheter connected to a radiofrequency generator is introduced percutaneously to the lumen of the main renal artery via femoral access and used to disrupt renal nerves located in the adventitia of these arteries without affecting other abdominal, pelvic, or lower extremity innervations. This technique aims to ablate efferent sympathetic and sensory afferent fibers of the renal nerves, both of which are thought to contribute to the blood pressure-lowering effect of catheter-based renal denervation.
Advantages

This technique has some significant advantages over the radical sympathectomy performed prior to the advent of anti-hypertensive drugs. These advantages potentially make it a viable therapeutic option for patients with resistant hypertension and for patients with other diseases thought to be associated with hyperactive renal sympathetic and afferent activity, such as chronic kidney disease and congestive heart failure. These advantages include short procedural and recovery times, the use of a minimally invasive approach and the localization of the procedure to the kidney, thereby avoiding the systemic side-effects that have plagued patients in the past.

In summary, renal denervation serves as a promising, safe and effective therapeutic technique for patients with hypertension and, potentially, for other diseases thought to be associated with renal sympathetic hyperactivity.

Renal denervation has been shown to:

- Reduce systemic sympathetic activation
- Reduce congestion (fluid overload) and congestive heart failure
- Induce LVH regression & ventricular remodeling
- Improve renal function
- Decrease arterial stiffness
- Reduce arrhythmias
- Reduce hypertension
- Reduce glucose tolerance
- Reduce insulin resistance
- Improve obstructive sleep apnea
Using Intravascular Ultrasound (IVUS)

Cardiologists at CIMS observe images inside the heart and coronary arteries to assist in diagnosis. IVUS offers a tomographic, 360-degree view of the arterial wall from the inside, allowing a more complete and accurate assessment than is possible with angiography.

At CIMS, IVUS is used to determine both plaque volume within the wall of the artery and/or the degree of stenosis of the artery lumen. It can be especially useful in situations in which angiographic imaging is considered unreliable; such as for the lumen of ostial lesions or where angiographic images do not visualize lumen segments adequately, such as regions with multiple overlapping arterial segments. It is also used to assess the effects of treatments of stenosis such as with hydraulic angioplasty expansion of the artery, with or without stents, and the results of medical therapy over time.

For IVUS, a tiny catheter is inserted into the heart or into a coronary vessel where high-frequency sound waves reflect off tissue or vessel walls. The reflected sound waves create a cross-sectional image from within the vessel or heart to aid in visualizing vessel and heart structure. IVUS technology also provides cardiologists with a better understanding of blocked vessels, which allows for proper selection and placement of stents and other devices to restore blood flow at the site of the blockage.

Arguably, the most valuable use of IVUS is to visualize plaque, which cannot be seen by angiography. It has been increasingly used in research to better understand the behavior of the atherosclerosis process.
CIMS has established a unique Cardiac Arrhythmia Management Centre (CAMC). The facility is one of its kind in India.

It offers:
1) Electrophysiology Studies (EPS)
2) Radiofrequency Ablation (RFA)
3) 3-Dimensional Mapping and Ablation
4) Pacemaker Therapy
5) Implantable Cardioverter Defibrillator (ICD)
6) Biventricular Pacing (CRT and CRT-D)

At CIMS a total of 179 patients underwent device implantation.

[**Laboratory Procedures**]

- Pacemaker: 118
- Cardioversion: 25
- CRT: 23
- ICD: 17
- CRT-D: 16
- Lead Extraction: 5

**Abbreviations:**
- **CRT** - Cardiac Resynchronization Therapy
- **ICD** - Implantable Cardioverter Defibrillator
- **CRT-D** - Cardiac Resynchronization Therapy- Defibrillator
[VVI- Ventricular Demand Pacemaker, **DDDR**- Dual Chamber Pacemaker,  
**VDD**- AV Dual Chamber Synchronous Pacemaker,  
**VVIR**- Dual Sensor Ventricular Demand Rate Responsive]

At CIMS, patients with EF <35% were also evaluated for risk of sudden cardiac death and a need for ICD. All patients implanted with defibrillators were followed up. These patients have successfully survived sudden cardiac arrest episodes due to VT/VF.
The 3-dimensional mapping system at CIMS treats complex arrhythmias like Ventricular Tachycardia, Atypical Flutters, Atrial Fibrillation, Ectopic Atrial and Ventricular Tachycardias which otherwise are difficult to tackle with conventional systems. At one year, most of the patients are free from lifetime impending palpitations and antiarrhythmic drugs, with improved Quality of Life (QoL).

The picture (shown on the right hand side) depicts the electro physiologist performing VT ablation in a Post-MI scar VT patient using Carto 3-Dimensional mapping technique.

As per recent evaluation, almost 50% of patients now opt for CRT-D so as to take care of both aspects of the disease - heart failure and sudden cardiac death due to VT / VF respectively.

At CIMS, a total of 376 patients were treated for cardiac rhythm disorders, amongst which 332 patients underwent EP study and Radio frequency ablation.

Meticulous care of advanced heart failure patients has resulted in 80% survival at a median 5 years after CRT implants. More than 100 patients implanted with CRT and CRT-D implants over the past decade were followed up at CIMS.
Case Presentation: A 33-year-old man was incidentally detected to have Premature Ventricular Contractions (PVCs) during annual health check-up done in January 2011. There were no other remarkable features in the ECG or echocardiogram (LVEF 60% and no Right Ventricular disease). Holter monitoring revealed frequent PVCs, Ventricular bigemini, trigemini and Non-Sustained Ventricular Tachycardia (NSVT), the ventricular ectopy burden being > 4% in 24 hours. Electrophysiology study (EPS) was performed; however there was no inducible sustained VT. Metoprolol was started for symptomatic relief of mild palpitations due to ventricular ectopy.

In February 2011, the patient was admitted with palpitations and presyncope, diagnosed as sustained VT, which was alleviated with direct current (DC) cardioversion, IV Amiodarone and Beta blockers. Detailed investigations were performed including contrast enhanced computed tomography (CECT) of chest, cardiac MRI, followed by Endoscopic ultrasound guided fine needle aspiration cytology (FNAC) which were all suggestive of sarcoidosis; therefore steroid immunosuppressive therapy was started.

In June 2011, the patient once again experienced palpitations (diagnosed as sustained rapid monomorphic VT), DC cardioversion was performed. Echocardiogram demonstrated left ventricular ejection fraction (LVEF) of 15%, LVDd of 64mm, LVDs of 58mm, and grade II mitral valve regurgitation. Dual chamber implantable cardioverter defibrillator (AICD) was implanted and patient was treated with beta blockers, Lidocaine and Amiodarone. Despite anti-arrhythmic drugs (AAD), the patient had recurrent VT treated successfully by AICD with 12 shocks in 24 hours. He was sedated, intubated and placed on ventilator support. In addition to AAD, IV Magnesium sulphate and Metoprolol infusions were started. The device was programmed to DDD mode 140 bpm lower rate in attempt to suppress ventricular ectopy. The patient was then weaned off the ventilator after 3 days and transferred to our institute via aeroplane, during the transfer he received shocks from AICD. Management during ICU stay is described in following table.
### Cardiac Rhythm Disorders

### Management

**On Admission**
- Patient had recurrent non-sustained ventricular tachycardia (NSVT) and polymorphic VT with QT prolongation
- Implantable cardioverter-defibrillator was reprogrammed with more aggressive ATP to reduce the number of shocks
- He was intubated and put on ventilator support
- Sedation maintained with IV fentanyl, IV morphine and IV midazolam intravenously
- Cervical sympathetic block was given with sensorcaine
- Chemotherapy with IV cyclophosphamide was started in addition to IV methyl prednisolone

**Day 4**
- Polymorphic VT had subsided; however, frequent monomorphic VT were observed with 3 different morphologies causing frequent shocks >10/day despite the aggressive anti-tachycardia pacing (ATP) programming

**Day 6**
- 3 morphologies (interchanging repeatedly) of VT were identified using electro-anatomical mapping (CARTO Biosense System)

<table>
<thead>
<tr>
<th>Morphology</th>
<th>Cycle length</th>
<th>BPM</th>
<th>Localization</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT1</td>
<td>RBBB Inferior axis</td>
<td>460</td>
<td>130</td>
</tr>
<tr>
<td>VT2</td>
<td>LBBB Inferior axis</td>
<td>500</td>
<td>120</td>
</tr>
<tr>
<td>VT3</td>
<td>LBBB left axis</td>
<td>550</td>
<td>110</td>
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- Extensive Theromocool RF ablation performed, almost continuous from LVOT to RVOT and RV mid-septum, at band of fractionated electrograms corresponding to basal septum scar in MRI

**Day 7**
- Patient had 3 shocks, at this time only VT3 morphology documented (VT1, VT2 not seen)

**Days 8-10**
- Longer episodes of VT occurred resulting in frequent shocks
### Cardiac Rhythm Disorders

<table>
<thead>
<tr>
<th>Day 11 (5 days post EPS1)</th>
<th>EPS2 was conducted (Conventional System), where both VT2 and VT3 were easily inducible.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repeat ablation was performed in RVOT region extending down to RV mid-septum.</td>
</tr>
<tr>
<td></td>
<td>Post ablation, VTs were not inducible but patient had residual RBBB.</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Days 12-18 (1 week post EPS2)</th>
<th>ECG recording showed frequent PVCs, occasional NSVT but no sustained VT.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>DDD pacing was reduced to 120 bpm.</td>
</tr>
<tr>
<td></td>
<td>Patient was taken off IV medications and sedation.</td>
</tr>
<tr>
<td></td>
<td>High dose of Metoprolol (&gt;200mg/day) and Fentanyl Patch were continued.</td>
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</table>

| Days 19-22 | Recurrent NSVTs starting at 5 am were observed (No signs and symptoms of obstructive sleep apnea or desaturations were noticed). |

<table>
<thead>
<tr>
<th>Day 23 (13 Days after EPS2)</th>
<th>Demonstrated frequent VTs again causing frequent ATPs and shocks; repeat ablation performed with CARTO Biosense</th>
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<tbody>
<tr>
<td></td>
<td>Morphologies of VTs were different than previously observed</td>
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</table>

<table>
<thead>
<tr>
<th>Morphology</th>
<th>Cycle length</th>
<th>BPM</th>
<th>Localization</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT4</td>
<td>RBBB left superior axis</td>
<td>330</td>
<td>180</td>
</tr>
<tr>
<td>VT5</td>
<td>LBBB left superior axis</td>
<td>330</td>
<td>180</td>
</tr>
</tbody>
</table>

| Extensive ablation was performed (thinned out IVS, 3mm on echo) |
| Days 24-37 (2 weeks post EPS3) |

<table>
<thead>
<tr>
<th>Days 38-76 (2 week post EPS2)</th>
<th>Patient was deeply sedated for 72hrs; gradually the sedation was weaned off</th>
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<tbody>
<tr>
<td></td>
<td>Frequent PVCs, occasional NSVT noted, rates maximum 140 bpm, no additional shocks by AICD</td>
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<table>
<thead>
<tr>
<th>Days 38-76</th>
<th>No shocks by AICD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ATP 4 occasions, for VT 140bpm</td>
</tr>
<tr>
<td></td>
<td>DDD pacing was reduced to 115bpm</td>
</tr>
</tbody>
</table>
Patient was observed and finally discharged after 76 days of ICU stay. The echocardiogram findings demonstrated LVEF of 15%, dilated Left Ventricle and thinned out myocardium. During the follow-up (6 months post discharge), patient was performing reasonably well, with LVEF of 25-30%, less frequent non-sustained VT and only one shock from AICD.

Discussion: Sarcoidosis is a multisystem granulomatous disease of unknown etiology characterized by the presence of non-caseating granulomas in the involved organs. Cardiac involvement in patients with sarcoidosis is getting vastly recognized and is associated with poor prognosis. The clinical sequelae of cardiac sarcoidosis range from asymptomatic conduction abnormalities to fatal ventricular arrhythmias, depending upon the location and extent of granulomatous inflammation. Sarcoid granulomas in the ventricular myocardium serve as foci for abnormal automaticity and cause changes in the ventricular activation and recovery process, which explains the reentry mechanism that is thought to lead to VT, the most frequent arrhythmia noted in cardiac Sarcoidosis. Some patients have VT and concomitant intermittent atrioventricular block, a combination that more typically suggests cardiac sarcoidosis.

Sarcoidosis that involves the heart warrants prompt therapy with steroids, immunosuppressive agents, or both. Steroids are believed to be capable of
attenuating the inflammatory response and slowing subsequent fibrosis, but it is less effective in preventing further arrhythmia as it is shown to be of different inducibility of VT between the active and inactive phases of sarcoid heart disease in an EP study. Management of arrhythmias in cardiac sarcoidosis is difficult and effective control of VT often is not achievable by a single method of therapy. Immunosuppressive therapies are recommended as a steroid sparing strategy in the management of sarcoidosis and can be beneficial in controlling arrhythmia. Treatment with an AICD along with anti-arrhythmic therapy is mandatory in sarcoidosis patients with refractory VT, who are at risk of sudden death. Prophylactic AICD placement is also recommended in patients with sarcoidosis having non-sustained VT or who develop VT during exercise electrocardiography or Holter monitoring. Implantable defibrillators can terminate ventricular arrhythmias and prevent sudden death, but do not prevent these arrhythmias from occurring. Ablation should be considered as an option in those patients with recurrent VT that are unresponsive to

Figure 2: VT1 termination during RF ablation:
anti-arrhythmic and immunosuppressive agents. RF ablation is very effective in decreasing or completely eliminating episodes of VT in a patient with cardiac Sarcoidosis. Though it is usual to perform multiple RF ablation due to VT, circuits can be changing as inflammation waxes and wanes, in such type of patients.
Risk Factors Include:

- Myocardial Infarction
- Damage to the heart valves or history of a heart murmur
- Enlargement of the heart
- Hypertension
- Diabetes
- Family history of enlarged heart

At CIMS, a total of 2680 patients were successfully treated for heart failure.

Risk Factors Among Patients with Heart Failure:

- Hypertension: 390
- Diabetes: 360
- Smoking: 274
- Age > 75: 226
- Obesity: 215
At CIMS, Appropriateness of Care for Heart Failure Patients was measured as:

- Smoking/Tobacco Cessation Advice
- Discharge Instructions
- ACE/ARB/Beta Blockers Administration
- LVEF Evaluation

Gender Distribution Among Patients With Heart Failure:

- Males: 1182
- Females: 283

Age Distribution in Years Among Patients with Heart Failure:

- ≤40: 134
- 41-50: 274
- 51-60: 475
- 61-70: 391
- 71-80: 173
- >80: 18
The mission of CIMS Endovascular Intervention is to offer the best minimally invasive treatment and diagnostic imaging for a wide range of conditions involving the Legs (Limb Vessels), Below The Knee (BTK), renals, brain, the head and neck region, and the spine and spinal cord.

Our recognized team of dedicated experts has extensive experience in providing endovascular treatment for peripheral vascular diseases, renal artery stenosis, carotid stenosis, un-bilateral limb vessel arterial/venous lesion interventions as well as intracranial aneurysms, varicose veins, arteriovenous malformations (AVM) and arteriovenous fistulas (AVF).

In addition, we manage and treat stroke, carotid artery stenosis, routinely with medical, percutaneous and surgical interventions.

CIMS endovascular and interventional specialists use state-of-the-art image-guided techniques in order to deliver therapeutic agents through a percutaneous route (that is, without the need for open surgery).
At CIMS, short hospital stays with reduced recovery times and decreased procedural risks are among the benefits of endovascular and minimally invasive techniques.

We specialize in:
- Limb vessel intervention (above and below the knee)
- Renal artery disease
- Carotid artery disease
- Abdominal aortic aneurysm
- Deep vein thrombosis
- Dialysis access procedures
- Mesenteric-Celiac artery disease
- Pulmonary embolism
- Thoracic outlet syndrome
- Uterine fibroids
- Varicose veins
- Vascular malformations
- Venous insufficiency and venous ulcers
Varicose veins have long been the commonest and most neglected clinical entity with a large disease burden affecting the quality of life of millions of Indian people. With recent advances in diagnostic work up and therapeutic modalities like RF ablation, we, at CIMS hospital have developed CIMS Varicose Veins Programme and successfully treated a large number of patients.

**What are varicose veins?** Varicose veins are enlarged veins that are visible through the skin and may appear as blue or purple twisted, knot-like cords. Varicose veins can occur anywhere in the body, but are more commonly found on the legs.

**What are spider veins?** Spider veins, a milder type of varicose veins, are smaller than varicose veins and often look like a sunburst or "spider web." They are red or blue in color and are commonly found on the face and legs, just under the surface of the skin.

It is the only minimally invasive segmental radiofrequency (RF) ablation treatment that utilizes radiofrequency energy to provide an even and uniform heat to contract the collagen in the vein walls, causing them to collapse and seal. Once a leg vein is closed, blood flow is redirected to healthy veins. The RF ablation procedure allows for a quick, comfortable recovery and a return to everyday activities, while also improving the appearance of varicose veins.
What causes varicose veins? Obesity, Genetic Predisposition, Prolonged standing, Previous DVT, etc.

What are the symptoms of varicose veins? Leg Ache, Itching, Skin Pigmentation, Cosmetic Blemish, Edema, Venous Ulcers

Diagnosis: Detailed clinic examination followed by Venous Doppler Scan

Treatment Options:
Non-surgical: Compression stockings and Microflavonoids
Surgical: Surgical Stripping, Foam Sclerotherapy, Radio Frequency Ablation, Multiple Hook Phlebectomies

VNUS Closure ablation using RF: Ablation involves the insertion of a thin, flexible tube called a catheter inserted into a varicose vein. The tip of the catheter heats the walls of the varicose vein using radiofrequency energy (also known as Closure procedure) and destroys the vein tissue. Once destroyed, the vein is no longer able to carry blood and is absorbed by your body.

Sclerotherapy: It is the most common treatment for both spider and varicose veins. This procedure involves a saline or chemical solution that is injected into the varicose veins that causes them to harden, so that they are no longer filled with blood. Blood that would normally return to the heart through these veins returns to the heart through other veins. The veins that receive the injection will eventually shrivel and disappear. The scar tissue is absorbed by the body.

Ambulatory Phlebectomies: This procedure involves passing hooks through small incisions, and may be done alone or together with vein stripping.
**Case Presentation**: A 40-year-old gentleman from Rajasthan presented with complaints of dilated tortuous veins in the right thigh and leg since 3 years. He started to have leg ache and swelling since last 6 months. He was referred to CIMS with a clinical diagnosis of varicose veins.

On detailed clinical examination, he had Grade II varicose veins in Right Great Saphenous territory, Incompetent S-F junction, multiple perforator incompetency, and multiple dilated veins in GSV and SSV territory. The above findings were confirmed using Venous Doppler and Deep Vein Thrombosis (DVT) and Deep Vein Incompetency were ruled out. Per abdomen examination was normal. Since the patient's occupation involves prolonged standing and he had troublesome ache in legs due to varicosities, pros and cons of conservative management as well as thermal ablation using RF were discussed with the patient, and it was judiciously decided to treat his veins using RF ablation plus phlebectomies. Final diagnosis as per CEAP classification: C2 E p A s P r – Primary Uncomplicated Varicose veins.

**Surgery:**
Preop minor investigations were performed. Morning admission was done on the day of surgery. Venous marking using indelible ink was performed. The patient was placed in supine position and under spinal anaesthesia, Right Leg painted and draped.
Ultrasound assessment was repeated and GSV was punctured at knee level using angiography needle and 7 F sheath inserted. RF catheter was checked and passed up to 2 cm proximal to SF junction. Tumescent anaesthesia using cold saline and soda bicarb were given in perivenous plane for compression of vein. Trendelenberg position was given and generator activated. SF junction was treated twice (because diameter is 8 mm) and rest of GSV treated in segments by pulling catheter 7 cm each time and maintaining compression on vein by ultrasound probe. Vein ablation confirmed after treating whole length and deep vein patency was also confirmed. Below knee varicosities were treated using multiple hook phlebectomies method in which veins are exposed through 2-3 mm stab incision and hooked out, pulled and excised. Steristrip closure was used for these incisions.

**Post Operative:**
Patient was allowed to walk as soon as spinal anaesthesia weaned off. He was advised to perform daily activities and re-joining of the job was recommended from the very first post operative day. Patient was recommended to wear compression stockings or bandage for a minimum of 2 weeks period. Analgesics and antibiotics were prescribed for initial 3-5 days.

**Discussion:**
As compared to older method of stripping, recent technology like RF ablation is far superior and has revolutionized the management of varicose veins. Clinical and radiological success rate reaches 95-97%. Patient compliance is excellent. Foam sclerotherapy and hook phlebectomies are very good treatment options for below knee veins varicosities. At CIMS, we prefer RF in comparison to LASER for GSV and SSV because of less pain, less bruising and enhanced patient comfort. Worldwide clinical trials have now proven the safety and efficacy of RF ablation in treatment of varicose veins.
Infrarenal Abdominal Aortic Aneurysm (AAA) treated by Intrarenal Endovascular Stent Grafting

Case Presentation:
A 71 year old male patient, normotensive and non-diabetic with known history of benign prostrate hyperplasia, with no current symptoms, presented at CIMS for routine medical checkup. The patient was also a known case of asthma, on intermittent Asthalin medication.

Diagnosis and Management:
While getting evaluated for Benign Prostatic Hyperplasia (BPH), incidentally the ultrasonography of abdomen showed aortic aneurysm at descending aorta. CT abdominal aortogram showed fusiform aneurysm along distal abdominal aorta extending up to aortic bifurcation. 2D echo showed normal LV function, diastolic dysfunction. The patient was diagnosed with large infra-renal AAA.

Under GA and with surgical cut-down, RFA and LFA were cannulated with 18 F and 12 F Gore Dorsal Sheaths respectively. Descending abdominal aortogram revealed large infra-renal fusiform aneurysm about 20 mm below origin of renal arteries and ending before bifurcation. All measurements of size and length for graft selection were done on CTA. Main trunk epsilateral leg endoprosthesis (Exclude- ER 23 X 14 X 14) was deployed through RFA. Contralateral leg endoprosthesis (Exclude ER 14 X 10) was deployed through LFA. Post-dilation of upper and right lower end was done with gore Tri-lobe balloon catheter at low pressure. Check angiogram showed good results. Upper end of prosthesis was placed just at the end of neck and to avoid future endoprosthesis leak, another aortic extender endoprosthesis. (Exclude – ER 23 X 33) was deployed at upper end and gentle post-dilation was done by tri lobe balloon catheter. Successful endoprosthesis was deployed.
Outcome:
Check angiogram revealed good results. Patient tolerated the procedure uneventfully. Arteriotomy site was closed with absorbable sutures. Patient was observed in ICU and shifted to ward later. The hospitalization was uneventful and the patient was discharged in haemodynamically stable condition. At 6 months follow-up, his CT scan is normal.

Discussion:
Aneurysm is enlargement of a blood vessel due to atherosclerosis, hypertension, trauma, or genetic factors. If it ruptures, it is fatal. Previously, surgery was the only option for such patients, which was effective but carried higher risk, needed 7 to 10 days of hospitalization and had associated complications. New technique called “Endoluminal Stent Grafting” provides an important alternative for patients requiring treatment of aneurysmal disease, specifically for the exclusion or confinement of AAA. Patient can be discharged within 2 days and has less complications and morbidity.

The need for Abdominal Aortic Aneurysm Therapy is expected to surge in the new millennium as the aging "Baby Boomer" population becomes increasingly at risk for cardiovascular diseases. Currently, more than 15,000 deaths can be attributed to AAA annually, making it the 13th leading cause of death in the United States. Some known figures who died due to Aortic aneurysm are Albert Einstein and Jawaharlal Nehru.
**Endovascular Intervention**

**Endovascular Management of Diabetic Foot –
A Multidisciplinary Approach with Below the Knee Approach**

**Case Presentation:** A 50 year old male patient presented at CIMS with right foot infection. The patient was a known case of diabetes since 1994 and had hypertension since last five years.

**Diagnosis and Management:** Upon admission the patient was evaluated by a vascular surgeon and infectious disease specialist and diagnosed as suffering from right diabetic foot infection; peripheral artery disease and stable angina.

The patient underwent debridement under epidural anaesthesia for diabetic foot infection. A deep tissue swab was send for culture sensitivity testing to decide upon further medical management of the wound. Appropriate antibiotics were prescribed.

Arterial Doppler of both lower limbs and carotid Doppler suggested atheromatous changes in aorta and in all major arteries of both lower limbs with plaques at various places. It also showed atherosclerotic changes with luminal narrowing in distal 2/3rd of anterior tibial artery, posterior tibial artery and dorsalis pedis artery with reduced flow, bilaterally; evident more in right as compared to left foot. The carotid doppler suggested diffuse atheromatous intima media thickening in both carotid artery system and in both subclavian arteries with atheromatous plaques at places. ECHO showed a LVEF of 60%.
On 15th October 2011, the patient underwent peripheral and coronary angiography. Coronary angiography revealed narrowing of left anterior descending artery with critical proximal LAD lesion. Peripheral angiography showed totally occluded anterior tibial and posterior tibial artery with distal filling by collaterals.

On 18th October 2011, the patient underwent successful peripheral angioplasty with stenting for right anterior tibial artery. Later, on 20th October 2011 the patient underwent successful PTCA plus stenting of LAD lesion using drug eluting stent with good end results.

**Outcome:** The patient's post procedure course was uneventful. His hemodynamic condition gradually improved during the course of his hospitalization. His wound healed with daily dressings (colloid silver gel). He was discharged in a haemodynamically stable condition with good QoL.

After 6 months patient is doing extremely well and followup showed totally healed foot.
**Carotid Angioplasty Cases**

**Case-1**
- 64 year male
- Hypertension, DM, CRF
- S/P CABG
- Carotid Doppler was suggestive of 60 % left ICA lesion

**Case-2**
- 78 year male
- C/O recurrent right upper limb and lower limb weakness for 3-4 months
- Carotid Doppler was suggestive of 80 % left ICA lesion

**Case-3**
- 69 year male
- C/O DM for 20 years
- On routine body check up found to have 80 % right ICA lesion

**Case-4**
- 55 year male
- C/O HTN for 3-4 years
- Right hemiparesis on 13/07/09
- CT Angio : left ICA 90 % lesion
At CIMS... we care
**Case Presentation:** A 49 year old female patient, known case of hypertension, CCF, IHD and LV dysfunction (EF-25%), presented with complain of breathlessness since 10 days. Previously, she was hospitalized and diagnosed as a case of Takayasu Arteritis, acute LVF, severe peripheral artery disease, pulmoedema, hypertensive encephalopathy and managed accordingly with bipap support and other medicines.

**Diagnosis and Management:** Patient was admitted at CIMS hospital for further treatment and management. Renal Doppler showed 90% renal artery stenosis. Peripheral angiography showed the specific pattern of stenosis, occlusion, irregularity and aneurysm involving multiple proximal branches of the aorta. It indicated severe stenosis of infra renal abdominal aorta (100%), abdominal aorta (80%) and celiac artery (80%).

**Outcome:** A patient of Takayasu Arteritis underwent successful surgery of PTA with stenting to abdominal aorta and celiac trunk with good end results. Also, 2 Pressure Control Ventilation (PCV) was replaced and extubated. She was managed with Bipap overnight. Post procedure hospital course was uneventful and she remained asymptomatic. Patient was discharged in haemodynamically stable condition. Patient was doing well at 6 months follow up visit and her LVEF improved from 25% (baseline) to 45%.
Discussion: Takayasu's arteritis is a well known, yet rare chronic inflammatory arteritis that affects the large vessels, predominantly the aorta and its main branches and the pulmonary arteries. Percutaneous transluminal angioplasty and stent implantation for stenotic lesions of renal artery and other branches of the aorta in Takayasu's Arteritis have been reported to show good outcomes.
Case Presentation: An 80 year old male, known case of Hypertension (8-9 years), Diabetes mellitus-type II (8-9 years), Ischemic heart disease (4-5 years), NYHA class (IV), Chronic renal failure, Trigeminal Neuralgia and an ex-smoker presented to CIMS hospital with sudden onset of breathlessness since last 4-5 days. During previous hospitalizations, he was treated for chronic kidney disease and accelerated hypertension with recurrent LVF. When local conservative treatment did not allay his problem, the patient was referred to CIMS for further management.

Diagnosis and Management: Physical evaluation revealed that the complain of severe breathlessness was not associated with chest pain, perspiration, fever or cough. On examination, pulse was 117/min, Blood pressure - 184/96 mm Hg, Respiratory rate- 34/ min, and temperature was normal. Bilateral crepitations were audible on RS examination. Rest of the systemic examination was normal except peripheral pulse examination which was suggestive of absent pulsations in digitalis artery, posterior tibial artery, popliteal artery and even femoral artery on both lower limbs.

Laboratory investigations showed altered renal function tests showing blood urea-124.5, serum creatinine-2.49, uric acid-15.24. Chest X-rays showed right lower zone consolidation. 2D Echo revealed LVEF 55%, moderate MR, and Moderate PAH.

USG-KUB suggested right small sized kidney with reduced cortical thickness, left kidney showing mild renal parenchymal disease, and borderline prostatic enlargement. Renal Doppler study was not conclusive about renal arteries patency.

Both lower limbs Doppler study showed severe atheromatous changes with calcified and diffuse intima-media thickening, completely blocked SFA from origin on both sides, and SFA reformed by collaterals in distal third on both sides, along with low velocity flow in ATA/ PTA/ DPA.
CAG was done suggestive of Triple vessel disease. Left renal artery revealed 90% occlusion, Right renal artery - 100% occlusion, Infra-renal aorta and common iliac artery showed 100% occlusion.

The patient underwent successful intervention of left renal artery Percutaneous Transluminal Angioplasty (PTA) with stenting with good end results. Renal stent of size 7mm×15mm was deployed via left radial route.

**Outcome:** Patient stay in the hospital was uneventful and he was discharged in a stable haemodynamic condition. Patient had been further advised for revascularization CABG and femoral bypass. Followup after 1 week showed significant results: NYHA class improved from IV to I, dose of antihypertensive medicines were reduced, RFTs improved significantly showing dropdown of S.creatinine from 2.2 to 1.4.

**Discussion:** Renal artery stenosis is an under diagnosed etiology in cases of uncontrolled hypertension and renal failure. Significant renal artery stenosis leads to renal failure, hypertension and heart failure. If treated, it can lead to significant improvement in symptoms and disease. Renal artery stenosis can be diagnosed with good Doppler, CT angiography, MR angiography or angiography. Fractional Flow Reserve (FFR) provides functional evaluation of treatment options.
A total of 1313 open heart surgeries were performed by cardiovascular surgeons of CIMS which include:

- Coronary Artery Bypass Grafting (CABG)
- Minimally Invasive Cardiac Surgery (MICS)
- Aortic Valve Replacement (AVR) and Repair
- Mitral Valve Replacement (MVR) and Repair
- Atrial Septal Defect (ASD)
- Double Valve Replacement (DVR)
- Ventricular Septal Defect (VSD)
- Surgical Ventricular Restoration (SVR)
- Redo CABG and its Combinations
- Pediatric Surgeries

**Assessment of process measures of cardiac surgery at CIMS**

**Standard protocols for CABG:**

- Optimum use and selection of antibiotic prophylaxis
- Preoperative beta blockade
- Use of internal mammary artery in CABG
- Preoperative medical optimisation of LV dysfunction patient
- Anti-lipid treatment at discharge
- Anti-platelet medication at discharge
- Betablocker at discharge

**Assessment of outcome measures of cardiac surgery includes risk adjusted for:**

- Operative mortality
- Deep sternal wound infection rate
- Postoperative renal failure
- Prolonged intubation (ventilation)
- Stroke/cerebrovascular accident
- Surgical re-exploration
Case Presentation: A 9 year old girl, a known case of Kawasaki disease since 2006 presented with complaints of chest pain and weakness on 28th November 2010. As patient history, the child was perfectly normal till 4 years of age (2006). She then had an episode of severe vomiting for which she was hospitalized. Later, she developed weakness on the right side of the body and was almost paralyzed with loss of voice. She gradually recovered in 25 days with return of voice and some residual limping on right side. In April 2006, she was admitted for developing pulmonary edema and for two peripheral embolic episodes. Also in August 2006, the patient developed aneurismally dilated LMCA with severe LV dysfunction of myocarditis etiology. She was treated for LV clot embolization. The LV function did not improve over period of time and continued in 2007 and 2008. An echo was performed on 20th Nov 2010 which showed situs solitus, dilated LV/LA, Intact IAS/IVS, severe global hypokinesia, diastolic dysfunction, no PAH and LVEF of 25%. This was conclusive of dilated cardiomyopathy with mild MR. On 22nd Nov 2010 she underwent CAG which depicted totally occluded origin of LAD and LCX vessels with collaterals from right sided vessels.

Diagnosis and Management: CABG was done with LIMA to LAD artery and Radial artery to OM (branch of Left circumflex). Surgery was done ‘On-pump’ as the size of the coronaries was 0.5 -1 mm size and they were atrophied vessel (normal adult coronaries are 1.5-2.5 mm).

Outcome: Postoperatively, she was on mechanical ventilation for two days and extubated on 2nd post-operative day. She was also on high inotropic support for a few days. Thereafter, she remained haemodynamically stable and the rest of her stay in the hospital was uneventful. She was discharged on 10/12/2010 in stable haemodynamic condition. At 1 year follow up, she is fine with good health status and quality of life.

Discussion: Kawasaki disease is an acute, self-limited vasculitis of unknown etiology that occurs predominantly in infants and young children. Though rare, if present it has the most serious and detrimental effect on the heart which can cause fatal coronary artery aneurysms in untreated children. Without treatment, mortality may approach 1%, usually within six weeks of onset. With early treatment, rapid recovery from the acute symptoms can be expected and the risk of coronary artery aneurysms is greatly reduced.
**Case Presentation:** A 33 years old normotensive, non-diabetic male patient had sudden abdominal pain with dyspnea on exertion followed by loss of consciousness. Patient was admitted at CIMS hospital for further management. 2D echo was done on next day which was suggestive of dilated ascending aorta, severe AR, mild MR and mild TR. CT Scan showed a dilated Ascending Aorta,(maximum diameter of 6.3 cm) with the dilatation extending up to arch of Aorta. Patient was advised for AVR and aortic root replacement.

**Management and Outcome:** Patient was planned to undergo surgery by Bentall procedure. Mechanical aortic valve replacement along with replacement of ascending aorta was done with dacron material graft. The coronary ostia were also implanted with dacron graft. The patient was weaned off Bypass and chest was closed in layers. He was then shifted to SICU in stable condition. On day-2, the patient developed Co₂ retention with severe acidosis. Hence he was immediately re-intubated and kept on ventilator. CT scan was suggestive of normal findings. Patient was then referred to a neurophysician and was treated conservatively. He gradually improved and was extubated. Patient remained stable and was shifted to ward on 10th post-operative day. He was discharged on 14th day, with a stable heamodynamic condition.

**Discussion:** Aortic Aneurysms are common in patients suffering from Marfan’s Syndrome and in patients with severely atherosclerotic aorta. The definitive treatment for an aortic aneurysm may be surgical or endovascular repair. The determination of surgical intervention is complex and determined on a per-case basis. Overall mortality world over ranges from 13- 20 percent, depending upon the associated risk factors.
CIMS has performed 900 isolated CABG procedures for National and International patients. Of these, 85.26% patients were males and 14.73% were females.

Patients who underwent CABG procedures at CIMS had more complex medical backgrounds as depicted by the low LVEF percent and associated risk factors.

Prevalence of other comorbid conditions

- Obesity: 24.6%
- Severe obesity: 7.2%
- Vascular disease: 18.3%
- COPD: 10.9%
- Liver disease: 0.6%

At CIMS... we care
Coronary Artery Bypass Grafting

The combined mortality rate for Coronary Artery Bypass Graft (CABG) and Valve + CABG procedures at CIMS is 1.8% (these patients are high-risk category and have LV dysfunction also), which was comparable to Stanford Hospitals and Clinics. At CIMS, CABG is cost-effective.

Clinical Outcome: Studies suggest that mortality after CABG is higher when carried out in institutions that annually perform fewer numbers of cases. At CIMS, mortality rate was 0.6 percent comparable to Cleveland Clinic and Duke Heart Centre.

At CIMS, the most consistent seven core variables of mortality prediction after CABG were:

i. Priority of operation
ii. Age
iii. Prior heart surgery
iv. Sex
v. LVEF %
vi. Stenosis of left main coronary artery
vii. Number of major coronary arteries with significant stenosis
Age Distribution in Years

Age contributes to the complexity of CABG surgical cases. Majority of patients who underwent CABG surgery at CIMS were more than 60 years of age (34.63%). Mortality among this age group (61-70 years) was 1.47%.

<table>
<thead>
<tr>
<th>Age</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 50 years (N=80)</td>
<td>1.25 (N=1)</td>
</tr>
<tr>
<td>51-60 years (N=168)</td>
<td>1.19 (N=2)</td>
</tr>
<tr>
<td>61-70 years (N=203)</td>
<td>1.47 (N=3)</td>
</tr>
<tr>
<td>71-80 years (N=87)</td>
<td>1.14 (N=1)</td>
</tr>
<tr>
<td>&gt;80 years (N=9)</td>
<td>0 (N=0)</td>
</tr>
</tbody>
</table>

At CIMS, along with CABG, valvular repair surgeries are also performed:
- CABG + MV Repair
- CABG + MVR
- CABG + AVR
- CABG + SVR
- CABG + DVR

Isolated CABG conduits used:
- LIMA 87%
- BIMA 12%
- Radial artery 56%
Management Strategies of High Risk Cases:

**Improved CABG technique**
- Beating Heart CABG
- Improvement in the CPB technology
- Improvement in heart protection during CABG
- Better invasive monitoring technology
- Minimally invasive CABG

**Better perioperative management**
- Better selection of Cardiac drugs
- Better evaluation of the patient in totality
- Availability of TEE and other imaging modalities in the ICU

**Good post operative care**
- Fast tracking
- Intense monitoring and evaluation by the team repeatedly
- Psychological support and backup
- Intense cardiac rehabilitation.

**Cardiac surgery has became a team work**
- A multidisciplinary team approach involving Cardiac Surgeon, Cardiologist, Anesthetist -Intensivist, Perfusionist, Nephrologist, Critical care specialist, Neurologist, Pulmonologist, Physiotherapist, Hematologist etc comprising CIMS team.
Case Presentation: A 67 year old male NRI from Zimbabwe complained of chest pain, breathlessness and perspiration on exertion. He had previous history of hypertension. During earlier hospitalization, CAG was done, suggestive of CAD-TVD; however patient was denied treatment due to high surgical risk. Patient communicated with CIMS hospital through internet and was advised CABG and LV remodeling.

Diagnosis and Management: Patient was admitted at CIMS Hospital. 2D echo suggested severe LV systolic dysfunction with LVEF: 25%. There was large LV aneurysm with LV volume of 350 ml (normal LV volume is 100-120ml). There was large LV thrombus also. After medical optimization, patient was taken for surgery. On table findings revealed apical and apical anterior LV aneurysm with large 3x2 cm size clot. After CABG with 3 grafts, LV was opened from apex through the aneurysm, clot evacuation was done, scar tissue was excised, then with Dacron haemsheild patch LV septum and LV apex was reconstructed. Here precision is required for creating a right LV size, shape and geometry. Patient came off bypass with minimal inotropic support.

Outcome: Post operatively, patient was shifted to SICU and aided with ventilator. Patient was extubated next day and had uneventful recovery. He was discharged in stable haemodynamic condition. He flew back to Zimbabwe after 15 days. In net follow-up after 1 year patient is fine in NYHA class I-II.

Discussion: SVR is a procedure designed to restore or remodel the left ventricle to its normal, spherical shape and size in patients with akinetic segments of the heart, secondary to either dilated cardiomyopathy or post infarction left ventricular aneurysm. The SVR procedure is usually performed in conjunction with CABG to ensure optimal blood supply to the heart. The combined SVR-CABG procedure should be offered to eligible patients with ischemic cardiomyopathy and ventricular enlargement. It improves the symptomatic and NYHA class of the patient and reduces repeat hospitalization.
Cardiac Valve Disorders

Prevalence of Cardiac Valve Disorders (N=144)

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>50</td>
</tr>
<tr>
<td>MR</td>
<td>40</td>
</tr>
<tr>
<td>MS-MR</td>
<td>22</td>
</tr>
<tr>
<td>AS</td>
<td>20</td>
</tr>
<tr>
<td>AR</td>
<td>12</td>
</tr>
</tbody>
</table>

[MS-Mitral Stenosis, MR-Mitral Repair, AS-Aortic Stenosis, AR-Aortic Repair]

At CIMS, Mitral valve repair is done routinely.

Electrocautery Maze procedure for atrial fibrillation and Left Atrial Appendage ligation is offered to all mitral valve patients.

Patient Populations with Valve Disorder

- Males: 47%
- Females: 53%
Prevalence of mitral stenosis and regurgitation were higher in females while aortic stenosis and regurgitation were higher in males.

## Gender Based Prevalence

<table>
<thead>
<tr>
<th>Condition</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td>MR</td>
<td>42.5</td>
<td>57.5</td>
</tr>
<tr>
<td>MS-MR</td>
<td>66.67</td>
<td>70</td>
</tr>
<tr>
<td>AS</td>
<td>70</td>
<td>91.67</td>
</tr>
<tr>
<td>AR</td>
<td>8.33</td>
<td>8.33</td>
</tr>
</tbody>
</table>

## Standard protocols for valve surgery

- Heavy antibiotic prophylaxis
- Pre op dental check up and treatment.
- Pre op on table and post procedure TEE is mandatory.
- Patient and relative education about anticoagulation regime
- Valve card with detail of anticoagulation regime and antibiotic prophylaxis given to all patients
- Mandatory regular follow-up
Case Presentation:
A 31 year old patient normotensive, nondiabetic had complains of giddiness and breathlessness on 26/3/2011.

Diagnosis and Management:
Patient was admitted at CIMS Hospital on 28/03/2011 for further management. 2D Echo at CIMS revealed large RA tumour prolapsing into right ventricle, attached to interatrial septum with mild PAH. His findings were confirmed on TEE. Because of large tumour, patient had low platelet count of 70,000. Surgery was planned on 30/03/2011, with internal jugular and femoral vein venous cannulation as there was no space in the right atrium. Whole tumour was excised and interatrial septum was also excised. Right atrial reconstruction was done using the pericardium. The size of the tumour was roughly 7x5x6 cm. Patient came off bypass smoothly.

Outcome:
Postoperatively, patient was extubated after 12 hours and rest of the course in the hospital was uneventful. Patient was discharged on 6/04/2011 in a stable haemodynamic condition, and follow-up information revealed that patient is in good health. Biopsy report was suggestive of Myxoma.

Discussion:
Tumours of the heart are a very rare pathology occurring in less than 2-3 of all tumours. Of these cardiac tumours, myxoma is very common, but right atrial myxoma accounts for only 15-20 % of all cardiac myxomas. These large size tumors are rare and they can cause destruction of atrial structure and wall with damage to tricuspid valve. Right atrial reconstruction in this situation is very promising. Recurrence rate in these tumours are also slightly high.
Case Presentation:
A 37 year old normotensive and non diabetic male complained of breathlessness and chest pain. On investigation, patient was diagnosed with Severe Aortic Regurgitation. On examination, patient had all the features of osteogenesis imperfecta, such as blue sclera, brittle bone, short stature; height was just 4 feet. In past, patient had fracture 3-4 times.

Diagnosis and Management:
Patient was admitted at CIMS hospital on 1/02/2011 for further management. 2D Echo revealed bicuspid aortic valve with severe AR with LVEF 35-40. Patient was operated on 2/02/2011 for aortic valve replacement. On table, sternum was very soft and the connective tissue was fragile. Heart and aorta were dilated with very thin aortic wall and expansile. Aortic leaflets were thick and rolled and dilated annulus was present. Aortic valve replacement was done using bioprosthetic valve.

Outcome:
Postoperative recovery was good and patient was discharged on 09/02/2011 in stable haemodynamic condition, and in follow-up patient is doing well.

Discussion:
Osteogenisis Imperfecta is a genetic connective and bone disease that is rarely associated with bicuspid aortic valve disease. World over literature confirms that only 42-45 patients of such disorder have undergone aortic valve replacement. Surgery on such patient’s carries high morbidity and mortality, which are mostly related with bleeding tendencies secondary to increased tissue and capillary fragility and also to bone fragility.
Case Presentation:
A 53 year old normotensive and nondiabetic male patient complained of chest pain and perspiration. Patient was admitted at a local hospital and diagnosed with inferior wall MI with acute LVEF. Trop T was positive and patient was treated conservatively. However, patient’s condition worsened and hence he was referred to CIMS hospital for further management.

Diagnosis and Management:
Patient was admitted at CIMS hospital on 18/12/2011. CAG was done which was suggestive of double vessel disease with right coronary artery totally occluded in the mid part. Patient had developed pulmonary edema and so Intra Aortic Balloon Pump (IABP) was introduced. 2DEcho was suggestive of large posterior inlet VSD with mild MR and mild TR and moderate PAH. LVEF was 45 %. Surgery was planned on 22/11/2011. CABG with VSD closure was done using Dacron patch. Perioperative findings were suggestive of infarction at the crux inferior wall of LV and RV. There was presence of small aneurysm also. VSD was large, 2 cm in the posterior septum in submitral position with a serpiginous tract into the right ventricle. RV septal and inferior wall were very friable and cheesy. Repair of the VSD was done by exclusion technique using Dacron patch and surgical glue.
**Outcome:**
Post operatively, patient was shifted to SICU with high inotropic support and on IABP support. He was extubated after 3 days and IABP was removed after 5 days of surgery. Patient was discharged on 5/01/2011.

**Discussion:**
Postinfarction rupture of the interventricular septum is a potentially fatal complication of acute myocardial infarction (MI). Even though most MIs involve some portion of the septal area, ventricular septal rupture is rare. It occurs in only 1 - 2% of patients with acute MI, and it causes early death in about 5% of post-MI patients. The most frequent complications of acquired VSD are rapidly progressing congestive heart failure, cardiogenic shock, hemorrhage, pulmonary edema, renal insufficiency, and eventual multiple organ failure; with these complications, mortality approaches 50%. For over 40 years, surgical management of acquired VSD has been the treatment of choice with an emphasis on early intervention, though post-MI VSD continues to be a surgical challenge carrying with it significant perioperative mortality. Despite intervention, operative mortality for post-MI VSD repair remains high (from 20% to 40% by several studies); however, patients that survive in the short-term usually have favourable long-term outcomes.
Minimally Invasive Cardiac Surgery (MICS) is the first official centre to launch a fully equipped MICS program in Ahmedabad and Gujarat. Minimally Invasive Cardiac Surgery (also called Keyhole Surgery) is performed through small incisions, using specialized surgical instruments by well-trained cardiac surgeons. MICS procedure can be offered for ASD closure, MV Repair / Replacement, AVR, Single vessel CABG.

Advantages of MICS
- Less invasive procedures
- Less pain
- Shorter ICU and hospital stay
- Preferable in high risk patients
- Early mobilization
- Faster recovery leads to early resumption of day to day activities
- Better cardiac rehabilitation
- Cosmetic incisions

Mortality was zero percentile during hospitalization and at Day 30 (post-discharge) in MICS programme.
At CIMS, of the total 75 patients, majority of patients underwent ‘Off-pump’ MICS surgery and LIMA to LAD anastomosis.

**Different Types of Surgeries in MICS**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number of Surgeries</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG (Isolated)</td>
<td>29</td>
</tr>
<tr>
<td>ASD Closure - MICS</td>
<td>20</td>
</tr>
<tr>
<td>Mitral Valve Replacement (MICS)</td>
<td>11</td>
</tr>
<tr>
<td>CABG (Hybrid)</td>
<td>9</td>
</tr>
<tr>
<td>Aortic Valve Replacement (MICS)</td>
<td>6</td>
</tr>
</tbody>
</table>

**LVEF %**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 35</td>
<td>12</td>
</tr>
<tr>
<td>40-55</td>
<td>27</td>
</tr>
<tr>
<td>&gt; 55</td>
<td>36</td>
</tr>
</tbody>
</table>

**Vessel Disease**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVD</td>
<td>29</td>
</tr>
<tr>
<td>TVD</td>
<td>6</td>
</tr>
<tr>
<td>DVD</td>
<td>3</td>
</tr>
</tbody>
</table>

**ASD** - Atrial Septal Defect

**SVD** - Single Vessel Disease

**DVD** - Double Vessel Disease

**TVD** - Triple Vessel Disease

At CIMS... we care
Minimally Invasive Cardiac Surgery (MICS)

Gender Distribution

Number of Patients

Males: 47
Females: 28

Age Distribution in Years

Number of Patients

- Less than 40: 19
- 41-50: 13
- 51-60: 18
- 61-70: 16
- Over 70: 9

At CIMS... we care
Hybrid Coronary Revascularization Surgery is the performance of coronary artery bypass surgery (CABG) and coronary stenting during the same operation. The surgery uses the best of both procedures and enables complete revascularization. It is usually considered as an alternative to traditional CABG in high risk patients and reduces post-operative morbidity.

A total of 8 patients with DVD had undergone hybrid coronary revascularization surgery. Of these 8 subjects, one had severe rheumatoid arthritis, while another had diabetes and obesity as associated risk factors. All patients were discharged after 6 days. Procedure related complications were absent with no in-hospital death. All patients underwent a successful LIMA to LAD anastomosis. No patient showed postoperative events or organ dysfunction. At one month, patients recovered completely to follow daily work schedules.

Perhaps, because of reduced myocardial injury, inflammation and activation of coagulation, patients undergoing hybrid procedure had better postoperative outcomes and satisfaction with excellent patency of LIMA as well as stents. From 8 patients of hybrid surgeries, 4 patients underwent PTCA to LCX with DES stenting, 2 patients underwent BMS in LCX and 2 patients underwent RAMUS & RCA with DES.

At CIMS, MICS CABG to LAD with LIMA and PCI (stenting) to RCA/Circumflex artery is done.

CIMS holds the label of being the first centre to do routine Hybrid CABG in India.
Case Presentation: A two month old female infant, weighing 3.2 kg was referred to CIMS for management of heart disease. She had an episode of severe respiratory infection requiring mechanical ventilation from which weaning was not possible. She had large mid muscular VSD (size 9 mm), severe biventricular dysfunction and severe pulmonary arterial hypertension. Prior to admission at CIMS, patient had a past history of hospitalization of 8 days, including being on mechanical ventilation.

Management and outcome: After admission at CIMS, she was stabilized with Ionotropic support and mechanical ventilation by our critical care team. After preoperative investigation and thorough counseling, she was planned for cardiac surgery. As the risk of open heart surgery was high in view of general condition of infant and underlying ventricular dysfunction, hybrid procedure or Perventricular Device Closure of VSD was planned (as per figure). Under this technique, the chest was opened and a thin guidewire was passed by a small puncture in RV free wall through VSD into left ventricle. Over the wire, a wide bore sheath was passed and a VSD occluding device was placed across VSD under echocardiography guidance. By this technique, the VSD was closed completely without putting baby on cardiopulmonary bypass or opening the heart. The recovery was really quick – the baby was extubated on the next day of procedure and was discharged back to referring doctor on 6th post procedure day. On subsequent follow up at 1, 3 and 9 months interval, baby was completely free from cardiac ailments and thriving well.

Message: Some infants with usual CHD present with some complications and are a real challenge in management. Pediatric cardiology is a unique branch, where collaboration and team efforts from pediatric cardiologist and pediatric cardiac surgeon make the real difference in management. Some defects which are difficult to assess during surgery or where likelihood of residual problems are more, are managed by this option.
Hybrid Cardiac Surgery

Subsequent to this case, we had five such other difficult cases which were managed similarly.

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Diagnosis</th>
<th>Previous Procedure</th>
<th>Current Management</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>1</td>
<td>3 y</td>
<td>Multiple VSDs (large perimembranous + Multiple apical)</td>
<td>PA band at 4 months of age</td>
<td>Device closure of apical VSDs + patch closure of pm VSD + PA debanding</td>
<td>Excellent, symptom free at 6 months follow up</td>
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<td>21 y</td>
<td>ACMGA + Large ASD + Large apical VSD + Severe PS</td>
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<td>2.5 y</td>
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<td>Discharged on 8th day of procedure</td>
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<td>5</td>
<td>45 y</td>
<td>Post MI VSD (large apical) with severe LCOS</td>
<td>Nil</td>
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</table>

Hybrid procedures in Management of CHD at CIMS

Team of Pediatric Cardiologist and Surgeon in Operation theatre – the way of achieving excellence

Epicardial Echocardiography – intraoperative echocardiography in small babies by putting echo transducer on heart in sterile manner
Peripheral vascular surgery is a specialty dealing with medical and surgical management of diseases involving blood vessels outside pericardium and outside brain. We have observed that Gujarat has huge burden of vascular diseases, but due to lack of awareness, thousands of patients are still suffering. Diabetes mellitus and Atherosclerosis are the major etiological factors leading to majority of vascular lesions.

CIMS surgeons not only perform routine arterial and venous surgical procedures, but are also involved in performing endovascular surgeries to treat aneurysms, DVT (Deep Vein thrombosis), varicose veins and the like. Amongst patients who underwent vascular surgery at CIMS, 50% patients had limb ischemia, 10% had infrarenal aortic aneurysm, 5% had pseudo aneurysm in common femoral artery, 15% had varicose vein, 10% had kidney disease and 10% had gunshot wound.

Of the total patients visiting vascular surgery department, 73.91% were males and 26.08% were females. Of these, 43.47% patients were of age less than or equal to 50 years.

Recent advances have made it possible to treat vascular diseases with minimally invasive techniques like angioplasty, stenting and endovascular aneurysm repair (EVAR).
Clinical Outcome
Of late, we have expanded division of vascular surgery at CIMS as the number of cases have almost doubled in last 3 months and been treated with excellent outcomes. We are planning to stretch the horizons with state-of-the-art vascular & endovascular set up where all below knee revascularizations and all complex aneurysm repairs will be performed.

Of the total patients undergoing vascular surgery, 50% patients had excellent outcome, 20% had very good outcome and 30% patients had good outcome related to quality of life and other vascular events.

As observed at CIMS prevalence of vascular disease was highest for patients under the age of 50 years.
**Case Presentation:** A 56 year old, male patient with recently detected hypertension and type II diabetes (15 years), presented at CIMS with black discoloration and ulceration of left foot since 20 days. H/O pain and trauma to the left foot, 1 month back for which he was treated conservatively elsewhere. Patient came to CIMS hospital expecting amputation and limb loss.

**Diagnosis and Management:** Clinical presentation was suggestive of critical limb ischemia (Rutherford Category 5). Ankle brachial index was 0.33. CT Angiography - 100% thrombotic occlusion in Left Superior Femoral Artery. Peripheral angiography revealed total occlusion of Left Popliteal Artery involving trifurcation. Digital Subtraction Tomography (DSA) - filling only through collaterals (TASC D category). Cardiac angiography - CAD with DVD. The patient was advised Revascularization by PCI to LAD. The patient underwent debridement and amputation of great toe and 2nd and 3rd toes as the left leg wound was gangrenous. The wound was kept open (Gullotine Type). As per the Angiosome concept, PTA supply to great toe was considered critical and it was decided to re-vascularize the crural vessel. A long left femoral-popliteal bypass plus popliteal to tibial bypass using Reverse Saphenous Vein Graft (RSVG) was planned. Great saphenous vein was harvested from ipsilateral lower limb. The Left supragenicular popliteal Artery was exposed and control obtained. The Left posterior tibial Artery (PTA) (Mid-Segment) was exposed and control obtained. Common femoral A. (CFA) was exposed and control obtained using silastic loops. CFA to RSVG anastomosis was done using 6-0 prolene, end to side. Graft tunneled and side to side upper popliteal artery – RSVG anastomosis was done. Distally vein was tunneled to PTA region. Distal anastomosis was performed to mid PTA.

**Outcome:** Post-operative recovery was excellent. Ankle brachial index had improved from 0.3 to 0.6. Debrided area started granulating with minimal slough. The vein harvest site had healed well. The patient was discharged on 6th post operative day, in a stable hemodynamic condition. After one month, the wound had healed completely.
**Case Presentation:** A 54 year old male patient presented at CIMS with a chief complaint of severe claudication in both lower limbs since last 6 months. The patient is a chronic smoker with a past history of CAG and PTCA plus stenting to RCA done in November 2011.

**Diagnosis and Management:** A provisional diagnosis of bilateral lower limb PVD (Atherosclerotic occlusion, clinically rutherford category IV) was made upon clinical evaluation. A CT angiography of abdominal aorta done at CIMS revealed complete occlusion of aorta at renal artery level and reformation of both CFAs. Bilateral SFA showed TASC D long segment aorto - iliac disease with juxta renal occlusion and left renal artery stenosis. The patient was considered for and advised to undergo aorto bi-femoral bypass for his condition. Strict smoking cessation was considered prior to surgery. The patient underwent aorto bi-femoral bypass under general anaesthesia. A midline xiphopubic laparotomy with bilateral groin vertical incision was made. Retro peritoneum was incised between duodenum and inferior mesenteric vein (IMV). Aorta was then exposed up to left renal vein and aortic bifurcation. The left renal artery was looped and controlled. Systemic heparin was given. The infrarenal aorta was looped, transected and 2cm segment excised. The proximal stump was cleared off and thrombus evacuated. Proximal anastomosis between aorta and 16X8 mm bifurcated Dacron graft placed end to end using prolene 4.0. Suture line confirmed and both graft limbs tunneled. Bilateral CFA to graft end to side anastomosis was done using prolene 6-0. Transected aorta suture ligated inferiorly. Lastly, closure was done in layers.

**Outcome:** Post-operative recovery was excellent with good wound healing. ABI improved in both legs from 0.3 to 0.9. At discharge, the patient was able to walk a distance of 2 to 3 kilometers without any complaint.
Case Presentation: A 52 year old male patient, known case of diabetes, hypertension presented at CIMS with acute hyperglycemia and history of left middle cerebral artery stroke. The patient did not have any past history of MI/Angina.

Diagnosis and Management: Upon clinical evaluation, carotid bruit was present and peripheral pulses were normal. Carotid Doppler revealed vulnerable plaque in common carotid artery (CCA) and 60-65% stenosis of ICA origin in left internal carotid artery (ICA). CT angiography confirmed the findings. CT brain ruled out presence of hemorrhagic infarct or any space occupying lesion. A carotid endarterectomy with vein repair using Reverse Saphenous Vein Graft (RSVG) was planned.

Surgery: A left neck incision was placed over sternocleidomastoid muscle. After retracting the ICV and SCM muscle, CCA was exposed and looped. Facial vein was divided and control obtained over ICA and ECA. The CCA, ECA and ICA were then clamped. Arteriotomy from CCA to ICA was done. Endarterectomy was performed and plaque was transected on CCA side. Pruitt Inahara shunt was inserted from CCA to ICA and vein patch repair was initiated. A Reverse Saphenous Vein Graft was incised from leg and anastomosed as patch over arteriotomy site, using prolene 6-0. De-airing was done, shunt removed and suturing completed. Romovac drain was inserted and closure done.

Outcome: Peri-operatively, no complications were observed. He gradually improved and was discharged in stable hemodynamic condition with good wound healing.
Facilities at CIMS
- 4 class 100 laminar air flow modular operation theatres
- Positive and negative isolation chambers in the SICU
- 20 bed surgical intensive care unit.

At CIMS, Surgeries Performed Include

Lobectomy
A lobectomy of the lung is performed in early stage non-small cell lung cancer patients. It is not performed on patients that have lung cancer that has spread to other parts of the body. Tumor size, type, and location are major factors as to whether a lobectomy can be performed.

Pneumonectomy
A pneumonectomy is most often used to treat lung cancer when less radical surgery cannot achieve satisfactory results. It may also be the most appropriate treatment for a tumor located near the centre of the lung that affects the pulmonary artery or veins. In addition, pneumonectomy may be the treatment of choice when the patient has a traumatic chest injury that has damaged the main air passage (bronchus) or the lung's major blood vessels so severely that they cannot be repaired. Extrapleural pneumonectomy involves the removal of the entire diseased lung, the pleural lining of the chest wall, the diaphragm, and the pleural lining of the heart.

The Cardiothoracic surgery team of CIMS is a highly skilled one and is backed by vast experience comprising of numerous surgeries.

At CIMS... we care
Pediatric and Neonatal Critical Care at CIMS Hospital (CIMS KIDS) is recognized as Gujarat's foremost pediatric health-care institution and is geared with its mission statement and vision to be the most leading centre dedicated to advancing children's health through the integration of patient care, research and education.

This is achieved by providing affordable healthcare solutions to critical illness of children. Our pediatric patients, besides Gujarat, travel from neighboring states of Madhya Pradesh, Rajasthan, Maharashtra and even across nations.
Neonatal Critical Care Unit at CIMS is specially designed to treat ill or premature newborn infants.

- It is managed by a team of experts under the guidance of a highly experienced and expert neonatologist who on requirement closely work with the hospital’s obstetrics team and highly specialized (subspecialty) pediatric services.
- Houses a special ranked as NICU: level 3C (without ECMO)
- “Newborn critical transport van “...working 24x7 for kids provides comprehensive care for newly born weighing 800g (or 28 weeks or more in mother's womb).
- Houses conventional and advanced life support systems including ventilators and ECMO (Artificial heart lung machine).
- Well equipped to perform complex surgeries including abdominal, respiration related and even cardiac surgeries in the newborn.

CIMS Perinatology wing promotes transfer of expecting mother’s for care of mother and prematurely delivered or sick babies identified through echo/sonography.
Pediatric Intensive Care Unit (PICU)
The PICU is well-equipped with recent and modern ventilators, infusion pumps, fiber optic and virtual bronchoscope unit at bedside, nitric oxide delivery system, sonography guided vascular access facility and bedside echocardiography along with all expert personnel, intensivist, cardiologists, general as well pediatric cardiac surgeon in house.

CIMS KIDS Foundation makes the unit self sustainable.
- First of its kind initiative with support of “Reeta Keyur Parikh Charitable Trust”, this Foundation supports families undergoing huge financial trauma for treating their kids with long standing illness like neurological, trauma, cardiac and neonatal disorders by adopting 1 NICU bed and 1 PICU bed. At least 20 families have been treated so far with the help of this Foundation. All neonatal consultants waive off their professional charges to support this mission.

CIMS KIDS - Community and Social Activities includes bringing awareness to children through school activities on theme of –
1. Healthy diet for healthy children
2. Pediatric CPR (Cardio Pulmonary Resuscitation)

Conditions that commonly cause critical illness and injury include:
- Severe infection
- Poisoning
- Drug overdose
- Trauma
- Extensive surgery
- Congenital anomalies
- Immunological disorders

A prematurely born baby with critical lung condition was kept on life support for 3 days by means of artificial lung machine (ventilator).
Neonatal and Pediatric Care

[MAS = Meconium Aspiration Syndrome (Inhaled stool in the lungs during birth process)]

[CDH = Congenital Diaphragmatic Hernia (Herniation of Intestine in place of lungs-a birth defect)]
Case Presentation: A 8 day old male baby born by caesarean section was brought to CIMS KIDS with a rare presentation of non resolving acute gastroenteritis with late onset of sepsis and continuous loss of weight. Baby had no health issue at birth, was breast feeding but due to inadequate weight gain and insufficient breast milk, was fed on AS formula feeds. Baby on admission was active, but severely dehydrated. Only positive finding on general examination was hyper pigmentation of scrotum, apart from dehydration. Systemic examination was normal except slightly high blood pressure with abnormal shrill cry.

Diagnosis and Management: Past medical history of mother depicted death of a child earlier in first 28 days of life with similar history of non resolving diarrhoea and ambiguous genital (External gonads). ... a rare clue in it’s own !!. Blood investigation on first day- Na -106, K-5.56, S Creatine-0.60 with history of polyurea (high urine output), CBC-was normal. CSF-was normal (done due to abnormal cry). Treatment was started to correct hyponatremic dehydration. Congenital adrenal hyperplasia was suspected by pediatric endocrinologist and baby was treated with IV antibiotic, IV hydrocortisone along with other supportive treatment. A disorder of faulty steroid synthesis by birth which runs in family as genetically defective chain of hormone synthesis was diagnosed and confirmed in no more than 36 hours and child started improving very well. Baby slowly started gaining weight with correction of low sodium and with RTF feeding changed to KSF along with breast feeding after few days. The baby was discharged with weight of 2.155 kg with good oral intake and stable vitals. Last sodium was 130.6. His karyotyping was normal. On discharge, his treatment included oral hormone replacement to be taken life long. (Fludrocortisone and Hydrocortisone).
Case Presentation: A 32-33 week old male child born via normal vaginal delivery with H/O breech presentation and absence of antenatal steroids treatment to mother. Child did not cry immediately after birth and was presented to CIMS – neonatal care unit for management of respiratory distress. On admission, child had upper and lower chest retractions with grunting and nasal flaring.

Diagnosis and Management: Silverman score was more than 6. Child was maintained on 100% SpO$_2$, on 7 L/min oxygen. His portable chest X-ray was done, supportive and symptomatic treatment was started. His X-ray showed fine reticulo-nodular pattern s/o HMD (Hyaline Membrane Disease). Meanwhile, child was under CPAP support.

His parents, were counseled about need of surfactant and with their consent curosurf (Special lung maturation agent which stimulates lung to mature faster and saves lung from harmful complication) was given after endo-tracheal intubation within first 2 hrs of life. Child was immediately extubated and put on bubble CPAP. Child underwent entire procedure well. Chest X-ray was done on next day s/o normal bronchovascular markings. Child was kept on bubble CPAP for one day and then weaned to room air. Apnoea of prematurity was dealt with IV and Oral caffeine total for 4 days. Child was treated with supportive treatment and nutrition.

Hospital stay was without any complication and he was discharged in stable haemodynamic condition with almost negligible oxygen requirement (< 25% FiO$_2$) from 12 hours after birth.
Case Presentation: A very difficult to manage child was ventilated for non resolving pneumonia at CIMS KIDS. ABG suggested severe respiratory acidosis with pCO$_2$ of 88 (carbon dioxide is detrimental to life) and paO$_2$ (blood oxygen levels) of just 46 at 100 percent oxygen delivery support. As per indication, he was a desirable candidate of HFOV ventilation. HFOV (High Frequency Oscillation Ventilation) is a kind of ventilation mode where breathing is provided with lung protective strategy and by giving a bit of rest to damaged lungs for its speedy recovery. Child was given support of artificial breathing support with HFOV for 5 days by serial monitoring of ABG (“every 6 hourly”) for which our unit prefers policy of indwelling arterial catheters and central venous line placement for long term administration of drugs and drawing of blood sample for investigation, so as to ensure needleless blood investigations (painless). At 5th day, child was switched to conventional ventilation strategy and he was ultimately weaned off from all life support on 24th day of admission and discharged in stable haemodynamic condition. At 7 months follow-up, the child is well.

As shown above, HFOV gives a life saving and rapid recovery in cases of meconium aspiration syndrome (in simple words, babies who have inhaled their stool inside mother's womb itself) and when they are delivered they cannot sustain load of breathing with a damaged lung. And when first few hours pass without artificial ventilator support, then they can have secondary effects on heart and rest part of body too. A child with similar presentation had been brought to our NICU with artificial ventilation in our “NICU on WHEELS” and was treated with success.
Tracheal Stricture and Successful Surgery of Tracheal Resection-Anastomosis

Case Presentation: A 14 year old boy presented to CIMS hospital with chief complaint of difficult breathing and breathlessness. The patient had a history of fall from height, one year back and was treated conservatively over the year. Over the last week, he developed shortness of breath and hence short term tracheostomy was performed at a local neurology hospital. He was then referred to CIMS for further management.

Management and Outcome: On examination, the patient had tracheal stricture which were probably related to the site of the cuff of the tracheostomy tube. Surgical intervention for excision of stricture with end to end anastomosis was deemed necessary to treat the problem. CT scan of neck and thorax was taken which was suggestive of tight stricture at level of C7 vertebra, bilateral minimal hydropneumothorax and patchy area of consolidation in bilateral lower lobe. Fiber optic bronchoscopy further showed tight stricture involving trachea approximately 3-4 cm from the vocal cords. The patient underwent tracheal resection with end to end anastomosis at CIMS. Neurophysician's opinion was taken for post traumatic scar epilepsy. Excision of the strictures with primary end-to-end anastomosis gave good results. Post-operative period was uneventful and patient was discharged in a hemodynamically stable condition.

Discussion: Tracheal resection is usually successful and has a low mortality rate. This entails proper patient selection through evaluation; careful coordination between anaesthesia, otolaryngology, and thoracic surgery; meticulous attention to the technical details of operation; and postoperative care. Anastomotic complications are uncommon and important risk factors are reoperation, diabetes, lengthy resections, laryngotracheal resections, young age (pediatric patients) and the need for tracheostomy before operation.
One out of every 100 babies is born with congenital heart defects (CHD). In fact, CHD is the most common congenital anomaly present in fetal life. Lack of awareness, average socioeconomic status, unpredictable outcomes and non-availability of expert units result in only few babies to reach to correct diagnosis and proper intervention at right time.

**Resources**

The department has all qualified and competent humane staff including pediatric cardiologists, pediatric cardiac surgeons, anaesthetist, perfusionist, intensivist, physiotherapist and trained nurses. In addition, it has state-of-the-art equipments and infrastructure required for management of these babies. This team has produced tremendous impact on outcome of several hundred small infants and children born with CHD since inception.

This includes all varieties of catheter interventions, device closure, closed and open cardiac surgeries, neonatal and infant cardiac surgeries, cardiac surgeries in adults (Grown up Congenital Heart Disease), re-do operations and hybrid cases.

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### Pediatric Surgeries (N=190)

<table>
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<tr>
<th>Procedure</th>
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<tr>
<td>Patent Ductus Arteriosus (PDA) and Co-arcitation of Aorta</td>
<td>25</td>
</tr>
<tr>
<td>Tetralogy Of Fallot (TOF)</td>
<td>27</td>
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<td>Ventricular Septal Defect (VSD)</td>
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<tr>
<td>Atrial Septal Defect (ASD)</td>
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<tr>
<td>Total Anamalous Pulmonary Venous Return (TAPVC)</td>
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<tr>
<td>Bidirectional Glenn (BDG)</td>
<td>10</td>
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<tr>
<td>BT Shunt</td>
<td>11</td>
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<tr>
<td>REV operation</td>
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<tr>
<td>Aneurysm Repair</td>
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<td>Konno Rastan</td>
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<td>Mitral Valve Repair (MVR)</td>
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<td>Aortic Valve Replacement (AVR)</td>
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<td>ASD+PDA</td>
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<tr>
<td>Glenn</td>
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<tr>
<td>Fontan</td>
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<tr>
<td>Pulmonary Artery Banding</td>
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<td>Switch (A.S.O.)</td>
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Pediatric Cardiac Services at CIMS hospital is the 'first and only' fully functioning department with dedicated team available 24 x 7 in 'private sector' organization in state of Gujarat.
At CIMS over 400 cardiac surgeries and CHD interventions have been successfully performed.

### Cardiac Catheterization Procedures

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<td>Coarctation stenting</td>
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<tr>
<td>PDA stenting</td>
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<td>PAVM closure</td>
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<td>VSD device closure</td>
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<tr>
<td>Balloon dilation of PA</td>
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<td>Balloon atrial septostomy</td>
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<td>MAPCA coiling</td>
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<td>PDA coil closure</td>
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<td>Balloon aortic valvoplasty</td>
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<td>Balloon dilation of coarctation</td>
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<td>Balloon pulmonary valvoplasty</td>
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### Pediatric Cardiology and Cardiac Surgery

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<td>(average)</td>
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<td>IPD Patients (Pediatric Cardiac)</td>
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<td>Cardiac Surgery (CHD)</td>
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<td>Catheter Interventions (CHD)</td>
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### Age Distribution in Years

- <= 1 month: 21
- 2-12 months: 35
- 2-10 years: 98
- >10 years: 60
Successful Catheter Intervention on Premature Infant with Excellent Outcome

Case Presentation:
A 3 day old premature infant (gestational age 32-33wks) weighing 1.5 kg was referred for evaluation of cardiac murmur. His echocardiography revealed valvular pulmonary stenosis with mild gradient and small atrial left to right shunt. In view of changing early neonatal hemodynamics, he was advised for close cardiac follow up. At age of 15 days, he presented with cyanosis on crying (SpO₂ falls to 60-70%) and feeding difficulty. Follow up echocardiography showed significant increase in gradient across pulmonary valve (pressure gradient of 80-90 mmHg) with atrial right to left shunt. Baby was advised balloon pulmonary valvuloplasty. With lot of apprehensions from family and referring doctor regarding outcome, we aggressively counseled and persuaded the family in favour of the procedure. He underwent successful balloon pulmonary valvuloplasty on 17th day of life weighing 1.56 kg only. To the best of our knowledge, he was one of the smallest infant undergoing successful intracardiac interventional procedure in the state. The outcome was excellent and baby thrived well subsequently. Follow up at 12 months showed, that he was asymptomatic, weighing 8.5 kg with no recurrence of pulmonary stenosis.

Message:
In today's world of interventional cardiology, it is possible to correct congenital heart disease even in infants. This needs not only the infrastructure and hardware, especially available for these babies; but also requires commitment and team approach to make these babies survive normally.
Case Presentation:
A 25 year old lady presented to us with history of brain abscess treated 3 months ago. During ICU stay, she was noticed to have cyanosis (SpO₂ = 80-85%) but was asymptomatic otherwise. Her echocardiography study and other work up done earlier were normal. On evaluation at CIMS, contrast echocardiography showed presence of right to left shunt in late phase. This was indicative of intrapulmonary right to left shunt Pulmonary Arterio-Venous Malformation (PAVM). CT angiography showed large PAVM involving right lower lung. She underwent successful device closure (duct occluder was used) in cardiac catheterization laboratory. The procedure was uncomplicated and the outcome was excellent. She had normal oxygen saturation (99-100%) and absence of right to left shunt on contrast echocardiography at one year follow up.

Message:
PAVM, a rare cause of central cyanosis, usually presents in grown up patients. Most patients are asymptomatic and cyanosis is detected incidentally. Some patients develop complications due to right to left shunt (e.g. brain abscess) on long run. Catheter based closure of PVAM is a treatment of choice in focal lesions and carries excellent prognosis.
BT Shunt Surgery
A 3 day old child was referred from Gandhidham, Kutch with severe cyanosis and on echo was found to have cyanotic congenital heart disease: Tetralogy of Fallot, Pulmonary Atresia, closing ductus. The kid was brought on ventilator; PGE1 infusion was started and the child underwent an emergency right modified BT shunt surgery successfully.

Arterial Switch Operation in Neonate
17 day old, 3 kg child was transferred from Bhavnagar and was found to have cyanotic congenital heart Disease, d-Transposition of Great Arteries with intact ventricular septum. The child underwent Arterial Switch Operation with excellent outcome.

REV Operation
An 18 month old girl child was referred from Kenya with a diagnosis of d- transposition of great arteries with VSD with pulmonary stenosis. As an alternative to the Rastelli’s operation in which a conduit is used, we performed REV (Le Compte operation) procedures in which, both pulmonary arteries were extensively mobilized, and brought anterior to aorta, and implanted in to RV, and VSD closure was done. Very few Centres across world do this operation successfully and we are proud to be one.

Grown Up Congenital Heart Disease (GUCH)
Seventeen year old boy, underwent Tetralogy repair at the age of four years at an outside hospital. He presented with dyspnea, pain in abdomen and was found to have hugely dilated right ventricle, free PR, severe TR & severe RV dysfunction. He was deemed at high risk and refused surgery elsewhere. He underwent pulmonary valve replacement using a tissue prosthesis and tricuspid ring annuloplasty. He is asymptomatic and pursuing his course in engineering now.

Staged Surgery
A boy was six month old when he underwent PA banding at outside hospital for tricuspid Atresia type 1C. At 4 year, he again underwent tightening of band and bidirectional Glenn operation. Now at 13, he presented to us with worsening of cyanosis. On completion of TCPC pathway, he underwent extra cardiac Fontan and was discharged 2 weeks after surgery with resting SpO₂ of 93%.
Core Principles of Safety Science at CIMS:
A. Although as human we are prone to make mistakes, we need to create a culture where mistakes are identified
B. We must focus on systems rather then people
C. Leader controls the potential to change system

At CIMS, core principles are achieved through:
A. Commit no harm
B. Encourage open communication
C. Celebrate safety

Salient Features of CIMS ICU/GICU Unit:
1. Close proximity to
   A. Emergency department
   B. Operating room
   C. Cath lab
   D. Pathology, Microbiology Department
   E. Radiology Department
2. Advantages of cubicle/ on patient room
   A. Better infection control
   B. Patient privacy maintained
   C. Minimization of disturbances
3. Ethics and End of life care
   A. Regular and repetitive communication with patients and families
   B. Inclusion of interdisciplinary team
   C. Routine ethics and palliative care consultation
   D. Standardized order forms for withdrawal of life sustaining treatment
   E. Routine family conferences
CIMS ICU/GICU Design:
The ICU complex at CIMS is designed in such a way that each ICU cubicle has adequate sunlight day long with exposure to common green atrium area, making the ICU really a green ICU with added advantage of making it least prone for ICU related delirium or psychosis.

At CIMS Merging ICU/GICU and Emergency Room:
This is a major and novel concept to place ICU, next to emergency room (ER) to complementing ER to manage all critical patients from the ER itself. This ensures treatment from ER itself relating with golden hour management.

Adding to this concept, CIMS houses many state-of-the-art ICU on wheels (ambulances) well equipped with intra aortic balloon pump and ventilator along with multiple inotropic support to take care of critical patients.
All CIMS ICUs' have advanced monitoring with centralized computer based nursing stations. The well spaced ICU cubicle houses enough space to allow for bedside X-ray, USG, tracheostomy, etc.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number of Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidural Catheter</td>
<td>5</td>
</tr>
<tr>
<td>IABP</td>
<td>6</td>
</tr>
<tr>
<td>Ascitic Tap</td>
<td>7</td>
</tr>
<tr>
<td>Bronchoscopy</td>
<td>8</td>
</tr>
<tr>
<td>Pleural Tap</td>
<td>8</td>
</tr>
<tr>
<td>Pericardial Tap</td>
<td>15</td>
</tr>
<tr>
<td>A-line</td>
<td>24</td>
</tr>
<tr>
<td>DLC</td>
<td>30</td>
</tr>
<tr>
<td>Lumber Puncture</td>
<td>32</td>
</tr>
<tr>
<td>ICD</td>
<td>33</td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>51</td>
</tr>
<tr>
<td>CVC</td>
<td>78</td>
</tr>
<tr>
<td>Intubation</td>
<td>102</td>
</tr>
</tbody>
</table>

\[\text{VAP} = \text{No. of VAP} \times 1000/\text{Total Ventilator days (<5%)}, \]
\[\text{SSI} = \text{No. of SSI} \times 100/\text{No. of Surgery (<2%)}, \]
\[\text{BSI} = \text{No. of BSI} \times 1000/\text{No. of CVP days (<2%)}, \]
\[\text{UTI} = \text{No. of UTI} \times 1000/\text{No. of catheter days (<6%)}, \]

Our own bench marks shown in the brackets above for all infections are lower than standard benchmarks for any infection for developing countries.

**Hospital Infection Data**

- **HAIs**
- **UTI**
- **VAP**
- **BSI**
- **SSI**

![Bar chart showing infection rates](#)

[**CVC** - Central Venous Catheter, **ICD** - Implantable Cardioverter Defibrillator, **DLC** - Dialysis Catheter, **IABP** - Intra Aortic Balloon Pump]
At CIMS, CCU Process Measures Include Avoiding
1. Excessive use of antibiotics
2. Iatrogenic fluid overload
3. Excessive administration of inotropic agents
4. Ventilation with too high tidal volumes
5. Excessive sedation
6. Invasive hemodynamic monitoring
7. Excessive caloric intake
8. Too liberal blood transfusion
9. Traumatic effects of endotracheal intubation and airway management

Responsibilities of CIMS Critical Care Physician/Manager
1. Creating guidance for granting of specific privilege in the ICU
2. Developing ICU programs, policies, rules & regulations
3. Developing recommendations about the need for continuous educational programs that are consistent with the type of service offered by critical care and developing performance improvement activities
4. Managing physician staff members adherence to
   A. Medical laws and other hospital policies
   B. Sound principles of clinical practice
   C. Regulation that promote patient safety

At CIMS Continuous Quality Improvement:
Code blue teams were created to attend and manage any emergencies within hospital premises. Entire CIMS staff is given repetitive training on CPR/BLS by certified doctors. Proper medical records are maintained for different procedures and infection control related issues. Frequent CMEs, case based discussions and training programs are ongoing.

Team of CIMS CCU:
The dedication to quality care & patient safety enforces CIMS to have patient vs. nurse ratio 2:1 in non critical/relatively stable patients whereas patients on IABP/ventilator/surgical patients have 1:1 nursing force. Also, two professionally trained intensivists in house are available 24X7 at CIMS besides well experienced ICU registers & medical officers.

Dial +91-79- 3010 1094 / 1095
24x7 Help Line at CIMS Critical Care

Ambulance & Emergency :
+91-98244 50000, 97234 50000, 90990 11234
Surgical Cases

1) A case of parathyroid tumor with bone involvement and pneumothorax with severe LV dysfunction and LVEF of 20% was successfully operated by onco-surgeon under G.A. Post operative course was uneventfully managed and patient was discharged after 7 days.

2) A case of severe LV dysfunction with 15% LVEF and carcinoma of mandible with neck nodes positivity was treated at CIMS. He was declared unfit for commando surgery by many surgeons of the city. At CIMS, patient underwent COMMANDO surgery under G.A. and post operatively was stable. He was discharged home in a stable hemodynamic state on Day 5.

3) An elderly lady came with h/o gradual progressing quadriplegia due to flurosis involving different spinal levels. She had severe flurosis involving all teeth, bone lungs (infiltrates) and bones. Fluotic spine was at different levels with quadriplegia and HOCM with aortic pre-gradient of 155.

She was diagnosed of HOCM with severe outlet obstruction with P.G. of 155 at aortic valve on Pre.Op. 2D Echo. The patient was optimized by beta-blockade and pre.op. hydration for 2 days and was then operated on day 4. Post operatively, she was kept in SICU and eventually was discharged on day 7 with improved quadruporesis.

### Cases of Critical Care treated at CIMS

<table>
<thead>
<tr>
<th>Acute and chronic liver failure</th>
<th>Infective Endocarditis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Gastroenteritis</td>
<td>Inoperable cases of Angina</td>
</tr>
<tr>
<td>Acute MI</td>
<td>Life-threatening Cardiac Arrhythmias including Cardiac Sarcoidosis</td>
</tr>
<tr>
<td>Acute pancreatitis</td>
<td>Meningocephilitis</td>
</tr>
<tr>
<td>Acute pneumonia, CAP, HAP, VAP</td>
<td>Neurology Stroke</td>
</tr>
<tr>
<td>Acute Pulmonary Embolism with shock requiring Thrombolysis</td>
<td>Occular Emergencies</td>
</tr>
<tr>
<td>Acute Renal Failure and CRF</td>
<td>Oncology/Oncology Cases</td>
</tr>
<tr>
<td>Addisonian crisis</td>
<td>Ortho Trauma</td>
</tr>
<tr>
<td>ARDS</td>
<td>Peripartum Cardiomyopathy</td>
</tr>
<tr>
<td>Cardiogenic Shock wit acute LVF</td>
<td>Peripheral Embolisatris</td>
</tr>
<tr>
<td>Chest Trauma</td>
<td>Poisoning/Snake Bite</td>
</tr>
<tr>
<td>Dengue/Malaria/Typhoid/Jaundice</td>
<td>Seizures</td>
</tr>
<tr>
<td>Diabetic Foot</td>
<td>Severe LVEF dysfunction, LVEF&lt;15%</td>
</tr>
<tr>
<td>Diabetic Keto Acidosis and HONC</td>
<td>Transfusion associated by TRALI</td>
</tr>
<tr>
<td>Head Trauma</td>
<td>Tuberculosis, viral, atypical pneumonia</td>
</tr>
<tr>
<td>Heart block</td>
<td>Valve Thrombus</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>Vascular insufficiency cases</td>
</tr>
</tbody>
</table>
Case Presentation: A 17-year-old normotensive and non-diabetic female patient, presented at CIMS with chief complaints of fever with seizures, since past one month. The patient had consulted a local neurologist and had received conservative treatment with antiepileptic drugs. She was also evaluated by a psychiatrist for possible psychotic behavior. However, her condition did not improve, the seizures were persistent and she was finally referred to CIMS Hospital for further management on 25th December 2011.

Diagnosis and Management: On admission, the patient was febrile with tachycardia and tachypnoea. On examination by the intensivist and neurologist, the patient was conscious, disoriented and irritable, talked irrelevantly and tested positive for neck rigidity. Patient was then started on two different groups of antiepileptics viz Injection Sodium Valproate and Injection Levetiracetam. Despite the antiepileptic infusion, the patient suffered from on and off seizure episodes followed by postictal drowsiness, facial twitching and episodes of unconsciousness. During the course of treatment, patient was administered valproic acid, tab lacasomide and tab clobazam, along with IV fluids and supportive treatment. Mechanical restraint was utilized to prevent self-induced injury. The patient was advised EEG (Electroencephalograph), PET–MRI (Positron Emission Tomography and Magnetic Resonance Imaging) and CSF (Cerebrospinal Fluid) examination for further management. The investigations were suggestive of diffuse glucose hypometabolism involving almost entire left cerebral hemisphere, left deep grey matter nuclei, right occipital lobe with crossed cerebellar diaschisis. These findings were consistent with diagnosis of Resmussen's Encephalitis.

Outcome: The patient's family was counseled about the severity of the disease and possible poor outcome. Aggressive treatment was initiated with IV steroids and supportive medical treatment and physiotherapy. Gradually the general condition of the patient started improving. During the patient's later stay in ICU, she remained stable and had occasional episode of GTCS and facial twitchings. Gradually, she improved and was shifted to ward with stable hemodynamics. The patient was finally discharged after 14 days. At the time of discharge, patient was haemodynamically stable and seizure free for more than 5 days and on three antiepileptics namely Tab. Oxcarbazepine, Tab. Locasamide and Tab Clobazam. She came for follow-up to hospital after one month and she had started going to school again.
CIMS Trauma Centre – A State-of-the-Art Facility

1. The first exclusive Trauma Centre in Western India to have ATLS and BLS protocol based management of trauma headed by a qualified trauma surgeon
2. 11-bed state-of-the-art emergency department for trauma patients requiring immediate care with exclusive trauma ICU and one emergency operation theater only for trauma patient.
3. Triage area equipped with facilities of a world class emergency room
4. Emergency operation theater only for trauma patient who requires urgent surgery in vicinity of emergency room 24x7
5. ICU-on-wheels ambulances with all the latest equipment's for pre-hospital care of trauma victims and pick-ups
6. State-of-the-art pathology and radiology department with 24x7 nearby to ER
7. Highly experienced team under a leadership of a senior qualified trauma surgeon with back up of all other specialists and super specialist surgeons, anaesthetist, etc.
8. All medico legal cases are accepted.

<table>
<thead>
<tr>
<th>Department</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPD Patients</td>
<td>215</td>
</tr>
<tr>
<td>IPD Patients</td>
<td>113</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
</tr>
</tbody>
</table>

Dial +91-79- 3010 1094 / 1095
24x7 Help Line at CIMS Trauma Centre

CIMS Emergency team is ready (24 x 7) to serve all kinds of medical emergencies.

Ambulance & Emergency:
+91-98244 50000, 97234 50000, 90990 11234

At CIMS... we care
Young people (21 - 40 years) were treated at CIMS Trauma Centre with highest % of limb fracture mainly due to road traffic accident.
At CIMS, trauma personnel are trained and re-trained using nationally available education tools such as the Advanced Trauma Life Support and Advanced Burn Life Support courses.

These are supplemented by local educational efforts which include cutting-edge educational instruments such as the use of patient simulators and telemedicine.

**CIMS Resource Matrix Includes**

1) Knowledgeable, skilled and trained human resources (medical, nursing and others) to perform diagnostic and therapeutic activities safely and successfully. Besides basic education, they undergo continuing education to maintain these skills.

2) Adequate physical resources including infrastructure, equipment and supplies: to not only have them physically present in the facility but also readily available on an ongoing basis 24 x 7.

3) Organizational and administrative processes to quickly replace depleted or expired stocks of supplies and medications, and to quickly repair non-functioning equipment assuring quality medical care.

**CIMS Trauma Centre Principles:**

1) Life-threatening injuries are appropriately treated promptly and in accordance with appropriate priorities, so as to maximize the likelihood of survival.

2) Potentially disabling injuries are treated appropriately, so as to minimize functional impairment and to maximize the return to independence and to participation in community life.

3) Pain and psychological suffering are minimized.

At CIMS Trauma Centre, patients are managed and treated as per the recent directives of WHO and International Society of Surgery and International Association for the Surgery of Trauma and Surgical Intensive Care.
Continuing Education and Quality Control Measures at CIMS

Continuing education courses taken by the trauma team improves the process and outcome of trauma care. Discussions of deaths and complications in search of preventable factors are ongoing.

Audit filters include factors such as patients with abdominal injuries and hypotension who do not undergo laparotomy within one hour of arrival at the emergency department; patients with epidural or subdural haematoma who do not undergo craniotomy within four hours of arrival at an emergency department; and open fractures which are not debrided within eight hours of arrival. List of potential complications are tracked as indicators of the quality of care. This includes complications such as pneumonia, wound infections, venous thrombosis and urinary tract infections.

Risk-adjusted mortality: Through this statistical process, CIMS evaluates the percentage of deaths occurring in patients with low injury severity scores or a low probability of death based on a combination of injury severity scores and trauma scores (TRISS methodology). Corrective action is taken to ameliorate these problems. Organized data collection system and software for analysis is a regular part of CIMS Trauma Centre.

Trauma audit committee and CIMS hospital ethics committee review the processes of the centre. CIMS Trauma Centre is in line in establishing trauma registry.

Awareness Initiatives at CIMS

CIMS Trauma Centre is working towards educating the general public via printed materials, seminars, and conferences on prevention of injuries like roadside accidents, safe driving, home accidents, work place injuries, first-aid at site, etc.
Case Presentation: A 17 year old normotensive and nondiabetic male patient met with RTA and had multi-organ injury.

Diagnosis and Management: He was admitted at CIMS hospital for further treatment and management. Following CT Scan he was diagnosed with blunt abdominal trauma with severe hemoperitoneum, pancreatic transaction and right renal pedicular avulsion with liver laceration. Exploratory laparotomy was planned after detailed counseling. After vertical long midline incision, about 1.5 liter of hemoperitoneum was drained. Left retroperitoneal hematoma and mesenteric hematoma were present. Right retro peritoneal hematoma was expanding and right kidney was avascular. Hence right nephrectomy was done, After ligating and transfixing renal pedicle, right renal artery was followed proximally which was seen avulsed. Hence it was sutured flush to aorta and transfixed with prolene 3-0. Lesser sac was opened. There was total transaction of pancreas at neck which was just medial to SMV. Spleen preserving distal pancreatectomy was done successfully and distally pancreas was sutured with prolene 3-0. Two ROMO-ADK chaui kept in lesser sac. There was large liver tear at junction of right and left lobe with active bleeding and bile leak. Liver tear repair was done with pledged vicryl 2-0 with omentopexy.

Outcome: Post operative period was uneventful and patient managed with IV fluids, blood transfusion antibiotics, antacids and supportive care in ICU. Patient shifted to ward in a haemodynamically stable condition. USG of abdomen and pelvis revealed resolved liver injury with changes of postoperative repair at junction of right and left lobe of liver, sludge in gallbladder and minimal free fluid in pelvis, bilateral mild pleural effusion. Post procedural hospital event was uneventful and at the time of discharge, patient was in a haemodynamically stable condition, tolerating normal diet without pancreatic/bile leak.
**Case Presentation:** A 4 year old male child met with a roadside accident while traveling on a bike with his family. Both the parents were simultaneously injured in this accident. The child was conscious when he was admitted to a nearby hospital.

On admission, the patient was found to be alert with spontaneous eye opening; followed verbal commands and complained of “belly” pain. The pulse rate was 140, blood pressure was 104/68, respiratory rate was 32 with non-labored breathing and SpO\textsubscript{2} was 100 at room air. P/A revealed minute abrasion on the abdomen. Further clinical examination showed pupils BERL, equal breath sounds, progressive tachycardia, hypotension, and abdominal tenderness and fullness. The pelvis was stable but the child was gradually becoming paler. The patient was shifted to CIMS for further management.

**Diagnosis and Management:** At CIMS, primary survey revealed that the child was pale and cold with altered consciousness, irritable and followed verbal command. The Glasgow Coma Scale was 14/15. The femoral pulsation was feeble at 188/min, BP 60 mm of Hg systolic, RS B/L Equal AE+ RR 44/min. P/A showed distention, tenderness at right hypochondrium and some abrasion of abdominal skin. The pelvis was stable and left humerus was fractured. Trauma surgeon was informed about the same.

The airway patency was checked, O\textsubscript{2} supplementation started and IV fluid resuscitation initiated with crystalloid 250 ml bolus. Two more IV access were obtained and blood samples taken and sent for investigations and cross match. The fracture was stabilized with POP slab. At 20 minutes from initial resuscitation, in spite of adequate SpO\textsubscript{2}, the child developed tachypnea. Foley's catheter was done. Arterial Blood Gas showed pH 7.40; pCO\textsubscript{2} 32; pO\textsubscript{2} 77 (at room air); HCO\textsubscript{3} - 22. Ryle's tube was inserted. X ray chest was ordered and done. Patient continued on IV crystalloid & colloid. PCV was ordered. The lab investigation showed Hb – 6.8 gm.; SGOT 1150; SGPT 780; PT- T 22.7 (C 15.6); aPTT –T 46.7 (C 32); and fibrinogen- 150 mg/dl. Chest X ray and Pelvis X ray was NAD and left humerus was fractured.
Since internal bleeding was suspected, CT-Abdomen was performed at 11:00 pm. The scan revealed contusion and laceration of liver with moderate hemoperitoneum (Grade IV injury); Grade II splenic injury, moderate free peritoneal fluid and hematoma involving right psoas muscle and both domes of diaphragm.

The patient had no change in GCS. Central line was inserted and intra-arterial blood pressure monitoring was initiated. Pulse was 180/min. Blood components were infused at 11:35 pm. The aim was to stabilize hemodynamic parameters, monitor GCS and oxygen saturation, look for signs of peritonism, assess adequate renal function and check for signs of abdominal compartment syndrome. Conservative medical treatment was continued with multiple blood products (PCV, Platelet concentrations, FFP) as per repeated blood investigations.

Next morning, the investigations showed altered coagulation, low platelets indicative of consumption coagulopathy. With transfusion of multiple blood products, Hb increased to 12.5, but S. creatinine was at 1.8. Xray of chest s/o shift of diaphragm upward, tachypnea but with adequate ventilation. ABG showed pH - 7.35; pCO₂ - 42; HCO₃ – 22 and pO₂ – 167. The patient was still on O₂ mask. Abdomen distention was mildly increasing. The plan of management was to treat non-operatively, if the child remained haemodynamically stable without s/o peritonism.

36 hrs post injury, the patient’s GCS was not altered, distention of abdomen had increased and serum creatinine was 1.8 suggestive of non oliguric renal failure. SGOT was 4500, S. bilirubin: - Total -2.6 (D 0.9 & ID 1.7). The patient was closely monitored and still on multiple inotrope and supportive care to aggressively correct the coagulopathy. Patient still had tachypnea and was on O₂ mask. It was a big challenge to treat a 4 year child with altered renal function, systemic inflammatory shock response and gradually increasing abdomen girth. Patient further developed decreased urine output (in spite adequate hydration and...
diuretics); mild respiratory distress and abdominal girth increased showing tense, dilated superficial veins. The intra-abdominal pressure monitoring was indicative of patient developing Abdominal Compartmental Syndrome.

The patient underwent planned laparotomy. About one litre of blood was removed from the abdomen. A large liver laceration was present over right lobe liver which was not actively bleeding. The spleen was salvaged, peritoneal cavity washed, drained and out with in minimum time of 45 min.

**Outcome**: The post-operative management of the patient was focused on correcting the renal dysfunction, transfusion induced lung injury and recurrent fever of inflammatory and infective origin. Antibiotics were prescribed based on culture sensitivity of various organism growths from different site cultures. The patient was on ventilator for 5 days and gradually weaned off. Eventually the patient improved, was afebrile, extubated and did well. Total hospital stay was of 22 days and the patient was discharged in haemodynamically stable condition, tolerating oral feeds.

**Discussion**: Blunt solid organ injury can be managed non-operatively, if the patient remains haemodynamically stable. But while managing the case non-operatively in ICU care, one should be vigilant and monitor for development of Abdominal Compartmental Syndrome.

Blunt abdominal injury is a high risk factor for developing Abdominal Compartmental Syndrome. Abdominal Compartmental Syndrome virtually affects all organs. In the emergency and intensive care unit, abdominal compartment syndrome is recognized with growing frequency as the cause of morbidity such as metabolic acidosis, decreased urine output and eventually decreased cardiac output. The cause of these events might easily be mistaken for other pathologic events such as hypovolemia, if the clinician is not alert to the morbidity associated with Abdominal Compartment Syndrome.

Therapy should include fluid resuscitation and transfusion, if needed. Pharmacologic therapy has its own pitfalls as compared to mechanical drainage.
At CIMS, from high-tech computer imaging to outpatient joint replacement surgeries are performed.

At CIMS, out of total 261 orthopedic surgeries performed on patients, 130 were knee surgeries.

CIMS Team
- CIMS knee and hip replacement team of surgeons lead the industry with their sophisticated approach to minimally invasive surgery.
- Conducts MRI based knee replacement and cruciate ligament retaining knee replacement.
- The entire team is well experienced and internationally trained at countries like USA, Germany, Australia, Belgium, Singapore and many more.
- Their practice and innovative approaches towards knee replacement procedures has built its stellar reputation on patient referrals and word-of-mouth recommendations.
CIMS joint replacement team is backed by an ultramodern high tech laminar airflow operation theatre with all sophisticated and latest anaesthesia equipment, power instruments, latest electro coagulation system, dual shadowless imported lights and many more gadgets. CIMS joint replacement department is supported for complicated and high risk patient by ultramodern well equipped incentive care units, round the clock critical care support of efficient critical care department and renowned experienced cardiology team.

**Outcomes Measures of Total Knee Replacement:**
- Decreased morbidity and mortality
- Improved functional status

**People who benefit from total knee replacement often have:**
- Severe knee pain or stiffness that limits everyday activities, including walking, climbing stairs, and getting in and out of chairs
- Moderate or severe knee pain while resting, either during the day or night time
- Chronic knee inflammation and swelling that does not improve with rest or medications
- Knee deformity — a bowing in or out of knee
- Failure to substantially improve with other treatments such as anti-inflammatory medications, physical therapy, or other surgeries

**At CIMS, Bone Grafting** is used to repair bone fractures that are extremely complex, pose a significant risk to the patient, or fail to heal properly, to help fusion between vertebrae, correct deformities, or provide structural support for fractures of the spine.
Bone grafting is also used to repair defects in bone caused by congenital disorders, traumatic injury, or surgery for bone cancer. It is also used for facial or cranial reconstruction.
Orthopedic Surgery

Complicated Total Knee Replacement

Case Presentation: A 75 year old normotensive diabetic male patient, with a known history of osteoarthritis of left knee presented at CIMS Hospital with a three week old depressed fracture of left lateral condyle of tibia. The fracture was plastered the next day and the patient was advised further surgical management.

Management and Outcome: Preliminary investigations revealed the defect to be quite large i.e. 15 mm in diameter and 12 mm in depth, as well as depressed; thus purely conventional approach to TKR was not on cards. The available options were whether to go for elevation of the depressed fragment with fixation or opt for TKR.

Along with routine pre-operative examination, roentgenographic evaluation was done using X-rays for proximal tibial cut. A standard approach was utilized to open the knee by making an anterior midline skin incision and cutting the medial para patellar capsule. After exposing the femur, conventional femur cuts were given and size 6 determined for the femoral implant component. The tibia was then exposed and K wires were used anteriorly and posteriorly to align and fix the lateral condyle, so as to avoid its displacement while preparing the tibia. Depressed central part of lateral condyle was exposed. Proximal tibial cuts were made with extra 2mm, keeping in mind not to exceed more than 15 mm (determined from pre op planning on X-ray). The tibial defect was filled in with cancellous bone graft. Tibial base plate was determined at size 4 and broaching was performed. Medullary reaming was done till 16X10 cm rod. The tibial base plate was placed with 13 mm poly and intramedullary rod of 16mm by 100mm, with good distal fix. Cementing was done such that it did not percolate into the fracture. K wires were then removed. The patient was discharged in a haemodynamically stable condition.
Total Hip Replacement

Hip replacement is a surgical procedure in which the hip joint is replaced by a prosthetic implant. Hip replacement surgery can be performed as a total replacement or a hemi (half) replacement. Such joint replacement orthopaedic surgery is generally conducted to relieve arthritis pain or fix severe physical joint damage as part of hip fracture treatment. A total hip replacement (total hip arthroplasty) consists of replacing both the acetabulum and the femoral head while hemiarthroplasty generally only replaces the femoral head.

Indications:
- Avascular necrosis
- Osteoarthritis
- Rheumatoid arthritis
- Traumatic arthritis
- Certain hip fractures

Mpmimoted Fracture of Right Subtrochanteric Femur

A 70 year old male with a body weight of 110 kgs was admitted at CIMS hospital with complain of pain in the right hip with restricted and painful movement of right hip joint. Patient was unable to bear weight on the right leg. X-ray was taken suggestive of nonunited fracture of right subtrochanteric femur.

The patient had a road traffic accident before one and half year in August 2010 at Jodhpur, Rajsthan. Patient was treated for the fracture with Dynamic Hip Screw. Post operatively there was backing out of implant. Patient was re-operated for removal of implant in August 2011. The X-Ray picture on presentation to our hospital was as shown in the pictures.

The dilemma was whether to go for refixation or to go for Hemiarthoplasty. Looking to his age and weight we decided to go for Hemiarthroplasty so as to start immediate post op mobilsation. To bypass the old fracture, we used a cementless long stem which had a good distal fit. We were able to mobilize the patient the very next day.
Bilateral Avascular Necrosis of Both Hip Joints

A 42 year old male was admitted at CIMS hospital with complain of pain in both hip joint with painful and restricted movement of both hip joint for 3 years. Patient was a known case of Psoriasis and had been taking steroids for a long time (5 years). This patient had fixed flexion deformity with restricted range of motion in all directions.

X-ray was suggestive of bilateral avascular necrosis of both hip joints, decreased joint space, cystic changes in acetabulum and head of femur. Steroids having role in causing avascular necrosis of hip joint and treatment of this disease is total replacement of hip joints.

Total replacement of hip joint was done with replacement of both acetabulum and head of femur. THR was uncemented with ceramic on poly because of relatively young age of patient. Ceramic joints are long lasting with great survival rates.
Complicated Orthopedic Trauma

As a tertiary care hospital we treat a lot of complicated, compound and multiorgan trauma. Etiologies include:
- High Velocity automobile injuries
- Fall from height
- Assault, bullet and stab injuries
- Machine injuries

We have a dedicated, experienced team of Trauma Surgeon, Orthopaedic Surgeons, Neurosurgeons and Intensivists with round the clock availability for these kind of injuries.

Right Side Comminuted Fracture Lower End Femur with Intraarticular Extension with Bone Loss

A 25 year old male patient had history of road traffic accident and was admitted at CIMS hospital with history of pain, swelling, deformity, crepitation of right lower thigh with bleeding wound over the anterior aspect of the right lower thigh. Patient was given primary treatment in form of wash, dressing, supportive splint, intravenous antibiotic, and Intravenous fluid.

X-ray was suggestive of right side comminuted fracture lower end femur with intraarticular extension with bone loss of approximately 4-5 cm. There was also transverse tear in the Quadriceps tendon which help in the extention of knee joint with dirty wound extending to fracture site.

Patient was taken to emergency OT for primary fixation of the fracture and wound debridment. Fracture was stabilized with external fixator. Ruptured quadriceps were repaired with ethibond suture. External fixator was...
done instead of internal fixator because of dirty wound with bone loss.

After 1 month, X-ray was taken for assessment of fracture healing and reduction. Wound was good without gaping and the patient was discharged.

Revision surgery was now required. The confusion was whether to go for Ilizarov with bone transport OR internal fixation with bone graft. Patient was not ready for another external fixator, so it was decided to go ahead with dual plating with bone grafting. The difficulty was WHERE TO GET SO MUCH BONE GRAFT....We planned allografts from freeze dried bone grafts obtained for Total Knee Replacement.
A 45 year old male presented with the history of Bullet injury on thigh. The entry wound was on anterolateral aspect of thigh. A part of the bullet went in the femoral canal and fractured it and the other part was lodged on the posteromedial aspect of U/3 thigh. Pre-op CT did not show any vascular discontinuity.

The issue with the surgery was the piece of bullet which was inside the canal. Taking the size of the nail one size smaller we were able to pass the nail and lock it. The part of the bullet in the upper thigh was removed through a medial incision.

A 59 year old male had history of Road traffic accident. Patient was admitted at CIMS hospital with complain of pain, swelling, deformity in right ankle and right hip.

X-ray and CT scan were suggestive of
- Right closed comminuted, Intraarticular fracture of lower end tibia with displaced fragments
- Right side posterior column and posterior wall fracture with displaced fracture with multifragmentations in the joints.
Ankle fracture was fixed with distal tibial plate with articular reduction. The acetabulum fracture was operated after 5 days. In acetabulum fracture there was superior gluteal vessel injury. Vessel injury was treated by vascular surgeon with stapler and fracture was treated with plating.
Arthroscopy (also called arthroscopic surgery) is a minimally invasive surgical procedure in which an examination and sometimes treatment of damage of the interior of a joint is performed using an arthroscope, a type of endoscope that is inserted into the joint through a small incision.

Indications for Knee Arthroscopy:
- Anterior cruciate ligament tear
- Medial or lateral meniscal tear
- Removal of loose bodies
- Synovectomy
- Arthrolysis
- Cartilage disorders

Indications for Shoulder Arthroscopy:
- Subacromial impingement
- Rotator cuff tears
- Frozen shoulder (adhesive capsulitis)
- SLAP lesions
- Chronic tendonitis and partial tears of the long biceps tendon
- Recurrent shoulder dislocation.
- Acromioclavicular osteoarthritis
Facilities at CIMS
- Highly efficient surgical oncology team that offers optimum multimodality treatment tailored to the need of every patient
- Harmonic scalpel and Enseal vessel sealing equipment
- Laproscopic Instrumentation with high HD images
- Olympus endoscopes for diagnostic tools
- Experienced team of nursing staff, medical officers backed by high-end infrastructure, ICU set-up for high risk and major operative procedures
- Round-the-clock availability of intensivists
- Trained nurses to handle patients who are on aggressive chemotherapy

Services offered at CIMS
- Early detection and prevention programs and cancer-related health check-up
- All types of surgery according to latest protocols
- Organ preserving surgery for different cancers (Mandible i.e. jaw, voice-box in throat cancers, breast cancers, sphincter preserving rectal surgeries, pouch surgeries, limb preservation in bone cancers)
- Chemotherapy for all solid cancers
- Protocol based chemotherapy for hemato-oncology disorders
- Reconstructive surgery and prosthesis for jaw, breast, limbs and other defects and rehabilitation
- Specially trained doctors and intensivists for medical management of patients
- Nutrition plan guided by dietician before and after surgery
- Stoma care and guidance
- Physiotherapy and functional rehabilitation
- Pre and post operative psychiatric counseling

Cancer is preventable and curable.

Coming 2013: Radiation Centre
Fully equipped world class radiation centre with proton therapy and brachy therapy

At CIMS... we care
At CIMS, out of a total 87 onco surgeries performed on patients, 48 patients were males and 39 were females. In addition, 32 patients were of age group between 51-60 years.

### Types of Surgeries

<table>
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<td>Breast Cancer</td>
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<td>Genitourinary</td>
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<td>Lung</td>
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### Mammography

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<tr>
<td>Jan '11-Jun '11</td>
<td>389</td>
</tr>
<tr>
<td>Jul '11-Dec '11</td>
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**Case Presentation**

A 60 year old male diabetic patient since 20 years, having hypertension and had undergone PTCA twice (5 years and 8 years back) with history of tobacco and pan chewing since 10 years presented at CIMS with complaint of non-healing mouth ulcer. Endoscopic biopsy was done for mouth ulcer suggestive of squamous cell carcinoma. Patient was admitted at our hospital and operated by CIMS expert team for left floor of mouth wide excision plus left hemi mandibulectomy plus left modified neck dissection (MND) and reconstruction was done with pectoralis major myocutaneous flap. The surgery lasted for 4 hours. Minimal blood loss occurred with no complication during surgery. No blood transfusion was required. Post operative patient received excellent ICU care. Diabetes remained under control. Intensivists and cardiologist took care of his cardiac status. Recovery was excellent. Patient was discharged on 11th day and recovered totally in 3 weeks.

**Conservative Breast Surgery**

**Case Presentation**

A 36 year old lady with history of total thyroidectomy done 3 years back presented with a lump in right breast. On investigation, the lump proved to be malignant and hence the patient was operated at CIMS for conservative breast surgery with latissimus dorsi flap. She was operated by our expert oncology and plastic surgeon team. Wide excision of the tumor was done along with axillary dissection. The breast was reconstructed with latissimus dorsi with small skin paddle. It took 5 hours to complete the surgery and the entire surgical course was uneventful. Patient was discharged in stable condition. No blood transfusion was required. Only 3 doses of injectable antibiotics were given. The wound healed very well and patient completely recovered in 10 days with satisfactory breast contour.
A 70 year old male had generalized weakness, anorexia, weight loss since few months. On endoscopic and CT scan investigation, he was diagnosed to have adenocarcinoma of second part of duodenum with cancer of head of pancreas. He was admitted to CIMS Hospital for standard pylorus non preserving pancreatico-duodenectomy. He was operated at CIMS for Whipple operation (for standard pylorus non preserving pancreatico-duodenectomy). Pancreatrico-jejunostomy and hepatico-jejunostomy was done. Two layer gastro-jejunostomy and feeding jejunostomy was also done here. Patient required only one PCV. Operative complications were nil. In post-operative period he developed biliary leak for which re-exploration and the collection in Morrison's pouch was drained and patients was discharged at the end of 22 days in stable hemodynamic condition. Patient survived the operative and post operative period very well. He comes for regular follow-up and he is on adjuvant chemotherapy and nutritional supplements.

At CIMS, we possess the level of surgical expertise and post-operative care necessary to perform cancer esophageal complex surgeries.
Modified Radical Mastectomy (MRM)

A 47 year old female patient was diagnosed as a case of left breast cancer. She took 3 cycles of FAC with 80% response and presented with residual (4 cm fungated tumor in central quadrant with skin around areola) disease. She was operated at CIMS for left MRM wherein left breast was removed and axillary dissection was done. Operative and post operative period were uneventful. Patient is free of disease and is coming for regular check-up.

Parotid Tumor Excision

A male patient in thirties was carrying a large parotid tumor on the right side of his face since 10 yrs. He was not getting the tumor removed due to religious taboo. He decided to get it removed as the tumor was getting fungated and ulcerated. Our onco- surgical team operated successfully and meticulously to give excellent end results.

Chemotherapy

Chemotherapy nowadays is highly effective and safe due to research and availability of newer drugs in cancer. The protocols for chemotherapy have been widely studied and applied on cancer patients with excellent outcomes. At CIMS, cancer chemotherapy is tumor cell specific and now given as an adjuvant to other modalities like surgery and radiotherapy. Side effects of chemotherapy have been minimized by many adjuvant agents that protect the bone marrow and prevent other toxicities.

At CIMS, a team of hemato-oncologist follow international standards of protocol in chemotherapy and with trained nurses and hospital staff, these protocols are well implemented.
CIMS has a specialized neurosurgery theater with world class standards and instrumentation which reduces complications and facilitates recovery.

CIMS neurosurgery facilities include:
- Operative neuro microscope (HS moller wedel)
- Sugita neuro frame
- Manman craniotome
- Neuro OT table
- LED OT lights

Post operative care for neurosurgery is done by trained staff and excellent ICU care in SICUs designated for neurosurgery patients. Care is taken by anaesthetists and intensivist.

At CIMS, neurosurgeons aptly perform:
- Brain tumors
- Transnasal excision of pituitary tumors
- Tumors of middle cranial, anterior cranial and posterior cranial fossa
- Trauma cases with extradural and intradural hematoma
- Intracranial aneurysm surgical clipping and AV malformation
- Shunts for hydrocephalus - Fluid is diverted from the head into another body cavity (typically the abdomen or chest) or within the brain
- Spinal procedures (operations for degenerative, disc and neoplastic disorders)
Interventional Procedures in Neurology at CIMS

At CIMS, we used our cath labs to perform carotid angiography and intra cranial angiography for diagnosis and treatment of AV malformation aneurysm and other intracranial vascular problems. Aneurysm coiling and micro vascular coagulation are also performed.

CIMS neurosurgeons are experienced and routinely update themselves by attending continuing medical education programs, seminars, and professional meetings.

![Image of angiogram]

### Procedure (n=78)

- Craniotomy + EVD + Excision of Tumour: 39
- Cranioplasty with CSF Drainage: 16
- Spine Decompression and Fixation: 12
- V. P. Shunt: 6
- MVD: 3
- Chronic SDH Removal: 2

[EVD: External Ventricular Drain, CSF: Cerebrospinal Fluid, SDH: Subdural Hematoma, VP Shunt: Ventriculoperitoneal Shunt, MVD: Microvascular Decompression]
Although the outcome of patient scheduled for GI surgery is influenced by age and co-morbidities at CIMS, the complexity of surgical procedure is handled by experienced GI surgeons and quality management of post operative recovery. In-house anaesthetists team closely cooperate with surgeons by taking care of peri-operative management.

At CIMS a total of 261 general and gastrointestinal surgeries were performed.
CIMS gastroenterology OT is well equipped with latest endoscopes; laproscopes & high define endoscopic camera systems to perform all major GI surgeries such as oesophagectomy, gastrectomy, total proctocolectomy, major GI resections, pancreatic surgeries, major liver resection, etc.

Lap cholecystectomy, Lap CBD exploration, Lap antireflux surgery for hiatus hernia, Lap adhesiolysis, Lap inguinal hernia repair, Lap incisional hernia repair, Lap diaphragmatic hernia repair, Lap assisted colectomy, laparoscopy assisted total enteroscopy in addition to routine diagnostic laparoscopy and biopsy are a part of routine gastroenterology surgeries at CIMS.

CIMS Experience

Out of total gastrointestinal surgeries performed on patients, 185 patients were males and 76 were females. Majority of patients were of age 50 or less.

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**Gender Distribution (N=261)**

- Males: 185
- Females: 76

**Age Distribution in Years (N=261)**

- ≤50: 117
- 51-60: 57
- 61-70: 55
- ≥71: 32
This branch deals with operations related to digestive system, liver, pancreas, gallbladder and other intra abdominal surgery. With best equipments and latest techniques, the GI and laparoscopic surgery at CIMS provides excellent surgical services. Minimal exposures to the above organs for surgery are possible by latest endoscopes, laparoscopes and high definition endoscopic camera system.

**Laparoscopic Cholecystectomy**
- At CIMS, our expert team of laproscopic surgeons performed 46 laparoscopic cholecystectomies with practically nil complication rate.
- Laparoscopic cholecystectomy is associated with less discomfort than regular surgery, shorter hospital stay with a quicker recovery time compared to open surgery.

**Stapled Hemorrhoidectomy**
- Conventional hemorrhoidectomy provides permanent symptomatic relief for most patients, and effectively treats any external component of the hemorrhoids, but Stapled Hemorrhoidectomy has an upper edge over the conventional surgery since there is less bleeding, complete encirclage of rectal veins, less trauma to tissue and less painful with better results. For cardiac cases wherein anti-platelet agents cannot be discontinued, this is the best procedure.

Stapled Hemorrhoidectomy is now very common and effective for patients having circumferential hemorrhoids, patients in old age group where conventional surgery morbidity is high.

**For cardiac patients who are on anticoagulants, Stapled Haemorrhoidectomy is the best choice.**
At CIMS, our team of bariatric surgeons are experts in minimally invasive weight loss surgical procedure. They have performed more than 29 weight loss procedures with an outstanding success rate and an extremely low complication rate.

**CIMS Sleeve Gastrectomy**

- It is a laparoscopic procedure, which is minimally invasive and is not reversible.
- It greatly reduces the size of stomach and limits the amount of food that can be eaten at a time.
- It does not cause decreased absorption of nutrients or bypass your intestines. After eating a small amount of food, you feel full very quickly and continue to feel full for several hours.
- Sleeve Gastrectomy may also cause decrease in appetite. In addition to reducing the size of the stomach, Sleeve Gastrectomy may reduce the amount of “hunger hormone” produced by the stomach which may contribute to weight loss after this procedure.
- Patients are normally followed-up every 3 months in the first 2 years.
**Case presentation:** A 43 year old male patient, with morbid obesity presented at CIMS with a chief complaint of breathlessness, sleep disturbance and skin infections due to excessive skin folds. He also had a history of hypertension, diabetes and joint pains.

**Diagnosis:** After completely evaluating the patient’s problems who was weighting 148 kg with a BMI of 49.35 at the time of admission, he was diagnosed to be suffering from obesity associated complications. Since the patient was unable to reduce his weight by diet alteration and was also unable to do strenuous exercise because of joint pain, he was advised to undergo laparoscopic bariatric surgery by CIMS bariatric team.

**Management and Outcome:** The patient was operated under general anaesthesia for bariatric gastric sleeve surgery. The port was inserted after creating the pneumoperitonium. Devascularization was done at the greater curvature. Echelon 60 staplers were used and reloaded with green, gold and blue load after insertion of gastric calibration tube. A leak test was done after insufflation of air from the stomach. His post-operative hospital course was uneventful and he was discharged after 3 days in stable hemodynamic condition. After the completion of four and half months, he had drastic reduction in weight by 36 kg. Along with weight loss his blood pressure and blood sugar are under control and now he does not require any medicine. He lives an active life and has no complains of fatigue, breathlessness or joint pain.

**Conclusion:** This case illustrates the challenges in treating obesity and complications associated with it. Bariatric surgery appears to be a clinically effective and cost-effective intervention for moderately to severely obese people and people having medical disease related to obesity (especially hypertension, heart disease, diabetes, etc).
At CIMS, we have a dedicated treatment program for prostate cancer and the skills and facilities to carry out laparoscopic (keyhole) surgery wherever possible.

**Services at CIMS**

- **Urinary Stone Surgeries**
  - Percutaneous Nephrolithotomy Surgery, for kidney stone (PCNL)
  - For uretric stones (URS)
  - Cystolithalopexy (For bladder stones)
  - Lithotripsy breaking of stones with ESWL

- **Surgical Procedures for Enlarged Prostate**
  - Trans-Urethral Resection of the Prostate (TURP)
  - Holmium laser enncleation of prostate (HOLEP)

- **Prostate Cancer Diagnosis and Treatment**
  - Radical Prostatectomy
  - Prostatic Biopsy and Screening by PSA and USG
  - Laparoscopic Radical Prostatectomy

**At CIMS, a total of 102 urological cases were resolved.**

- **Bladder Cancer**
  - Transurethral Resection of Bladder Tumour (TURBT)
  - Laparoscopic Radical Cystectomy
  - Radical Cystectomy and Neobladder formation

- **Kidney Cancer**
  - Partial Nephrectomy
  - Laparoscopic Radical Nephrectomy
  - Open Radical Nephrectomy
  - Visual Internal Urethrotomy (VIU) – for Stricture Urethral

- **Pediatric Urology Surgeries**

- **Tension-free Vaginal Tape (TVT) / Transobturator Tape (TOT) for Stress Urinary Incontinence**
  - Plastic surgery for hypospadias, hernia, hydrocele operations and mesh repairs orchiopexy, vasectomy
  - Varicocelectomy done laproscopically and under microscope

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**Procedures (n=102)**

<table>
<thead>
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<td>Bladder Surgery</td>
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<tr>
<td>Prostate TURP</td>
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<tr>
<td>Stone surgery (PCNL+URS)</td>
<td>17</td>
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<tr>
<td>Urethral Dilatation + VIU</td>
<td>9</td>
</tr>
<tr>
<td>PCN insertion</td>
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<tr>
<td>Lap. + Micro</td>
<td>5</td>
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<tr>
<td>Varicocelectomy</td>
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<tr>
<td>Orchidectomy</td>
<td>3</td>
</tr>
<tr>
<td>HOLEP</td>
<td>3</td>
</tr>
<tr>
<td>Prostatic biopsy</td>
<td>3</td>
</tr>
<tr>
<td>Lap. Radical Prostatectomy</td>
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</tbody>
</table>

Transurethral Resection of the Prostate (TURP)

TURP is the most effective urological operation used to treat benign prostatic hyperplasia (BPH).

Ureteroscopic Stone Removal (URS)

URS is a highly successful endoscopic procedure for the retrieval of stone in the ureter.

Percutaneous Nephrolithotripsy (PCNL)

Under this technique, the stone is removed by making a small tunnel into the kidney from the lumbar region.

HOLEP Surgery

Holmium Laser Enucleation of Prostate is the latest advancement in prostatic surgery, specifically -
- For patients on Anti-coagulant drugs
- For patients having IHD and cardiac problems. Hence, there is minimal bleeding and patient can be discharged early with minimal complication.

Urology procedure were performed more on elderly males at CIMS.
Obstetrics and Gynecology

At CIMS, Obstetrics and Gynecology department conducts surgeries like:

- Laparoscopic Assisted Vaginal Hysterectomy (LAVH)
- Total Laparoscopic Hysterectomy (TLH)
- Laparoscopic ovarian cyst removal + Node dissection
- Werthime's Operation
- Laparoscopic Myomectomy
- Cesarean Section Surgery
- Vaginal Hystrectomy

High Risk Pregnancy Care

CIMS houses advanced equipments like foetal monitor supported by the neonatal ICU, ensuring total care of mother and baby under one roof. Excellent ICU care and round the clock intensivists are very important for **High-Risk Pregnancy Care** and **Management of Labour**.

CIMS being a multi specialty, well equipped hospital is able to handle emergencies and thus stands to be an ideal place for high risk pregnancy which include patients with chronic hypertension; preterm labor, premature delivery, congenital abnormalities, IUGR (Intra-uterine growth restriction), gestational diabetes, kidney problems, decreased fetal movement, abnormal amount of amniotic fluid (too much polyhydramnios, too little oligohydranmios), breech or transverse position of the baby, etc.

MYOMECTOMY

TO MASS EXCISION
CIMS Comprehensive Women Health Programme:
- Mammography
- Pap smear
- Ultrasonography & Doppler study
- Gynec Check Up
- Counseling sessions

Painless labour is safe now. The perception of pain during labor and delivery varies between individuals. Epidural analgesia for painless labour ensures that a pregnant woman has a comfortable labor being mobile and conscious, with no associated post partum headache. Care is taken to avoid drop in blood pressure and use of forceps.

At CIMS, our gynecologist and anaesthetist team perform painless labour with good outcomes.

Laparoscopic and Open Surgeries at CIMS

![Bar chart showing procedures (N=47)]

- Hysterectomy: 16
- LSCS: 13
- Normal Deliveries: 5
- Werthinus: 4
- D and C: 4
- Myomectomy: 3
- Ovarian Tumour: 2

[ LSCS - Lower Segment Cesarean Section; D and C - Dilatation and Curettage]
Spine Surgery

CIMS Experience

- Out of total 34 spine surgeries performed on patients, 21 were males and 13 were females.
- In addition, majority of patients were of geriatric age group.
- Cervical spine surgeries outnumbered lumber and dorsal surgeries.

At CIMS, Spine Surgeries are conducted for:

- Conditions that compresses spinal nerves, causing debilitating back pain or numbness along the back of leg
- In some instances, for bulging or ruptured disks
- Broken bones (fractured vertebrae) or other damage to spinal column from an injury that leaves spine unstable
- Spine Repair
- Vertebral fractures and an unstable spine related to osteoporosis
- First tried conservative measures and failure to relieve back pain or other symptoms

Spine Decompression Surgery

Refers to various procedures intended to relieve symptoms caused by pressure, or compression, on the spinal cord and/or nerve roots. Bulging or collapsed disc, thickened joints, loosened ligaments and bony growths can narrow the spinal canal and the spinal nerve openings (foramen), causing irritation.

The following are common techniques for decompression:

- Discectomy-Microscopic
- Spinal Decompression
- Laminotomy or laminectomy
- Foraminotomy or foraminectomy
- Osteophyte removal
- Corpectomy
- Spinal Pedical Fixation
- Bone Grafting
- Inter Body Fixation
- Support by Rods and cage

Procedure (N=34)

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<td>Lumbar</td>
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<td>Dorsal</td>
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At CIMS... we care
As of now, we have successfully operated six patients with MED during last eleven months with minimum of three months follow-up. There were four patients with L5S1 disc herniation and two with L4-5 disc herniations.

**Advantages of MED**
- It is less invasive than conventional discectomy procedures
- It causes less muscle damage than open discectomy
- It results in less back pain
- It has less operative blood loss
- It shortens the hospital stay
- It can also be used in recurrent disc herniations

**Disadvantages** : It requires learning curve for the young surgeons to use it as well as thorough training. It usually takes at least 20 cases to decrease operative time as well as average operative blood loss. However, it gives the same clinical outcome in spite of level of experience compared with open procedures.

**Conclusion** : MED discectomies have given us very high success rate in our initial experience of first six disc herniations. We are expanding it to use even in double level discectomies as well as doing decompression in lumbar stenosis using unilateral approach and bilateral decompression techniques.
Case Presentation: A 73 year old diabetic, IHD male came to CIMS around a year back with complaints of severe radicular pain in left leg starting from back of the buttock to the lateral aspect of left foot since last four months. He also had left S1 dermatomal tingling and numbness sensations along with severe claudication. He was not able to stand and bear weight on his left foot even for a minute due to severe radicular pain along the left foot. He stood with typical flexion from the back with right sided tilt. On examination, his straight leg raising (SLR) was just 30 degrees on the left side and 60 degree on the right side (cross SLR). He had weakness in his left EHL and decreased sensation in left S1 dermatomes.

Diagnosis and Management: His X-ray showed fairly degenerative spine with lots of osteophytes around the vertebral edges with pedicle rotations. Lateral x-ray showed possible lysis at L5; however, there was instability at flexion image (Figure 1 a-b). MRI showed a huge paracentral disc herniation mostly on the left side causing compression over left S1 nerve root (Figure 2 a-e). The case required surgery in form of discectomy and decompression. However, considering his old age and possible lysis at L5 open surgery might require decompensation and possible instrumentation at L5-S1. Another choice was to go for MED at L5S1 from left side. Both the options were explained to patient as well his son who is a dentist. They fully understood the issue and choose to go with MED.

Surgery: The patient underwent MED discectomy at L5S1 from the left side. A huge piece (4 cm long) of disc at L5S1 level from the left side was extruded (Figure 3 a-d). His radicular pain and numbness sensation disappeared immediately and SLR was 90 degree postoperatively and he was able to walk. At 11 months follow-up, he has no back pain.
**Case Presentation:** A 47 year old male visited CIMS with complaints of severe radicular pain in right leg starting from back of the buttock to the lateral aspect of right foot and sole since last three months. He had right S1 dermatome tingling and numbness sensations along with severe claudication. He was not able to bear weight on his right foot for more than five minutes due to severe radicular pain. He walked with a scoliosis gait. On examination, his straight leg raising (SLR) was just 40 degrees on the right side and 90 degree on the left side. His neurological examination was normal except decreased sensation on right S1 dermatome.

**Diagnosis and Management:** His X-ray showed fairly healthy spine (Figure 4 a-b). On MRI, it showed a huge paracentral disc herniation mostly on the right side causing compression over right S1 nerve root (Figure 5 a-c). He under went MED.

**How the MED was Done?**
For MED, the para spinal approach was used. The appropriate disc space was marked approximately one finger breadth from the midline. A long guide wire was inserted percutaneously under image intensification until it hit the superior lamina, and its position was identified (Fig. 3 a). Progressively increasing sizes of dilators were used to split the muscles away from the field (Fig 3 b). After removing the dilators (MTRx tubes), microscope was brought in to visualize the operative field deep inside the dilators (Fig 3 c & 4 a). The superior lamina with the ligamentum flavum below was visualised and incised.
Nerve roots and dura were identified and protracted using a nerve root retractor. Any protruded disc fragment was separated from the root and cord. Bleeding epidural veins were coagulated using the bipolar cautery and by pressure using 'gel-foam'. An incision in the annulus was made using the sheathed knife blade after identifying the disc space. Disc material was curetted out using pituitary forceps and curettes (Fig 3 d & 6 b). Final movement of nerve roots was checked to ensure they were free and not entrapped. The axilla of nerves were checked for any sequestrated fragment. Haemostasis was achieved. The scope and sheath were removed and skin sutured with 4-0 undyed vicryl. A small band-aid was applied to cover the dressing (Fig 6 c-d). Post operatively, after four hours, the patient was able to walk and at six months follow-up, he is free from back pain.
Plastic Surgery

At CIMS, out of a total 58 plastic surgeries performed on patients, 37 patients were males and 21 were females. In addition, 38 patients were of age 50 years or less. Reconstructive surgery stands a mainstay at CIMS.

Plastic Surgery at CIMS

1) In Trauma Patients

CIMS trauma patients frequently need plastic surgeons to restore and correct the damaged body parts, especially facio-maxillary fracture, face and nose reconstruction, microvascular reconstruction for severed limb and digit. We have an expert team of plastic and vascular surgeons who can deal with microanastomosis of limb vessels.

2) In Cardiac Patients

At CIMS Hospital, many open cardiac bypass surgeries are conducted wherein few patients require help of plastic surgery for sternal wound problems which can be restored by plastic surgeries.
3) **In Cancer Patients**

In onco surgeries, a lot of tissue loss occurs as cancer part is removed in total, thus requiring reconstruction and replacement by plastic surgery besides restoring the disability of the patient. Many myocutaneous flaps have been used to reconstruct breast cancer patient and oro-laryngeal cancer. Free microvascular flaps have also been used for reconstruction. Mandibulectomy is commonly done for oral cancer patients wherein mandible reconstruction is performed at CIMS.

4) **In Burns**

There are two main categories of burn surgery: Acute and reconstructive. Acute burn care occurs immediately after the injury. Complex burns often require consultation with plastic surgeons, who assist with inpatient and outpatient management of these cases.

CIMS Hospital is well equipped for ICU care and isolation for burns patients. After completion of acute phase and stabilizing the patient, plastic surgeons involvement helps in big way to normalize these patients by doing skin grafting and proper sterile dressings. The goals of reconstructive burn surgery are to improve, both, the function and the cosmetic appearance of burn scars.
CIMS Otolaryngology Primary Objectives are:
1. To provide the highest possible quality of care to patients with complicated ear, nose, and throat disorders
2. To discover new insights into the pathophysiology of otolaryngological disease
3. To invent new technological applications designed to optimize therapy of challenging clinical problems as well as to overcome disabilities brought on by illness

At CIMS, Head and Neck Surgeries include:
- Tympanoplasty (reconstruction of the ear drum)
- Nasal endoscopy
- Stapedectomy (removal of all or part of a bone in the middle ear)
- Cochlear implants (implantation of a device to stimulate nerve ends within the ear to enable hearing)
- Myringotomy (insertion of ear tubes to drain fluid in persons with chronic ear infections)
- Correction of a deviated septum and various forms of endoscopies
- Tonsillectomy and Adenoidectomy of various grades were successfully performed

At CIMS, a total of 94 ENT procedures have been conducted.

Balloon Sinuplasty at CIMS

Balloon Sinuplasty – A Novel Treatment for Chronic Rhinosinusitis
Balloon Sinuplasty is safe and minimally invasive procedure that opens blocked sinus passages. Surgeon thread a soft tipped guide wire equipped with a tiny balloon into the nostrils and up to the area of blockage. They then inflate the balloon just enough to open the passageway. Finally they spray fluid into the infected sinus to flush out the pus and mucous.

Advantages of Balloon Sinuplasty Technique
Less invasive: No need of cutting and removing the normal tissue of nose
Less trauma: The pressure needed to inflate the balloon can be monitored from outside
Less pain: Minimum intra operative and post operative pain
Less recovery time: Procedure is recommended as office procedure / day care procedure
Less scarring: No need of putting any incision over face or nose
Less follow up: No post operative endoscopic nasal cleaning is required

At CIMS, a total of 94 ENT procedures have been conducted.
Sinonasal Polyposis

A 50 year old male patient visited CIMS with complaint of recurrent nasal discharge and blockage since last 2-3 years with history of nasal surgery for same complain few years back. He was found to have recurrent extensive sinonasal polyposis which was confirmed radiologically. He was a candidate for Bilateral revision FESS, but was carrying a major medical risk due to long standing diabetes, hypertension, operated CABG and moderately severe OSAS. We took the advantage of Microdebrider (shaver) system for the complete removal of disease with minimal mucosal injury which also reduced intra operative time and associated risk.

Tympano - Mastoidectomy

A female patient, aged 40 years came to CIMS with complaint of right ear discharge and hearing loss since 1 year. She had history of same ear surgery 20 years back. Patient was suffering from recurrent right ear large central perforation. She was operated for right ear revision Tympano - mastoidectomy under general anaesthesia via post aural route. The para operative period was smooth. Dry and hearing ear was achieved, which was confirmed with post operative audiometry.

Obstructive Sleep Apnoea Syndrome

A 9 year old girl came to CIMS with severe mouth breathing, snoring and recurrent rhinosinusitis since 2-3 years. She was found to have Obstructive Sleep Apnoea Syndrome (OSAS) due to large kissing tonsils and adenoid hypertrophy, completely obstructing the nasopharyngeal airway. Due to interrupted sleep since a long time she had become irritable and lethargic, which was also affecting her school performance. She was offered the advantage of bloodless coblation technique for Tonsillectomy and Adenoidectomy. To ensure complete removal of adenoids including choanal part without damaging surrounding tissues, we opted for Transorral Endoscopic Adenoidectomy. The patient was relieved of OSAS.
Pain Clinic at CIMS is a new addition to overcome intractable pain and improve quality of life. A team of anaesthetists with their expertise in pain management and with newer equipments, conduct these procedures under IITV and CT-guidance.

At CIMS, outcome measures of pain management include:
- Decreased pain
- Increased mobility
- Diminished dependency on pain medication
- Decreased medical complications of pain
- Decreased length of hospital stays and frequency of visits

Pain Management procedures include selective nerve root block, facet joint block, facet joint rhizotomy (radiofrequency), percutaneous disc decompressor, spinal cord stimulator, morphine pump. Cancer blocks include celiac block, superior hypogastric block, T2 T3 sympathetic block and many more.

Trigeminal neuralgia
A patient was treated for carcinoma of mandible. Following mandibular surgery, he developed pain over trigeminal nerve distribution. He was injected with alcohol twice elsewhere which increased his pain. At CIMS he was diagnosed with trigeminal neuralgia and treated with radio frequency ablation of trigeminal nerve, which relieved his pain.

Cancer Pain
A patient due to lung carcinoma was suffering from intractable pain on right side of chest. According to oncologist it was a non-operable mass. All means to treat his pain with medicine including morphine did not work. At CIMS, a T2 and T3 sympathetic block with radio frequency ablation was done. His pain subsided immediately after procedure.
At CIMS, following therapeutic procedures are conducted for pain management:

1) Trigeminal nerve block: it is usually done with alcohol/glycerol or RF ablation for trigeminal neuralgia, cluster headache, oral and facial cancer
2) Greater occipital nerve block/RF ablation: For occipital headache and migraine
3) Sphenopalatine ganglion block/RF ablation: For cluster headache, migraine, atypical facial pain and cancer pain of palate, base of tongue or pharynx.
4) Stellate ganglion block/RF lesioning: For CRPS, phantom limb pain, to improve vascular insufficiency
5) Suprascapular nerve block: For frozen shoulder, acute shoulder pain, rehabilitation of chronic arm or hand problem for shoulder movement
6) Celiac plexus block: For pancreatic cancer, liver metastasis and gall bladder malignancy and visceral upper abdominal pain
7) Lumber sympathectomy: For pain of peripheral vascular disease, diabetes, burger's disease, post vascular surgery, Raynaud's disease, stump pain, CRPS
8) Superior hypogastric block/RF ablation: For lower abdominal pain of visceral origin from transverse colon to rectum, ovarian/uterine malignancy, endometriosis
9) Ganglion of impar block: For pain originating from anal canal, rectum and perianal pain
10) Median branch block/RF lesioning: For back pain from facet joint arthropathy
11) Transforaminal epidural injections: For pain of radioculopathy of lumber, cervical and thoracic region.
12) Facet joint block for facet arthropathy
13) Implantable spinal cord stimulation: Epidural electrodes are placed which sends electrical impulses to block pain signals to brain. Patients have reported 70-80% pain relief with SCS
14) Implantable peripheral nerve stimulator: Used to control chronic pain signals from peripheral nerves. It is implanted under skin which sends electrical pulses to problematic nerves
15) Percutaneous vertebroplasty: Used to treat fracture spine caused by osteoporosis, IIT guided needle is placed into vertebral body and cement is injected
16) Intradiscal Electrothermal therapy (IDET): IDET is used to treat herniated or torn spinal discs. Prior to IDET, discography must be performed to confirm the diagnosis. A catheter is placed in the spinal disc and controlled level of thermal heat is conducted through catheter and into the disc. Thermal heat allows the disc wall to thicken its collagen and reduce hernia; partially destroys the nerves that supply the disc and conducts painful signals.
CIMS Hospital provides dental family care in a comfortable, modern and relaxed environment. The state-of-the-art equipped dental area provides comprehensive dental care. Dental treatment has been revolutionized in recent times in terms of patient comfort (painless), less operational time, minimum sittings with special emphasis on highest standards of asepsis to eliminate cross infections.

**Dental Care for Cardiac Patients**
- Procedure to these patients are done under continuous cardiac/ NIBP and SpO₂ monitoring on dental chair
- Backup support of Cardiologist/Intensivist/Physician
- Day care/indoor facilities for medically compromised and seriously ill patients
- Facility of general anaesthesia on dental chair only
- Comprehensive care (24×7) to trauma patients
- Total care for NRI and overseas patients by special international patient's department

**CIMS State-of-the Art Dental area:**
- Minimum Dental Sittings
- Less Operational time
- Painless Treatment
- No Cross Infection

<table>
<thead>
<tr>
<th>Dental Procedures (N=5357)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gum Surgery</td>
<td>10</td>
</tr>
<tr>
<td>Orthodontics Occlusion</td>
<td>12</td>
</tr>
<tr>
<td>Apicectomy</td>
<td>15</td>
</tr>
<tr>
<td>Cometic Dental Treatment</td>
<td>20</td>
</tr>
<tr>
<td>Dentures</td>
<td>22</td>
</tr>
<tr>
<td>Implants</td>
<td>60</td>
</tr>
<tr>
<td>Impacted Wisdom Tooth</td>
<td>112</td>
</tr>
<tr>
<td>Pediatric Procedure</td>
<td>264</td>
</tr>
<tr>
<td>RCT</td>
<td>529</td>
</tr>
<tr>
<td>Crown &amp; Bridge</td>
<td>815</td>
</tr>
<tr>
<td>Cleaning of Teeth</td>
<td>948</td>
</tr>
<tr>
<td>Extraction</td>
<td>1059</td>
</tr>
<tr>
<td>Composite Filling</td>
<td>1509</td>
</tr>
</tbody>
</table>

**Number of Procedures**
Pulmonary Medicine

Sleep Lab
CIMS Sleep Laboratory fills the vacuum for a world class sleep disorder lab in Gujarat. It is the latest and most sophisticated Sleep Lab in Gujarat.

The Sleep Lab is designed to evaluate, diagnose and help patients to manage OSA.

A sleep study examines sleep patterns, body movements, snoring, airflow, stages of sleep, heart rate, blood pressure, ECG and others. It helps the experts in locating the exact problem with the patient and dealing with it accordingly.

Equipments: Our sleep lab is equipped with additional sensors, hardware and software to carry out cardiovascular studies. Our lab is equipped to diagnose cases of unexplained impotence due to sleep apnea or other diseases.

Who needs a sleep study?
- Obstructive Sleep Apnoea
- All individuals who snore at night
- Disturbed night sleep
- Daytime sleepiness
- Breathlessness that wakes you from sleep
- Choking in sleep
Pulmonary Function Tests

- Pulmonary function tests are a group of procedures that measure the function of the lungs, revealing problems in the way a patient breathes.
- The tests can determine the cause of shortness of breath and may help confirm lung diseases, such as asthma, bronchitis or emphysema.
- The tests also are performed before any major lung surgery to make sure the person won't be disabled by having a reduced lung capacity.

At CIMS, a total of 1658 pulmonary function tests have been performed.
At CIMS, 24 x 7 Dialysis Facility is available

- 6 bed dialysis facility with features like blood leak detector
- Settings for pressure limits
- Simple, fast and safe connection for ease of use for clinicians.
- Facility of Dialysis in ICU for critical patients.

![Bar charts showing number of patients undergoing dialysis and dialysis performed at CIMS.](image)
CIMS is fully equipped with latest Olympus endoscopic equipments and endoscopes.

At CIMS, experienced and expert endoscopists perform various endoscopies.

Outcome of this endoscopies are for diagnosis and documentation of patient diseases.

Endoscopic guided biopsies and procedures are also performed.

**Endoscopy Procedures (N=322)**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophageal Dilatation</td>
<td>1</td>
</tr>
<tr>
<td>DLB+Biopsy</td>
<td>2</td>
</tr>
<tr>
<td>ERCP</td>
<td>4</td>
</tr>
<tr>
<td>Rigid Bronchoscopy</td>
<td>4</td>
</tr>
<tr>
<td>UGI PEG Insertion</td>
<td>8</td>
</tr>
<tr>
<td>Nasal Endoscopy</td>
<td>8</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>46</td>
</tr>
<tr>
<td>Bronchoscopy</td>
<td>92</td>
</tr>
<tr>
<td>UGI + Gastroscopy</td>
<td>157</td>
</tr>
</tbody>
</table>

[**PEG**-Percutaneous Endoscopic Gastrostomy, **DLB**-Direct Laryngo Bronchoscopy, **ERCP**-Endoscopic Retrograde Cholangiopancreatography]
The Pathology department at CIMS Hospital works 24x7 catering to needs of indoor as well as out patient departments.

CIMS Pathology Department provides a range of services including:

- Biochemistry
- Immunoassay
- Hormonal assay
- Hematology
- Clinical Pathology
- Histopathology & Cytology.
- CIMS Microbiology is one of its kind offering an overall microbiology workup from basic stains and basic cultures to specialized stains including fluorescence stain and fastidious cultures with automated systems. The microbiology department offers drug sensitivity with automated system and MIC values.
- CIMS Microbiology also offers state-of-the-art molecular microbiology with the high end fully automated gene sequencer.

**Pathology Tests**

The laboratory is well equipped with state-of-the-art and automated equipments like:

- Cobas Integra 400 plus
- Chem-7
- Cobas E 411
- Microscan ELISA
- ABL 800
- Cobas B121
- Sysmex XT 1800i
- Stago
- QBC
A wide range of hematological tests are conducted at CIMS Pathology.

**General Haematology & Clinical Pathology**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC</td>
<td>32322</td>
</tr>
<tr>
<td>ESR</td>
<td>6450</td>
</tr>
<tr>
<td>MP by QBC</td>
<td>260</td>
</tr>
<tr>
<td>Blood Group</td>
<td>12307</td>
</tr>
<tr>
<td>Urine</td>
<td>8827</td>
</tr>
<tr>
<td>Stool</td>
<td>1913</td>
</tr>
<tr>
<td>Body Fluids</td>
<td>486</td>
</tr>
</tbody>
</table>

**Special Haematology Workup**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone Marrow Tests</td>
<td>30</td>
</tr>
<tr>
<td>Biopsy</td>
<td>331</td>
</tr>
<tr>
<td>Cytogenetics</td>
<td>1</td>
</tr>
<tr>
<td>LAP Score</td>
<td>3</td>
</tr>
</tbody>
</table>

[**CBC** - Complete Blood Count, **ESR** - Erythrocyte Sedimentation Rate, **PT** - Prothrombin Time, **APTT** - Activated Partial Thromboplastin Time, **FDP** - Fibrin Degradation Products, **QBC** - Quantitve Buffy Coat, **G6PD** - Glucose 6 Phosphate Dehydrogenase, **TIBC** - Total Iron Binding Capacity]

**Anemia Profile**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hba2</td>
<td>1</td>
</tr>
<tr>
<td>Hb Electrophoresis</td>
<td>28</td>
</tr>
<tr>
<td>G6PD</td>
<td>29</td>
</tr>
<tr>
<td>Retic</td>
<td>101</td>
</tr>
<tr>
<td>Ferritin</td>
<td>119</td>
</tr>
<tr>
<td>TIBC</td>
<td>99</td>
</tr>
<tr>
<td>Iron</td>
<td>115</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>1046</td>
</tr>
</tbody>
</table>

**Coagulation Markers**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td>5620</td>
</tr>
<tr>
<td>APTT</td>
<td>1640</td>
</tr>
<tr>
<td>FDP</td>
<td>7</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>108</td>
</tr>
<tr>
<td>D-Dimer</td>
<td>161</td>
</tr>
</tbody>
</table>
Pathology

Various Biochemistries at CIMS Pathology

**Cardiac Markers**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troponin-T</td>
<td>1908</td>
</tr>
<tr>
<td>Troponin-I</td>
<td>101</td>
</tr>
<tr>
<td>CPK-T</td>
<td>605</td>
</tr>
<tr>
<td>CPK MB</td>
<td>620</td>
</tr>
<tr>
<td>NT Pro BNP</td>
<td>578</td>
</tr>
<tr>
<td>BNP</td>
<td>620</td>
</tr>
<tr>
<td>LDH</td>
<td>204</td>
</tr>
</tbody>
</table>

**Diabetic Care**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Number of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin</td>
<td>20</td>
</tr>
<tr>
<td>Serum Acetone</td>
<td>364</td>
</tr>
<tr>
<td>Microalbuminurea</td>
<td>947</td>
</tr>
<tr>
<td>HbA1c</td>
<td>3547</td>
</tr>
<tr>
<td>Sugar</td>
<td>41167</td>
</tr>
</tbody>
</table>

**Thyroid Profile**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>5258</td>
</tr>
<tr>
<td>T4</td>
<td>838</td>
</tr>
<tr>
<td>T3</td>
<td>830</td>
</tr>
<tr>
<td>Free T4</td>
<td>234</td>
</tr>
<tr>
<td>Free T3</td>
<td>233</td>
</tr>
<tr>
<td>Thyroglobulin</td>
<td>13</td>
</tr>
</tbody>
</table>

**Bone Markers**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D3 (25OH)</td>
<td>1404</td>
</tr>
<tr>
<td>Calcium</td>
<td>1985</td>
</tr>
<tr>
<td>RA</td>
<td>120</td>
</tr>
<tr>
<td>Uric Acid</td>
<td>1404</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>578</td>
</tr>
</tbody>
</table>

**Explanation**

- **CPK-MB** stands for Creatine Phosphokinase-MB,
- **CPK-T** stands for Creatine Phosphokinase Total,
- **BNP** stands for Brain Natriuretic Peptide,
- **LDH** stands for Lactate Dehydrogenase.
Various Biochemistries at CIMS Pathology

**Collagen Markers**

- ANA: 159
- ANA profile: 4
- Collagen Profile: 6
- Anticardio Lipid: 16
- Antiphospho Lipid: 35

**Renal Function Test**

- Blood urea: 16528
- Creatinine: 28668
- Sodium: 16837
- Pottasium: 42565
- Chloride: 12523

**Tumor Markers**

- PSA: 752
- CA 125: 20
- CA 15.3: 3
- CA 19.9: 19
- AFP: 41
- CEA: 84

**Liver Function Test**

- SGPT: 16119
- SGOT: 4564
- Bilirubin: 4031
- Total Protein: 3920
- Alkaline phosphatase: 2577

*Note: SGPT - Serum Glutamic Pyruvate Transaminase, SGOT - Serum Glutamic-Oxaloacetic Transaminase*
1) External Quality Assessment Scheme
(For Biochemistry & Immunology, once in Month)

<table>
<thead>
<tr>
<th>No. of Analyses</th>
<th>No. of Months</th>
<th>No. of Events</th>
<th>Accuracy Score (0-2) Excellent</th>
<th>Accuracy Score (3-5) Good</th>
<th>Accuracy Score (5-10) Average</th>
<th>Accuracy Score (&gt;10) Below Average</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 24</td>
<td>20</td>
<td>466</td>
<td>356</td>
<td>91</td>
<td>19</td>
<td>0</td>
<td>100%</td>
</tr>
</tbody>
</table>

2) Blood Bank External Quality Assessment Scheme
(For Serology & Blood Group, 3 Cycles/Year)

<table>
<thead>
<tr>
<th>Cycle No.</th>
<th>CIMS Score</th>
<th>Score</th>
<th>Criteria of Score</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>Good</td>
<td>2 : Excellent 1.5 : Good 1.0 : Acceptable 0.5 : Need for Improvements 0 : Not Acceptable</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>Excellent</td>
<td>2 : Excellent 1.5 : Good 1.0 : Acceptable 0.5 : Need for Improvements 0 : Not Acceptable</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Excellent</td>
<td>2 : Excellent 1.5 : Good 1.0 : Acceptable 0.5 : Need for Improvements 0 : Not Acceptable</td>
<td>100%</td>
</tr>
</tbody>
</table>

3) All India Institute Of Medical Science (For Haematology, Once in 3 Months)

<table>
<thead>
<tr>
<th>No. of Parameter</th>
<th>No. of Cycle</th>
<th>No. of Events</th>
<th>Criteria (Satisfactory/Unsatisfactory)</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>2</td>
<td>18</td>
<td>Z score among with lab (External Quality Assurance) Z score among within lab (Internal Quality Assurance)</td>
<td>100%</td>
</tr>
</tbody>
</table>

Peripheral Study Assessment

<table>
<thead>
<tr>
<th>No. of Cycle</th>
<th>Result</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Satisfactory</td>
<td>100%</td>
</tr>
</tbody>
</table>
## Various Quality Indicators at CIMS pathology

### 1. Critical Results

<table>
<thead>
<tr>
<th>Total No. of Sample</th>
<th>No. of Critical Result</th>
<th>Informed within 15 min.</th>
<th>Informed within 30 min.</th>
<th>Informed after 30 min.</th>
<th>Compliance</th>
<th>Acceptance Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>291065</td>
<td>931</td>
<td>842</td>
<td>57</td>
<td>32</td>
<td>96.56%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 2. Reports Within TAT (TURN AROUND TIME)

<table>
<thead>
<tr>
<th>No. of Sample</th>
<th>Informed within TAT</th>
<th>Compliance</th>
<th>Acceptance Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>829</td>
<td>824</td>
<td>99.39%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 3. Number of Redos

## QUALITY INDICATORS REPORT

**This report is an output of the indicator monitoring system of CIMS quality assurance programme.**

**Indicator: Percentage of Redos**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Indicator</th>
<th>Data</th>
<th>Response Percentage</th>
<th>Standard values for compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Percentage of Redos</td>
<td>Total no of Investigations conducted during the month</td>
<td>291065</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of Redo investigations/procedures performed in the pathology department</td>
<td>6357</td>
<td>0.021%</td>
</tr>
</tbody>
</table>

**Formula:** No of redos performed in pathology department/Total number of investigations or procedures conducted in the pathology*100

**Analysis:** Redo's occurred due technical causes like, Sample gel, First result out of linearity, ISE unstable, no ISE calibration, no ISE fluid detection and others causes.
Radiology

CIMS Radiology is equipped with state-of-the-art equipment and is led by a team of highly qualified radiologists and technicians. The department is fully furnished to provide support for diagnosis and treatment for every department at CIMS.

The Imaging Section works extensively on maintaining and improving quality control measures to ensure accuracy, precision, reproducibility and speedy reporting.

Various diagnostic and therapeutic radiological procedures are conducted, including:

- Abdominal imaging
- Biopsy, using CT, ultrasound and fluoroscopic procedures
- Breast imaging
- Cardiac radiology
- Computed tomography
  - Coronary artery calcification scoring
  - Lung cancer screening
- Diagnostic imaging in oncology
- Gastrointestinal radiology
- General radiology, chest and skeletal
- Genitourinary radiology
- Mammography
- Musculoskeletal imaging
- Ultrasound, including duplex and color-flow imaging
- Uroradiology
- Thoracic radiology
- Vascular radiology

<table>
<thead>
<tr>
<th>Test</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-rays</td>
<td>12702</td>
</tr>
<tr>
<td>Ultra Sonography</td>
<td>3489</td>
</tr>
<tr>
<td>USG and Doppler</td>
<td>2380</td>
</tr>
<tr>
<td>CT Scan</td>
<td>1311</td>
</tr>
<tr>
<td>CT Calcium Scoring</td>
<td>75</td>
</tr>
</tbody>
</table>
At CIMS, ultrasound is used to generate soft tissue images of liver, gall bladder, spleen, kidney, prostate, female reproductive organs and of fetus. Ultrasound is also useful in evaluation of various small parts of body such as eye, neck, knee joint, etc.

- Trans vaginal USG and trans rectal USG helps in diagnosis and detailed evaluation of pathology.
- Doppler study is useful for detecting blockages in blood vessels.
Radiology

At CIMS... we care
The goal of cardiac CT scan for calcium scoring is to determine the presence of CAD, although symptoms may be absent. It may be recommended by a physician for patients with risk factors for CAD, but no clinical symptoms.

**Indications of CT Coronary Calcium Scoring:**
1. Male above 55 years of age
2. Female above 45 years of age or postmenopausal woman
3. Family history of coronary artery disease before 55 years in father/brother or before 65 years in mother/sister
4. H/O Smoking
5. S. Cholesterol level of 200 mg/dl or higher
6. High BP
7. Diabetes
8. Obesity
9. Sedentary lifestyle

<table>
<thead>
<tr>
<th>Agatston Score</th>
<th>Presence of Coronary Artery Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No evidence of CAD</td>
</tr>
<tr>
<td>1-10</td>
<td>Minimal evidence of CAD</td>
</tr>
<tr>
<td>11-100</td>
<td>Mild evidence of CAD</td>
</tr>
<tr>
<td>101-400</td>
<td>Moderate evidence of CAD</td>
</tr>
<tr>
<td>Over 400</td>
<td>Extensive evidence of CAD</td>
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![Calcium Scoring Chart]

At CIMS... we care
The procedure usually takes about 10 minutes and does not require any needles or injections. Coronary calcium scans are done in a hospital or outpatient office. Patient is able to return to his/her normal activities after the calcium scan is done.

- A negative cardiac CT scan for calcium scoring shows no calcification within the coronary arteries. This suggests that CAD is absent or so minimal it cannot be seen by this technique.
- A positive test means that CAD is present, regardless of whether or not the patient is experiencing any symptoms. The amount of calcification—expressed as the calcium score—may help to predict the likelihood of a myocardial infarction.
- After the scan, patient will receive a calcium score called an Agatston score. The higher the Agatston score, the more severe the atherosclerosis.

Benefits

- Cardiac CT for calcium scoring is a convenient and noninvasive way of evaluating whether person may be at an increased risk for a heart attack.
- The test takes little time and causes no pain.
- Coronary calcium scanning does not require an injection of contrast dye to make heart or arteries visible on X-ray images.
- No radiation remains in a patient's body after a CT examination.
- X-rays used in CT scans usually have no immediate side effects.

Importance of coronary calcium scoring in age group of less than 40 years age

In less than 40 years age group, if calcium score is high, it suggests more aggressive plaque forming process, e.g. calcium score of 150 in 70-year-old man has slower growing, more stable plaque than a 40-year-old woman with a score of 150 (above the 90th percentile for that age group); she has a more aggressive plaque forming process and needs to be treated accordingly.
On CT perfusion images, red area are suggestive of infarcted area (Core-Umbra) and green area suggestive of ischemic area (PenUmbra). Infarcted area is non-salvageable, while ischemic area is salvageable brain tissue.

CT perfusion study helps physician to determine how much and what area of brain is salvageable after treatment, and helps in deciding line of management of patient.
CT Renal angiography done in patient with renal cell carcinoma. On CT angiographic images, dual renal arterial supply on right side noted with right accessory renal artery arises few centimeter below right main renal artery origin. Majority of tumor was supplied by right accessory renal artery and small portion of tumor was supplied by right main renal artery.

CT Angiography in patient with aortic endoprosthesis for treatment of aortic aneurysm.

Subclavian artery complete tear with refilling of distal subclavian artery by collaterals.
At CIMS, Department of Internal Medicine treats patients with both simple and complex medical condition in surgical patients. The department consists of consultants, who are trained and experienced, working at leading medical Institutes in India and abroad and are prominent consultants in the city. A team of specialists work to achieve the best possible treatment outcomes and to obtain a high degree of patient satisfaction.

The department provides a broad range of services for diagnosis and treatment of multiple medical problems.

**Services offered at Internal Medicine Department:**

- Cardiovascular Medicine
- Endocrinology
- Hematology
- Perioperative Medicine
- Medical Oncology
- Nephrology
- Rheumatology (Immunology)
- Obstetrics Medicine
- Critical Care Medicine
- Gastroenterology
- Infectious Disease
- HIV Medicine
- Neurology
- Pulmonology
- Dermatology
Wellness is an approach to life where you aim at recognizing the risk factors that could lead to life-threatening diseases in the future and thereafter work towards reducing them.

CIMS offers healthcare programs to individuals who are keen on being medically vigilant.

A health check-up is needed, in case of one or more of the following:

- Above 40 yrs of age
- Obesity
- Chewing Tobacco/Smoking or Heavy drinker
- Executive with a stressful job
- Diabetes, High blood pressure and Heart disease.
- Low exercise tolerance
- Weight loss / Weight gain
- Chronic indigestion
- Swelling in stomach, hand-leg, breast, etc.
- Blood in urine, stool or while coughing

At CIMS, Wellness Program Tests include:

- **Liver Profile:** SGPT, SGOT, Total Bilirubin (Conjugated Bilirubin, Unconjugated Bilirubin), Alkaline Phosphatase, Total Proteins, Albumin, Globulin, A/g ratio.
- **Renal Profile:** Blood Urea, Serum Creatinine, Electrolytes (Sodium, Potassium & Chloride)
- **Lipid Profile:** Serum Cholesterol, Triglycerides, HDL Cholesterol, LDL Cholesterol, VLDL Cholesterol, Cholesterol / HDL Ratio, LDL/HDL Ratio.

- **Recommended:** Acid Phosphatase for males below 45 years, PSA for males above 45 years
A total of 10,675 patients with essential hypertension visited CIMS Hospital. Of these, 49.81% had Stage I hypertension and the rest had Stage II hypertension, classified as per JNC VII guidelines. Prevalence of hypertension was higher in patients between 51-70 years of age. In addition, hypertension was more common in males compared to females.
At CIMS, a total of 46045 tests were performed for patients admitted for diabetic screening.

- HbA1c, Microalbuminurea, Serum Acetone and Insulin are also carried out for diabetic profile of patients.

- At CIMS, from amongst 6360 patients with diabetes, 3071 patients had associated hypertension and who are at high risk of developing coronary artery disease, stroke, peripheral vascular disease and heart failure.

- At CIMS, 36.25% of adult incident cases of diabetes were diagnosed between the age of 51 to 60 years, which is quite comparable with the data of the centre of disease control and prevention of USA.
At CIMS a total of 61 patients with primary (i.e. idiopathic) pulmonary artery hypertension are followed up. In PPAH, a 1.7:1.0 female-to-male preponderance is noted.

Response to therapy is commonly evaluated with a variety of methods, including assessment of functional capacity, exercise tolerance, echocardiography, and right heart catheterization. Enhancing functional capacity, measured objectively by an assessment of exercise endurance such as the six minute walk test (6MW) or a cardiopulmonary exercise test, is also a treatment objective.
Our Physiotherapy and Rehabilitation team provides treatment and assesses individuals to develop, maintain and restore maximum movement and function throughout life.

CIMS Physiotherapy and Rehabilitation Centre is equipped with latest equipments to give higher standard of services.

**At CIMS Physiotherapy Treatment Includes:**
- Manual Therapy (manipulations / mobilizations)
- Electrotherapy Modalities
- Short Wave Diathermy
- Ultrasound
- Traction
- Interferential Therapy
- TENS (Transcutaneous Electrical Nerve Stimulation)
- Muscle Stimulator
- Wax Bath
- Hydrocollater (Hot pack)
- Suspension Frame
- Biomechanical Assessment
- Orthotic and Prosthetic Exercises
- Muscle Imbalance Correction

**At CIMS Rehabilitation Services Include:**
- Cardiac Rehabilitation
- Orthopedic Rehabilitation
- Neurological Rehabilitation
- Pulmonary Rehabilitation
- Post Surgery Rehabilitation (including liver and kidney transplant)

**Cardiac Rehabilitation Prescription (N=5198)**

<table>
<thead>
<tr>
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<tr>
<td>IPD</td>
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</tr>
<tr>
<td>OPD</td>
<td>780</td>
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At CIMS, basically the diets are classified into five types:

I. **Low Fat and Low Fat-Low Cholesterol Diet:** This type of diet is recommended for CVD patients specially with high cholesterol level and obesity as risk factors, along with hepatic dysfunction. As recommended by Indian Council Of Medical Research (ICMR), the visible fat should not exceed more than 25 gm in a day or in percentage it should not exceed 20 - 35% of total calories. Animal fats such as whole milk and milk products should not exceed more than 10% of total calories.

II. **Anti Diabetic Diet:** This diet is calories and protein specific recommended for subjects with blood glucose above 120 mg/dl in fasting condition and 140 mg/dl in post prandial condition. It excludes simple carbohydrates like sugar, honey, jaggery, mango, banana, fruit juices, coconut water, chickoo, plain rice, potato and sweet potatoes.

It includes complex carbohydrates like rice with vegetable combination or cereals and pulses in combination. Also, frequent meals are advised to maintain glucose balance in the body of these subjects.

III. **Low Protein Diet:** This diet is often prescribed to patients with kidney or liver dysfunction. Higher levels of proteins are found in animal products like fish, poultry, eggs, dairy products. Lower levels are found in vegetable products like cereals, rice, pasta or dried beans and pulses. A little higher amount of proteins are present in whole pulses which are a rich source for vegetarians. A suggested acceptable level of protein in a low protein diet is about 0.6g/kg of body weight per day or about 40-50 gms/day.

IV. **High Protein Diet:** It is often recommended to build muscle and loose fat. It is also advisable for ICU and trauma patients. Recommended value of protein for a normal person is 1 gm/ body weight. In case of high protein diet, it can be 1.5-2 gm/ body weight.

V. **Renal Diet:** Recommended for patients with renal dysfunction. Generally foods high in potassium, phosphorus, salt and protein like palak, methi, tomato, coriander leaves, coconut water, fruit juices, papad, pickles, raw vegetables, raw fruits (except papaya and apple), whole pulses, etc. are restricted. The patients vital are affected if potassium increases beyond 5 meq/l, salt increases above 140 meq/l and urea increases beyond 50 mg/dl.
At CIMS, a total of 26 CODE BLUE were conducted.

Worldwide, emergency codes are used by hospitals to alert staff to various emergency situations. The purpose is to convey essential information quickly and accurately, while preventing panic amongst patients and visitors to the hospital.

**Code Blue** is usually activated when a patient requires resuscitation or otherwise is in need of immediate medical attention, most often as the result of a cardiac or respiratory arrest.

At CIMS to activate the code, the caller will call on the unique tele-number **222** and speak "Code Blue, (floor), (room)" to alert the resuscitation team where to respond.

At CIMS, we have a policy to determine which units will provide personnel for code coverage. Code Blue and CPR committee meet at regular intervals. In theory, any medical professional may respond to a code, but in practice at CIMS team makeup is limited to those with Advanced Cardiac Life Support or other equivalent resuscitation training.

At CIMS, the anaesthetist is responsible for directing the resuscitation effort and is said to "run the code."
Quality improvement is not just about standard-setting and benchmarking with the best: there are analytical, counseling and self-improvement dimensions to the process. Through self-assessment at CIMS, we strive to assess our level of performance in relation to established standards and implement ways to continuously improve.

**Quality Measures**

At CIMS, quality measures are assessed by monitoring a wide range of parameters monthly and comparing them to established certified benchmarks.
The CIMS quality cell continuously measures and evaluates performances and outcomes. Errors are readily identified and evaluated, processes are redesigned, and knowledge and skills are polished to achieve a consistent and predictable performance.
**Pharmacovigilance Unit**

**Objective of CIMS Pharmacovigilance Unit**
- To monitor Adverse Drug Reactions (ADRs) in patients
- To create awareness amongst health care professionals about the importance of ADR reporting
- To monitor benefit-risk profile of medicines
- Generate independent, evidence based recommendations on the safety of medicines

**CIMS Pharmacovigilance Outcomes**

At CIMS, Naranjo’s scale was used for causality assessment of detected ADRs. Of the ADR's reported, 73.4% ADRs were probable followed by 26.5% as possible in OPD, while in CCU, 71.4% ADRs were probable followed by 30% as possible.

At CIMS, modified Hartwing and Siegel scale was used for severity assessment of detected ADRs. Of the 64 ADRs assessed, 28.1% were moderate followed by 71.8% as mild in OPD, while in CCU 57.1% were moderate, 33.3% were mild and 9.5% were serious.

Preventability Assessment of Detected ADRs by Schumock and Thornton scale for preventability at CIMS showed that majority of the reactions were not preventable.
At CIMS, ambulance service aims to provide appropriate means for the transportation of patients who must be sent to other designated areas for special tests, procedures or advanced care or more importantly, for emergency cases to be brought into the hospital for treatment. At CIMS, after receiving the call in the shortest possible time, the ambulance reaches the place to rescue the patient/victim.

We have 4 ambulances including one Trauma ambulance with fixed ventilator unit, one CIMS Kids ambulance, and two general ambulances with two mobile ventilator units. Till now, 1724 trips have been made by our ambulances.

The demand for emergency ambulance services continues to increase each month, and as such, it becomes even more of a challenge to maintain the standards we wish to provide.

Ambulances are equipped with international quality instruments for international standards of service & care. The doctors on board are trained adequately experienced to handle all kinds of emergencies.
Volunteer Service and Spiritual Care

This unique unit of CIMS enrolls volunteers who offer selfless services willingly by contributing their valuable time, talent and commitment to build a stronger vision to bring a positive change in the patient; helping them to recover faster and overcome the “Loneliness Syndrome”, with their compassion and “Human Touch”.

In a day, the volunteer visits 20-30 patients depending upon the occupancy. These volunteers help the patient to overcome dejection and depression, reassuring and lending a patient hearing by interacting with a positive attitude.

These Volunteers

a. Extend friendly, comfortable and human touch approach to the patients and their families
b. Help to improve the quality of services and functions of the hospital by providing support to the staff
c. Provide moral and emotional support to the patient for a faster recovery

- The volunteers visit the patient’s rooms and wards, extend a warm “Human Touch” by talking to them in a very pleasant and friendly manner.
- Comfort the patient and help them by providing full co-operation and support helping to make their hospital stay comfortable.
- In case of any complain, suggestion or special requirement, the volunteer forwards it to the concerned department and also ensures that timely care is provided.

At CIMS Activities of Volunteer Service

- Flowers are given to each patient every day to uplift the patient’s mood.
- In the afternoon, along with the afternoon tea there is a “Magazines on Wheels”, round by the volunteers which distribute magazines to the patients as well their relatives.
- Periodically, yoga and meditation sessions are organized for the relatives of the patient to let them de-stress themselves.
- Health awareness and motivational talks by professionals are organized in the auditorium for everyone.
CIMS values the patient most. Patient care comes first and our commitment to them goes beyond providing the best care.

We aim to make their stay in the hospital pleasant and make continuous endeavors to create a highly comfortable ambience for them.

Patient experience is our prime importance in Hospital's strategic plan to improve clinical outcomes, quality, and safety.

Patient experience is a key component of CIMS.
What our patients say about us...

😊 “I was to get married in near future & was diagnosed to have Mitral Stenosis. It was a great stress & shock to me. After getting MICS MVR, I am enjoying my marriage & life” - Shilpa

😊 I specially came from USA for MICS Bypass. Without bone cutting through 4 inch cut, my surgery was done. Now, I feel very happy and healthy and I am back to New Jersey and working within one month. - V. D.

😊 We stayed for 75 days here at CIMS and the entire stay was comfortable. We got immense co-operation from all the departments, whether dormitory, kitchen and undoubtedly the PCCU. The Nursing staff treated our patient with great calm and compassion. Our long stay with a 4 year child would have been disastrous, but the entire CIMS family looked after him and was vigilant. We owe a lot of gratitude towards entire CIMS family; even the guards were so co-operative. We wish all-round success to CIMS from the bottom of our heart. - A. S.

😊 Everything is the best beyond the expectation. Every employee has done his duty in a very polite, humane manner. I and other relatives were extremely satisfied with the services. All Doctors have performed very good duty and given the patient a new lease of life. Also, it is affordable along with systematic service and price. - V. T.

😊 I’m Ra’ad the father of patient Iman. I am unable to express my feelings, I did not imagine all what I have seen here, you are really angels of mercy. I express my special thanks to all doctors, nursing staff, administrations who saved my little daughter's life and gave a new life to my daughter. I shall forever remember the kindness and generosity at CIMS. I, my daughter were lucky, too lucky. You have wonderful foundation “CIMS”. All my people in Iraq need your science, expertise and the feelings you possess; sorry I cannot express enough. I can just express my thanks and gratefulness to all the people here. - R. M. A.
Thank you all and appreciate the service provided to me while being your patient. I was admitted on 26th May, 2011 with chest pain (thinking of it as normal acidity pain); within no time angiography was performed on me. To my surprise they found one of the arteries had a 100% blockage and so they took a prompt decision to perform angioplasty and thus saved me from a massive heart attack. I was in hospital for two days and on the day of my discharge on 28th May, 2011, it being my Birthday too, the staff arranged for a small Birthday celebration. They brought a cake and bouquet along with a gift for me which will be a life time remembrance to me. Thanks again to all the very good, smiling and caring staff that helped me out of the crisis and special thanks to my doctor. - **Y. C.**

The day we admitted my mother in law in at CIMS hospital, I felt so relaxed. From 2 months I was under mental stress, but after getting treatment here, services are so good that relatives do not have to worry about the patient. We feel so relax and peaceful. All the staff are so courteous and provide care time to time. The support that we received from staff is highly co-operative and best. This is the reason that patient recover faster and our happy when they go back home. Because of all this it is one of the best experience that I had and I am taking a very good image of this hospital along with me. – **T. P.**

I am very satisfied with the facilities provided by the hospital. The food provided by the hospital was very hygienic. I am going to refer CIMS hospital to all my known ones and family members – **N. V.**

Nursing Staff was very good. I am specially thankful to staff nurse. I am very impressed by her for her way of treatment and handling the situation with the patient. The hospital management staff was too much co-operative and helpful. Hospital management solved all the problems within 5 to 15 minutes. The overall facilities were very good. He always has a smiling face which helps a lot for the cure of the patient. He is good and friendly enough towards the patient and we felt it 8 years back during the treatment of my mother and he has the same good nature this time too. I pray God for his long, healthy, happy and peaceful life. I also pray to God to fulfill all his good desires. I am also thankful our family doctor for his caring and his suggestion for further treatment with doctor – **S. V.**
It is really very calm and cool among the hospitals I have visited and experienced so far. It not only lowers your anxiety but the place has got vibrations in terms of spirituality. God bless all. – Vasantbhai

Save my daughter for heart surgery. Excellent doctor and good guide line. Good care by nursing and ICU staffs Thanks.. – D. P.

CIMS hospital provides exceptional service and medical care. My Father was admitted in CIMS hospital. Doctor has been outstanding in providing treatment, the facilities at the hospital is one of the best in the country. The staff has been trained very well to deal in all situations, and have treated us as being at home. - Hemal

In keeping with today's times, CIMS Hospital adopts innovative technology. Right from the topmost to the lowest level, the management is very good, making it comparable to hospitals in developed countries - Navin

Services of hospital are fast. There is no need to go outside as all facilities are available in the hospital. Doctor explained the entire treatment so nicely and done the treatment in the same way as he had explained to us. Such a nice hospital with a pleasant atmosphere and even the entire hospital staff is good. - D. R.

Doctors are excellent. Services of the hospital are good. Nursing staff was good. Cleanliness is there in the hospital. The overall facilities were good. - K. M.

We are satisfied with the overall services. Satisfied with the Nursing staff. And Food services was A-ONE as per quality. The overall experience with Cardiologists has been excellent. - N. D. K.
CIMS Hospital Dictates its Ethical Standards Through

Independent Ethics Committee of Care Institute of Medical Sciences

Institutional Review Board (IRB) Registration No. : IORG0006900
The IRB/IEC reviews and approves clinical trials and research studies following well defined SOP’s as per ICH GCP, ICMR and Schedule Y Guidelines

The Ethical Committee is

- Well constituted
- Regular meetings
- Open discussion

EC of CIMS registered by U.S. Department of Health and Human Services (HHS)

CIMS Hospital Ethics Committee

In house Hospital Ethics Committee monitors requirements and responsibilities of physician towards patient care besides checking overall hospital performance.

Scope of Hospital Ethics Committee

- Monitoring hospital practice as per code of medical ethics, 2002
- To resolve potential conflict of ethical issues and practice
- Provide opinion on hospital related ethical matters
CIMS Innovation Centre is Actively Involved in Basic and Clinical Research.

Vision
To foster basic and applied medical and health related research projects, research publication and education evolving into an internationally recognized multifarious medical science centre:

- Addressing clinical, behavioral, and social determinants of health
- Promoting interactions among medical scientists exploring diverse specializations
- Encouraging collaboration, effective partnerships with national and international research institutions, research agencies, funding bodies/sponsors and benefactors
- Achieving health equity in outcomes and access to care with a population-based impact
- Creating a more unified, supportive, healthy and inclusive community

With a strong advisory board, CIMS Innovation Centre aims to:
1. Design Indian guidelines for various diseases and help researchers to make international publication
2. Provide training to people for treatment of patients
3. Create a pool of well trained and highly ethical assistant doctors nurses, pharmacist and other allied healthcare workers. This can be achieved by offering variety of courses on site and online
4. Explore, disseminate, direct and guide Indian health sciences to promote international scientific publication through research and education

CIMS Research and Innovation Centre has completed 35 research projects and 20 are ongoing. These projects are related to basic and clinical sciences. The research centre is recognized by Gujarat Forensic Science University (UGC approved).

The centre has collaborated with Gujarat Forensic Science University for conducting course on Post Graduate Diploma in Hospital Management.
Orbital Atherectomy System in Treating Calcified Coronary Lesions: First in Man Assessment- 3 Year Follow Up

3 year followup orbit trial was conducted at CIMS to evaluate the safety and performance of the Diamondback 360 Orbital Atherectomy System (OAS) (Cardiovascular Systems, Inc., St. Paul, MN, USA) for the treatment of calcified coronary lesions. Of the 33 patients, 90.90% (n=30/33) were males with an average age of 54.9 years. The ACC/AHA lesion class was: Type A 6.06% (n=2/33); Type B1 33.33% (n=11/33); Type B2 60.60% (n=20/33). The % diameter stenosis was 85.75%; lesion length was 15.90 mm. The procedural success was 97% (32/33) with one case where IVUS/device was not able to cross the lesion due to severe calcification. This case series demonstrates that OAS safely and effectively modified calcified lesions and facilitated stent delivery in this difficult-to-treat plaque morphology, which continues up to three years post-procedure.

A Six Year's Clinical Experience Evaluating the Safety of Neovasc Reducer for No Option Patients

Ten patients implanted with CS ReducerTM in 2005 were considered for six years follow-up study at CIMS. At post-implantation 6 year follow-up, no deaths, MI or adverse events were reported among all ten patients enrolled in the study. At 6 year follow-up, Seattle Angina Questionnaire score for the four domains including physical limitation, angina frequency, treatment satisfaction, and QoL demonstrated significant improvement as compared to baseline for patients with chronic refractory angina patients with no option for coronary revascularization.

Remon CHF, Better Care for Congestive Heart Failure Patients

This study demonstrated the safety, functionality and accuracy of the RemonCHF implant for 6 months in the right pulmonary artery of 10 patients, using RemonCHF delivery system followed at CIMS. Implantation was successful in all 10 patients. The pressure curves, collected simultaneously from the RemonCHF implant and the Millar pressure catheter, were almost identical and are equivalent for all practical clinical purposes. Accuracy was measured using the Millar pressure catheter as the control article. Bland Altman analysis of the 6 months data showed that the mean difference between the RemonCHF and the Millar pressure measurements was 0.81mmHg with a SD of 1.9mmHg. All study endpoints, primary and secondary were met. No device related adverse event occurred in any of the patient during the study and until the study report date, 10 months from implantation.
Gender Related Disparity In Cardiovascular Risk Factors and Treatment Option: An Indian Scenario

A total of 10,450 consecutive CVD patients were enrolled at CIMS. Of these, 8744 (83.67%) were males and 1706 (16.33%) were females. Prevalence of CVD was higher in urban female subjects whereas it was higher in males in rural areas. As compared to males, female population had an increased prevalence of hypertension, diabetes and family history; while male population had smoking as a contributable risk factor. Obesity contributed equally as a risk factor to both male and female subjects. Treatment options like CABG and PCI were higher in males as compared to female subjects where medical therapy was the preferred option irrespective of the contributing/confounding factors. Gender related wide differences to testing, prevention and availed treatment options prevail in Indian CVD patients.

Correlation Between Depression and Cardiovascular Disease

A total of 948 consecutive CVD patients were enrolled in the study. Of these, 39.45% patients depicted depression (MADRS score > 6), while 60.55% had a MADRS score less than 6. Prevalence of depression was higher in males as compared to females. Of the patients with MADRS score >6, 52.94% were hypertensive, 33.42% were diabetic, and 25.67% had myocardial infarction. Socioeconomic data of 710 patients revealed that depression was higher in males, uneducated, unemployed, rural subjects and subjects with monthly income less than 10,000 rupees.

Pharmacoeconomic Analysis, Clinical Outcomes and Quality of Life Assessment between Medication Therapy and Drug Eluting Stent in Single Vessel Blockade Patients

A total of 164 ACS patients suffering from single vessel blockade were analyzed at CIMS. Effectiveness of medicines and stent deployment was calculated to be 2.53 QALYs and 3.00 QALYs respectively. MACE in medical therapy and stent receiving group were 47.56% (n=39) and 34.14% (n=28), respectively. Cost effectiveness analysis suggested the average cost of the stent and medical therapy as Rs. 1, 38,206 (n=17) and Rs. 22,610 (n=17), respectively. The clinical outcome results show that the MACE events were lower in stent therapy group as compared to medical therapy group.
Evaluation of Antidepressant Activity of Phosphodiesterase III Inhibitor Cilostazol in CVD Patients
Of the total 22 patients, 17 patients at CIMS depicted mild (Score 7-19) depression while 5 patients depicted moderate (Score 20-34) depression. In cilostazol treated arm, baseline MADRS score was 15.18±4.75. There was complete remission rate with MADRS score of < 8 in all patients at the end of cilostazol treatment phase as compared to baseline, with a follow up (exit score) MADRS score of 3.86±2.05. In control arm baseline MADRS score was 15.38±5.08 with a follow up MADRS score of 6.90±3.51. Cilostazol possesses antidepressant effect as evidenced through decrease in MADRS scoring as compared to baseline ratings and compared to control.

To Study Correlation between Insulin Resistance and Altered Thyroid State
In a clinical study at CIMS there was significant increase in the HOMA-IR in hyperthyroid patients and hypothyroid group as compared to control group suggesting development of insulin resistance. Also the insulin levels were significantly higher in hyperthyroid and hypothyroid group as compared to control group.

Effect of Metoprolol CR/XL on Pulmonary Artery Pressure in Chronic Heart Failure Patients Assessed by an Implanted Ultrasonic Device with Special Emphasis on Diurnal Variation and Exercise Capacity
We evaluated the impact of Metoprolol CR/XL on the diurnal and exercise induced variation on Pulmonary Artery Pressure (PAP) in patients with Chronic Heart Failure (CHF) by implanted ultrasonic device. Slow and careful uptitration of MXL with simultaneous non-invasive monitoring of PAP may benefit in nocturnal rise and exercise capacity in CHF patients.

Incidence of Renal Dysfunction in CABG in Patients: Correlation with Diabetes and Hypertension
A total 238 patients with CABG at CIMS were enrolled. Of these, 54.20% patients had hypertension, 37.81% patients had diabetes and 24.37% patients had both. Out of these 238 patients, 15.96% patients had renal dysfunction (serum creatinine >1.5mg/dl) after surgery in which 75.67% patients had hypertension and 51.35 patients had diabetes. Chronic history of diabetes and hypertension are a significant risk factor for the development of acute renal dysfunction post CABG.
Correlation of Affective Disorders and CVD and Effect of Cardiac Rehabilitation on QoL

Socioeconomic data of 644 CVD patients at CIMS revealed that depression and anxiety were higher in uneducated, unemployed, rural subjects and subjects with monthly income less than 10,000 rupees. Following cardiac rehabilitation, significant improvement was observed in Quality of Life (QoL) of patients after 1 month compared to baseline.

Evaluation of Prescribing Pattern of Statins In Cardiovascular Disease

A total of 8,201 patients were enrolled at CIMS. Of these, males were prescribed more statin therapy compared to females. The different statins prescribed were atorvastatin (6527), rosuvastatin (1441), and simvastatin (233). Of patients prescribed atorvastatin, majority of patients were prescribed 5 mg followed by 40 mg and 10 mg. According to Framingham risk score, majority of patients were having moderately high risk for CVD. Statin therapy showed benefits in diabetic patients, also. Statin therapy demonstrated improvement in clinical outcome as well as quality of life of patients.

To Study Medication Adherence in Patients with Hypertension and/or Hyperlipidemia

A total of 1000 patients were enrolled at CIMS. Rate of adherence was assessed by Modified Morisky Adherence Scale (MMAS). Personality traits of the patients and reason for non-adherence were studied using Myers-Briggs Type Indicator (MBTI). The percentage of non-adherence was 41.6% (MMAS score < 80%). Of these, 75.8% were males and 24.1% were females. Non adherence was higher in Type A1 and A2 personality compared to other types of personality. The most prevalent causes of non-adherence were taking too many medications (45.8%), lack of understanding of medication (45.1%), change of routine (41.8%), forgetfulness (30.7%), no good reason (28.7%), side effect (24.7%), traveling (16.4%), misplacing of medication (13.6%), carelessness (8.5%), cost of medication (4.1%). All patients showed improvement in their medication adherence following counseling.
We believe every human being has a fundamental right of access to medical treatment.

India is a host to a multitude of health problems coupled with a vast class of people who cannot afford medical treatment.

In India, every year 200 thousand children are born with congenital heart defects. Only 2.5% get diagnosed and corrected, while the rest remain untreated due to lack of diagnosis and financial resources. Same is the case of adult population, wherein a majority remains untreated due to the same reasons.

Scope of CIMS Philanthropy

- Aid people who do not undergo medical care due to financial constraints
- Invest in innovations, research, education and healthcare
- Provide immediate and direct physical support including medical care, food, clothing, clean drinking water, psychosocial counseling
- Establish regular mobile medical clinics to provide medical assistance at doorstep in the rural areas
- Establish and execute preventive medical programs like- Health awareness camps, Preventive cardiology, Diabetes Programs, Cancer Screening Programs
- Collaborate with other NGOs of good reputation for overall community development
- Hospice – End of Life Care: Provide extra care and concern for patients with advanced stage diseases, where cure is not possible. Extend emotional support as well
- Create a pool of well trained and highly ethical assistants to doctors, nurses, pharmacists and other allied health care workers
- Design appropriate guidelines for holistic treatment of patients

CIMS has set up three Foundations is an effort to contribute to the cause of medical welfare.
\`Charity begins at home.\'

CIMS Foundation is set up with contributions from the medical directors of the Hospital. The Foundation is set up:

- To provide full/partial financial help to needy patients
- To provide ambulance services to needy patients
- To pursue research in the field of medicine and surgery
- To undertake health awareness programs throughout the state of Gujarat

**CIMS KIDS FOUNDATION**

Set up with the assistance of Reeta Keyur Parikh Foundation, this is a special Foundation to care for infants and the very young to create a healthier tomorrow.

The Foundation is an attempt to help those very young lives who lack finance to acquire the right medical treatment.

The Foundation is set up:

- To aid infants or young kids who are unable to afford or procure medical aid by giving them the right and quality medical care.
- To provide ambulance services
- To work for prevention and early detection of illness in children
TRAUMA FOUNDATION

Trauma (injury) is the leading cause of death and disability in young and active population.

Set up with the assistance of Palash Patel Foundation, the Foundation is set up to provide rapid and right medical treatment to the injured.

The Foundation is set up
- To provide swift transport to trauma victims without delay
- To provide full/partial financial help to needy patients so that no life would be lost due to financial constraints.

All the funds for philanthropy for the three Foundations would be availed from
- Individuals in India or abroad
- Corporate bodies in public or private sector
- Other non–corporate philanthropic organization, in India or abroad
- Corporates /Individuals who will provide medical equipment’s, Drugs, or likewise as allowed or permissible by Indian Laws

CIMS welcomes all contributions in the form of cheque/draft/wire transfer in favour of “CIMS FOUNDATION”.

All the contributions to any of the three foundations will be routed through CIMS FOUNDATION.

Please indicate your contribution to the desired Foundation.
There are no full stops in education.

A relentless pursuit of the latest and being update with newer innovations in the medical field drives us to plan, organize and manage various educational forums.

Education for Innovation

We are firmly committed to the application of newer and innovative medical techniques for improved patient care. CIMS regularly organizes CMEs, workshops, etc. to acquaint our doctors with the latest technology and techniques in the field of medicine and surgery.

As a part and process of education, we are proud of our annual mega educational event—CIMS-CON (www.cimscon.com), an annual conference targeted at physicians showcasing advances in medicine and surgery. Addressed by leading international and national medical luminaries, the Conference is a result of an unwavering passion to educate all.
**Cardiology**
- Dr. Anish Chandarana
- Dr. Ajay Naik
- Dr. Satya Gupta
- Dr. Joyal Shah
- Dr. Gunvant Patel
- Dr. Keyur Parikh
- Dr. Milan Chag
- Dr. Urmil Shah
- Dr. Hemang Baxi

**Cardiac Electrophysiology**
- Dr. Ajay Naik

**Cardiovascular Surgery**
- Dr. Dhiren Shah
- Dr. Dhaval Naik
- Dr. Dipesh Shah

**Pediatric & Structural Heart Surgery**
- Dr. Shaunik Shah
- Dr. Ashutosh Singh

**Cardiac Anaesthesiology**
- Dr. Niren Bhavsar
- Dr. Hiren Dholakia
- Dr. Chintan Sheth

**Vascular & Endovascular Surgery**
- Dr. Srujal Shah
- Dr. Kiran Dave
- Dr. Rajesh Hydrabadi

**Orthopedics**
- Dr. Amir Sanghavi
- Dr. Ateet Sharma
- Dr. Hemang Ambani
- Dr. Chirag Patel
- Dr. Kartik Patel
- Dr. Prakash Amin
- Dr. Harshad Bhalodiya
- Dr. Deepak Dave
- Dr. Saurabh Goyal
- Dr. Bhavesh Jesalpura
- Dr. Yogesh Kapadia
- Dr. Hasmukh Kubavat
- Dr. Sunil Maheshwari
- Dr. Dimple Parekh
- Dr. Mahipatsingh Parmar
- Dr. Jitendra Parmar
- Dr. Bhavin Patel
- Dr. Hitendra Patel
- Dr. Jyotish Patel
- Dr. Kamlesh Patel
- Dr. Satish Patel
- Dr. Viren Rajyaguru
- Dr. Ashvin Sardhara
- Dr. Ajay Shah
- Dr. Darshan Shah
- Dr. Jigar Shah
- Dr. Mukesh Shah
- Dr. Manish Shah
- Dr. Saurabh Shah
- Dr. Daria Singh
- Dr. Ketan Thaker
- Dr. Navin Thakkar

**Pediatric Cardiology**
- Dr. Kashyap Sheth
- Dr. Milan Chag

**Neonatology and Pediatric Intensive Care**
- Dr. Amit Chitaliya
- Dr. Rajesh Maheshwari
- Dr. Rahul Tandon

**Critical Care**
- Dr. Vipul Thakkar
- Dr. Bhagyesh Shah
- Dr. Harshal Thaker
- Dr. Dhanashri Atre Singh

**Trauma Centre**
- Dr. Sanjay Shah

---

*Visiting Consultant(s)/Surgeon(s) (alphabetically)*

We apologise for any inadvertent omission of visiting consultant(s)/surgeon(s) names. We would appreciate if any missed name is brought to our notice.
## Oncosurgery
- Dr. Ashok Patel
- Dr. Jayesh D (J.D.) Patel
- Dr. Jayesh V Patel
- Dr. Natubhai Patel
- Dr. Dhaval Rajde
- Dr. Laxmidhar Murtuza
- Dr. Chaitanya Shroff
- Dr. Anjana Chauhan
- Dr. Somesh Chandra
- Dr. Darshil Dalal
- Dr. Kiran Kothari
- Dr. Kaustubh Patel
- Dr. Mahesh Patel
- Dr. Shakuntala Shah
- Dr. Hemant Shukla

## Neurosurgery
- Dr. Parimal Tripathi
- Dr. Mukesh Patel
- Dr. Y.C. Shah
- Dr. Navin Patel
- Dr. Vipul Amin
- Dr. Somesh Desai
- Dr. Dipak Patel
- Dr. Harshil Shah
- Dr. Sandeep Shah
- Dr. Ashok Somani

## Pediatric Surgery
- Dr. Keyur Bhalawat
- Dr. Hitesh Gandhi
- Dr. Jayul Kamdar
- Dr. Amar Shah
- Dr. Parthiv Shah
- Dr. Krunal Sheth

## Pediatric Uro Surgery
- Dr. Raj Shah

## Thoracic Surgery
- Dr. Dhaval Naik
- Dr. Rajesh Hydrabadi
- Dr. Pranav Modi

## Gastrointestinal Surgery
- Dr. Kaushal Anand
- Dr. Mahendra Bhavsar
- Dr. Hitesh Chavda
- Dr. Premal Desai
- Dr. Manish Gandhi
- Dr. Bhavin Patel
- Dr. Rajesh Shukla
- Dr. Rashmi Thakkar

## Gastroenterology
- Dr. Rajiv Bansal
- Dr. Jay Bhatt
- Dr. Manish Bhatnagar
- Dr. Manoj Ghoda
- Dr. Nilay Mehta
- Dr. Yatin Patel
- Dr. Sudhanshu Patwari
- Dr. Umang Rathi
- Dr. Sanjay Rajput
- Dr. Kaushal Vyas

*Visiting Consultant(s)/Surgeon(s) (alphabetically)

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<table>
<thead>
<tr>
<th>Bariatric and GI Surgery</th>
<th>Obstetric and Gynecology</th>
<th>Plastic Surgery</th>
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<tbody>
<tr>
<td>* Dr. Manoj Agrawal</td>
<td>* Dr. Prashant Acharya</td>
<td>* Dr. Hemen Jaju</td>
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<td>* Dr. Digvijaysingh Bedi</td>
<td>* Dr. Rajni Asthana</td>
<td>* Dr. Ashwin Lakhani</td>
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<td>* Dr. Manish Khaitan</td>
<td>* Dr. Kashmira Chhatrapati</td>
<td>* Dr. Bijal Parikh</td>
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<td>* Dr. Yogendra Jhala</td>
<td>* Dr. Chintan Patel</td>
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<td>* Dr. Vishal Patel</td>
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<td>* Dr. Pinky Naik</td>
<td>* Dr. Shailendra Singh</td>
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<td>* Dr. Rajesh Punjabi</td>
<td>* Dr. Shishir Shah</td>
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<td>* Dr. Arunkumar Patel</td>
<td>* Dr. Dilip Trivedi</td>
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<td>* Dr. Falguni Patel</td>
<td>* Dr. Himanshu Vora</td>
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<td>* Dr. Tejanshu Shah</td>
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<tr>
<th>Urology</th>
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<tr>
<td>* Dr. Himanshu Shah</td>
<td>* Dr. Bharat Dave</td>
<td>* Dr. Manish N. Goyal</td>
<td>* Dr. Hemaxi Ambani</td>
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<td>* Dr. Sharad Dodia</td>
<td>* Dr. Subir Jhaveri</td>
<td>* Dr. Rajiv Jha</td>
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<td>* Dr. Ketan Shukla</td>
<td>* Dr. Jayprakash Modi</td>
<td>* Dr. Manish Ninama</td>
<td>* Dr. Hitesh Modi</td>
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<td>* Dr. Hemang Baxi</td>
<td>* Dr. Hitesh Modi</td>
<td>* Dr. Mihir Mehta</td>
<td>* Dr. Tarak Patel</td>
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<td>* Dr. Janak Desai</td>
<td>* Dr. Biren Shah</td>
<td>* Dr. Navin K. Patel</td>
<td>* Dr. Shaishav Sakhidas</td>
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<td>* Dr. Gaurang Kadam</td>
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<td>* Dr. Mehul Pujara</td>
<td>* Dr. Monark Shah</td>
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<table>
<thead>
<tr>
<th>Department</th>
<th>Qualifying Medical Practitioners</th>
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<tbody>
<tr>
<td><strong>Nephrology</strong></td>
<td><em>Dr. Sonal Dalal</em>&lt;br&gt;<em>Dr. Prakash Darji</em>&lt;br&gt;<em>Dr. Subhramanyam Iyar</em>&lt;br&gt;<em>Dr. Manthan Kansara</em>&lt;br&gt;<em>Dr. Rajkumar Mandot</em>&lt;br&gt;<em>Dr. Bhavin Mehtalia</em>&lt;br&gt;<em>Dr. Apurva Parekh</em>&lt;br&gt;<em>Dr. Himanshu Patel</em>&lt;br&gt;<em>Dr. Jagdeep Shah</em>&lt;br&gt;<em>Dr. Javed Vakil</em></td>
</tr>
<tr>
<td><strong>Intensive Care</strong></td>
<td><em>Dr. Pratibha Dileep</em>&lt;br&gt;<em>Dr. Rajesh Mishra</em>&lt;br&gt;<em>Dr. Tejas Padodra</em></td>
</tr>
<tr>
<td><strong>Radiology</strong></td>
<td><em>Dr. Kirtan Shah</em>&lt;br&gt;<em>Dr. Jaimin Shah</em>&lt;br&gt;<em>Dr. Parag Sheth</em></td>
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<tr>
<td><strong>Dentistry</strong></td>
<td><em>Dr. Parvin Chandarana</em></td>
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<tr>
<td><strong>Pathology</strong></td>
<td><em>Dr. Manisha Shah</em>&lt;br&gt;<em>Dr. Jitendra Nayak</em>&lt;br&gt;<em>Dr. Dhaval Nathwani</em></td>
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<tr>
<td><strong>Microbiology</strong></td>
<td><em>Dr. Bhavini S. Shah</em></td>
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</tbody>
</table>

CIMS invites visiting qualified surgeons/doctors to use our facilities. Please contact Dr. Nimish Parikh (M) +91-97277 51820

*Visiting Consultant(s)/Surgeon(s) (alphabetically)*

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<table>
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<tr>
<th>No.</th>
<th>Department</th>
<th>Person</th>
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<tbody>
<tr>
<td>1)</td>
<td>Clinical Care:</td>
<td>Dr. Nimish Parikh</td>
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<tr>
<td></td>
<td></td>
<td>Head - Clinical Services</td>
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<tr>
<td></td>
<td></td>
<td>email: <a href="mailto:nimish.parikh@cimshospital.org">nimish.parikh@cimshospital.org</a></td>
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<tr>
<td>2)</td>
<td>Hospitality and Administration:</td>
<td>Mr. Rajesh Pandya</td>
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<tr>
<td></td>
<td></td>
<td>General Manager – Hospitality and Administration</td>
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<tr>
<td></td>
<td></td>
<td>email: <a href="mailto:rajesh.pandya@cimshospital.org">rajesh.pandya@cimshospital.org</a></td>
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<td>3)</td>
<td>Communications:</td>
<td>Ms. Preeta Chag</td>
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<td></td>
<td></td>
<td>Director – Communications and Marketing</td>
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<tr>
<td></td>
<td></td>
<td>email: <a href="mailto:preeta.chag@cims.me">preeta.chag@cims.me</a></td>
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<td>4)</td>
<td>Education and Academics:</td>
<td>Ms. Komal Shah</td>
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<td></td>
<td></td>
<td>Manager – Education</td>
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<tr>
<td></td>
<td></td>
<td>email: <a href="mailto:komal.shah@cimshospital.org">komal.shah@cimshospital.org</a></td>
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<td>5)</td>
<td>CIMS Innovation Centre</td>
<td>Dr. Keyur Parikh</td>
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<td></td>
<td></td>
<td>Chairman, CIMS Hospital</td>
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<tr>
<td></td>
<td></td>
<td>email: <a href="mailto:keyur.parikh@cims.me">keyur.parikh@cims.me</a></td>
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<td></td>
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<td>Dr. Parloop Bhatt</td>
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<td></td>
<td>Advisory Member</td>
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<td></td>
<td></td>
<td>email: <a href="mailto:parloop.bhatt@cimshospital.org">parloop.bhatt@cimshospital.org</a></td>
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<td>6)</td>
<td>IT Department</td>
<td>Shivam Parikh</td>
</tr>
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<td></td>
<td></td>
<td>Head, I. T. Department</td>
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<tr>
<td></td>
<td></td>
<td>email: <a href="mailto:shivam.parikh@cimshospital.org">shivam.parikh@cimshospital.org</a></td>
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</table>
CIMS Hospital has proudly launched CIMS Clinic at Maninagar, Ahmedabad

CIMS Clinics at Maninagar is well equipped with basic investigation facilities like Echocardiography, TMT, pathology, etc. CIMS has embarked on this venture to provide quality healthcare services to all citizens of Ahmedabad.

OPD services of various departments include:

- Cardiology
- Cardiothoracic and Vascular Surgery
- Critical Care
- ENT
- Gastroenterology
- General Surgery
- Gynecology and Obstetrics
- Infectious Disease
- Neonatalogy and Pediatrics
- Nephrology
- Neurology
- Neurosurgery
- Obesity/Bariatric Surgery
- Oncology
- Oncosurgery
- Orthopedics
- Pain Management
- Pediatric Cardiology
- Pediatric Surgery
- Plastic Surgery
- Pulmonology
- Spine Surgery
- Trauma Care
- Urology and Urosurgery
- Pathology
- Radiology
A Green Hospital
Tenets of CIMS Hospital

Keeping in line with our vision, mission and values we have established a set of tenets to attain the highest levels of efficiency and create a system of providing the highest quality and safest patient care.

- **Patient Care**
  Access and implementation of the most advanced evidenced-based patient care protocols.

- **Technology**
  Patient’s expectation of the most advanced technology and treatments fulfilled. CIMS Hospital has access to many new devices and therapeutics—many of them developed by CIMS Hospital staff. We value new technology and put it to work for patients.

- **Support Team**
  Supported by the most skilled and qualified support team, we recruit skilled and qualified surgical assistants, percussionists and mid-level caregivers and help them deliver high standards of excellence.

- **Resource Management**
  We have a lean, powerful operation to maximally utilize institutional and community resources. We track expenses, maximize resources, standardize purchasing, and get the most out of the supplies.

- **Education**
  Our staff needs to be up-to-date in the fast moving medical specialties. CIMS Hospital operates one of the largest continuing medical education programs. We conduct one-to-one training or continuing education in new technologies, procedure and techniques. For our patients, we offer comprehensive, branded, patient education materials in every media.

- **Risk Management**
  We are prepared for the unexpected. We integrate quality, legal risk management and insurance activities into all areas of health care program. We have strategies to prevent loss, monitor sentinel events, detect near misses, intervene early and profile complaints.

- **Personnel Management**
  We appoint team-building Medical Directors who support our mission and work effectively with staff and administration.

- **Data Management**
  Our programs run on data. We have established data management processes, which help identify relevant data, collect it, collate it, and put it to use for cost savings, quality improvement, safety, compliance and review. We build a quality dashboard to monitor progress towards our goals.

- **Space Management**
  We get the maximum value of our real estate. Few Centres can equal CIMS Hospital’s experience in building state-of-the-art facilities and planning new operating rooms and procedure rooms. Our space-planning experts have organized our clinical areas for efficiency and ease-of-use.

- **Philanthropy**
  The community and grateful patients help you achieve our goals. We practice philanthropic support to our hospital’s mission.
<table>
<thead>
<tr>
<th>No.</th>
<th>Author(s)</th>
<th>Title</th>
<th>Journal/Year</th>
<th>Pages/Volume</th>
</tr>
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<tbody>
<tr>
<td>46.</td>
<td>Gupta S.</td>
<td>Utility of N-Terminus of the Precursor Brain Natriuretic Peptide in identifying left ventricular dysfunction.</td>
<td>Indian Heart Journal 2002; 54:559.</td>
<td></td>
</tr>
</tbody>
</table>

At CIMS... we care

Gupta S. In hospital mortality and 30-day events in patients with acute STEMI presenting to a tertiary care Centre. Indian Heart J 2003;55:462

Gupta S. Role of NTproBNP for the diagnosis of LV systolic and diastolic dysfunction. Indian Heart J 2003;55:466

Gupta S. Cutting balloon angioplasty of obstructive lesions in Takayasu’s arteritis yields exceptional results. Indian Heart J 2003;55:476

Gupta S. Frequency of angiographically significant CAD in patients with RHD. Indian Heart J 2003;55:578


Gupta S. Profile of Myocardial Infarction in Young Indian Patients. Indian Heart J 2004; 56:406.


Gupta S. Profile of coronary artery disease in Indian women. Indian Heart J 2004; 56:407.

Gupta S. Target lipid levels and Statins. Indian Heart J 2004; 56:557.

Gupta S. Comparison of echocardiographic left ventricular dimension with plasma levels of NTproBNP. Presented at 9th Annual conference of Indian academy of echocardiography and international conference on advances in cardiology. 13th-15th Feb 2004, Bhubaneswar.


Gupta S. Mortality and morbidity due to acute ST segment elevation myocardial infarction in the current era. Indian Heart J 2004;56:210-214.


Gupta S. Blood filled cysts of heart. Indian Heart J 2004;56:174-175.


112. KH Parikh, AM Naik, HA Baxi, MC Chag, UG Shah, AH Chandarana, et al. First In Man Non-Invasive Monitoring of Pulmonary Artery Pressure from an


134. Keyur Parikh, et al. Randomized, Multi-centric, Open Label Study to Evaluate Safety and Efficacy of Faximab®, A Biosimilar Abciximab in Indian Patients Undergoing Percutaneous Coronary Intervention. Submitted to Indian Heart Journal in August 2008.
151. Parikh KH, Bhatt PA, et al. Study to Evaluate Safety and Efficacy of Bare Metal Stent and Zotarolimus Eluting Stent. Poster Session at the 61st Indian Pharmaceutical Congress, on Dec. 11 – 13, 2009, at the Nirma University of Science and Technology, Ahmedabad, India.

152. Parikh KH, Bhatt PA, et al. To evaluate the comparative efficacy of angiotensin receptor blocker in acute coronary syndrome patients following medicated and non-medicated coronary stent implantation. Poster Session at the 61st Indian Pharmaceutical Congress, on Dec. 11 – 13, 2009, at the Nirma University of Science and Technology, Ahmedabad, India.


154. Parikh KH, Bhatt PA, et al. Pharmacoeconomic analysis, clinical outcomes and quality of life assessment between medication therapy and drug eluting stent in single vessel blockade patients. Poster Session at the 61st Indian Pharmaceutical Congress, on Dec. 11 – 13, 2009, at the Nirma University of Science and Technology, Ahmedabad, India.


Satya Gupta, Ajay Naik, Hemang Baxi, Urmil Shah, Anish Chandarana, Keyur Parikh, et al. Transient Heart Rate Responses to Transitions in Posture in Ambulatory Heart Failure Patients are Correlated to BNP. Heart Failure Society of America 2011 HFSA Abstract Number – 150398.
Keyur Parikh. Use of Extraction Devices in Acute Myocardial Infarction- Are we there or do we need More Trials? Abstract Book of ICI Meeting, 6th December 2011, Israel.
Keyur Parikh, Parloop Bhatt. Correlation between Insulin Resistance and Altered Thyroid State. Abstract Accepted; CSI, 8-11 December 2011, Mumbai, India
Keyur Parikh. Parloop Bhatt, JL Mehta, Abhishek Deshmukh. Correlation between Depression and Cardiovascular Disease. Abstract Accepted; CSI, 8-11 December 2011, Mumbai, India.
CIMS Hospital:
Nr. Shukan Mall, Off Science City Road, Sola, Ahmedabad-380060, Gujarat, INDIA.
Ph.: +91-79-2771 2771-75 (5 lines) Fax: +91-79-2771 2770
For appointment call: +91-79-3010 1200, 3010 1008
(M) +91-98250 66661 or email on: opd.rec@cimshospital.org
www.cims.me

CIMS Clinic (Maninagar):
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