

# Healthy Heart

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**Honorary Editor :**  
Dr. Milan Chag



## From the Desk of Hon. Editor:

Dear Friends,

Atrial Fibrillation (AF) is the most common arrhythmia in clinical practice affecting approximately 9 million people in US and Europe and may be an equal number of patients in the rest of the world. AF increases the risk of stroke by 5 fold and to decrease this risk, such patients need long-term Oral AntiCoagulant (OAC) therapy if stroke risk is intermediate or high as assessed by CHA2DS2-VASc score. For patients who cannot tolerate OAC or has suboptimal INR control or has contraindications for that, there is new ray of hope in form of percutaneously insertable novel left atrial appendage occluding device which is now approved by US-FDA for suitable patients.

- Dr. Milan Chag

## Left Atrial Appendage Closure: A Novel, Approved Therapy for Atrial Fibrillation and Stroke Risk Reduction

### What is risk of stroke in patients with Atrial Fibrillation?

Atrial fibrillation is the most common arrhythmia treated in clinical practice. Patients with AF have a 5 times increased risk of stroke and two fold increase risk of all-cause mortality (Figure 1). AF-related strokes are more frequently fatal and disabling. Approximately half of acute stroke victims will die or live with a significant disability, which may result in institutional care.

The major goal of therapy is to prevent

thrombo-embolic complications such as stroke. Warfarin is more effective than Aspirin to prevent this. However, despite its proven efficacy, long-term warfarin therapy is not well-tolerated by some patients and carries a significant risk for bleeding complications.

Therefore, it is useful to risk stratify patients with AF to identify appropriate candidates for long-term oral anticoagulant therapy. Simple and most widely used risk score is CHA2DS2-VASc score (Figure 2). If score is 2 or more,

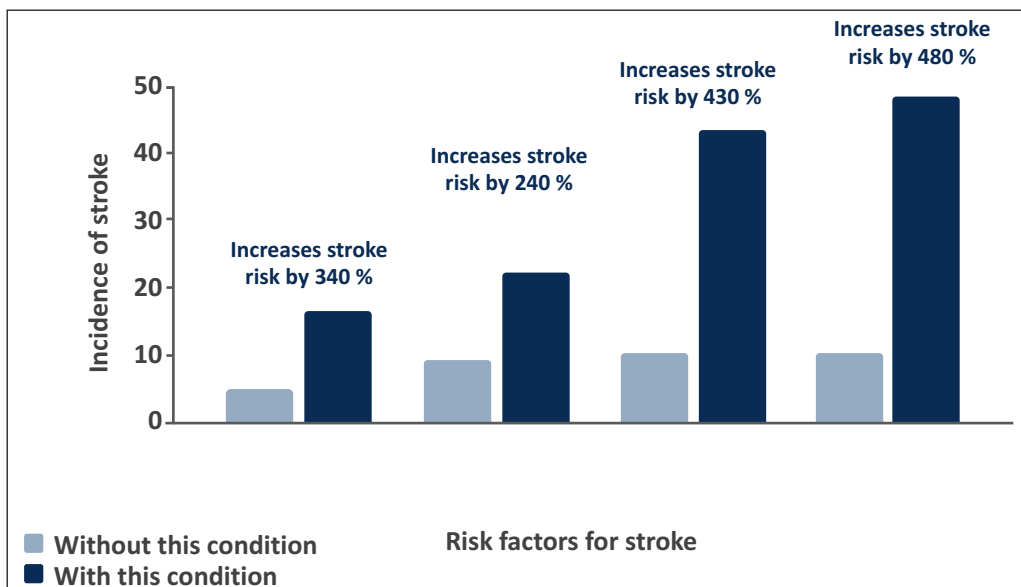


Figure-1

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### Thrombo-embolic risk : CHA<sub>2</sub> DS<sub>2</sub>-VASc Score

Letter	Risk factor	Score
C	Congestive heart failure/LV dysfunction	1
H	Hypertension	1
A <sub>2</sub>	Age ≥75	2
D	Diabetes mellitus	1
S <sub>2</sub>	Stroke/TIA/thrombo-embolism	2
V	Vascular disease	1
A	Age 65–74	1
Sc	Sex category (i.e. female sex)	1
<b>TOTAL (maximum 9)</b>		

Stroke rate (%/year) by score	0	1	2	3	4	5	6	7	8	9
	0.0	1.3	2.2	3.2	4.0	6.7	9.8	9.6	6.7	15.2

Lip GY et al, Chest 2010; 137(2): 263 - 72  
Camm AJ et al, Eur Heart J 2010; 31, 2369 – 2429

Figure-2

### Bleeding risk : HASBLED Score

Letter	Clinical characteristic	Points awarded
H	Hypertension	1
A	Abnormal renal and liver function (1 point each)	1 or 2
S	Stroke	1
B	Bleeding	1
L	Labile INRs	1
E	Eldery (e.g. age ≥65 years)	1
D	Drugs or alcohol (1 point each)	1 or 2
<b>TOTAL (maximum 9)</b>		

Bleeds per 100 patient-years by score	0	1	2	3	4
	1.13	1.02	1.88	3.74	8.70

Pisters R, et al. Chest 2010; 138:1093-100  
European Heart Journal 2012 - doi:10.1093/eurheartj/ehs253

Figure-3

Total Score : CHA <sub>2</sub> DS <sub>2</sub> -VASc Score	Anticoagulation therapy options
0 (low stroke risk)	No antithrombotic therapy (or aspirin 75-325 mg daily)
1 (moderate)	Either DOAC or warfarin at an international normalized ratio (INR) of 2.3-3.0
≥2 (high)	Either DOAC or warfarin at INR 2.0-3.0

patient is at high risk and needs oral anti-coagulant. Patients with score 0 (Low risk) may be kept on Aspirin alone while those with score 1 (Intermediate risk) may be given Aspirin or OAC. Bleeding risk may be assessed by HASBLED score (Figure 3) but prevention of thromboembolism has more priority than bleeding risk.

#### AF related Stroke Risk Treatment Option (Figure-4 & 5):

- ◆ AF is projected to increase as population ages.
- ◆ Prevalence is estimated to at least double in the next 50 years as population ages.

- ◆ In non-valvular AF, over 90% of stroke-causing clots that come from the left atrium are formed in the left atrial appendage (LAA).
- ◆ 50% of AF-related strokes occur under the age of 75.
- ◆ <50% of patients eligible for warfarin are NOT being treated (tolerance/compliance).
- ◆ Lifestyle limitations when taking warfarin include high risk of bleeding, negative interactions with food and drugs, serious side effects that are often difficult to tolerate, and requires frequent and ongoing monitoring.
- ◆ Left atrial appendage closure is an alternative to medication. Local

therapy with left atrial appendage closure by percutaneous implantable device like WATCHMAN or Amplatzer vascular plug is an option to reduce the risk of stroke in patients with non-valvular atrial fibrillation. It is designed to avoid the embolization of thrombi that may form in the left atrial appendage (LAA).

#### Indications: Who should have LAA device closure? (Figures : 6-9)

Left Atrial Appendage Closure Technology is intended to prevent thrombus embolization from the left atrial appendage and reduce the risk of life-threatening bleeding events in

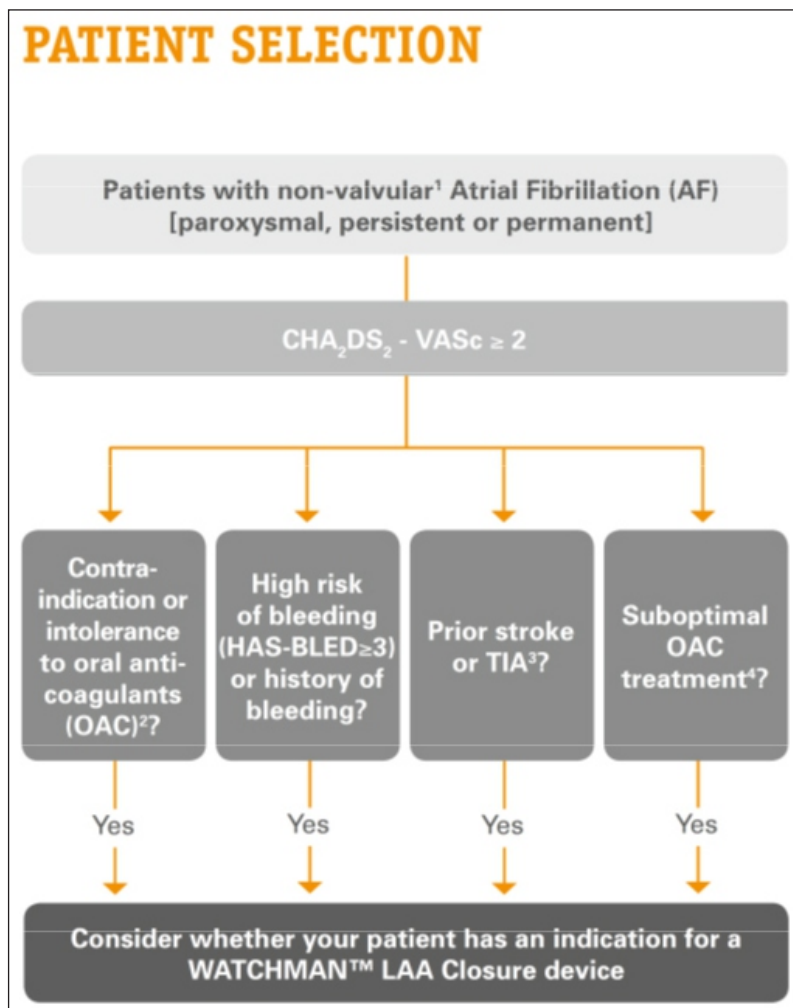


Figure-4

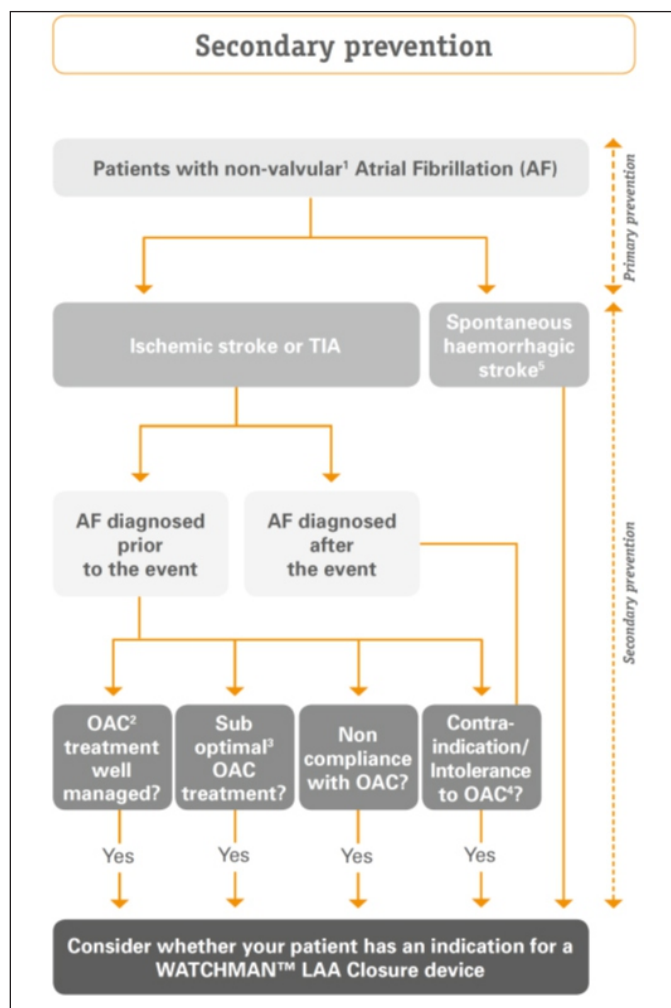


Figure-5

patients with non valvular atrial fibrillation who are eligible for anticoagulation therapy or who have a contraindication to anti-coagulation therapy (Figure 4).

**Benefits of LAA Closure:**

- ◆ Stroke risk reduction
- ◆ Long term anticoagulation therapy cessation
- ◆ Better quality of life

**Post-procedure:**

As the procedure is minimally invasive patient recovery takes about 24 hours. After the device has been implanted, patient should receive Warfarin (or other OACs) for 45 days, to facilitate device

endothelialisation. A follow-up trans-oesophageal echocardiography will be performed at 45 days. At this stage, physician may decide to discontinue Warfarin therapy and prescribe Clopidogrel (75mg) and Aspirin (81-325mg) until completion of the 6 months

visit, from which point aspirin alone should be continued. Physicians may prescribe clopidogrel and aspirin daily dose for up to six months to the patients contraindicated to anticoagulation therapy. These patients should remain on aspirin indefinitely.

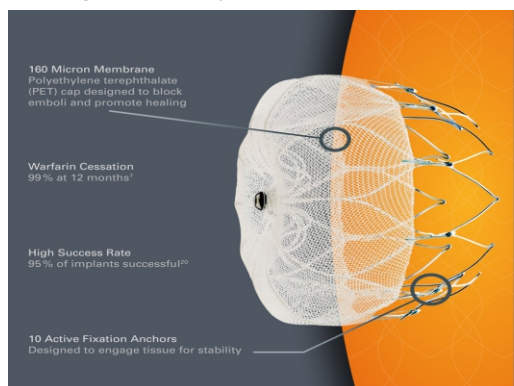


Figure-6



Figure-7



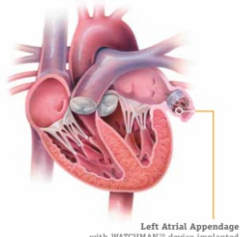


Figure-8

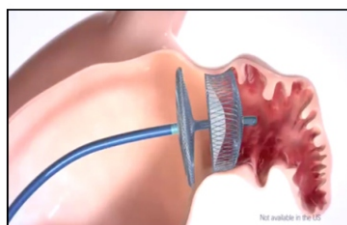
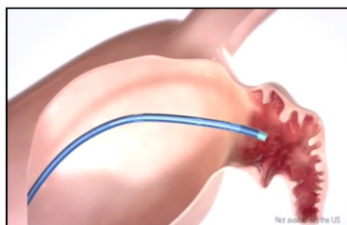


Figure-9

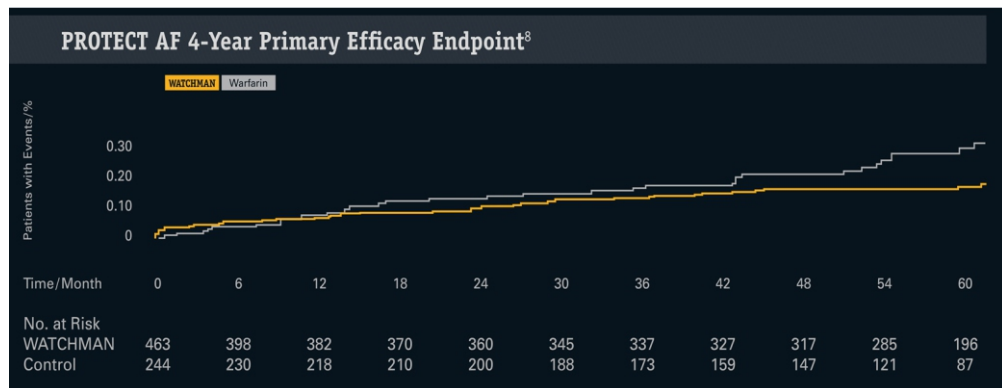


Figure-10

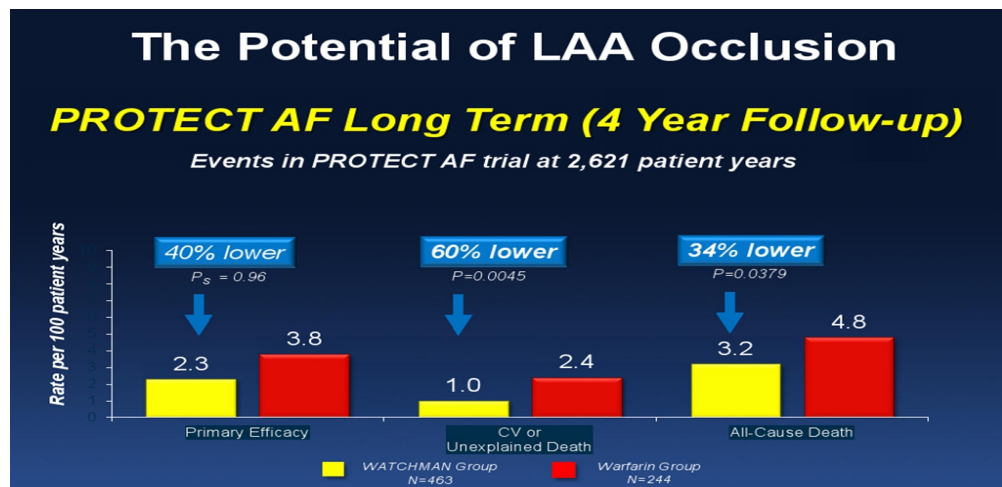


Figure-11

## Safety, Efficacy and Mortality Data (Figure 6-11)

- ◆ Proven implant safety profile demonstrating a 95% implant success in the hands of both new and experienced operators, as well as a declining procedural complications rate to less than 5% in later trials.
- ◆ 40% reduction of stroke, systemic embolism, cardiovascular/unexplained death at 4 years in PROTECT-AF study

- ◆ 60% reduction in CV-death compared to Warfarin at 4 years in PROTECT-AF study
- ◆ 34% reduction in All Cause Death compared to Warfarin at 4 years in PROTECT-AF study
- ◆ FDA has recently approved Watchman device for LAA closure

**Courtesy :** Some of figures, charts and information are taken from Boston Scientific Inc.

## TECHNOLOGICAL BREAKTHROUGH VALVE SURGERY AT CIMS

On April 3, 2015 Trans Aortic TAVR (Transcatheter Aortic Valve Replacement) was done for the first time in India on a 81 year old male patient with severe aortic stenosis, LVEF 25%, COPD, mild renal dysfunction and severe peripheral arterial disease. It was a very high risk case for an open heart procedure: so TAVR was decided upon. TAVR IS A HYBRID PROCEDURE where in cardiology catheter based technique and cardiac surgery beating heart technique are combined to give mortality and morbidity benefit to the patient. Because this patient had severe peripheral artery stenosis, through a small right thoracotomy a direct aortic puncture access was used and stent mounted aortic tissue valve was implanted on beating heart. Post op recovery is good and LVEF has improved. This procedure was performed by Dr Dhiren Shah (Cardiac Surgeon) Dr Milan Chag (Cardiologist), Dr Chintan Seth and Dr Hiren Dholakia (Cardiac Anesthetists).

## FFF (Flattening Filter- Free) for Radiotherapy at CIMS

A recent milestone achieved by CIMS Cancer Center in Radiotherapy is the AERB approval to use FFF (Flattening Filter- Free) for clinical use. By removing the flattening filter from the linear accelerator, greater dose rate can be achieved due to the physiologic property of flat beam. Advanced treatment like SRS (Stereotactic Radio Surgery) SRT (Stereotactic Radio Therapy) and SBRT (Stereotactic Body Radiation Therapy for Lungs and Prostate) with use of state of art planning system can now be used to modulate non-flat, high dose rate beams to achieve highly conformal dose distributions with a reduced treatment time.



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## Management of pregnant patients coming for open heart surgery

### Introduction:

The incidence of heart disease in pregnant women is reported to vary from 1% to 4%. In low-income countries, 60-80% of the pregnant women with heart disease suffer from rheumatic heart disease and it is a major cause of death related to pregnancy. Indications for surgery using Cardio Pulmonary Bypass (CPB) during pregnancy include cardiac valve disease, prosthetic valve malfunction, cardiac myxoma, congenital heart disease, pulmonary embolism, aneurysm and coronary artery disease. Recent data suggests a maternal mortality rate similar (1.47%) to that associated with CPB in non-pregnant women, unless the surgery is emergent while fetal mortality is as high as 16-33%. Cardiac surgery in pregnant patients, as a result, must be limited to cases where medical management fails.

Recently, we have successfully managed a case of 26years old primigravida with 5.5 months of amenorrhea with twins fetus with ruptured sinus of valsalva into right ventricle and Ventricular Septal Defects (VSD). Patient has been operated successfully with repair of ruptured sinus of valsalva with VSD repair on CPB. Mother discharged with stable condition with live healthy twin fetus.

Success of surgery depend upon the timing (trimester) of surgery, perturbation of maternal cardiovascular system by the heart disease, concomitant maternal and fetal morbidities. Table 1 shows the predictors of maternal and fetal outcome according to the heart disease.

### Why it's a real challenge?

During pregnancy physiologically cardiac output increases by 40-50% with increase in plasma volume by 45% and heart rate

by 15-25%. The presence of maternal heart disease with these circulatory changes of pregnancy can result in decompensation and in death of the mother or fetus.

### Management:

There is no difference in surgical approach and management of a pregnant versus non pregnant patient coming for heart surgery. Anaesthesia and cardiopulmonary bypass management is the real challenge as at any given point of time uteroplacental insufficiency can result in fetal demise. So proper planning with multi disciplinary team approach including cardiologist, cardiac surgeon, cardiac anaesthesiologist, gynecologist and perfusionologist is utmost important

### Goals of anaesthesia and CPB management

- Infective endocarditis prophylaxis
- Avoid fetotoxic drugs
- Be prepared for difficult intubation as airway edema with high vascularity
- Antiaspiration prophylaxis
- Avoid inferior ven caval compression by gravid uterus by left lateral tilt of 20-30 degree
- Fetal heart rate and uterine contraction monitoring (fig. 1)
- Maintain utero placental circulation
- On CPB maternal hematocrit >25%, High maternal oxygen saturation, Normothermia, High perfusion flow rates (>2.5 L/min/m<sup>2</sup>), High perfusion pressure (>70 mm of Hg), Minimize CPB time with Pulsatile flow (preferred but not mandatory)
- Adequate analgesia post operatively
- CPR in pregnancy is different than non pregnant patient
- At any given point of time maternal well being is given priority over fetus

**Table 1. Predictors of maternal and fetal outcome**

Low Risk	Moderate Risk	High Risk
Most commonly repaired lesions	Single ventricle	NYHA functional class >III
Uncomplicated left-to-right shunt	Systemic right ventricle	History of peripartum cardiomyopathy
Pulmonary stenosis	Uncorrected coarctation	Pulmonary hypertension
Pulmonary regurgitation	Unrepaired cyanotic lesions	Marfan syndrome with aortic size >4 mm
Aortic regurgitation	Use of anticoagulants	Severe left ventricular dysfunction
Mitral regurgitation, mitral valve prolapse	Mitral stenosis	
	Aortic stenosis	
	Left ventricular dysfunction	

NYHA = New York Heart Association

\*Adopted from a table in Dob and Yentis.\*



## Counseling of women with heart disease

- The counselling of cardiac patients about the risk of pregnancy should commence as soon as they become sexually active.
- Adequate advice concerning contraception should be offered.

■ There is a significant risk of maternal cardiac decompensation and death during pregnancy and in the first month post partum in women with Eisenmenger's syndrome, severe pulmonary hypertension,

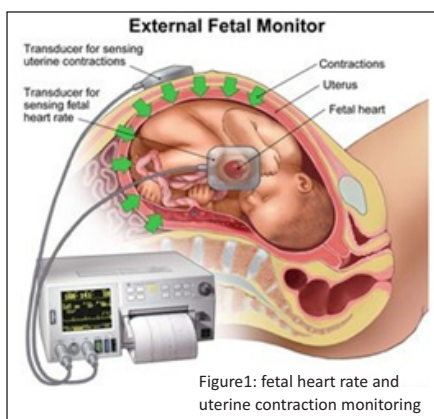


Figure1: fetal heart rate and uterine contraction monitoring

severe aortic stenosis or left ventricular outflow tract obstruction, Marfan's syndrome with aortic dilation greater than 4 cm or symptomatic systemic ventricular dysfunction with an ejection fraction < 40%. These patients should be counseled against pregnancy.

- In general regurgitant and volume overloaded conditions are better tolerated than stenotic and pressure overloaded conditions.
- When a woman wants to get pregnant, clinical assessment including echocardiography, exercise testing and sometimes 24-hour ECG and MRI is indicated. Based on these data, risk assessment can be performed.
- When it is decided that the woman can carry on and attempt to get pregnant, each medicine that she is using

should be reviewed: is it necessary to continue this medication throughout pregnancy, or can it be safely discontinued, or should it be replaced by a safer alternative?

- A plan for cardiology and obstetric supervision during pregnancy must be made
- If pregnant patient requires cardiac surgeries, it should be performed during second trimester as first trimester is associated with organogenesis and third trimester is associated with risk of premature delivery.
- Many women with heart disease can go through pregnancy with few or no complications if managed by multidisciplinary team at tertiary care center.

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