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CIMS Neonatal & Pediatric Critical Care Services

*We deliver STATE-OF-THE ART
PEDIATRIC CRITICAL CARE SERVICES*

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*Ensuring the best care
in initial steps of their lives.*



CIMS
Care Institute of Medical Sciences
At CIMS... We Care



CIMS Kids Department of Neonatal & Pediatric Critical Care

CIMS kids-Department of pediatric and neonatal critical care is committed to serve all kids who are in their critical phase of life during Treatment of various diseases requiring critical care. We share experience of HFOV in 4 extremely critical neonates and infants where neonates/infants got excellent recovery in a significantly rapid time frame.



High Frequency ventilation- A name in pediatric critical care ; which drew lot of attention and proven its efficacy in extremely sick lungs due it's unique feature of lung protective ventilation using very high respiratory rates (Between 3.5 to 15 hertz (210 - 900 breaths per minute) and very small tidal volumes (usually below anatomical dead space) by stretching alveoli at required PEEP. Out of many type of HFV (High frequency ventilation); Oscillation is proven to be the best among other modes like HFJV (Jet), HFFI (Flow interruption). We are sharing our use of SLE5000 (HFOV) with one of the most recommended technology which has unique feature of combining conventional mode with HFOV- providing ability to switch over to CMS to HFOV and vise versa

which is specifically useful in neonatal patients in difficult weaning.

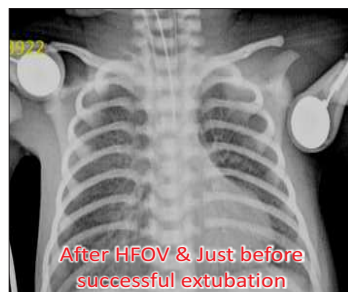
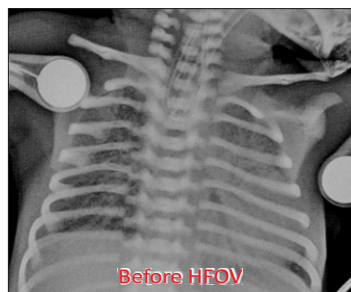
Where should it be used? : It is used in patients who have refractory hypoxemia that cannot be corrected by normal mechanical ventilation such as is the case in the following disease processes: i.e. HMD, Pneumothoraces (air leak), ARDS, ALI and other oxygenation diffusion issues i.e. RSV pneumonia, pulmonary hemorrhage etc. In some neonatal patients, HFOV may be used as the first-line ventilation mode due to the high susceptibility of the premature infant to lung injury from conventional ventilation.

Here we share recent examples of 4 different types of disease process where HFOV was used and all 4 patients got their healthy newborn life back with continuous efforts & the protocol based management on HFOV.

Case 1 :

Diagnosis – Severe RDS (HMD) 26 weaker/900gms/male/aga with severe grunting presented at 32 hours of life with 60% Oxygen saturation and gasping respiration. Intubation was performed and ventilation was commenced (CMV). Child had extremely non compliant lungs with severe acidosis with Ph of 6.7 and Pco2 of 72 with Pao2 of 46. Rescue surfactant was given immediately but very transient response was achieved being late presentation. Commenced on HFOV with MAP of 18, Delta P of 40 and fio2 of 90 %. Gradually, child started improving lung recruitment was better on X-ray on day 3 of ventilation. Weaning was soon started with ABG analysis at 2,8,14 and 20 hours of starting HFOV and henceforth 8-12 hourly once ABG as per need clinically. On day (4) settings were minimal on HFOV with MAP of 10, Delta P of 25 and

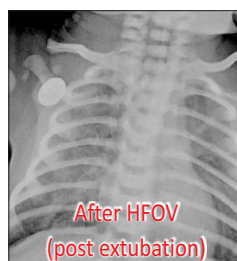
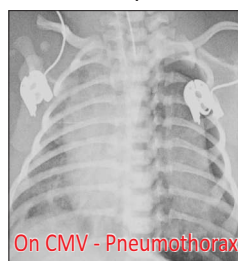
FiO2 of 0.45. We switched over to CMV mode and continued weaning on traditional SIMV+PC mode for 3 days, sooner child was prepared for extubation which was successful.



Discussion –disease with Homogenous lung damage like HMD, ARDS can have best result with HFOV if used early in the setting how it was used in these patients. Newer Modalities and mode of HFOV like HFOV+CPAP is getting a wide acceptance during weaning of such patient and same was used in above patient for approximately 26 hours before extubation by Naso pharyngeal tube in situ. Recent data says that early and protocol based use of HFOV is not associated with any adverse outcome rather neurodevelopment is unaffected at all⁽¹⁾.

Case-2 : Diagnosis, Severe Meconium aspiration Syndrome with PAH:-

38 wk, Term, Male child was presented to us at 1st hour of life



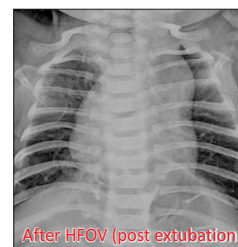
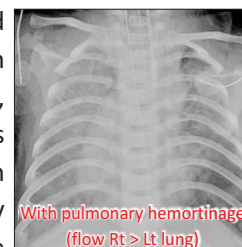
with H/O thick MSL, With severe birth asphyxia, with Severe RD and impending respiratory failure. CMV was commenced and he required very high settings on CMV (MAP14, Fio2 of 0.8 giving result to spo2 of 94%). At 26 hour of life he developed massive pneumothorax on CMV. At night 03:00am Lt. intercostal drain was inserted by using 8 Fr. IC Drainage catheter and pneumothorax was drained successfully. To avoid further leak and in view of providing lung protective ventilation, child was shifted to HFOV. Insertion femoral arterial line was performed for repeated ABG sampling required. Air leak resolved after 24 hours (Shown in x-rays wide infra) and weaning of ventilation was possible quite faster than expected. On day 3, child was switched on SIMV and child was successfully extubated on day 5 of admission.

Case 3- Almost similar results have been achieved in a case of a term baby, severe MAS with PPHN.

Details of ventilation strategy are wide infra in Tabular format.

Case 4 :

A child who had been taken for One of the rare variety of disease: Situs inversus, Dextrocardia, CCHD, Unbalanced AV Canal (Univentricular physiology)-a duct dependent Pulmonary circulation with unusual LPA Stenosis and whose PDA was nearly closed. Child presented with severe cyanosis, respiratory distress and who had been taken for emergency PDA stenting (where an expandable metal coil had been inserted in PDA) by pediatric cardiology department at CIMS.



It was expected that after procedure, sudden rise in flow per lungs may create unbalanced circulation and one of the lung may have over circulation because Rt. Pulmonary artery was stenosed. Similarly, child developed massive pulmonary hemorrhage which was not able to be ventilated by Conventional ventilation (CMV). Very less literature is available showing efficacy of HFOV in non homogenous lung disease (RT.>Lt!). But in emergency situation a trial of HFOV was worth thought upon.

After commencing HFOV (High frequency Oscillator), a strict eye on suspecting Further V/Q mismatch was kept due to chances of over ventilation of Lt. lung, henceforth from beginning Mean airway Pressure was kept at marginally higher than conventional ventilation but Delta P (which can have effect on PaCo2) was kept at 25-30 range and which needed adjustments as per 6 hourly ABG protocol. On day 2, Flow per stent got balanced. And hemorrhage stopped. Child was commenced on weaning HFOV and day 3 of HFOV child was put back on SIMV (PC) and successfully extubated 24 hours later.

Child is under follow up at CIMS Pediatric critical care and cardiology division and doing absolutely well.

Discussion: - It is a pleasure to mention the success of this case amongst an example of effect of PEEP in recruiting lungs as well as in controlling the flow per Branch Pulmonary artery till circulation gets adjusted and lung gets primed. At one point of time concern was shared which showed difficult picture to promise survival to this patient but with a joint effort of team ;it was possible to see the child coming in follow up with out any sequel.

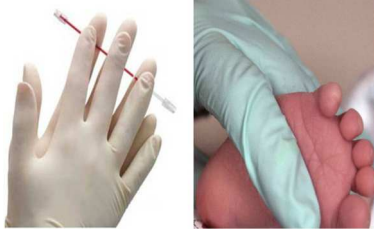
Summary of ventilation in above said cases in tabular format:- Use of HFOV

| | HFOV for (in days) | CMV/Other modes (in days) | Total duration of ventilation | Outcome | Total ICU stay |
|----------|--------------------|---------------------------|-------------------------------|---------|----------------|
| PT No.-1 | 4 days | 2 days | 6 days | cured | 18 days |
| PT No.-2 | 3 days | 2 days | 5 days | cured | 9 days |
| PT No.-3 | 4 days | 1 day | 5 days | cured | 13 days |
| PT No.-4 | 3 days | 4 days | 7 days | cured | 6 days |

Tit Bits of Refractory hypoxemia & Journey of ventilator care :-

Much progress has been made in the treatment of neonatal respiratory failure over the past few decades. In particular, antenatal steroids and exogenous surfactant replacement have decreased neonatal mortality and morbidity in premature infants^{(2), (3), (4)}. However, lung injury and pulmonary morbidities secondary to mechanical ventilation remain an ongoing problem in the care of premature infants and refractory hypoxemia in infants. Of utmost concern, chronic lung disease (CLD) develops in up to one third of preterm infants who have respiratory distress syndrome (RDS) who receive positive pressure mechanical ventilation HFOV-data suggest that early use of high-frequency ventilation, compared with conventional ventilation; high-frequency oscillatory ventilation is not associated with a poorer neuromotor outcome, rather in few studies early use rather than rescue use has been proven to be having less neuromotor insult at 2 years follow up⁽¹⁾. There are many randomized control trials available now in today's era of evidence based medicine, which says improved gas exchange and less treatment failure with HFOV, both in the patients initially allocated to HFOV as a primary mode and in those that failed conventional CMV and crossed over to HFOV too. There was no difference in the incidence of chronic lung disease, IVH, or death between the HFOV & CMV but hospital stay and ICU stay was markedly reduced in HFOV Group⁽⁵⁾. Cases like PPHN, air leak syndrome and Congenital diaphragmatic hernia (CDH) claim much better results and response with HFOV when used alone or with Nitric oxide therapy in selected scenarios.

In all of above mentioned 4 cases; a considerable benefit of capillary ABG Program was utilized. Capillary ABG for neonates is a well proven method in all developed countries as method of choice



in doing ABG is these tiny babies avoiding multiple peripheral arterial pricks. Its unique feature of full panel ABG analysis with lactate and electrolytes in just 60 micro L blood, requiring no additional cost gives a relief to clinician as well as Neonate. Sooner As a next step CIMS kids-Department of pediatric and neonatal critical care is going to support such kind of above said neonates and infants with Nitric oxide therapy in near future.

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સીમ્સ હોસ્પિટલમાં બાળકીએ ગુમાવેલી દ્રષ્ટિ ૧૫ દિવસે પાછી મેળવી

મેડિકલ સાયન્સ ક્ષેત્રે વિવિધ ટેકનોલોજીના વિકાસને અસાધ્ય લાગતાં રોગ પણ મટી શકે છે. જવલ્લે જોવા મળતાં આવા જ એક કિસ્સામાં સીમ્સ હોસ્પિટલના ડોક્ટર અમિત ચિતલીયા ની ટીમનાં સઘન પ્રયાસોથી છ વર્ષની બાળકી એ અચાનક ગુમાવેલી દ્રષ્ટિ ૧૫ દિવસ બાદ પરત મેળવી છે.

બાળકીમાં જોવા મળેલી આ બીમારીને તબીબી ભાષામાં એન્જાઈટીસ કહે છે. જે મોટેભાગે પુષ્કોમાં જોવા મળે છે. પરંતુ એથીય ચોકાવનારી વાત એ છે કે બાળકીમાં વિશ્વમાં જવલ્લે જોવા મળતાં મેલા સિંડ્રોમનાં લક્ષણો દેખાયા હોવાથી વધુ તપાસ અર્થે બાળકીનાં રિપાર્ટ બેંગલોરની ટેલી રેડિયોલોજી અને મુંબઈની આઈસીએમઆર (ઈન્ડિયન કાઉન્સિલ ઓફ મેડિકલ રિસર્ચ) ખાતે મોકલાયા છે.



નરોડા ખાતે રહેતા અમિત પટેલની છ વર્ષની દિકરી પ્રિયા ગત ૨૩મી માર્ચ ના રોજ રાત્રે ટીવી જોઈને સૂઈ ગઈ હતી. પરંતુ જ્યારે સવારે ઉઠી ત્યારે અચાનક તેને કાંઈ દેતાખું નથી તેમ જણાવતાં બાળકીના પિતા અમિતભાઈના પગ નીચેથી ધરતી સરકી ગઈ હતી. જેથી તેઓ તેમના ફેમિલી ફિઝિશિયન અને આંખના ડોક્ટર પાસે તપાસ કરાવતાં પ્રિયાને આંખની નહી, પણ મગજ ની નસની તકલીફ હોવાનું નિદાન થતાં

મેલો સિન્ડ્રોમ નાં લક્ષણો દેખાતાં રિપાર્ટ મુંબઈ-બેંગલોર મોકલાયો

તેઓ તાત્કાલિક સીમ્સ હોસ્પિટલનાં ડો. અમિત ચિતલીયા પાસે લઈ આવ્યા હતા. જ્યાં ડોક્ટરોની ટીમ દ્વારા વિવિધ પ્રકારનાં રિપાર્ટ અને સતત ૧૫ દિવસની સઘન સારવારથી તેમની દીકરીની દૂરની દ્રષ્ટિ પાછી મેળવી છે.

જવલ્લે જોવા મળતાં આ કેસમાં બાળકીની મેડિકલ હિસ્ટ્રી તપાસતાં બાળકીમાં હાથપગની મુવમેન્ટ ઓછી થવી, ખેચ આવવી અને દ્રષ્ટિ ગુમાવવી અને હૃદયની સાઈઝ મોટી થવી જેવા એન્જાઈટીસ ની સાથે મેલા સિન્ડ્રોમ નાં લક્ષણો દેખાયા હતા.

એમઆરઆઈ અને સીટી સ્કેન કરતાં બાળકીને લોહી જતી નસો સંકોચાવાથી મગજમાં કેટલાંકમાં ભાગ લોહી ઓછું પહોંચતાં પેદા થતી એન્જાઈટીસ ની તકલીફને લીધે અચાનક જોવાની ક્ષમતા ગુમાવવું હોવાનું નિદાન થયું હતું. બાળકીની સારવારમાં કીટીકલ કેર ટીમ, ન્યુરોલોજિસ્ટ અને

બાળકીમાં જોવા મળેલી બીમારીને એન્જાઈટીસ કહેવાય છે

રહ્યુમેટોલોજિસ્ટ સ્પેશિયાલીસ્ટના સંયુક્ત પ્રદાનથી સતત ૧૫ દિવસની સઘન સારવાર બાદ બાળકીની દૂરની દ્રષ્ટિ પરત આવી છે. તેમજ થોડા

દિવસમાં સંપૂર્ણ રીતે જોતી થઈ જશે એવી આશા રખાઈ છે. જ્યારે આ રિપોર્ટ લખાઈ રહ્યો છે ત્યારે બાળકીનું ડાબી બાજુનું અંગ બિલકુલ નોર્મલ થઈ ચુક્યું છે અને ૮૦ % દ્રષ્ટિ નોર્મલ થઈ ચુકી છે.

બાળકમાં રંગસૂત્રોની જન્મજાત ખામીને કારણે શરીરમાં લેકિટક એસિડનું પ્રમાણ વધવાથી શરીરનો એક ભાગ લકવાગ્રસ્ત થાય. અચાનક દ્રષ્ટિ ગુમાવવી. ચાલવામાં તકલીફ અને હાર્ટની સાઈઝ વધવી જેવા મેલા સિન્ડ્રોમ નાં લક્ષણો અચાનક દ્રષ્ટિ ગુમાવી હોય અને સેન્ટ્રલ નર્વસ સિસ્ટમમાં ખામી સર્જાયાનાં લક્ષણો દેખાયા હતા.

Courtesy : Divya Bhaskar, Sunday, 24-04-2011

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