Pulmonary

P047

BRONCHOPULMONARY DYSPLASIA
(CHRONIC PULMONARY DISEASE)

Todorović - Guid M., Žic L., Kanič Z., Burja S., Bračič K.
Pediatric Intensive Care Unit, Teaching Hospital Maribor, Slovenia

Bronchopulmonary dysplasia (BDP) is a chronic pulmonary disease of preterm and term babies treated with mechanical ventilation for respiratory problems of different origin and requiring oxygen therapy 28 days after birth. BPD is a disease affecting the growth and development of pulmonary tissue. Such pulmonary lesions heal by squamous metaplasia leading to scar formation and fibrous tissue ingrowth. The Pediatric Intensive Care Unit makes the survival of babies with very low birth weight (500 - 999 g) possible. With the increase in their survival, the number of complications in low birth weight babies increases as well. BDP is a very serious complication. Therefore the importance of early diagnosis and treatment of BDP must be stressed in order to reduce the consequences. Babies with BDP must be under medical surveillance for at least 3 years as the disease needs at least that long for complete resolution.

In the ICU of Pediatric Department at Maribor Teaching Hospital, during the past two years (1994-95) 154 newborns, were treated with mechanical ventilation. The neonatal and postnatal death rate of all newborns admitted to our ICU was 7,1%. In the two years from 1994 to 1995, 16 newborns were admitted to our ICU (2 % of all newborn babies at Maribor Teaching Hospital), with birth weight 500-999 g. In the ICU, the survival of these babies and parallel to it the number of complications is increasing.

During the mentioned 2- year period, 8 babies with very low birth weight (500-999 g) survived: 5 in 1994 and 3 in 1995. In 45-50 %, first or second stage BDP was treated, there was no case of third or fourth stage BDP. The treatment consisted of early removal from mechanical ventilation, oxygen therapy, intensive treatment of infection, volume and caloric intake control, corticosteroid treatment through 6 weeks with decreasing doses, diuretic and antioxydant therapy. The children are to be reevaluated at the age of 3 and 6 months and again at 1 and 3 years.

P048

SHORT-TERM EFFECTS OF SYNCHRONIZED ASSISTED VENTILATION /SAVI/
- A NEW METHOD OF PATIENT TRIGGERED VENTILATION /PTV/ IN
INFANTS WITH RESPIRATORY FAILURE.

Piotrowski A, Krajewski P, Czech P, Kawczyński P, Stengert P.
Intensive Care Unit, Paediatric University Hospital, Medical
University of Łódź, Poland.

A prospective study was undertaken to assess circulatory and respiratory effects of SAVI in which mechanical breaths are initiated by infant's own inspiratory effort registered as the chest expansion by pulmonary impedance monitor.

Methods: 16 infants with mean weight 1996 g and postnatal age 12 days ventilated because of RDS, pneumonia, MAS, PDA or BPD were studied. After a 30 min period of observation on conventional ventilation /IMV/ they were switched over to SAVI with the settings unchanged, and observed for the next 30 min.

Results : Significant increase in ventilator rate and mean airway pressure was noticed after the change to SAVI. No differences in oxygenation, CO_2 partial pressure and systolic, diastolic or mean blood pressure between IMV and SAVI periods were noted. In 6 infants however an improvement in PaO_2/pCO_2 and decrease in $PaCO_2$ was observed after the switch to SAVI. These babies had a lower initial a/A oxygen tension ratio and required higher initial ventilator rate $/p < 0.05/$ in comparison to the rest of the studied patients.

Conclusion: Infants with low a/A PO_2 ratio who need high initial ventilator rate are likely to obtain benefit from SAVI..

P049

HIGH FREQUENCY OSCILLATORY VENTILATION (HFO-V) IN A PEDIATRIC AIDS PATIENT WITH PNEUMOCYSTIS PNEUMONIA.

Deure J van der, Markhorst DG, Haasnoot K
Department of pediatrics, pediatric intensive care unit, Free University Hospital, Amsterdam, the Netherlands.

Case Summary A 4½-month 6.5 kg girl of African origin was admitted to the Pediatric Intensive Care Unit with pneumonia and progressive respiratory insufficiency. She was intubated and ventilated by pressure regulated volume controlled ventilation (Servo 300C, Siemens, Soina, Sweden). Maximum conditions were inspiratory Minute Volume 3.2 l, PEEP 10 cm H_2O and 100% O_2 . Chest X-ray showed bilateral interstitial consolidation. Material obtained by broncho-alveolar lavage showed Pneumocystis Carinii. HIV-serology (Elisa and Western blot) and p24-antigen were positive, confirming the diagnosis of pediatric AIDS. She was then treated with high dose co-trimoxazole, Pentamidine, Zidovudine and steroids iv. Because of chest X-ray features, high need for O_2 (100%, paO_2 56 mm Hg), not responding to elevation of PEEP (max 10 cm H_2O) and $PaO_2/FiO_2 < 200$ (56).¹¹ Acute Respiratory Distress Syndrome (ARDS) was diagnosed. Because conventional ventilation (cv) failure, HFO-V (3100A, Sensor Medics, Yorba Linda, Ca) was initiated. Starting Mean Airway Pressure (MAP) of 19 cm H_2O was based on MAP of the cv, oscillatory pressure amplitude (dP) of 47 was, at initial frequency of 7.5 Hz, adjusted until chest wall vibrations were visible. It was required to raise MAP to 26 cm H_2O and dP to 66 before optimal lung volume and ventilation were achieved and need for O_2 reduced within hours. This was monitored by frequent blood-gas analysis and chest X-rays. MAP and dP could slowly be reduced. After a good response the first day, gradually O_2 demand reduced and the patient could be weaned from the ventilation. MAP, dP, FiO_2 and Oxygenation Index ($MAP \times PaO_2/FiO_2$) are shown in table 1. Chest X-ray follow-up showed gradually improving lung features, with marked improvement of aeration. After 10 days HFO-V she could be successfully detubed when a MAP of 10 cm H_2O was achieved.

HFO-V (days)	day 1	day 2	day 4	day 6	day 8	day 10
MAP (cm H_2O)	22	45	24	24.5	23.5	14
FiO_2	1.0	0.75	0.35	0.35	0.25	0.21
OI	32.8	19.5	12.7	10.5	8.3	3.5

Conclusion: HFO-V proved to be an effective alternative in conventional ventilation failure in this pediatric patient.

¹¹ Bernard GR et al. Report of the American-European consensus conference on ARDS. Intensive Care Med 1994;(2):225-32.

P050

USE OF HEAT AND MOISTURE EXCHANGES IN PEDIATRIC ICU

Fumimaro HATORI, Haruo UCHIDA, Masao KATAYAMA, and Rika MUTO
Department of Anesthesia and Critical Care Medicine
Chiba Children's Hospital, Chiba City, Japan.

Purpose: This study was made to find out whether the heat and moisture exchangers (HME) was effective enough to humidify in the respiratory management for children.

Patients: The study population consisted of 21 patients who were provided with artificial airway. They were divided into the two groups: 11 with heated humidifier (A) and 10 with HME (B).

Methods: HME could be used for those without pulmonary complication and with less leakage around the endotracheal tube. In both A and B groups, (1) we have measured relative humidity, temperature, and absolute humidity at the endotracheal tube connector. For these measurements, Humidity Sensor System was utilized. (2) Any troubles and complications caused by the artificial airway were investigated.

Results: (1) In Group A, we confirmed the mean values as the relative humidity of 96.5%, the temperature of 32.8°C, and the absolute humidity of 34.0mg/L. In Group B, they were 92.7%, 29.5°C, and 28.7mg/L respectively. No difference was noted between the two groups as to the relative humidity, but the temperature and absolute humidity were lower in Group B with a significant difference ($p < 0.0001$). (2) In neither of the groups, any respiratory complications such as obstruction or stenosis of the artificial airway were noted.

Conclusion: In pediatric ICU, HME can be used without any problems under given conditions.

P051

Titel: POSITIVE PRESSURE VENTILATION WITH FACE MASK IN CONGENITAL CENTRAL ALVEOLAR HYPOVENTILATION SYNDROME

Autoren: HM Grubbauer, R Kerbl, H Litscher, G Zobel, M Trop

Congenital central alveolar hypoventilation syndrome (CCHS) is a rare disorder with failure of chemoreceptor control of ventilation. Depending on the degree of severity children with CCHS need ventilatory support continuously or during sleep. Treatment modalities ranging from diaphragmatic pacing, negative pressure ventilation or positive pressure ventilation through a tracheostomy tube. To bypass the problems of an artificial airway only few experience with nose mask ventilation in older children have been made.

Case reports: We report our experience with face mask ventilation in two siblings with CCHS. The experiment to try a face mask ventilation for treatment of CCHS was done because the parents refused a tracheostomy in both of their children. The face masks were made by a medical bandagist. They are tightly fitting masks which are closing the mouth and applying the positive pressure ventilation through the nose. In the older boy face mask ventilation was started only at the age of four years due to a delayed diagnosis. Hypoventilation was present only during sleep and the patient is treated with nocturnal mechanical ventilation. The patient has now home ventilation since four years without major problems. His younger brother was diagnosed with CCHS much earlier at the age of 8 months. Since that time for now 12 months he is also ventilated via face mask during sleep at home. Both boys are on a volume cycled respirator (life care PLV100 respirator) under pulseoximetric monitoring and close medical observation.

Conclusion: In our experience face mask ventilation for CCHS is an efficient alternative even in the young child to bypass the complications of an artificial airway.

P052

Assessment of high-frequency neonatal ventilator performances. P. Jouvet*, P. Hubert*, D. Isahay*, D. Pinguier*, E. Dahan*, M. Clouet*, A. Harf*. #USIP, Hôpital Necker-E.M. Paris. *INSERM U296, Hôpital H. Mondor. Créteil. France.

High-frequency ventilation provides adequate ventilation in neonates at tidal volumes smaller than the anatomic dead space. High frequency ventilators available nowadays are widely used in neonatal intensive care units.

Aim of the study : To assess the performances of three high-frequency ventilators.

Methods HFV-Babylog 8000 (Dragør, Lubeck, Germany), OHF1 (Dufour, Villeneuve d'Asc, France) and SM 3100A (SensorMedics, Bithoven, The Netherlands) were connected to a neonatal test-lung. Resistance was modeled by 3 endotracheal tube (ETT) sizes (2.5; 3, 3.5), and compliance by 2 test lungs (1 and 5 ml/cmH₂O). For each resistance - compliance arrangement, we measured tidal volume (Vt) at various frequencies, peak to peak (P-P) and mean airway pressures.

Results Vt increased when ETT size increased with all 3 ventilators in accordance with Fredberg results (JAP, 1987; 62: 2485-90). The maximum Vt delivered was smaller with the HFV-Babylog 8000 than with the OHF 1 or the SM 3100A at a given frequency (figure on the left). Increasing P-P resulted in a linear increase in Vt delivery in the 0-30% range of maximum P-P (figure on the right). HFV-Babylog 8000 didn't provide significant Vt increase when P-P was set above 50% and Vt delivery decreased when mean airway pressure decreased.

Conclusion OHF 1 and SM 3100A were able to deliver adequate Vt at the usual frequency of 15 Hz regardless of the endotracheal tube size and respiratory system mechanical properties.

P053

THE USE OF A NEW DEVICE TO MEASURE AUTO-PEEP IN PEDIATRIC PATIENTS DURING MECHANICAL VENTILATION.
Ferreira ACP; Carvalho WB; Kopelman BI; Lee JH.
UTI Pediátrica da Universidade Federal de São Paulo UNIFESP-EPM-Brazil.

Objective: evaluate the precision, reproducibility and applicability of a new device to measure auto-PEEP in pediatric patients during mechanical ventilation.

Material and Methods: it's an electronic-pneumatic controlled device with an occlusion valve and a pressure monitor installed between endotracheal cannula and the ventilator circuit. The measurements were performed with a solenoid connected with the ventilator to detect the end of inspiration phase and the activation of the occlusion valve. The signs of pressure and flow were monitored using a differential transducer and it was processed using a PC computer and a Pneumoview® software. The auto-PEEP also displayed in the ventilator pressure monitor.

Results: we submitted 17 children with neuromuscular disease or respiratory distress in this study. The incidence of auto-PEEP was 76%, with variability between 1,5 to 13 cmH₂O. All the measurements were performed 3 times to verify the precision and the reproducibility and evaluation of the pressure and flow curves.

Conclusion: the device is low cost, easy to use and can be used without the pneumotachograph. The auto-PEEP measurement can be done during mechanical ventilation with time cycled, pressure limited and continuous flow, the most common ventilator used in pediatric patient.

P054

A NEW APPROACH TO ARTIFICIAL LUNG VENTILATION (ALV) IN NEWBORN INFANTS WITH ARF.

A.P. Kolesnichenko, O.B. Milenin, A.I. Gritsan, I.V. Kuznetsova, Krasnouarsk Medical Academy, Russian Medical Academy, Russia.

A number of ventilatory parameters had been analyzed with Russia-produced monitor Humitemp HTM 902 (Servisinstrument J.S. Co) in 24 newborn infants with RDSN of I-IV stages on CMV, CPPV, IMV, and CPAP steps using respirators of various kinds (Stephan-Staxel, Bear-2001, Newport Brezee, Sechrist). Parameters investigated were: temperature of inspired mixture (Ti), relative and absolute humidity (RH and AH, respectively), static compliance (C), expired tidal volume (Vte), expired minute volume of ventilation (MVe). The monitor read these parameters in following ranges; RH-from 10 to 100%; AH-up to 55mg/l; MVe-up to 3.0 l/min; Vte-from 3 to 130 ml; T-accurate to 3%; C-from 0.1 to 10 ml/cm H₂O. Continuous monitoring time ranged from 2 to 96 hours, it was noted, that during this time the monitor and transducers had no malfunctions, and it's using didn't require additional calibration. it was found, that humidifiers MR 498 and MR 410 (Fisher, Paykel) couldn't maintain parameters T and AH continuously (these values varied from 34.3 to 38.2 °C and from 37.5 to 47.1 mg/l, respectively, when heating regulator position was unchanged).

Changes of parameters C depended clearly on CPPV conditions and RDSN severity (with RDSN of stages I-II C value ranged from 2.4 to 1.2 ml/cm H₂O; and with stages III-IV- from 0.3 to 1.1). In 6 newborn suffering from RDSN of stages II-III and III-IV with PIP>25 mbar, FiO₂>0.7, PEEP=4-7 mbar, C from 0.3 to 1.2 ml/cm H₂O, effectivity of Exosurf Therapy was studied. In 4 newborns in 4-12 hours of therapy PIP decreased to 0.3-0.4, and C increased to 1.7-2.4 ml/cm H₂O. In 2 newborn infants with AaDO₂>500 mmHg and C from 0.3 to 0.8 ml/cm H₂O positive effects of Exosurf on lung compliance were not observed. In 3 newborns the monitor had revealed decreased of C (from 3.4-2.9 to 1.8-1.3 ml/cm H₂O), manifested clinically by pneumothorax. In general, monitor HTM 902 made possible; 1). to estimate the adequacy of CMV-parameters and regimes in newborn infants; 2). to select optimal T and AH values in the respiratory outline in dependence on lung damage severity and infused volume; 3). to reveal RDSN severity; 4). to optimize indications and adequacy of surfactant therapy; 5). to diagnose the air leakage syndrome; 6). to effects to some agents (broncholytics, spasmolytics); 7). to obtain objective indications for IMV/SIMV and CPAP regimes.

P055**HOME CARE FOR A BETTER QUALITY OF LIFE FOR VENTILATOR DEPENDENT CHILDREN.**

Albano L. MD, Panigazzi A. MD, Saligari L. MD, Capra D. MD, Reta A. PT, Engardt P. PT, Alderete M. RN. Pediatric Intensive Care Unit, Policlinica Bancaria, Buenos Aires, Argentina.

Increased survival rates in chronic ventilator-assisted children has impelled a search for new therapeutic approaches in order to improve their quality of life. As very few institutions can handle this patients, home care represents a promising alternative. We describe 2 patients with Spinal Muscular Atrophy, one type I (2 months old) and a 2 year-old boy with type II. Hospital stays were 130 and 176 days, respectively. Both were on permanent ventilatory support through an indwelling tracheostomy.

Looking for a better quality of life, a decision was made to continue their treatment in a home care basis. A multidisciplinary team, including intensive care physicians, physical therapists, nurses, nutritionists and a psychologist, developed a training program to instruct children's parents how to operate the ventilator and other ancillary monitoring devices as well as to perform some primary care techniques. (Suction procedures, set alarm thresholds, ventilatory support with an air bag, etc.). In addition to an equipment tailored to their needs, each patient received all the disposables and full support through scheduled control visits paid by physicians, a trained nurse and physical therapists and, if needed, home emergency assistance through a medical manned and fully equipped ambulance service.

So far, results are encouraging regarding children's reincorporation to family environment and recovery of the family organization, allowing one or both parents return to work. A decrease in infectious complications and a sensible reduction in costs (home care vs in-hospital care) are major advantages of this approach. We think home care could be an alternative approach in suitable cases, leading to a better quality of life for this chronically ventilated patients, compared to that offered by the traditional in-hospital care.

P056**SPEAKING AIDS IN CHRONICALLY VENTILATED CHILDREN**

Fraser J, Pengilly A, Mok Q

Paediatric Intensive Care Unit, Great Ormond Street Hospital for Children, London, WC1N 3JH

Communication is an important aspect of human development and existence, and an inability to vocalise can be a problem in ventilator-dependent patients. We present our experience with speaking aids as a means of enhancing verbal communication in four ventilator-dependent children in our Paediatric Intensive Care Unit.

The age of the children ranged from 7 months to 5 years, and the period of ventilation ranged from 3 months to 21 months via a tracheostomy. They require continuous flow generated pressure limited or control ventilation at rates of 13-20 bpm. The reasons for ventilation include tetraplegia following a shrapnel injury; tetraplegia following congenital cervical spine damage; tetraplegia following atlanto-axial subluxation; and critical illness polyneuropathy following adult respiratory distress syndrome from prolonged ventilation for a severe head injury.

The first three patients have Passy-Muir one-way speaking valves and the final patient has a Bivona foam cuffed tracheostomy tube with a talk attachment in view of recurrent aspiration. An improvement in quality of speech has been shown by independent assessment.

We will review the present literature on this subject and discuss the advantages and disadvantages of these two types of speaking aids in the light of our experience.

P057**USE OF NONINVASIVE VENTILATION DURING GASTROINTESTINAL ENDOSCOPY IN PATIENTS WITH NEUROMUSCULAR DISEASE.**

John Pope, David Birnkrant, James Martin and Anthony Repucci. Department of Pediatrics MetroHealth Medical Center, Case Western Reserve University, Cleveland, Ohio, USA.

Introduction: Patients with severe neuromuscular weakness hypoventilate and may require endotracheal intubation during procedures done under conscious or deep sedation. We describe the use of noninvasive nasal ventilation (NNV) with a pressure support device (BiPAP®) (Respironics, Murrysville PA, USA) during gastrointestinal endoscopy in patients (pts) with chronic respiratory failure (CRF). 3 procedures were performed in 2 pts with Duchenne's muscular dystrophy. All procedures were done in the pediatric intensive care unit with continuous pulse oximetry, ECG, and blood pressure monitoring.

Results:

Pt 1: 20 y.o. with severe dysphagia using chronic NNV for CRF; forced vital capacity (FVC) = 230 ml. Malnutrition necessitated gastrostomy placement. The gastrostomy was placed percutaneously with endoscopic guidance. Continuous NNV was used with nasal pillow® (Puritan-Bennett, Carlsbad, CA, USA) interface. BiPAP was in the spontaneous/timed (S/T) or timed (T) mode. Pressures, rate and FiO₂ were adjusted to maintain oxyhemoglobin saturations (SpO₂) 95-100%. The pt tolerated the procedure without complication.

Pt 2 (procedure 1): 17 y.o. male using nocturnal NNV for CRF (FVC = 750 ml). Endoscopic gastroduodenoscopy for suspected peptic ulcer disease. BiPAP in S/T or T mode with pressures, rate and FiO₂ adjusted to maintain SpO₂ 93-100%. Pt tolerated procedure well without adverse effect.

Pt 2 (procedure 2): Colonoscopy for hematochezia performed 1 month after procedure 1. BiPAP in S/T mode with pressures and FiO₂ adjusted to maintain SpO₂ 95-100%. Pt tolerated procedure well without complication.

Conclusion: NNV with BiPAP is an effective means of providing respiratory support during gastrointestinal endoscopy in pts with significant respiratory muscle weakness.

P058**EARLY PREDICTION OF PULMONARY HYPOPLASIA (PH) IN ANTENATALLY DIAGNOSED CONGENITAL DIAPHRAGMATIC HERNIA (CDH). JF Germain, B Thebaud, C Farnoux, D Pinquier, A Cortez, O Sibony, F Beaufrils**

The prognosis of antenatally diagnosed CDH is closely related to the degree of PH. There have been attempts to correlate antenatal or postnatal criteria to mortality: none have been demonstrated to be predictive of lethal PH. The aim of this retrospective study was to determine whether antenatal or early postnatal data could correlate with the findings of post-mortem examinations. **Patients and methods:** Between July 1990 and July 1994, 32 CDH patients have been antenatally and postnatally managed at our institution. Twenty-three infants underwent a post-mortem examination. PH was assessed by using the lung weight to body weight ratio (LW/BW) and the radial alveolar count (RAC). **Antenatal results:** CDH diagnosis was made at 24 weeks of gestation (wg) (15-37). Twenty-eight patients had a left sided CDH, 3 had a right sided CDH, and one had a bilateral CDH. Herniated organs were stomach alone (n=21), or liver alone (n=4), or both stomach and liver (n=5). In 8 patients, echographic studies disclosed associated malformations. **Postnatal results:** Six patients survived and 26 died. Thirteen were treated by ECMO. Sixteen reached a PaO₂ ≥ 100 mmHg during conventional therapy, including the 6 survivors. Sixteen did not reach this PaO₂ level and none survived. **Correlations with post-mortem examinations:** Two patients had no PH (LW/BW > .018). Twenty-one patients had PH: 12 of them had obvious PH (LW/BW ratio < .009); in 9 patients, LW/BW ranged from .009 to .018, but the low RAC (< 3.1) confirmed PH. The term of diagnosis was positively correlated with LW/BW and RAC (r² = .40, p = .002 and r² = .49, p = .0003 respectively). Patients with PH had an earlier antenatal diagnosis (22 ± 3.6 vs 29.6 ± 4.3 wg, p = .0004), and a lower left to right ventricle ratio when measured between 36 and 40 wg (.57 ± .11 vs .87 ± .15, p = .04). All infants with a best PaO₂ < 100 mmHg had severe PH. Patients with a best PaO₂ ≥ 100 mmHg included 2 infants who died from complications without PH, 7 infants with PH, and the 6 survivors (necropsy was denied in one). **Conclusion:** 1) The term of diagnosis correlated with the severity of PH. In addition, low left to right ventricle ratio was also a good predictor of PH. 2) Permanent poor values of PaO₂ allowed to predict PH in all cases. This study suggest that such patients could probably be excluded from ECMO. 3) Adequate values of blood gases were associated with a good prognosis or with lethal PH. This condition probably justifies to start ECMO when conventional therapy fails. **Hôpital Robert Debré; 48 Bd Séurier; 75019 PARIS-FRANCE.**

P059

OPPORTUNISTIC PNEUMONIA, AND ARDS MAJOR COMPLICATIONS AFTER RENAL TRANSPLANTATION.

MODESTO V, IBIZA E, ABENGOCHEA A, ARAGO J, SANCHIS R, ORTOLA C, VARAS R, GARCIA E. PICU. Children's Hospital La Fe, Valencia. Spain.

CASE REPORT: The patient was a 3-year-old girl with chronic renal insufficiency secondary to renal dysplasia. Two months before admission a kidney transplant was performed. One month later she showed acute graft rejection with serum creatinine (Cr) level of 0.7 mg%. The rejection was unresponsive to an increased steroid dosage, and OKT3 was begun with resolution of the rejection. One week after, new rejection episode was seen unresponsive to an increased steroid dosage, and transplantectomy was performed five days before admission to our PICU. Hemodialysis and Peritoneal dialysis (P.D.) each other day, was indicated (G.R.F. < 10 ml/min). Four days before admission T° rose to 38°C. The diagnosis of opportunistic pneumonia was made on the basis of tachypnea, hypoxia, and diffuse interstitial infiltrates. Serum IgM was positive for cytomegalovirus (CMV), and stool culture for *C. Albicans*. Pentamidine, ganciclovir (DHPG), anti-CMV gamma globulin, eritromicine and amphotericin B was administered. On admission in our PICU, trachea was intubated, (A-a) O₂ gradient was 600, PaO₂/FiO₂: 65, Lung Injury Score > 3 with PEEP level of 8 cm H₂O. She had normal liver function. During the next days she had fever and developed ARDS. BAL was negative. P.D. was of little efficiency. We adjusted pentamidine, and DHPG doses for severe renal failure, with supplements after hemodialysis, and after P.D.. During the next days she was afebrile, and the chest became radiologically normal. After ten days on Mechanical Ventilation (M.V.), the patient was extubated. Cr. level was 3.2 mg%, (A-a) O₂ gradient was 20, and PaO₂/FiO₂ was 375. The patient was discharged with chronic ambulatory P.D.

DISCUSSION: OPPORTUNISTIC PNEUMONIA is a major complication in immunocompromised children, specially after kidney transplantation. C.M.V. infection can result after OKT3 administration. In the treatment DHPG dose must be adapted to the degree of renal insufficiency, with supplements after hemodialysis, and after P.D. *Pneumocystis carinii* pneumonia is characterized by ventilation-perfusion mismatch, decreased pulmonary compliance, hypoxia and elevated (A-a) O₂ gradient, with diffuse interstitial infiltrates. In our case BAL was negative. Although we did not find the etiology the precocious combination of antimicrobial therapy, along with M.V., and supportive measures were the most effective treatment.

CONCLUSION: 1) In patients with severe renal failure and life-threatening infections, we must consider drug adjustments. 2) In our patient we gave DHPG supplements after P.D. with excellent results, although P.D. was of little efficiency.

P060

PNEUMONIA IN VENTILATED BABIES IN A DEVELOPING COUNTRY: CLINICAL FEATURES AND SHORTTERM OUTCOME

S.Kling, RP Gie

Pneumonia is the second most important cause of death in young South African children. The clinical features, intensive care course and outcome of children being ventilated for pneumonia in the developing world is unreported.

AIM: To describe the clinical findings, aetiology and shortterm outcome of children younger than 6 months with pneumonia requiring ventilation.

METHOD: The data of all babies under the age of six months with a lower respiratory tract infection admitted to the Paediatric ICU for ventilation were prospectively collected over a period of 14 months. Tracheal aspirates and blood specimens were submitted for viral and bacterial cultures.

RESULTS: Forty-seven babies aged 14 to 174 days were ventilated for pneumonia. Twenty-six infants had been born prematurely; 12 had been ventilated during the neonatal period and 4 had BPD. The median duration of symptoms was 1 day, the most common being cough, tachypnoea, apnoea and cyanosis. Five babies (10%) died. The mean duration of ventilation was 8 days (range 1-85 days) and of ward stay after ICU discharge 19 days (range 1-161 days). Blood cultures were positive in 7 children (15%). Viruses were cultured in 14 children (30%).

CONCLUSION: 1) Fifty-five percent of children below 6 months requiring ventilation for pneumonia were premature infants, of whom 46% had been ventilated during the neonatal period. 2) The median duration of symptoms prior to admission was 1 day. 3) Ninety percent of the children survived and were discharged from hospital. 4) Viral pneumonia was responsible for 30% of the admissions.

P061

PREVALENCE OF OROPHARYNGEAL ASPIRATION IN INTUBATED CHILDREN

Amantéa S, Piva J, Palombini B.

PICU of Santo Antônio Children's Hospital of Porto Alegre - Brazil

Introduction: Endotracheal intubation and mechanical ventilation have become an important treatment for many diseases accompanied by respiratory failure. With the frequent use of this treatment modality, an increasing number of complications associated with endotracheal intubation have gained clinical significance.

Material and Methods: A transversal study was realized to find the prevalence of pulmonary aspiration with endotracheal tubes in 36 infants and children. Aspiration was assessed by applying two dyes (Evans Blue, Erythrosine Sodic) on the tongue and searching for the dye during suctioning in the endotracheal aspirate.

The factors, that potentially have influenced the aspiration, including weight, age, sex, cause of respiratory failure, main pressure airway (MAP), level of consciousness, presence of swallowing and body position were evaluated.

All the variables studied had their association with aspiration tested by chi-square Method with Relative Risk considering a Confidence Interval of 95%. The results were adjusted by multivariate analysis.

Results: The overall prevalence of aspiration was 36.1%. Among all children who aspirated, compared to those who did not, there was a statistically significant difference in the presence of swallowing (p=0.005). The odds ratio to aspiration in the presence of swallowing was 38.4 (1.75 - 100 C.I.95%) and the relative risk 55.5. Aspiration was not significantly affected by sex, weight, age, cause of respiratory failure, MAP, level of consciousness and position of the body during the ventilation.

Conclusion: The endotracheal intubated children frequently aspirate as intubated adults and that preventive measures are ineffective. The presence of swallowing movements is the main risk factor to aspiration of oropharyngeal content in intubated patients.

P062

MECHANICAL VENTILATION AND ATRIAL NATRIURETIC FACTOR RELEASE

Ulloa Santamaría, E, Pérez Navero JL, Ibarra de la Rosa I, Espino Hernández M, Velasco Jabalquinto MJ, Frías Pérez M.

PICU. Reina Sofia Children's Hospital. Córdoba. Spain.

Mechanical ventilation effects on renal function decreased diuresis and natriuresis due several factors including ANF. Several studies have demonstrated ANF released due increasing pressure in right atrium. On the other hand, mechanical ventilation, overall PEEP modality, inhibits peptide release although CVP increased is found. This study was designed to demonstrate ANF stimulation is due right atrium stretch which be higher during mechanical ventilation instead of atrium pressure.

We desing a prospective study including 14 patients, age range 16 months-13 years with congenital heart disease. All of them were admitted at Pediatric Intensive Care Unit after extracorporeal surgery and were assisted by mechanical ventilation. Hemodynamic state was stabilized in all patients and nor renal neither neurological diseases were found. After 24 hours with mechanical ventilation, plasmatic levels of ANF were measurement, PVC, pericardial pressure were assessment; all patient were sedated with midazolam and paralyzed with neuromuscular blocking agent; mechanical ventilation technique was as follow: IMV between 20 and 30, tidal volume and Fi O₂ enough to maintain respiratory parameters in normal range. Afterwards, at least twentyfour hours in spontaneous breathing, the study was made again in each patient. Atrial stretch was assessment according to following equation:

Transmural pressure= CVP - Pericardial pressure.

CVP were significantly higher with mechanical ventilation than when the patient was breathing by himself. (5.4 ± 2.2 vs 3.8 ± 1.8 mm Hg; $p < 0.01$). However, transmural pressure during mechanical ventilation were lower than during spontaneous breathing (8.92 ± 3.86 vs 11.76 ± 3.32 mm Hg; $p < 0.01$). Equal, plasmatic ANF levels were lower during mechanical ventilation (87.77 ± 46.55 vs 108.92 ± 49.06 pg/ml; $p < 0.01$).

In conclusion, ANF secretion decreases during mechanical ventilation, even with CVP higher. ANF release would depend on atrial stretch measured by transmural pressure, lower in patients with mechanical ventilation and it would not depend on atrial pressure.

P063

EXPERIENCE WITH VENTILATION IN CHILDREN

RASHID MAHMOOD, SAJID MAQBOOL, WAQAR HUSSAIN, TARIQ MAHMOOD, FAUZIA SHOUKAT
DEPARTMENT OF PAEDIATRICS, SHAIKI ZAYED HOSPITAL,
LAHORE.

The Paediatric intensive care unit Shaikh Zayed Hospital, Lahore is an acute care area devoted to the care of critically sick children upto the age of 13 years. In a 6 bedded unit with limited equipment, constant care is ensured by the presence of at least one nurse and one doctor round the clock. In this setup we have the facility to ventilate 2-3 children at one time. Between Sep. 93 and Dec. 95, out of 885 patients admitted to ICU, 171 (19.32%) were below 1 yr of age, while 48 (28%) were below 1 month of age. Life support was discontinued in 17 (9.9%). Total mortality was 56 (32.7%). Major mortality was in 0-1 month age group 22 (12.8%), and 1 month to 6 month 15 (8.7%). Majority of the patients were of sepsis (36.2%), CNS disorder (22.2%) followed by respiratory problems (14.6%). It seems therefore that the major indication for ventilation was overwhelming septicemia leading to multiple organ failure, rather than purely respiratory problems.

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High frequency oscillation (HFO) in the therapy for ARDS in pediatric patients requiring aggressive conventional mechanical ventilation (CMV) - routine or experimental mode of pre ECMO therapy.
Fedora M., Nekvasil R., Vobruha V., Srnsky P., Zapadlo M.
Dpt. Critical Care Medicine, NICU and ECMO Center, University Children's Hospital Brno, NICU of University Hospital Prague, Czech Republic.
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Introduction: 9 pediatric patients (8 males, 1 female, average age 4.7 months, average body weight 5.8 kg) with severe ARDS ventilated with aggressive regimen of PCV or PRVC were connected to HFO (Sensormedics 3100) as the last "rescue" therapy due to uncontrollable respiratory failure before intended ECMO. In the course of HFO 2 of them were given NO in the concentrations of 5-80 p.p.m., 3 were subjected repeatedly to surfactant replacement therapy (Alveofact).

Results: ECMO was needed in no patient, 8 patients survived, 1 patient was disconnected from the ventilator because of brain death in spite of conspicuous improvement of oxygenation and other parameters. Some relevant parameters 48 hours before and 48 hours after starting HFO are given in table 1. In all the cases, the disconnection from HFO was carried out through the SIMV regimen, never directly to CPAP.

Table 1: The levels of blood gases, oxygenation index (OI), AaDO₂, MAP, FiO₂ and PaO₂/FiO₂ ratio 48 hours before and 48 hours after starting HFO.

Conclusion: Although none of the patient had to be subjected to pediatric ECMO, HFO should be carried out only in workplaces having the immediate possibility of using this method in the case of HFO failure.

Speculation: Should not HFO be used in pediatric patients with ARDS earlier than aggressive CMV? Can HFO be considered standard, not experimental method of therapy?

Table 1:

Parameter	before HFOV		during HFOV		signif.
	average	deviat.	average	deviat.	
pH [-]	7.357	± 0.066	7.412	± 0.054	n.s.
pO ₂ [torr]	66.050	± 13.683	88.760	± 34.102	n.s.
PCO ₂ [torr]	55.198	± 10.964	45.022	± 9.162	n.s.
OI [-]	19.848	± 12.177	9.684	± 5.886	<0.05
AaDO ₂ [torr]	392.217	± 113.994	213.509	± 174.224	<0.10
MAP [cmH ₂ O]	14.017	± 4.337	13.948	± 4.361	n.s.
FiO ₂ [%]	74.352	± 13.909	49.019	± 22.136	<0.05
PO ₂ /FiO ₂ [torr]	101.216	± 27.383	296.030	± 199.757	<0.10

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RESCUE HFOV IN SEVERE RESPIRATORY HIPOXEMIC FAILURE IN A PREMATURE INFANT CANDIDATE TO ECMO.

Bustos R, Battisti O, Langhendries JP, Francois A and Bertrand JM, NICU Rocourt Liege Belgium

Refractory hypoxemia in premature patients is characterized in a persistent elevation of pulmonary vascular resistance, with right to left shunt through the ductus arteriosus and/or foramen oval. We report the case of a VLBW patient (GA 27W, BW 1010g) who present a severe hypoxemia related to hyaline membrane disease and a pulmonary and systemic infection to group B streptococcus, refractory to conventional ventilatory support and surfactant therapy, associated to hemodynamic failure falling in ECMO criteria used for term infants. A rescue therapy with HFOV (Sensor Medics 3100A) is decided at 5 h of live. The table resume the patient's evolution before and after HFOV. At 36W of postgestational age the patient present a FiO₂ of 0.23 with a chest X ray compatible with a CLD type I. At discharge no oxygen requirements was needed and actually he's doing well.

CONCLUSION: HFOV, using an adequate alveolar recruitment strategy, was effective in the rescue of a severe hypoxemic respiratory failure with a rapid off of ECMO criteria entry in our VLBW premature patient.

MODE	CMV	CMV	HFOV	HFOV	HFOV	HFOV
HOURS	-H5	-H2	+H1	+H3	+H5	+H9
FiO ₂	0.7	1.0	0.6	0.35	0.35	0.27
MAP	17	24	27	30	30	30
PaO ₂ *	43	38	50	55	58	68
PaCO ₂ *	39	35	49	31	35	31
AaO ₂	400	640	310	290	200	90
aA ₀₂	0.09	0.04	0.13	0.25	0.28	0.4
OI	25	64	45	19	12	15
mmHg						

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TREATMENT OF SEVERE ASTHMATIC ATTACK IN PICU FOR THE LAST TWO YEARS

Z.ZIVKOVIC, S.MIHAILOVIC

During the United Nation's embargo against Yugoslavia the prevalence of the asthmatic attacks in children raised. The most common causes have been: dramatic worsening of life standard, economic disaster in global community, great number of refugees from the other parts of former Yugoslavia. It was obvious that socio-economical conditions took a part in the exacerbations of previously known childhood asthma, because of micro- and macroclimatic changes, psychosocial and emotional crises, lack of medications for prevention and therapy of acute asthmatic attacks. About 10% of children treated in our PICU for these years experienced severe attack for the first time in their lifes. It has been cured 1362 children in respiratory PICU of our Hospital. The acute severe attack (more than 50% of highest clinical score) was detected in 62% of all children admitted with respiratory problems. From the analyses we excluded: bronchiolitis, congenital anomalies, severe infections. Concerning our drug supplies (which were reduced), we started our therapy by administration of oxygen, beta2-agonist inhalations (but sometimes we had the solution for jet nebulizers only for one inhalation per patient), aminophyllin and methylprednisolone intravenously. 48% of these asthmatics needed repeated doses of aminophyllin parenterally, including the fluids. The bronchodilator response was poor and slow, hospital stay in PICU was for 4 days and for 14 days in other units afterwards. The maintenance of their stable condition was hard at home (or refugees camps), without prevention, so they came back to hospital for more than 3 times in 27% of cases. During these last months the situation improved, concerning the drugs supply for prevention, and we hope that these life-threatening conditions wouldn't repeat.

Adress: Z.Zivkovic, MD, MS, Research Fellow, Head of PICU
Children's Hospital for Pulmonary Diseases and Tbc, 11000 Beograd
Ivana Milutinovica 9, Yugoslavia