Transplantation/Digestive tract

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FULMINANT LIVER FAILURE [FLF] IN CHILDREN: REPORT OF 63 CASES EVALUATED FOR ORTHOTOPIC LIVER TRANSPLANTATION
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We report our results with orthotopic liver transplantation [OLT] in children with FLF.

Patients: Between Dec 1987 and January 1996, 63 children (mean : 5.5 yr) with FLF were evaluated for OLT. The main causes were viral hepatitis (30.1 %) and toxin-induced FLF (14.2%). In 21 children (33.3%), the cause of FLF remained undetermined. Children were considered as candidates for OLT only if hepatic encephalopathy was associated with a decrease in the level of factor V to below 25 %.

Results: 12 children had no indications for OLT: all recovered. OLT was contraindicated in 7: all died. In 3 of these 7 children, contraindications included irreversable brain damage at the time of admission. 44 children were considered as candidates. 3 died awaiting a graft, 1 recovered spontaneously, 40 underwent OLT. Among them, 25 survived (62.5 %) but 2 had serious neurologic sequela. Mortality rates in children with toxin-induced FLF, virus-induced FLF, and undetermined causes were respectively 66 %, 22 % and 30 %.

Conclusion: OLT is an effective treatment for children with FLF. However the prognosis is still serious especially in patients with toxin induced fulminant liver failure.

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ORTHOTOPIC LIVER TRANSPLANTATION [OLT] FOR SEVERE LIVER FAILURE [SLF] IN INFANTS YOUNGER THAN 1 YEAR OF AGE.
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Severe liver failure [SLF] is a rare but severe condition in infants. We report our experience.

Patients: SLF was defined as liver insufficiency with hepatic encephalopathy and a decrease in the level of factor V to below 25 %. Between 1984 and 1996, 29 infants (mean : 4 mo) were admitted for SLF (neonates excluded). Main causes were metabolic disorders (41.3%) (tyrosinemia n=5, homochromatosis n=2, Reeye's syndrome n=2, other n=3), virus-induced FLF (20.6%) and hematologic diseases (13.7%). In 4 cases, the causes remained undetermined.

Results: OLT was contraindicated in 12 cases because of multiple organ failure (n=10), or underlying disease. All of them died within 6 days after admission. 7 patients had no indications for OLT, all but one are alive. (1 of them was transplanted later for tyrosinemia and 1 died lately (virus induced-SLF). Among the 10 infants who underwent emergency OLT, 6 are alive and 4 died because of primary non function of the graft.

Conclusion: SLF in infants admitted before their first birthday is a severe condition with an overall mortality rate reaching 60%. Inherited metabolic disorders are the first cause of SLF at this age. Contraindications for OLT are frequent because of underlying disease or multiple organ failure.

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COMPARATIVE MORBIDITY AND MORTALITY FOR PEDIATRIC PATIENTS UNDERGOING REPEAT LIVER TRANSPLANTATION
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Introduction: A number of children undergo primary graft failure after liver transplantation. It is unknown if there is any increased morbidity or mortality following retransplantation. This study seeks to explore these issues.

Methods: A pediatric intensive care/liver transplant database is in formation. Records of all liver transplant patients are reviewed and abstracted. This data is then computerized to allow analysis. This data provides the source for this study. Statistical analysis was performed via Student's t-test where appropriate.

Results: Of the 350 patients who have thus far received at our center orthotopic liver transplants, the records of 112 who underwent 140 transplants form the basis for this study. Of the 112, 74 were female and 38 were male. The mean age at transplant was 4.4 years (range: 1 month to 17 years) and the mean donor age was 2.2 years (range: 1 month to 13 years).

The indications for retransplant were: 1) primary nonfunction (n=41), 2) primary rejection (n=10), 3) biliary leakage (n=9), 4) hepatic artery thrombosis (n=7), 5) sepsis (n=6), 6) hemorrhage (n=5), 7) miscellaneous (n=18), and 8) other (n=3).

The median duration of the retransplant was 7.5 days (range: 1 day to 45 days). The median duration of the primary transplant was 14.5 days (range: 1 day to 90 days).

Conclusion: Children who require another liver transplant have a markedly increased mortality. Bleeding and prolonged ICU stay is not significantly different between the first and subsequent transplants.

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FULMINANT HEPATIC FAILURE AND ORTHOTOPIC LIVER TRANSPLANTATION
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Introduction: Fulminant Hepatic Failure (FHF) is a clinical syndrome, defined by the development of hepatic encephalopathy within 8 weeks from onset of illness in a previously healthy person. By far the most common cause of pediatric FHF in all series is acute viral hepatitis. We report our experiences with the pediatric FHF and orthotopic liver transplantation (OLT) as alternative of treatment.

Patients:30 children with FHF diagnosis were admitted at the PICU from 1/1/1993 to 1/12/1995. Symptomatic treatment was given to all children and all were put on list for OLT, following the King's College criterion (Prothrombina time, age, etiologies, bilirubin, and encephalopathy state). Results: Etiologic causes corresponded to the 29 children were:23, HAV (76%); 6, NoA NoB (20%);1, autoimmune (4%). The age was mean:4 years (Range:6 month-10 years). Seventeen patients were transplanted,13 children were discared because: no donors;3 withdrow of the list;3 because sepsis in 2 and bleeding of CNS 1; and no admission at list:5 because genetic syndrome 1, massive intestinal nerosis, 1,atalytic vahulopathy 1 and sepsis, 2. 25 patients (86%) had at least one complication during the post operative period. The most frequent was the acute renal insufficiency (40%) and patients required continuos hemofiltration. The global mortality rate was 75%. The mortality of patients without OLT was 100% and the mortality of patients with OLT was 41%, 4 patients dieday because sepsis, (2 candidiasis) and the others 3 because MOF. The actuarial survival at 1 year is 54% and the follow up of 8 months.

Conclusions: The FHF is a very severe and frequent disease at PICU. Supportive treatment only is associated with a very poor prognosis and high mortality rate. The most frequent etiology in our country is the HAV. The OLT is applicable in this cases and it is a valid alternative of treatment (mortality in our series 41%). The ARI is the most frequent complication during the post operative period in Argentina, due the high prevalence of HAV prevention must be considered the main and only way to avoid this catastrophic illness.
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GASTRIC INTRAMUCOSAL pH IN CRITICALLY ILL CHILDREN LIKE HEMODYNAMIC MONITORING
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OBJECTIVE: To assess the efficacy of gastric intramucosal pH (pHi) for evaluation of tissue perfusion and prediction of hemodynamic complications in critically ill children.

PATIENTS AND METHODS: Thirty critically ill children (16 boys and 14 girls) whose age ranged from 3 month and 12 years old were studied. A tonometry catheter was placed in the stomach of all patients at their admission in Pediatric ICU. Intramucosal pH measurements were made at the admission and every 6-12 hours during the study, a total of 202 determinations were made. The catheter was removed after extubation and/or checking of hemodynamic stability of the patient.

The intramucosal pH was derived from application of the Henderson-Hasselbalch formula using the pCO2 value from the tonometer and the arterial bicarbonate. Values of pH between 7.30 and 7.45 were considered normal. The relationship between pHi and severity of patient measured through PRISM, presence of major (cardiorespiratory arrest, shock) and minor (hypotension, hypervolemia or arrhythmias) hemodynamic complications, mortality and stay in the PICU, was analyzed.

RESULTS: The admission value of pHi was 7.48 ± 0.15 (range 7.04-7.68). Five patients (16%) had an admission pH < 7.30. No relationship was found between an admission pH < 7.30 and a higher incidence of hemodynamic complications. Sixteen patients (53%) showed some values of pH < 7.30 during their evolution. Patients with pH < 7.30 had a higher number of hemodynamic complications than the rest (p<0.0001). Every cardiorespiratory arrest (CRA) and shock cases were related to a pH < 7.30. Patients with major complications (CRA and shock) had a pH lower (p=0.03), as well as a number of measurements of low pH (p=0.003) than patients with minor hemodynamic complications. The value of pH lower than 7.30 presented a 90% of sensitivity and 98% of specificity with regard to hemodynamic complications. There was no relationship between pH < 7.30 and PRIMS score and stay in PICU. Patients with pHi < 7.20 presented a PRIMS higher than the rest of patients (p<0.05).

CONCLUSIONS: The pH value may be an early sign of presence of hemodynamic complications in the critically ill child.

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PROGNOSTIC VALUE OF THE GASTRIC INTRAMUCOSAL pH IN MORTALITY AND MULTIORGAN FAILURE IN CRITICALLY ILL CHILDREN
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OBJECTIVES: 1-To determine the prognostic value of the gastric intramucosal pH to mortality and multiple organ dysfunction (MOD) in critically ill children. 2-To compare this value, with the Pediatrics Risk Index Mortality Score (PRIMS).

METHODS: A prospective study was performed with 51 critically ill children, aged from 1 month to 16 years. The admitting diagnosis was: 26 post-surgery (13 neurosurgery, 9 spinal fusion and 4 thoracic or abdominal surgery), 7 sepsis, 6 miscellaneous had a pHi < 7.30. No relationship was observed between the pHi and the score of PRIMS-1 and PRIMS-2 (weaning); in group A: 7.40 ± 0.04 (VM) and 7.41 ± 0.02 (weaning) in group B: 7.40 ± 0.04 (VM) and 7.41 ± 0.02 (weaning).

CONCLUSIONS: Although we did not find differences in gastric pHi during VM, the group A had a lower value than group B due to the number of cardiac patients (70%) and transfusion therapy, in this group. In group B 75% of patients showed a problem in upper airway (subglottic edema, and enlarged tonsils). We found it after extubation.

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GASTRIC INTRAMURAL pH AS A PREDICTOR OF SUCCESS IN WEANING PEDIATRIC PATIENTS FROM MECHANICAL VENTILATION. IBIZA E, ABENGOCHEA A, MODESTO V, ABENGOCHEA B*, ARAGO J, SANCHIS R, VARAS R, GARCIA E. Children's Hospital La Fe, Valencia;*Children's Hospital M. Servet, Zaragoza, Spain.
We tested the hypothesis that Gastric intramural pH (pHi) can be used as an early sign of failure in weaning pediatric patients because the blood flow from nonvital areas is diverted to meet the increased demands of respiratory muscles.

METHODS: 24 children (mean age 4.7±0.3 years ± SD) who were thought by their physicians to be weanable from Mechanical ventilation (M.V.). These patients were ventilated on Servo 900C ventilators, receiving ranitidine, and had intestinal tonometric measurements, in 60 minutes before extubation. All children were placed on pressure support (PS) at levels judged to overcome the resistance of the endotracheal tube and ventilatory circuit (2 cm H2O). A sample of arterial blood and a sample of tonometer were obtained during VM and weaning (PS). pHi, hemodynamic and respiratory data were recorded during VM and weaning. We did not interfere with the primary caretaker's decisions regarding extubation. Patients were considered to be successfully weaned if they were able to sustain spontaneous ventilation for more than 24 hours after extubation. Unpaired t-test were used to compare the values obtained during mechanical ventilation with those obtained during weaning trials. Unpaired t-test were used to compare values from the group that was successfully weaned (A=15) with those from the group that were not (B=9).

RESULTS: We did not find statistical differences in any of those variables measured during MV for patients who were successfully weaned(group A) and those who were not (group B). Gastric pHi was at group A: 7.35 ± 0.03 (VM) and 7.39 ± 0.02 (weaning); in group B: 7.40 ± 0.04 (VM) and 7.41 ± 0.02 (weaning).

DISCUSSION: Although we did not find differences in gastric pHi during VM, the group A had a lower value than group B due to the number of cardiac patients (70%) and transfusion therapy, in this group. In group B 75% of patients showed a problem in upper airway (i.e., airway obstruction). We found this after extubation.

CONCLUSION: 1) Gastric pHi is a good predictor of risk in critically ill patients but maybe because of the small size of the sample, in our study is not of practical value as a predictor of failure in weaning pediatric patients from VM. 2) This test is not a predictor of problems in upper airway, important etiology of failure weaning in children.

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EFFECT OF HYPOTHERMIA ON RECTAL MUCOSAL PERFUSION IN INFANTS UNDERGOING CARDIOPULMONARY BYPASS
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After Ethics Committee approval, written, informed consent was obtained from the parents of 20 infants aged 1.4-45 wk requiring cardiopulmonary bypass (CPB). Patients with aortic coarctation were excluded from study.

METHOD: Following induction of anesthesia, a laser Doppler probe (Moorsoft Instruments Ltd) was inserted 7cm into the patient's rectum, the probe's special design ensuring that the optical prism lay against the mucosa. Continuous monitoring of rectal mucosal perfusion ("flux") was continued throughout the operation. After 10 min CPB at 35°C, "steady state" readings of nasopharyngeal temperature, mean femoral arterial pressure (MAP) and flux were recorded over a further 5 min before CPB-induced core cooling to 14-24°C. Steady state was defined as 5 min period with no change in core temperatures or MAP. Other 5 min steady state recordings were taken immediately prior to rewarming and after rewarming to 35°C, before initiation of any vasoactive drugs. The CPB flow rate was kept at 100 ml kg⁻¹ min⁻¹, the PCV at 25±3%, the Pco2 at 5.3±0.5 kPa and the Pao2 at 20±5 kPa.

RESULTS: Initial warm and rewarm MAP (both 46 mmHg) were significantly lower (p=0.008) than during the 2 cold CPB periods (63 & 64 mmHg). The mean cold flux before (152) and after rewarming to 35°C, before initiation of any vasoactive drugs. The CPB flow rate was kept at 100 ml kg⁻¹ min⁻¹, the PCV at 25±3%, the Pco2 at 5.3±0.5 kPa and the Pao2 at 20±5 kPa.

CONCLUSION: Although hypothermia significantly reduces rectal mucosal perfusion, rewarming produces an even greater reduction in gut perfusion which, considering that mucosal oxygen consumption is highest during this period, may prove crucial in the postoperative development of MOD. Therapy aimed at improving gut perfusion during CPB should be directed at the rewarming period in particular.

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ACUTE CLINICAL FORMS OF ENTERITIS NECROTICANS
(PIGBEL SYNDROME)
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ABSTRACT
This work is aimed at establishing a clinical procedure for the diagnosis of Enteritis necroticans (EN), even at the communal level, and to define criteria for diagnosis able to distinguish between acute forms.

SUBJECTS AND METHOD: 100 cases admitted at the Institute for Protection of Children's Health (IPCH), having characteristic symptoms, were examined clinically, by roentgenography of the abdominal cavity, with the analysis of the blood (total protein, electrolytes, hematocrite) and cultures of intestinal fluid and faeces. Through surgical operations, the pathological lesions were observed and recorded.

RESULTS: Common epidemiological features: the average age is 6-8 years old (3-15); male/female: 1.85; In 70% of the cases, the disease occurred after a meal rich in proteins. The acute toxic form accounted for 15%: severe shock appearing early, with very severe dehydration associated with profoundly decreased blood protein concentration and lowered natriemia as well. The lesions of the small intestine were expanded, all of them were necrotic. In the surgical form (20%), the predominant feature was an obstruction - peritonitis syndrome, the peritoneal fluid showed a characteristic inflammatory reaction. For the rest of cases 65% were the internal form, the shock syndrome was less severe, the abdominal distention was light and disappears gradually, the inflammatory reaction of the peritoneal fluid was not so characteristic.

CONCLUSION: The EN can be diagnosed at the communal level of care units. The changes in the peritoneal fluid are factors contributing to the accurate diagnosis and classification. Approximately half of the cases of EN can be treated at the district hospital. A specific management of shock due to the Pigbel syndrome is also well established.