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Intensive Care Medicine

Correspondence

Inborn errors of metabolism (IEM) revealed by Reye's syndrome (RS)

Dear Sir,

Reye's syndrome (RS) [1] is an acute, rare but serious childhood encephalopathy in which vomiting and coma develop 3–5 days after a viral prodromal disease. Selective hepatic dysfunction is a constant finding. Panlobular microvesicular fatty changes and mitochondrial alterations are characteristic of the disease. Many aetiologic factors have been implicated (viruses, drugs, toxic substances). Recent reports have stressed the importance of early screening for IEM masquerading as RS [2–5]. This justifies a systematic metabolic evaluation on admission, performed in parallel with other investigations. In our unit, this has revealed two fatty acid oxidation defects and 1 partial ornithine transcarbamylase (OTC) deficiency out of 4 consecutive cases of RS observed during a 4-year period (2000 admissions):

A 3 1/2-year-old girl presented with stage-3 coma and seizures during the course of a common cold. Previous history included muscle weakness and hypoglycemia. Laboratory studies showed hypoketotic hypoglycemia. ASAT 160 IU/l, ALAT 100 IU/l, normal prothrombin time, hyperammonemia (145 mol/l), low serum carnitine levels (free 4 µmol/l, total 25 µmol/l, F/T ratio 16%), and medium chain dicarboxylic aciduria (C6, C8, C10). Liver biopsy showed macrovesicular perilobular and microvesicular centro-lobular steatosis. Fibroblast oxidation of labeled C-14 was 39% of normal with C8, normal with electron transfer flavoprotein, suggesting an electron transport defect. Outcome was satisfactory.

An 11-year old boy developed a cold, vomiting and stage-4 coma. Laboratory data showed: pH 7.5, PCO_2 31 mmHg, HCO_3^- 20, ammonemia 390 mol/l, ASAT 48 IU/l, ALAT 78 IU/l, prothrombin time 39% and oroticuria 1836 mg/g creatinine. Liver biopsy revealed micro- and macro-vesicular steatosis with moderate glycogenic depletion without hepatocellular necrosis or mitochondrial changes. The patient died 5 days later but residual liver OTC activity was not studied. Partial OTC deficiency of late onset was confirmed by protein challenge of the sister and mother (Basal oroticuria: 18/22 µg/mg creatinine respectively (normal <2.9)); 6 h post-challenge: 83/87.

A 13-month-old boy was admitted with intense vomiting and coma following a viral infection. Laboratory studies showed: ASAT 27500 IU/l, ALAT 12000 IU/l, prothrombin time 10%, ammonemia 230 mol/l and hypoketotic hypoglycemia. Liver biopsy was normal. He recovered completely but relapsed two years later. Serum carnitine/amino acids and urine GC/MS were unremarkable. Ketone bodies increased normally after a medium-chain triglyceride callenge, but not after long-chain trigylcerides. An unidentified defect in long chain fatty acid oxidation is suspected (normal hepatic carnitine palmitoyl transferase activity).

IEM must be searched in any case of RS in order to exclude mainly β-oxidation defects, urea cycle defects and organic acidemias [2–5]. Since clinical findings indicative of an underlying IEM [3] are non-specific, metabolic studies should be done for *all* patients with RS. Serum and urine samples should be taken *at presentation* and specific treatment administered immediately. Simple lab tests can be of great value [3]: hypoketotic hypoglycemia indicates possible fatty acid β-oxydation enzyme defects; whereas alcalosis, severe hyperammonemia contrasting with mild hepatic cytolysis, a urea-cycle defect. Furthermore, macrovesicular fatty changes without ultrastructural mitochondrial changes should araise suspicion of an IEM.

Yours faithfully,

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Continuous flow modification for Siemens Servo 900C ventilator

Dear Sirs,

I read with interest the correspondence entitled, "CPAP with a Siemens Servo 900 C Ventilator during weaning in infants" [1].

I would like to report on our modification of the Siemens Servo 900 C Ventilator, which we have used successfully since 1986 on infants and children up to 16 kg, both in the pressure control and volume delivery modes. These patients had varying conditions which included: cardiovascular surgery, chronic lung disease, neuromuscular disorders and difficulty in weaning individuals. Our goal(s) for this type of application were: (a) To limit the work of breathing through use of non-demand valve effect [2–5]; (b) Prevention of dysynchrony; (c) Maintenance of PEEP, with the presence of a significant leak around an artificial airway; (d) To enhance our ability to wean ventilator dependant patients.

We support the finding that gas flow meets inspiratory demands, and that no negative effort is necessary to initiate flow, as well as the findings with the monitoring and alarm functions.

Please note on our schematics, we have included an anti-asphyxia valve, Fig. 1. Should inadvertent loss of gas flow occur, the Siemens Servo 900C does not contain an internal anti-asphyxia valve. We do realize the Servo 900C contains an internal loss of gas supply alarm, yet the anti-asphyxia valve is still utilized should that occur. This valve is a variable orifice device calibrated at 5 cmH_2O. A negative pressure created