lary function was normal as assessed by a normal shortening fraction. Because of the neurological findings, the pacemaker was replaced with a programmable demand pacemaker set at a rate of 70 beats per minute. One epicardial lead was placed in the right ventricular outflow tract and the other in the left ventricular apex, which was connected to the generator. The right hemiparesis has continued to improve following discharge.

Discussion

The child described in this report presented in early infancy with cardiomegaly and congestive heart failure secondary to complete A-V block which responded to digitalization and pacing [4]. Despite pacemaker failure eighteen months after the implantation, he remained asymptomatic for the next four years. The presence of left bundle branch block in congenital complete heart block is rare and may be suggestive of a cardiomyopathy. The clinical presentation of right hemiparesis secondary to a left internal capsule infarct is unusual. Stroke may complicate the clinical course of patients with homocystinuria, but this condition was excluded in our patient [3]. The quantitative urinary amino acids results are compatible with the heterozygous state for cystinuria, type II or III [8]. To our knowledge this is not associated with strokes. There are other causes of stroke in children [2,10], most of which were ruled out in this patient. Stokes-Adams attacks (syncope, dizziness, seizures) are uncommon in children with complete heart block but when observed they may be fatal [1,4,7]. Unilateral neurological deficits were not documented in these children. Fever, exertion, infection and increased vagal tone have been reported to precipitate these attacks [1,4,7].

The development of a stroke in a child with congenital complete A-V block is quite unusual. The fact that he appeared to tolerate the bradycardia when the original pacemaker failed was possibly misleading and in our patient the stroke may have been precipitated by increased demands on cardiac output produced by exercise. We recommend replacement of defective pacemakers as soon as they are detected to be malfunctioning in patients with congenital complete A-V block even in the absence of symptoms. We also emphasize the need for regular pacemaker monitoring.

References


Carbamyl Phosphate Synthetase Deficiency with Lethal Neonatal Outcome

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Abstract. A neonate with pronounced hyperammonaemia died at the age of 6 days. Absence of liver carbamyl phosphate synthetase activity was demonstrated. This is the eighth reported patient with a severe variant of isolated mitochondrial carbamyl phosphate synthetase deficiency.

Key words: Carbamyl phosphate synthetase — Hyperammonaemia — Newborn

Introduction

At least seven hereditary urea cycle defects are known at present (Shih 1978; Bachmann et al. 1981). For most of them severe neonatal variants have been reported besides milder forms with later onset. One of the rare urea cycle defects is carbamyl phosphate synthetase (CPS) deficiency. We report another patient with the rapidly fatal neonatal variant of this disease.

Report of Patient

K. V. was the only child of unrelated healthy, Flemish parents. There was no family history of hereditary disease. Pregnancy and birth were normal. Weight at birth was 3980 g, length 55.5 cm and head circumference 36 cm. At the age of 54 h anoxia and stertorous breathing were noted, followed by coma and apnoea so that artificial ventilation became neces-

Fig. 2. Electrocardiographic lead VI. The atrial rate is 91 per min and the ventricular rate is 54 per min. The QRS has a left bundle branch pattern and the duration is 0.10 seconds.
sary. He suffered minor convulsions. On admission at the age of three days he was comatose with circulatory collapse. Small jerky movements of arms and legs were elicited by gently pressing on thorax or abdomen.

Biochemical investigation revealed pronounced hyperammonaemia (1600 μmol/l; nl <50) which in spite of four exchange transfusions, increased to 2570 μmol/l on the sixth day. Plasma amino acid analysis showed increased concentrations of alanine (4.1 mmol/l; nl 0.13-0.44) and glutamine (2.0; 0.35-0.70) with smaller increases of α-aminobutyric acid (106; 13-53), glutamic acid (400; 23-179), glycine (559; 80-341) and lysine (530; 60-275). Plasma arginine (16; 32-117) and citrulline (10; 15-55) were decreased. Blood count, acid-base status, serum electrolytes and blood glucose were normal. Serum calcium was 1.5 mmol/l, phosphorus 1.8 mmol/l, alkaline phosphate 121 U/l, urea 1.7 mmol/l, creatinine 150 μmol/l, uric acid 672 μmol/l, total bilirubin 87 μmol/l (direct reacting 15), SGOT 87 U/l, SGPT 72 U/l, blood lactate 5 mmol/l (nl <2.2) and pyruvate 112 μmol/l (nl <80) and PTT 15%.

Urine examination revealed proteinuria but no sugars or ketones. There was no increase in urinary orotic acid (colorimetric method). Urinary short chain fatty acids were not increased and argininosuccinic acid was not detectable. Cerebrospinal fluid glucose was 3.2 mmol/l and protein 85 mg/dl without cells. Blood and cerebrospinal fluid cultures were negative. Portal angiography showed normal liver perfusion.

The patient’s neurological condition further deteriorated so that he became completely unresponsive on the fourth day. He died at the age of six days. Determination of urea cycle enzyme activities (Bachmann and Colombo 1980) was performed after two weeks on liver tissue obtained immediately after death and stored at -70°C. CPS activity was absent (0 μmol/h.g; nl range 110-356) and N-acetylglutamate synthetase and ornithine carbamyl transferase activities were normal.

Discussion

Severe neonatal hyperammonaemia has mainly been reported in three conditions: hereditary urea cycle defects (Shih 1978; Bachmann et al. 1981), transient neonatal hyperammonaemia (Ballard et al. 1978; Eggermont et al. 1980) and here-

Fig. 1. Schematic representation of the urea cycle. Encircled numbers denote urea cycle enzymes. 1. carbamyl phosphate synthetase 2. ornithine carbamyl transferase 3. argininosuccinate synthetase 4. argininosuccinase 5. arginase. N-acetylglutamate is an obligate activator of carbamyl phosphate synthetase.