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DIAGNOSTIC AND THERAPEUTIC PROBLEMS OF ACUTE RENAL FAILURE IN CHILDHOOD

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ABSTRACT

Acute renal failure (ACR) is a clinical-biological syndrome of sudden rapidly advancing, commonly reversible damage of renal function when a normal body homeostasis cannot be maintained. In the Department of Paediatrics, Medical University of Varna, 18 children with ACR were treated. The most common reasons for the ACR were the following: acute glomerulonephritis, haemolytic-uraemic syndrome, and severe malformations of the urinary tract. Blood urea, creatinine, ionogram,acid-base balance, and diuresis were dynamically monitored in all the children. Therapeutic behaviour was directed towards the correction of the dyselectrolytaemia and acid-alkaline profile. The elevated lethality rate still persisted. Three patients deceased.

Key words: acute renal failure, etiology, diagnosis, treatment, childhood

INTRODUCTION

Acute renal failure (ACR) occurs often in the clinical practice and can complicate almost every disease. This is an actual topic because of its still unsolved etiopathogenetic mechanisms, high incidence rate, high mortality rate along with the complete restoration of the renal function in ACR survivors (2-4,6,7). A 10-year experience gained in the Paediatric Haemodialysis Centre of Sofia with the ACR shows that a total of 90 children with ACR aged between 7 days and 16 years have been treated. In this study a lethality rate of 12 per cent has been reported (4).

ACR develops on intact parenchyma; it can, however, superpose on a preceding renal disease. It is caused by numerous diseases varying most commonly in dependence on children's age. One can observe congentital anomalies of the urinary system and haemolytic-uraemic syndrome in sucklings and even small infants as well. In older children, acute glomerulonephritis and immunologically determined nephropathies can be proved (1,3,4-6).

The aim of the present study is to establish the reasons for ACR in childhood, to define the therapeutic behaviour and dynamic following-up of the disease.

MATERIAL AND METHODS

During a 3-year period in the Department of Paediatrics and Medical Genetics, Medical University of Varna, a total of 18 children aged between 7 days and 14 years with ACR were treated. Usage was made of common medical documentation and file-card containing the following complex:

- anamnesis about preceding water-salt losses, uptake of medicaments, toxic influences, arterial hypertension, oligouria and even anuria;
- objective status - data about dehydratation, parameters of the cardiovascular system, gastrointestinal tract, urinary system;
- level of creatinine, uric acid, urea, ionogram, acid-alkaline profile, blood count with hematocrit, bilirubin, hepatic tests;
- urine - quantitative and qualitative analysis;
- microbiological examinations;
- instrumental examinations - echography of the urinary tract, excretory urography, and miction cystography.

RESULTS AND DISCUSSION

ACR was preceded by enterocolitis in 9 of our patients, by haematuria and oedemas in 5, by severe fit of shivering, febrility, and significant bacteriuria - in 4. The diagnosis of ACR was based on the oliguria, high blood urea values, creatinine, uric acid, hypercalciemia, and severe metabolic acidosis.

ACR represented a complication of a haemolytic-uraemic syndrome in all the patients with enterocolitis. Anaemia was proved in all of them. Besides, differential blood count showed fragmented erythrocytes, schizocytes, elevated bilirubin values (over 30, 40, and even 80 mikromol/l), abnormal hepatic tests, and low thrombocyte values. A haemorrhagic exanthema was observed in 4 children. Echographically, there was enlarged renal size, enhanced parenchymatous echogenicity, and unclear visualization of the pyramids.

In one child with ACR complicating the acute glomerulonephritis the onset was acute and presented with febrility, influenza-like symptoms, evidence of

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hepatomegaly and jaundice. The symptoms on the side of the urinary system were dominated by the macroscopic haematuria and ACR manifestations. Leptospirosis was proved in the same patient (Fig. 1) .

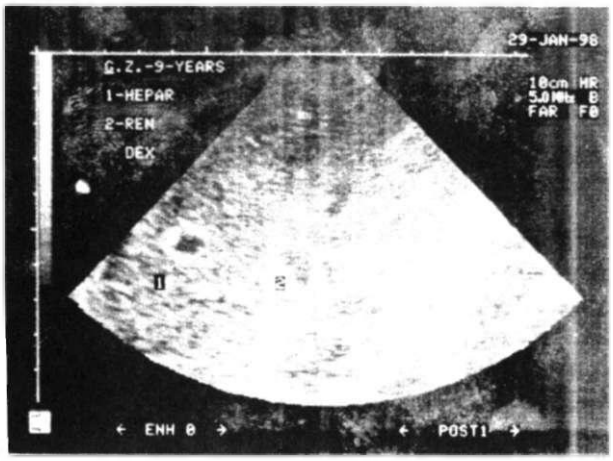

Fig. 1. Echographic changes of the right kidney in a child with a haemolytic-uraemic syndrome consisting in strongly enhanced echogenicity of the renal parenchyma and unclearly visualized pyramids

The echographic examination in the children with acute glomerulonephritis demonstrated kidney enlargement, enhanced parenchymatous echogenicity, unclear visualization of the pyramids, and deleted cortico-medullar link (8). Dynamic echographic monitoring indicated normalization of the echographic changes that correlated with normalization of the clinical symptomatics and laboratory parameters in the children with haemolytic-uraemic syndrome and acute glomerulonephritis (8) (Fig. 2).

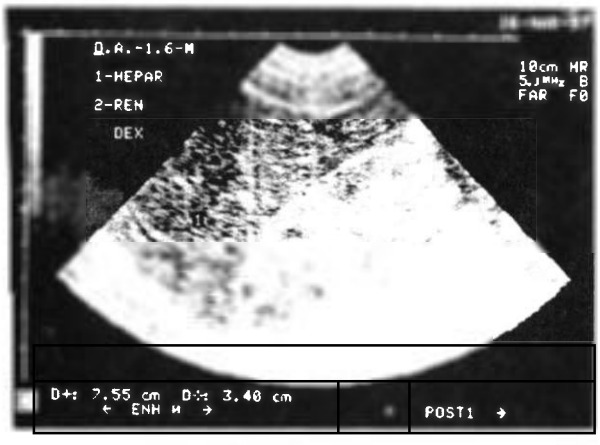

Fig. 2. Echographic changes of the right kidney in a child with acute glomerulonephritis

The febrility, severe fit of shivering, and significant bacteriuria dominated in the clinical manifestation of urosepsis on the background of the congenital anomalies of the urinary tract such as Prune-Belly syndrome, multicystic renal dysplasia, bilateral hydronephrosis of III degree, and bilateral high-grade vesicoureteral reflux in one child each. The analysis of the reasons for ACR revealed that in these patients the most common etiological factors were the following: haemolytic-uraemic syndrome, glomerulonephritis, and congenital urinary tract anomalies. This finding coincides with other studies reported in the literature available (1,4,6,9).

The therapeutic behaviour was directed towards the:

- normalization of the water-electrolyte balance;
- copying the hyperkaliemia, and
- antioedematous, hypotensive, anticonvulsive, and antibacterial treatment of the complications.

In our opinion, the lethality rate of 16,66 per cent (3 deceased children) is due to a great extent to the impossible performance of a haemodialysis treatment at place.

CONCLUSIONS

1. Renal ACR is more common in childhood than prerenal and postrenal ones.
2. The main reasons for ACR are the haemolytic-uraemic syndrome, congenital urinary tract anomalies, glomerulonephritis, and leptospirosis.
3. ACR occurs more often in sucklings and small infants than in older children.
4. The therapeutic influence on the disturbances in the course of ACR represents still a serious problem determining the unfavourbale outcome in some children (lethality rate of 16,66 per cent).

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