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Case Report

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A Rare Manifestation of Child Abuse: Acute Kidney Failure

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ABSTRACT

The most common findings of child abuse are ecchymosis, scars, and burns. Rhabdomyolysis may develop in the presence of multiple soft tissue trauma. Typical presentation of rhabdomyolysis is muscle aches, dark urine and increased muscle enzymes, and acute renal failure and electrolyte disturbances may develop in the presence of severe trauma. In this article, a pediatric patient who developed rhabdomyolysis and acute renal failure after physical abuse was mentioned.

Keywords: Child abuse, rhabdomyolysis, acute kidney failure

ÖZ

Çocuk İstismarının Nadir Bir Manifestasyonu: Akut Böbrek Yetmezliği

Çocuk istismarının en yaygın bulguları ekimoz, yara izi ve yanıklardır. Multipl yumuşak doku travması varlığında rabdomiyoliz gelişebilir. Rabdomiyolizin tipik prezantasyonu kas ağrıları, koyu renk idrar ve kas enzimlerinde artış olup, ciddi travma varlığında akut böbrek yetmezliği ve elektrolit bozuklukları gelişebilir. Bu yazıda fiziksel istismar sonrası rabdomiyoliz ve akut böbrek yetmezliği gelişen bir çocuk hastadan bahsedildi.

Anahtar Kelimeler: Çocuk istismarı, rabdomiyoliz, akut böbrek yetmezliği

INTRODUCTION

Child abuse is defined as all actions knowingly or unknowingly performed by an adult, society or state, which negatively affect the health and physical and psychosocial development of the child. The frequency of child abuse in the world is reported between 1-10%; however, this rate is between 10-53% in Turkey (1,2). The frequency of experiencing a second incident for children who return to their families without an intervention following maltreatment and abuse has been reported as 11-50% (3). Therefore, determining suspected abuse is necessary not only to treat the present situation but also to protect the child from further serious injuries.

The most common findings of child abuse are ecchymosis, scars, and burns. Rhabdomyolysis may develop in the presence of multiple soft tissue trauma. Typical presentation of rhabdomyolysis is muscle aches, dark urine and increased muscle enzymes, and acute renal failure and electrolyte disturbances may develop in the presence of severe trauma (4). In this paper, a pediatric patient who developed rhabdomyolysis and acute renal failure after physical abuse was mentioned.

CASE REPORT

A 6-year-old male patient presented to the emergency service with swelling in the left thigh after an assault. Physical examination revealed hematoma in the lower lip,

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hematoma and ecchymosis in the lower extremities, and a 10 cm diameter difference between the thighs. It was learned from the history that the patient was abused in the family and refused to eat. Tests revealed anemia and liver and renal function disorders (hemoglobin: 7.3 g/dl, White blood cell: 18.4 x 10^3/U/L, platelet: 302x10^3/mikroL, urea: 181 mg/dL, creatinine: 3.13 mg/dl, AST: 1382 U/L, and ALT: 410 U/L). In addition to these findings, the patient also suffered from electrolyte disorders (Sodium: 124 mmol/L, potassium: 6.06 mmol/L, calcium 8.5 mg/dl).

The patient was found to have presented to hospital due to trauma two years ago. Family history showed that the mother and father were substance abusers. The patient, in whom femur fracture was determined on direct graphy, was admitted to the orthopedics ward following splint application. Increase in urea and creatinine (urea: 246 mg/dl, creatinine: 5 mg/dl, uric acid: 11.8 mg/dl) was detected on the tests of the patient whose oral intake was poor and who started vomiting on the 24th hour of hospitalization. Cell destruction markers of the patient was found high (AST: 1382 U/L, ALT: 410 U/L, CK: 47120 U/L, myoglobin: 649 mg/dl, LDH: 3283 U/L). Blood gas of the patient was normal (pH: 7.33, HCO_3: 20), and urine test showed protein excretion at a non-nephrotic level (density: 1010, pH: 6; Sediment: 8 eryhthrocyte/HS, 3 leucocyte/HS; spot urine protein excretion 1.8 g/g creatinine). Urine output of the patient was 0.8 cc/kg/h. Acute renal failure was suspected in the patient. Intravenous fluid treatment (2500 cc/m^2) and high-calorie diet were started. PTH level was at the normal range, which was considered for the differential diagnosis of chronic renal failure (PTH: 106 ng/dl). Urine electrolyte excretions increased (FENa: 8%, FEK: 76%, TPR: 57%). Kidney size and echogenity were found normal in urinary system ultrasound examination. The patient was considered to have acute renal failure secondary to rhabdomyolysis with his clinical and laboratory findings. Intravenous fluid treatment was regulated as alkaline. On the third day of the follow-up of the patient, urine output rose to 2.8 cc/kg/h. CK, myoglobin, LDH, AST and ALT values, which are indicators of rhabdomyolysis, gradually decreased. Figure 1 shows the changes observed in the laboratory parameters of the patient during hospitalization. On the seventh day of follow-up, the patient was discharged with the following values: urea: 32 mg/dl, creatinine: 0.44 mg/dl, uric acid: 4.2 mg/dl, sodium: 137 mmol/L, potassium: 3.4 mmol/L, calcium 9.9 mg/dl, AST: 22 U/L, ALT: 48 U/L. The patient is now being followed as an outpatient, and at his sixth month follow-up, his normal renal function tests are normal.

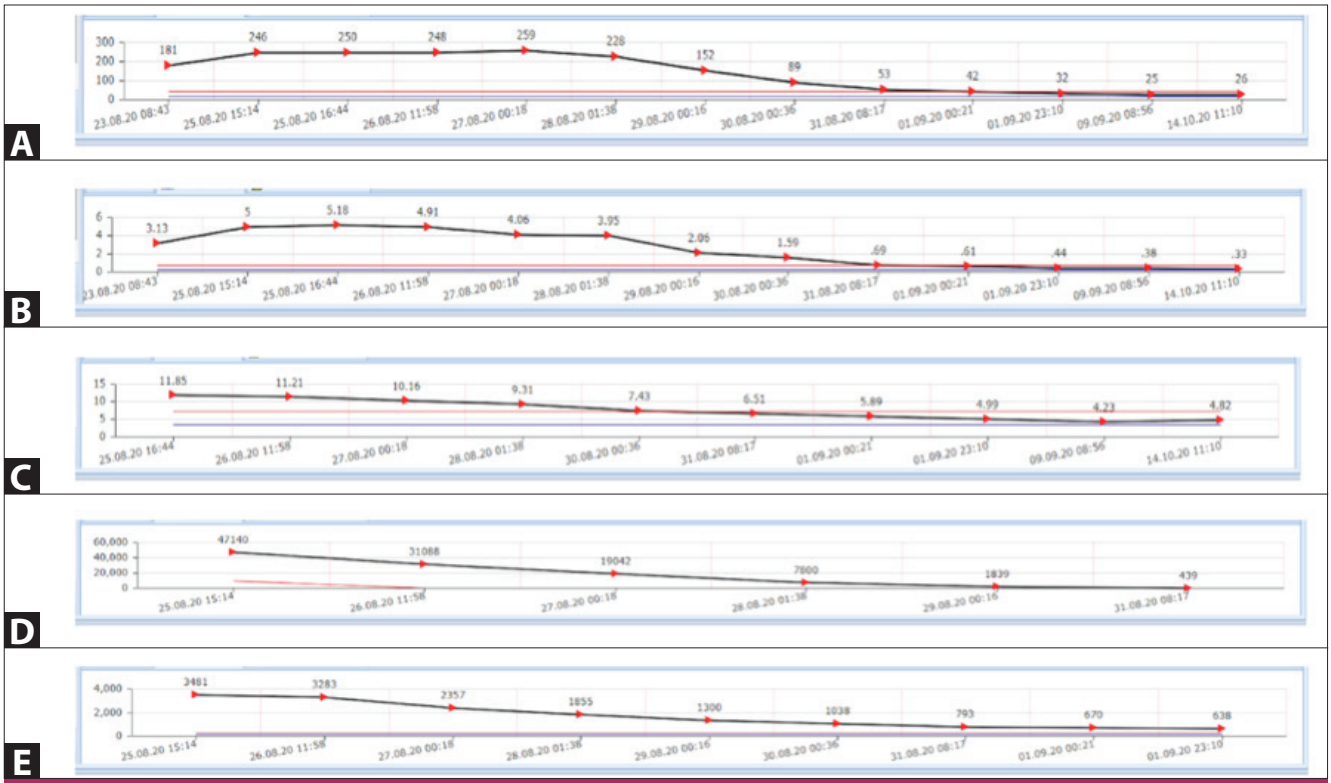

Figure 1. Change in the biochemical parameters of the patient during follow-up.
A. Urea (mg/dl), **B.** Creatinine (mg/dl), **C.** Uric acid (mg/dl), **D.** Creatinine kinase (CK (U/L), **E.** Lactate dehydrogenase (LDH) (U/L).

DISCUSSION

Rhabdomyolysis is a syndrome characterized by muscle necrosis and the release of muscle components into the circulation. Typically, levels of creatinine kinase (CK) rise distinctively, and muscle pain and myoglobinuria may be present. Severity of the disease ranges from asymptomatic increases in serum muscle enzyme to life-threatening diseases related to excessive enzyme increase, electrolyte imbalance and acute renal damage (5). Even though rhabdomyolysis is rarely reported as a result of child abuse, it can lead to renal failure, and it must be considered when physical abuse is being suspected. In severe physical abuse cases, it is important to evaluate rhabdomyolysis including urine test, CK and a full metabolic profile (6). Acute renal failure is the most common fatal complication of rhabdomyolysis, and the frequency of acute renal failure related to rhabdomyolysis varies between 15% and 50% (7). In patients with a CK level of lower than 15-20.000 U/L at the time of presentation, the risk of acute renal failure is lower. In patients with lower CK, dehydration, sepsis, and acidosis are the risk factors of acute renal failure (8). Although CK elevation is a good diagnostic marker for muscle damage, the main reason of renal damage is myoglobinuria, another marker released from damaged muscle cells. Even though the etiology of this acute renal failure that develop secondary to myoglobinuria is not exactly clear, possible reasons include direct nephrotoxic and vasoconstrictive effects of myoglobinuria or obstructive effect of precipitated myoglobinuria on renal tubules (9). Hypovolemia resulting from renal ischemia, tubular obstruction and tubular damage due to free iron contribute to the development of renal dysfunction (8,9). In our case, CK of 50000 U/L and elevated AST, ALT, LDH and myoglobin in biochemical analysis were high enough to predict that cellular damage would be a risk factor for the kidneys. Concomitant anemia and the serious diameter difference between two legs were indicators of the severity of bleeding into the tissues and were evaluated as indicators of hypovolemia and severe renal damage that could develop.

Treatment is oriented at protecting renal function and preventing complications caused by electrolyte anomalies. The prevention of acute renal failure related to rhabdomyolysis necessitates early and aggressive fluid resuscitation. When necessary, it is recommended to keep the case's diuresis over 2 cc/kg/h with fluid treatment. Following the provision of proper hydration, furosemide treatment is also recommended to sustain diuresis, if necessary.

The aim of fluid treatment is to continue and increase renal perfusion and to minimize tubular damage by decreasing the toxic effects of myoglobin. Intravenous isotonic saline must be applied immediately and continued until muscle damage is resolved. There is no need for an additional treatment for hyperpotassemia and hypocalcemia developing due to the release of potassium and phosphorus from the damaged muscle cells since they are frequently asymptomatic. Cardiac monitorization of the patients is sufficient for following their electrolyte disorders (8,9). Even though alkaline hydration has been implemented in a majority of the patients considered to have severe acute renal failure in case and case studies reported, the place of alkaline hydration is debatable (9,11). Our case showed a swift recovery with proper treatment, rapid fluid resuscitation and sustaining diuresis.

In this study, we wished to emphasize the importance of efficient treatment with early diagnosis for acute renal failure that developed secondary to rhabdomyolysis. CK level in children presenting with findings of physical abuse and ecchymosis should be tested so as not to delay diagnosis and treatment.

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