

# Acute Renal Injury Following Detergent Ingestion

## *Deterjan Yeme Sonrası Akut Böbrek Hasarı*

### ABSTRACT

Acute kidney injury (AKI) due to detergent ingestion has been reported infrequently in the literature and there is no report about pancytopenia developing after detergent ingestion. We report a case with AKI and pancytopenia that developed after ingestion of laundry detergent. We thought that renal toxicity due to detergent ingestion might be a result of the direct toxic effect of the detergent on the renal tubular epithelium.

**KEY WORDS:** Acute kidney injury, Detergent ingestion, Pancytopenia, Metabolic acidosis

### ÖZ

Deterjan yemeye bağlı akut böbrek hasarı (ABH) literatürde çok nadir bildirilmiştir. Fakat deterjan yeme sonrası gelişen pansitopeni ile ilgili herhangi bir bildirim yoktur. Bu yazımızda çamaşır deterjanı yeme sonrasında gelişen ABH ve pansitopeni olgusunu bildireceğiz. Deterjana bağlı böbrek hasarının deterjanın böbrek tübül epitellerine direkt toksik etkisi sonucu olabileceğini düşünüyoruz.

**ANAHTAR SÖZCÜKLER:** Akut böbrek hasarı, Deterjan yeme, Pansitopeni, Metabolik asidozis

### INTRODUCTION

Anionic detergents are known as agents with low toxicity potential. In the literature, acute kidney injury (AKI) due to detergent ingestion has been reported very rarely. However, there is no report about pancytopenia developing after detergent ingestion. In this paper, we report a case in which AKI and pancytopenia developed after ingestion of laundry detergent

### CASE REPORT

A 44-year-old male was admitted to emergency room with unconsciousness. His relatives told that he had mental retardation and epilepsy for forty years, for which he was taking valproic acid and carbamazepine. No clinical anamnesis could be obtained from the patient. He was transferred to the neurology clinic with the presumptive diagnosis of postictal period. The patient was consulted with nephrology clinic due to lack of improvement in his consciousness status and the metabolic acidosis on his arterial blood gas analysis. On evaluation

by the nephrology clinic, he was lethargic, there were multiple ulcers in oropharynx, his blood pressure (BP) was 110/70 mmHg, body temperature was 37°C and pulse 85/min, and other findings of physical examination were normal. Blood gas analysis revealed; pH: 7.1, HCO<sub>3</sub>: 6, oxygen saturation: 90%, pCO<sub>2</sub>: 15.4 mmHg and pO<sub>2</sub>: 50.9 mmHg, lactate: 1.1 mmol/L. (metabolic acidosis with an increased anionic gap).

His biochemical values and total blood count were normal (glucose; 75 mg/dl, blood urea; 25 mg/dl, creatinin; 0.78 mg/dl, albumin 4 g/dL, AST; 14 U/L, ALT; 11 U/L, potassium; 4.2 mEq/L, sodium; 143 mEq/L, chloride; 118 mEq/L). Urine analysis revealed; pH: 5.5, protein: + positive, ketone: negative, erythrocyte: + positive, glucose: negative. Chest radiography and renal ultrasonography were normal. Blood carbamazepine and valproic acid levels were within the therapeutic range. Intravenous fluid infusion was initiated. Hemodialysis was administered due to severe acidosis. A detailed history obtained from his relatives,

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and it was figured out that he ingested laundry detergent (Bingomatik®) and he had presented to emergency nearly 12 hours after the ingestion of detergent. No clear information was derived about the amount of the ingested detergent. His creatinine levels started to increase on the second day of admission. On the 3<sup>rd</sup> day of hospitalization he became febrile (38.5 C). His white blood cell (WBC) count and platelet counts were 2400 K/uL, and 129.000 K/uL, respectively. No infection focus could be found and imipenem therapy was initiated after infectious disease clinic consultation. His total blood count analysis on the 4<sup>th</sup> day of admission revealed WBC: 480 K/uL, PLT: 41.700 K/uL and hemoglobin: 10.3 gr/dL. His urea was 109 mg/dL, creatinine 4 mg/dL, magnesium 1,1 mg/dL, albumin: 2 g/dL and calcium 6.3 mg/dL. Mechanical ventilation was performed due to development of respiratory failure. Intermittent hemodialysis was applied. He was oliguric throughout his hospitalization period. On his 12<sup>th</sup> day of admission, laboratory analysis revealed; WBC :1280 K/uL, PLT:62.900 K/uL, hemoglobin:9.48 gr/dL, urea:289 mg/dL, creatinine:3.99 mg/dL magnesium:1.6 mg/dL, albumin:1.9 g/dL, calcium:6.9 mg/dL. He was not hypotensive throughout his hospitalization. He died because of sepsis on the 12<sup>th</sup> day of admission.

## DISCUSSION

Detergents are divided into three groups as nonionic, anionic and cationic. It is known that nonionic and anionic detergents have low toxic effects. Although exposure occurs via oral, respiratory and skin routes, intravenous exposure has been reported as well (1). There is no standard treatment protocol for detergent toxicity. Supportive treatment is given. Even though gastrointestinal, respiratory and local effects of detergent ingestion are known, there is no information about the effects on bone marrow and renal functions. Gastrointestinal damage, cardiac dysfunction, acute renal failure with rhabdomyolysis, acute respiratory distress syndrome (ARDS), hemolysis and coagulation disorders due to detergent ingestion have been reported (1, 2).

Our patient presented to emergency room 12 hours after ingestion of detergent. No diarrhea was present. The hemodynamic parameters of the patient were stable. There were multiple ulcers in the oropharynx. Severe metabolic acidosis with increased anionic gap was present. Acute renal failure due to detergent intoxication is reported rarely in the literature. The similar characteristics of our patient with the reported cases were carbamazepine and valproic acid usage due to epilepsy, normal creatinine levels on admission and development of AKI 24 to 48 hours after ingestion (2,3). In a case of detergent ingestion reported by Prabhakar et al, AKI developed after rhabdomyolysis. The patient, who had severe metabolic acidosis with increased anion gap, needed hemodialysis. Lim et al. attributed the AKI of their patient to renal tubular damage. In a recently published case report, AKI was attributed to direct toxic action of detergent components on renal tubular epithelial cells and endothelium (4). In our case, serum creatine phosphokinase

(CPK) and lactate dehydrogenase (LDH) levels were normal. We did not think that the cause of the renal injury was dehydration, because adequate fluid replacement therapy was given and he had never been hypotensive. At the time of development of renal injury no physical examination and laboratory finding of infection was present. He did not receive any nephrotoxic drug and never used alcohol. In the case reported by Okumura et al. in which renal failure developed after intravenous detergent exposure, acute tubular necrosis was shown by renal biopsy. We could not perform renal biopsy in our case. Like Lim et al., we considered that systemic absorption occurred after ingestion of detergent, and acute tubular necrosis and renal injury developed because of the direct toxic effect of detergent during extraction through the kidneys.

Pancytopenia is defined as decrease of erythrocyte, leukocyte and thrombocytes in the blood (5). Pancytopenia alone is not a disease, and occurs as a finding due to many disease states. Decreased production of hematopoietic cells in bone marrow or early destruction in the periphery may cause pancytopenia. The reason of decreased production of hematopoietic cells in the bone marrow may be damage of marrow tissue by toxins. Infiltration of bone marrow by abnormal or malignant cells may also cause pancytopenia. We could not find any information in the literature about pancytopenia developing after detergent ingestion. There is no known drug intake history of patient that may cause pancytopenia. On bone marrow aspiration biopsy, there was significant depression of erythroid, megakaryocytic and myeloid series. No other hematological disease or malignancy such as leukemia was found by the evaluation of the patient. We thought that in our case, pancytopenia might have developed due to the direct toxic effect of the detergent on the bone marrow.

Detergent ingestion may cause severe clinical consequences. Beside AKI, the pancytopenic effect should be kept in mind after its ingestion.

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