

1 **Başlık:** Çöliak hastalığı prezentasyonu olarak hipokalemik rabdomiyoliz ilişkili akut böbrek
2 yetmezliği

3 **Özet**

4 Erişkin çöliak hastalığı sıklıkla kronik ishal ve kilo kaybı gibi klasik semptomlar olmaksızın
5 görülür. Biz ishale bağlı hayatı tehdit edici hipokalemi, akut böbrek yetmezliği ve akut
6 quadripleji gelişen 31 yaşında bir kadın çöliak hastası sunmaktayız. Literatürde hipokalemik
7 rabdomiyolizli çöliak hastaları sunulmasına karşın akut böbrek yetmezliği gelişmiş hasta
8 bildirilmemiştir. Bu vaka hipokalemik rabdomiyolize bağlı akut böbrek yetmezliği ile
9 başvuran ilk çöliak hastasıdır. Şiddetli ishale bağlı hipokalemik rabdomiyoliz ile başvuran
10 akut böbrek yetmezliği vakalarında anti gliadin IgA antikoru negatif olsa bile ayırıcı tanıda
11 çöliak hastalığı da düşünülmelidir.

12 Anahtar sözcükler: çöliak hastalığı, akut böbrek yetmezliği, hipokalemik rabdomiyoliz

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25 **Title:** Hypokalemic rhabdomyolysis induced acute renal failure as a presentation of coeliac
26 disease

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28 **Abstract**

29 Adult coeliac disease commonly presents without classical symptoms as chronic diarrhea and
30 weight loss. We describe the case of a 31-year-old woman with persistent life-threatening
31 hypokalemia, acute renal failure, and acute quadriplegia due to diarrhea that had developed
32 for one month. Although there are cases of coeliac disease diagnosed with hypokalemic
33 rhabdomyolysis in the literature, none of the cases developed acute renal failure. This is the
34 first case in the literature diagnosed with acute renal failure due to hypokalemic
35 rhabdomyolysis as a presentation of coeliac disease. In acute renal failure cases that present
36 with hypokalemic rhabdomyolysis due to severe diarrhea, coeliac disease should be
37 considered a differential diagnosis despite the negative antigliadin IgA antibody.

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40 Key word: Adult coeliac disease, acute renal failure, hypokalemic rhabdomyolysis

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50 **INTRODUCTION**

51 When hypokalemia develops rapidly and becomes severe, muscle injury and
52 rhabdomyolysis may occur.¹ One of the causes of acute renal failure (ARF) is
53 rhabdomyolysis. Many diseases causing hypokalemic rhabdomyolysis have been reported.
54 Even though there are only a few cases, coeliac disease (CD) is a cause of hypokalemic
55 rhabdomyolysis.²⁻⁵ This is the first case in the literature that presented with ARF due to
56 hypokalemic rhabdomyolysis with regard to CD.

57 **CASE REPORT**

58 A 31-year-old woman presented at the infection diseases department because of diarrhea
59 10-15 times a day for one month, fatigue, weight loss. She was elevated serum blood urea
60 nitrogen (BUN) and creatinine levels and severe hypokalemia. In the last week, progressive
61 muscle weakness had resulted in quadriplegia, severe generalized myalgia, and oliguria. Since
62 the previous week, she had not been able to walk because of weakness. There was no history
63 of any drug use. One week ago, when she admitted to the hospital, her physical examination
64 was normal except for dehydration and a fever of 38.2°C. In the fecal examination,
65 erythrocytes and leucocytes were seen; therefore, metronidazole 1000 mg daily and
66 ciprofloxacin 1000 mg daily treatment had been started. On admission, the patient's serum
67 BUN, creatinine, sodium, potassium, **hemoglobin, ferritin, parathormone and C-reactive**
68 **protein levels were 30 mg/dl, 1.8 mg/dl, 131 mmol/l, and 1.8 mmol/l, 12 gr/dl, 48.3 ng/ml,**
69 **89 pg/ml, 13.1 mg/ml, respectively. Blood, urine, and fecal cultures were negative, and**
70 **serology for salmonella was negative.** On the fourth day of treatment, she had no fever, but
71 the treatment achieved no improvement in the diarrhea. There were no erythrocytes and
72 leucocytes in fecal examination. Since BUN and creatinine levels increased and hypokalemia
73 persisted despite adequate replacement, she was transferred to our nephrology clinic after one
74 week of admission. Blood pressure was 100/60 mmHg, heart rate was 96 bpm, breath sound

75 was 26/minute and body temperature was 37.2°C. Generalized edema was present. There was
76 a symmetrical and dominantly proximal muscular weakness of all extremities. Bilateral
77 respiratory sounds could not be heard. Laboratory findings were shown in table 1.
78 Sedimentation rate and CRP were normal. Arterial blood gas showed metabolic acidosis
79 (PH:7.28 PCO₂:37 HCO₃:18). **Urine output, proteinuria and creatinine clearance were**
80 **detected 400 cc/day, 2 .1 gr/day and 11.5 ml/min/1.73 m², respectively.** The spot urine
81 sample showed potassium 9 mmol/l, sodium 31 mmol/l, and pH lower than 5 with normal
82 sediment. On fecal examination, no erythrocytes, leucocytes, Entamoeba histolytica
83 trophozoites or cysts, and Giardia cysts were detected. The fecal culture was negative.
84 Serologic tests for HIV and hepatitis B and C viruses were negative. TSH, cortisol, and
85 ferritin levels were normal. P/A chest graphy showed bilateral pleural effusion. Abdominal
86 ultrasound examination revealed that bilateral renal sizes and parenchymal echogenicities
87 were normal with no pelvicalyceal dilatation. On the EKG, a U wave and a prolonged QT
88 interval were detected. IgA antigliadin antibody was negative. Colonoscopy was normal.
89 Gastroscopy revealed normal gastric mucosa and duodenal mucosa, from which biopsies were
90 taken. Duodenal biopsy revealed subtotal atrophy, flattening and loss of villi.

91 Hydration and replacement of electrolytes were started. Since the patient's urine output
92 was inadequate, BUN and creatinine levels progressively elevated, hemodialysis was
93 considered. After daily hemodialysis therapy, K levels increased to normal ranges, muscle
94 weakness improved, and adequate urine output was achieved. A gluten-free diet was started
95 and diarrhea ameliorated.

96 **DISCUSSION**

97 The first finding of celiac disease is mostly iron deficiency anemia among adults with
98 CD.⁷ In our case, the patient did not exhibit iron deficiency anemia on admission. Due to the
99 identifying etiology of diarrhea, the fecal examination for parasitosis, fecal cultures, serology

100 for salmonella, viral hepatitis, and HIV were negative. Colonoscopy was normal. IgA
101 antigliadin antibody was negative. It is known that IgA antigliadin antibody measurement
102 with ELISA has 75%-87% sensitivity in adults with CD.^{6,8} Thus, we performed gastroscopic
103 biopsy of the duodenum and diagnosed celiac disease.

104 We diagnosed ARF due to rhabdomyolysis because of the elevated serum muscle
105 enzyme levels. We considered that the etiology of rhabdomyolysis was hypokalemia due to
106 the patient's prolonged severe diarrhea. Injury of the cells causes the efflux of cellular
107 components such as myoglobin and creatine kinase into the circulation, and then
108 rhabdomyolysis occurs. Myoglobin in the renal glomerular filtrate may precipitate, leading to
109 renal obstruction and renal damage. Furthermore, myoglobin is a inhibitor of nitric-oxide
110 bioactivity and causes intrarenal vasoconstriction and ischemia.

111 It has been established that rhabdomyolysis is not an uncommon cause of ARF, with a
112 rate of 5%-25%.¹⁰ ARF develops in 10%-50% of patients with rhabdomyolysis.¹¹ It is
113 admitted that for ARF to occur in cases of hypokalemic rhabdomyolysis, a number of
114 conditions such as dehydration, acidosis, physical exercise, or nephrotoxic drugs should also
115 be present.¹⁰ In our patient, ARF rapidly developed, probably due to rhabdomyolysis
116 accompanying acidosis and dehydration caused by severe diarrhea. The reported causes of
117 hypokalemic rhabdomyolysis include renal tubular acidosis, Bartter syndrome, diuretics,
118 laxative, Conn's syndrome, etc.^{12,13} The first case of hypokalemic rhabdomyolysis caused by
119 CD was reported in 1982; since then, six additional cases have been reported in which CD
120 started with rhabdomyolysis induced by hypokalemia.²⁻⁵ This is the first case in the literature
121 that presented with ARF due to hypokalemic rhabdomyolysis with regard to CD.

122 We started potassium replacement with intensive intravenous hydration; but since it may
123 cause a reduction in plasma potassium concentration secondary to intracellular shift, we did
124 not consider the alkalization. Hypocalcaemia occurs in the first few days because of the

125 deposition of calcium salts in damaged muscle and decreased bone responsiveness to
126 parathyroid hormone.^{14,15} Because of this probability, we avoided calcium replacement.

127 To prevent ARF due to rhabdomyolysis, there is no specific treatment except to
128 maintain fluid and electrolyte balance and preserve tissue perfusion. Once volume overload,
129 hyperkalemia, acidemia, and uremia develop, dialysis should be initiated. During the follow-
130 up period, our patient required dialysis. After daily dialysis therapy for one week, her muscle
131 enzymes levels decreased, and her serum electrolyte imbalance improved. Due to the gluten-
132 free diet, the diarrhea ameliorated.

133 In summary, in ARF cases that present with hypokalemic rhabdomyolysis due to severe
134 diarrhea, CD should be considered as a differential diagnosis. Despite negative antigliadin
135 antibodies, endoscopic biopsy should be performed to diagnose CD.

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179 **Table I. Changes in blood laboratory tests**

	On admission infectious disease clinic	On admission nephrology clinic	After one week on admission nephrology clinic	After two weeks on admission nephrology clinic	After seven weeks on admission nephrology clinic
BUN (mg/dl)	30	27	41	23	19
Creatinine (mg/dl)	1.8	3.7	4.5	2.5	0.9
Na (mg/dl)	131	132	131	136	138
K (mmol/l)	1.8	1.2	1.8	4.9	5
Ca (mg/dl)	6.2	6.6	6.6	7.7	8.9
P (mg/dl)	2	1.7	1.7	5	
Albumin (g/dl)	3.6	3.6	3.8	3.7	
CK (ng/ml)		55000	10000	488	147
AST (U/l)	750	850	640	52	44
LDH (U/l)	1100	1250	793	500	274
Spot urine K (mmol/l)		9			
Spot urine Na (mmol/l)		31			
Ph		7.28			
HCO ₃		18			
PCO ₂		37			

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