# Recurrent Hypokalemia leading to Flaccid Quadriparesis: A Renal or Connective Tissue Disorder

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**Hypokalemic periodic paralysis (hypoKPP) is a clinical entity characterized by recurrent skeletal muscle paralysis due to a decrease in serum potassium levels; hypoKPP can have either a primary (familial) or a secondary cause. One of the secondary causes of hypoKPP is distal renal tubular acidosis (dRTA). Distal renal tubular acidosis (dRTA) is diagnosed when the urinary pH is greater than 5.3 and in the presence of hyperchloremic metabolic acidosis and hypokalemia, with one of the causes being primary Sjögren's syndrome (pSS). PSS can have both glandular and extra glandular manifestations, with dryness of the eyes and mouth being the most common presenting symptoms. DRTA arising from pSS is very unusual, occurring in fewer than 2% of the cases of Sjogren's syndrome (SS). Here, we report on a case of recurrent flaccid quadriparesis that appears to have been caused by distal RTA, resulting in hypokalemia; upon further investigation and clinical evaluation, the patient was diagnosed with pSS. [*P R Health Sci J 2017;36:240-242*]**

*Key words: Distal renal tubular acidosis, Primary Sjogren's syndrome, Paralysis, Hypokalemia*

Distal RTA (dRTA) leading to recurrent hypokalemia and paresis as an initial manifestation of primary Sjogren's syndrome (pSS) is well-known but not commonly reported (1), as pSS is one of the secondary causes of dRTA. Primary Sjogren's syndrome (pSS) is an autoimmune disease in which the immune system targets moisture-producing glands and causes dryness in the mouth and eyes, which is the most common presenting symptom. In this paper, we report a case of recurrent flaccid quadriparesis due to dRTA as a presenting symptom of a patient who, upon evaluation, was diagnosed to have pSS.

## Case report

A 45-year-old female presented with complaints of rapidly progressive weakness in all 4 limbs, which weakness reached its maximum extent within 6 hours of admission. She had a history of multiple similar episodes in the 5 years prior to her visit, which improved on treatment without any residual weakness. However, no cause for the same was determined, and according to the patient, she was not on regular follow-up. During the current presentation, she also related a history of dry mouth and eyes, with Raynaud's phenomenon involving both the upper limbs (since the previous year), which she had not reported in earlier admissions. She had no family history of similar episodes; no history of drug use (such as might precipitate such an event) was noted.

A physical examination revealed a blood pressure of 124 over 84 mmHg, body temperature of 36.7°C, and pulse rate of 82 bpm; cardiac and neurological examinations showed that the patient was conscious and oriented, with no cranial nerve involvement or ptosis. Further examination revealed a flaccid paresis (grade 2 of 5) involving both the distal and proximal muscles bilaterally in the upper and lower limbs; associated with that, the patient had diminished patellar and ankle-jerk reflexes (grade 2 for both). There was no evidence of atrophy of the muscles or of sensory, bowel, bladder, or respiratory muscle involvement. Acute inflammatory demyelinating polyradiculoneuropathy (AIDP), hypoKPP, and (in view of the recurrence) Chronic inflammatory demyelinating polyneuropathy (CIDP) were all considered in the differential diagnosis.

Laboratory investigations (Table 1) revealed a serum potassium level of 2.1meq/L (3.5–5.5), a serum chloride level of 116.6 meq/l, an anion gap of 9 meq/L (8-12), and a blood pH of 7.3. Urine pH was 7, with mild albuminuria (1+). A 5-minute Schirmer's test yielded values of 2.28 mm (5mm) in the

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patient's right eye and 2.42 mm in the left eye. Immunological investigations revealed that the serum titers of anti-Ro/SSA and anti-La/SSB antibodies were significantly raised. The test for antinuclear antibodies (ANA) was positive (1:240), whereas the results for anti–double-stranded deoxyribonucleic acid (anti-dsDNA), anti-Smith (anti-Sm), anti-ribonucleoprotein (anti-RNP), anti-topoisomerase I (anti-Scl-70), rheumatoid-factor (RA), and anti-Jo-1 antibodies were negative. Further, the TSH values were found to be normal.

**Table 1**. Laboratory findings of the patient.

| | Day 1 | Day 5 |
|---|---|---|
| Serum potassium (meq/L) | 2.1 | 3.5 |
| Serum sodium (meq/L) | 141 | 139 |
| Blood pH | 7.30 | 7.40 |
| Bicarbonate levels (meq/L) | 17.5 | 24.0 |
| pCO2 | 26 | 38 |
| Anion gap | 9 | 10 |
| Urine pH | 7 | |
| Hemoglobin (g/dL) | 11.0 | 10.2 |
| Total leucocyte Count (/µL) | 4500 | 4830 |
| Blood urea (mg/dL) | 28 | 25 |
| Serum creatinine (mg/dL) | 0.7 | 0.8 |
| SGOT/SGPT (IU/L) | 25/26 | |
| Serum bilirubin (mg/dL) | 0.9 | |
| Total protein (g/dL) | 6.2 | |
| Serum albumin (g/dL) | 3.2 | |
| TSH (mIU/L) | 2.0 | |
| ESR (mm/hr) | 15 | |
| C-reactive protein (mg/L) | <1 | |
| Rheumatoid factor (IU/ml) | <10 | |

Based on the above clinical presentation and the attendant laboratory work, a diagnosis of distal RTA (dRTA) due to primary Sjogren's syndrome was made. The patient was started on oral potassium replacement (80meq/day) in the form of potassium citrate, which led to a clinical improvement on day 2; she showed complete recovery on day 5 of admission. She was discharged and is being closely followed up.

## Discussion

HypoKPP is a clinical condition characterized by recurrent episodes of skeletal muscle weakness resulting from a decrease in serum potassium levels during symptomatic episodes. The various causes of hypoKPP include thyrotoxicosis, use of diuretics, distal RTA (dRTA)(6%), Gitelman syndrome, liquorice consumption, and primary hyperaldosteronism (2,3).

Our patient presented with acute onset flaccid quadriparesis without sensory, cranial nerve, bladder, bowel, or respiratory muscle involvement but with a history of similar recurrent episodes in the 5 years previous to the current admission. AIDP, CIDP, and hypoKPP were all considered in the differential diagnosis.The presence of hypokalemia (K =2.1) favored the third diagnosis, which was strengthened by the immediate improvement of the quadriparesis and a complete improvement without residual paresis by day 5 of admission (by potassium supplementation). Further, hyperchloremic metabolic acidosis (blood pH of 7.3) and alkaline urine pH (7) indicated distal RTA.

Renal tubular acidosis (RTA) is a disease in which there is impaired reabsorption of filtered bicarbonate or hydrogen ion (H+) excretion. This results in a normal anion gap hyperchloremic metabolic acidosis. Plasma potassium (K+) maybe normal, low, or high, depending on the type of RTA. There are 4 types of RTA; type 1 (distal) and type 2 (proximal) are relatively common.

There are many causes of distal RTA, which causes may be primary or (more commonly) secondary (due to paraproteinemia, medullary sponge kidney, nephrocalcinosis, obstructive uropathy, or autoimmune disease, etc.) (4) In our patient, the history of subjective xerophthalmia, subjective xerostomia, and positive anti-SS-A (Ro) and anti-SS-B(La) along with the results of the 5-minute Schirmer's test together supported the clinical diagnosis of pSS (5). These symptoms, as per her history, were new manifestations that were absent in prior admissions and were associated with the significantly raised serum titers of anti-Ro/SSA and anti-La/SSB antibodies and the positive titers of antinuclear antibodies (ANA).

Primary Sjögren's syndrome (pSS) is an autoimmune disease typically associated with a lymphocytic and plasmacytic infiltrate in the salivary, parotid, and lacrimal glands, leading to a sicca syndrome presenting primarily with dryness of the mouth and eyes, which is the most common manifestation. This immune process can also affect non-exocrine organs, including the skin, lungs, gastrointestinal tract, central and peripheral nervous systems, muscular skeletal apparatus, and kidneys (6,7). The reported rate of renal involvement in pSS in the literature is variable, ranging from 4.2% to 50% (1). The spectrum of renal disease includes interstitial nephritis, which can manifest as distal RTA, proximal RTA, tubular proteinuria, nephrogenic diabetes insipidus, glomerular disease, or renal failure (1,8). The most common manifestations are related to tubular dysfunction, which results from chronic interstitial nephritis (8). Hypokalemia is the most common electrolyte abnormality in patients with dRTA. Distal RTA leading to hypokalemia is usually a late manifestation; however, many case reports exist in which paralysis (paraparesis or quadriparesis) is the presenting feature of Sjogren's syndrome (SS) (9-11). An extensive study of renal manifestations (Bossini et al) discovered that although 7% of the participating patients had hypokalemia, hypokalemia-induced paresis was present in only 1 patient (1).

Hence, our case adds to the scarce literature indicating that features of distal RTA can precede the common and more recognizable features of pSS. This case suggests that clinicians would benefit from increasing their knowledge of pSS, especially its presentation as RTA, in order to avoid a delay in diagnosis. To that end, we report this case to highlight the fact that patients presenting with hypoKPP maybe suffering from early pSS, which would need to be investigated and, if not ruled

out, for which an appropriate management strategy would need to be designed and implemented.

## Conclusion

This case shows that pSS can present primarily with the features of distal RTA (in the form of flaccid quadriparesis), which itself can precede more common manifestations such as dryness of the eyes and mouth. Hence, clinicians must be aware of dRTA as a cause of hypoKPP and must evaluate secondary causes of dRTA such as pSS for early and appropriate management.

## Resumen

La parálisis periódica hipopotasémica (PPH) es una entidad clínica caracterizada por parálisis del músculo esquelético recurrente debido a la disminución de los niveles séricos de potasio, y puede ocurrir debido a causas primarias o secundarias. Una de las causas secundarias de PPH es la acidosis tubular renal distal (ATRD). La acidosis tubular renal distal (ATRD) se diagnostica con un pH urinario de más de 5.3, acidosis metabólica hiperclorémica e hipopotasemia, siendo una de las causas el síndrome de Sjögren primario (SSp). El SSp puede presentar manifestaciones glandulares y extra glandulares, siendo la sequedad en los ojos y la boca los síntomas de presentación más frecuentes. La presentación de manifestaciones de SSp como ATRD es muy rara y se ha reportado que es <2% de los casos de síndrome de Sjogren (SS). En este trabajo se reporta un caso de quadriparesia flácida recurrente debido a ATR distal que resulta en hipokalemia que con posterior investigaciones y evaluación clínica fue diagnosticada con SSp.

## References

1. Bossini N, Savoldi S, Franceschini F, et al. Clinical and morphological features of kidney involvement in primary Sjögren's syndrome. Nephrol Dial Transplant 2001;16:2328–2336.
2. Sinharay R. Hypokalaemicthyrotoxic periodic paralysis in an Asian man in the United Kingdom. Emerg Med J 2004; 21:120–121.
3. Beş C, Paksoy F, Namal E, et al. Thyrotoxic Hypokalemic Periodic Paralysis. Turk Klinik J Nephrol 2008;3:22–24.
4. Chan JC, Alon U. Tubular disorders of acid-base and phosphate metabolism. Nephron 1985;40:257–279.
5. Vitali C, Bombardieri S, Jonsson R, et al.; European Study Group on Classification Criteria for Sjögren's Syndrome. Classification criteria for Sjögren's syndrome: a revised version of the European criteria proposed by the American-European Consensus Group. Ann Rheum Dis 2002;61:554–558.
6. Fox RI. Sjögren's syndrome.Lancet 2005;366:321–331.
7. Manthorpe R, Asmussen K, Oxholm P. Primary Sjögren's syndrome: Diagnostic criteria, clinical features and disease activity.J Rheumatol Suppl 1997;50:8–11.
8. Goules A, Masouridi S, Tzioufas AG, Ioannidis JP, Skopouli FN, Moutsopoulos HM. Clinically significant and biopsy-documented renal involvement in primary Sjögren's syndrome.Medicine (Baltimore) 2000;79:241–249.
9. Poux JM, Peyronnet P, Le Meur Y, Favereau JP, Charmes JP, Leroux-Robert C. Hypokalemic quadriplegia and respiratory arrest revealing primary Sjögren's syndrome.Clin Nephrol 1992;37:189–191
10. Palkar AV, Pillai S, Rajadhyaksha GC. Hypokalemic quadriparesis in Sjogren syndrome.Indian J Nephrol 2011;21:191–193.
11. Soy M, Pamuk ON, Gerenli M, Celik Y. A primary Sjögren's syndrome patient with distal renal tubular acidosis, who presented with symptoms of hypokalemic periodic paralysis: Report of a case study and review of the literature.Rheumatol Int 2005;26:86–89