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Hypocalcemia as a Revealing Sign of Distal Renal Tubular Acidosis: A Case Report

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Abstract **Case Report**

Distal renal tubular acidosis (dRTA) is a rare renal pathology, yet increasingly diagnosed in clinical practice. This clinical observation highlights the importance of early recognition of dRTA signs, particularly when hypocalcemia is present as a revealing symptom. We report the case of a 4-month-old infant presenting with hypocalcemia, seizures, and asthenia, ultimately diagnosed with dRTA, in order to enhance the understanding of this condition and its course while emphasizing the importance of appropriate management.

Keywords: Hypocalcemia, Distal Renal Tubular Acidosis, Infant, Seizures, Acute Interstitial Nephritis.

INTRODUCTION

Distal renal tubular acidosis (dRTA) is a renal disorder characterized by the failure of distal renal tubules to excrete hydrogen ions, leading to blood acidification and electrolyte disturbances [1, 2]. Although dRTA is relatively rare, it can be diagnosed in infants or adults with renal or electrolyte abnormalities [3]. Hypocalcemia, while rarely reported in this context, can play a critical role in the early diagnosis of dRTA.

dRTA can be either acquired or hereditary and is often associated with abnormalities such as hypokalemia and hyperchloremia due to impaired distal tubular function [1-3]. Hypocalcemia is a clinical sign observed in some cases, although its presence is infrequently documented in the literature [5].

METHODOLOGY

We report the clinical case of a 4-month-old infant admitted to the pediatric emergency department for prolonged asthenia and seizures. Clinical and biological assessments revealed metabolic abnormalities characteristic of dRTA, enabling early diagnosis. The patient's evaluation included blood gas analysis, standard biological workup, and a renal biopsy to confirm the diagnosis.

RESULTS

The clinical examination revealed significant failure to thrive and polyuria. Laboratory investigations showed hypocalcemia at 2 mmol/L, hyperchloremia above 115 mmol/L, hypokalemia at 3 mmol/L, blood pH at 7.2, plasma bicarbonate at 9 mmol/L, and polyuria measured at 14 ml/kg/h. Urinary pH was greater than 5, and hypercalciuria was recorded at 15 mg/kg/day. These findings led to the diagnosis of distal renal tubular acidosis, confirmed by renal biopsy, which showed characteristic lesions of acute interstitial nephritis.

The clinical and biological abnormalities observed in this case are consistent with the typical features of dRTA. Management of the condition, including correction of electrolyte imbalances and symptomatic treatment, led to progressive improvement in the infant's condition.

DISCUSSION

Distal renal tubular acidosis (dRTA) is a rare but serious condition that may result in major renal complications such as end-stage renal failure if not diagnosed and treated promptly. In this case, hypocalcemia served as a key revealing sign for diagnosis. Although this imbalance is not commonly associated with dRTA, several studies have demonstrated that calcium disorders, especially

hypocalcemia, can occur due to impaired distal tubular function [1, 2].

Hypocalcemia in dRTA likely results from the failure of calcium transport in distal renal tubules, preventing adequate reabsorption and leading to increased urinary excretion [5]. This disturbance is often accompanied by signs of metabolic acidosis, such as hypokalemia and hyperchloremia, related to dysfunction of the distal tubules [3].

dRTA may be caused by hereditary factors, such as genetic mutations affecting ion transport in tubular cells, or acquired factors, including autoimmune diseases or long-term use of specific medications [4]. Diagnosis is based on a series of biological tests, including acid-base analysis, electrolyte profile, and sometimes renal biopsy to confirm typical lesions [6].

Treatment of dRTA mainly involves correction of metabolic acidosis, restoration of electrolyte balance, and management of underlying causes when identified. Bicarbonate supplementation is commonly used to correct acidosis, while hypocalcemia is treated with calcium supplements [6]. Early and appropriate management is essential to prevent long-term renal complications, including chronic kidney disease [7].

CONCLUSION

This case underscores the importance of early diagnosis of distal renal tubular acidosis, especially when atypical signs such as hypocalcemia are present. Prompt and appropriate treatment reduces the risk of severe complications, including end-stage renal failure. Early recognition of dRTA, particularly in infants, and optimization of therapy improve long-term outcomes for affected patients.

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