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Case Report

A Case Report on Milk Alkali Syndrome Presenting as Recurrent Stroke with Posterior Reversible Encephalopathy

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Abstract

This is a case of 75-year-old lady known case of chronic kidney disease, coronary artery disease, recent stroke – left hemiparesis, diabetes mellitus, systemic hypertension, recurrent seizures probably due to hypocalcemia, post thyroidectomy on supplements. She presented with acute onset of recurrent left sided weakness, mental confusion, and decreased urine output for 3 days. On examination she was drowsy, left hemiparesis with stable vitals. Investigations revealed raised serum calcium and creatinine levels. ABG showed metabolic alkalosis. MRI Brain suggestive of PRES. She was initially treated as a case of recurrent stroke with PRES. Subsequent evaluation revealed persisting hypercalcemia and worsening of renal parameters. Further workup ruled out hyperparathyroidism and malignancy. Repeated enquiry revealed that patient had been taking calcium supplements equivalent to 4 gm of elemental calcium, calcitriol and vitamin D3 supplements and was on irregular follow up. A diagnosis of milk alkali syndrome presenting with recurrent worsening of pre-existing left hemiparesis was made. Calcium supplements withheld and was on adequate fluid therapy. She became symptomatically better.

Keywords: Hypercalcemia; ECG; Alkalosis; AKI; PRES

Introduction

Milk-alkali syndrome is a condition characterized by a triad of hypercalcemia , metabolic alkalosis and acute kidney injury , which is attributed to ingestion of high amounts of calcium and absorbable alkali. It constitutes more than 10% of hypercalcemia cases and in hospitalized patients, it is the third most common etiology of hypercalcemia after primary hyperparathyroidism and malignancy [1]. It was first described in early 20th century with the introduction of treatment regimen for peptic ulcer disease consisting of milk and sodium bicarbonate [2]. Incidence of this syndrome declined with the use of newer drugs for peptic ulcer disease. However cases are now being reported due the widespread use of over the counter calcium supplements.

Objective

- To describe the clinical triad of Milk Alkali Syndrome.
- To review the diagnostic approach and management of hypercalcemia.
- To create awareness regarding the toxic effects of over the counter calcium preparations.

Case Report

This is a case of 75-year-old lady who is a known case of chronic kidney disease, coronary artery disease, recent stroke – left hemiparesis, diabetes mellitus, systemic hypertension, recurrent seizures probably due to hypocalcemia, post thyroidectomy on supplements. Patient was recently treated for symptomatic hypocalcemia and was on calcium supplements. She now presented

with acute onset of recurrent left sided weakness, mental confusion, and decreased urine output for 3 days. On examination she was drowsy, left hemiparesis with stable vitals. Routine blood investigations revealed raised serum calcium and creatinine levels.

MRI Brain showed diffusion restriction in right tempero parietal lobe, bilateral symmetrical T2-flair hyper intensity involving bilateral parietooccipital regions (Figure 1), bilateral thalami (Figure 2) and Pons (Figure 3)- likely PRES. She was initially treated as a case of recurrent stroke with PRES.

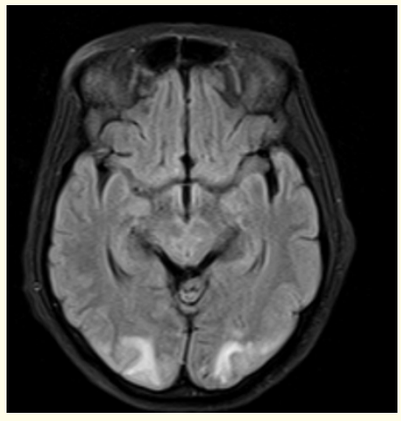

Figure 1: MRI Brain showing abnormal near symmetrical flair hyperintense signal changes involving bilateral parietooccipital lobes [12].

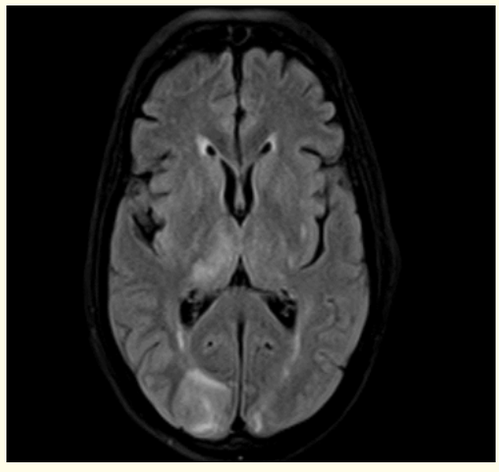

Figure 2: MRI Brain showing abnormal near symmetrical flair hyperintense signal changes involving bilateral thalamus [13].

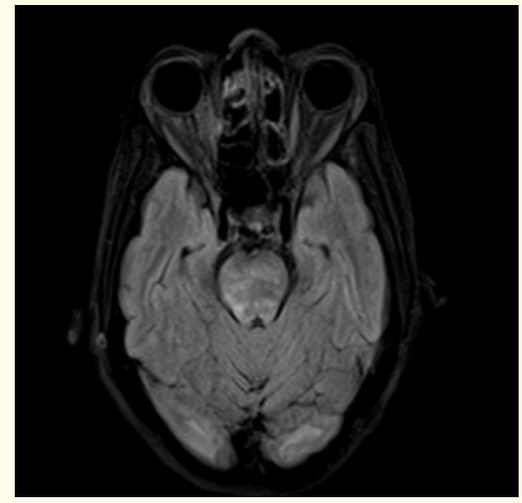

Figure 3: MRI Brain showing abnormal near symmetrical flair hyperintense signal changes noted in pons [15].

Subsequent evaluation revealed persisting hypercalcemia, worsening of renal parameters, ABG showed metabolic alkalosis, Further workup of hypercalcemia ruled out hyperparathyroidism and malignancy. She has been taking calcium supplements equivalent to 4 gm of elemental calcium, calcitriol and vitamin D3 supplements and was on irregular follow up. A diagnosis of milk alkali syndrome presenting with recurrent worsening of pre-existing left hemiparesis was made. Calcium supplements were withheld. Patient received adequate fluid therapy with serial monitoring of serum calcium and creatinine levels. Calcium levels got normalized. She became symptomatically better.

Discussion

The Milk-alkali syndrome now constitutes for more than 10% of the hypercalcemia cases and is considered as the third most common cause of hypercalcemia in hospitalized patients following primary hyperparathyroidism and malignancy [1]. Majority of cases are being reported in post menopausal women. A study noted an increase in incidence of Milk Alkali syndrome in places where betel nut chewing is common as in India and Southeast Asia [3].

The rise in the incidence of Milk Alkali syndrome can be related to easily available over the counter calcium carbonate supplements for treatment and prevention of osteoporosis mostly in postmenopausal women and who are on long term steroid treatment [9]. The use of calcium carbonate to impede the occurrence of secondary hyperparathyroidism in chronic kidney disease is also a contributing factor. Milk products is no longer considered as a prominent cause of milk alkali syndrome.

Ingestion of huge amounts of Calcium and absorbable alkali are the causative factors for milk alkali syndrome. It is characterized by clinical triad consisting of hypercalcemia, metabolic alkalosis and impairment in kidney function. The effects of hypercalcemia include renal vasoconstriction resulting in reduced GFR, activation of the calcium-sensing receptor in the thick ascending limb in medulla thereby inhibits the Na-K-2Cl cotransporter promoting natriuresis and block the action of ADH.

In this case, patient was on high dose calcium supplements for symptomatic hypocalcemia, presented with acute encephalopathy probably due to hypercalcemia induced PRES. Impairment in cerebral autoregulation due to reversible cerebral vasospasm and endothelial dysfunction caused by hypercalcemia is considered to be underlying mechanism for PRES [10,11].

The classical presentation include three clinical forms.

- Acute or Toxemic Form can occur after one week of treatment. Symptoms include nausea, vomiting, weakness, mental changes with psychosis or depression and severe metabolic alkalosis. Rapid relief of symptoms achieved after withdrawal of offending agent [9].
- Chronic (Burnett's syndrome) [4] form symptoms of chronic hypercalcemia like polyuria, polydipsia, muscle aches, and pruritus are noted. Metastatic calcifications are present. Patient had developed chronic kidney disease so only minimal reversal can occur at this stage.
- Subacute or intermediate (Cope's syndrome) [5]. Patients had symptoms of both acute and chronic hypercalcemia and responded to medication withdrawal with gradual improvement.

Diagnosis – Milk alkali syndrome is a diagnosis of exclusion. A thorough history is crucial for diagnosis. A clinical triad of hypercalcemia ,alkalosis and acute kidney injury provide clue to diagnosis of milk alkali syndrome. Additional tests to look for alternative causes of hypercalcemia should be performed.

Cessation of the offending agent and adequate hydration is the mainstay of treatment [6,7]. In severe cases , furosemide therapy can be used to increase urinary calcium excretion [8]. Use of bisphosphonates in treating patients with milk alkali syndrome will produce hypocalcemia for prolonged period, so not recommended [12].

Conclusion

In our case, an extensive work up of hypercalcemia ruled out other causes, along with recent history of excessive intake of calcium supplements ,acute symptom onset and typical triad of Hypercalcemia , Acute Kidney Injury and metabolic alkalosis led to diagnosis of Milk alkali Syndrome.

Prognosis is favorable as it can easily got reversed with stoppage of offending agent [9]. The mortality associated with milk alkali syndrome depend on severity and duration of hypercalcemia. Early diagnosis and treatment reduces the risk of complications.

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