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CASE REPORT

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Invasive Ductal Carcinoma of the Breast Presenting as Hypercalcemic Encephalopathy

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ABSTRACT

We hereby present the case of a 68-year-old woman who presented to our emergency department with acute onset altered mental status. On evaluation, it was discovered that her serum calcium levels were elevated. The rest of the labs were normal. Through further testing and imaging studies, we found out that she had invasive ductal carcinoma leading to hypercalcemia which was causing her altered sensorium. The diagnosis of hypercalcemic encephalopathy was made with the primary culprit the ductal carcinoma of the breast. Herein, we would like to highlight hypercalcemia as an important cause of encephalopathy. With our report, we are trying to prove encephalopathy can be the first presentation of ductal carcinoma of the breast.

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Introduction

Invasive ductal carcinoma of the breast or infiltrating ductal carcinoma is a type of cancer that has invaded the fibrous/fatty tissues of the breast outside of the duct [1]. It is one of the most common forms of breast cancer [1]. The most common symptoms of breast cancer are the presence of a lump in the breast, thickening of breast skin, swelling, rash or redness of the breast, nipple pain or discharge or lumps in the axilla, or changes in the appearance of the nipple or the breast [1]. Here, we report a 68-year-old woman who presented to the emergency department with acute onset altered sensorium which on evaluation was diagnosed as hypercalcemic encephalopathy due to ductal carcinoma of the breast. Hypercalcemia is a common metabolic disorder of malignancy. However, hypercalcemic encephalopathy as an initial presentation of invasive ductal carcinoma of the breast is not commonly reported in the literature.

Case Presentation

A 68-year-old-woman with an unknown past medical history presented to our emergency department from home due to altered mental status that was new and different from her baseline. The patient presented in a very disheveled state. No further history was obtainable due to the patient's mental status. Vitals on Presentation as in table 1.

Table 1: Vitals on Presentation

Blood Pressure	121/59 mm Hg
Heart rate:	125 beats/minute
Temperature	96.50F
Saturation	>95 % on room air
Respiratory rate:	22 breaths/minute

Extensive blood work was done. The most significant labs are shown in the table 2.

Table 2: Labs on Presentation

	Patient's Value	Reference Range
Hemoglobin	16.8 g/dL	12.0-18.0g/dL
Hematocrit	50.3 %	37-47 %
Mean Corpuscular Volume	81 FL	81-99 FL
White Blood Cell Count	22.6 x 10^3/uL	5.2-12.4 x 10^3/uL
Platelet Count	177 x 10^3/uL	130-400 x 10^3/uL
Sodium	141 mmol/L	137-145 mmol/L
Potassium	4.7 mmol/L	3.5-5.1 mmol/L
Bicarbonate	25 mmol/L	22-30 mmol/L
BUN	32 mg/dL	7.0-17.0 mg/dl
Creatinine	1.90 mg/dl	0.52-1.04 mg/dL

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Serum calcium was 17.0 mg/dL (Normal 8.4-10.2mg/dL) table 3. Repeat calcium was the same. Patient was started on aggressive IV fluids hydration. ICU was consulted and the patient was started on pamidronate.

Table 3: Showing calcium, PTH, PTHrP

	Patient's Value	Reference Range
Serum calcium	17.0 mg/dL	8.4-10.2 mg/dL
PTH (Parathyroid Hormone)	21.4 pg/ml	Normal 7.5-53.5 pg/ml
PTHrP (Parathyroid Hormone Related Peptide)	<2.0 pmol/L	Normal <2.0 pmol/L

Urine toxicology was negative. Chest x-ray and Cat scan of the brain were unremarkable. Breast Ultrasound showed suspicious mass within the right breast and right axillary lymphadenopathy. Successful sonographic guided core biopsy of the right breast was performed and the specimen was sent to the pathology lab which came out to be positive for invasive ductal cell carcinoma of the left breast. Over time serum calcium decreased to 12 mg/dL. The patient's mental status improved, she became more alert. Her acute kidney injury resolved. Surgery was consulted for the breast mass. No acute surgical intervention was indicated. The patient was back to her baseline, given an out-patient surgical appointment, and discharged home with close follow-up.

Discussion

Delirium or fluctuating course of sensorium or disturbances of cognition may arise because of some malignancies. Encephalopathy or delirium may arise because of some underlying cancers. Mostly it's multifactorial, especially in patients with advanced cancer and elderly patients. In our patient, dehydration, advanced disease, and hypercalcemia played important roles in the development of her acute encephalopathy or delirium. But the symptom that led to the diagnosis of her underlying malignancy was her altered mental status. The mechanism by which hypercalcemia develops is unclear, although it seems most likely to be associated with the production of parathyroid hormone-related protein [2]. Other factors to consider in delirium are the presence of infections; medication side effects, such as those of opioids and psychoactive medications; and withdrawal from substances of abuse, such as alcohol [3, 4, 5]. Hypercalcemia of malignancy occurs in 20% of patients with cancer, most commonly associated with multiple myeloma (MM), leukemia, and non-Hodgkin lymphoma, and among solid tumors, breast, lung, and renal cancer. Approximately 80% of cases are humoral, associated with parathyroid hormone-related protein (PTHrP) which increases bone resorption through osteoclast activation and osteoblast suppression [6-9]. Less common causes are direct metastatic involvement of bone and 1, 25 dihydroxy vitamin D(calcitriol) and parathyroid hormone-mediated hypercalcemia [10]. A rapid rise of serum calcium (>13.5 mg/dL) causes delirium and coma. Chronic elevation may produce more subtle findings such as malaise, lethargy, mood disturbance, anorexia, and constipation, constitutional symptoms which may mistakenly be attributed to the patient's underlying disease. Hydration and bisphosphonates are the main treatments. Denosumab, a monoclonal antibody that inhibits osteoclast function, is useful for bisphosphonate-refractory hypercalcemia [11].

Conclusion

Patients with cancer usually have multiple causes of delirium and altered mental status, among which hypercalcemia is one of the many which is treatable, with rapid improvement in the cognitive status of the patients.

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