

Case report

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Aggressive gyriform calcifications and seizures after ischemia stroke in a patient with primary hyperparathyroidism

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Learning Point for Clinicians

This case highlights that patients with ischemic stroke concurrent with hypercalcemia caused by primary hyperparathyroidism should be aggressively treated because long-term hypercalcemia complicated with impaired renal function may promote cerebral calcification due to elevated blood calcium–phosphate cross-product levels. Otherwise, hypercalcemia and cerebral calcification may be predisposing factors of post-stroke seizures.

Case history

A 59-year-old man with a history of coronary artery disease developed a sudden onset of weakness of his right limbs and an inability to speak, giving an impression of acute cerebral infarction in the left middle cerebral artery area. Brain computed tomography (CT) excluded intracranial hemorrhage; he had a score of 23 on the National Institutes of Health Stroke Scale. Tissue plasminogen activator (50 mg) according to the body weight was administered within 3 h after acute infarction. No hemorrhagic transformation was found in the brain CT images shown in Figure 1a. However, laboratory examinations revealed serum total calcium level

of 16.3 mg/dl (4.07 mmol/L) (reference range, 8.6–10.2 mg/dl), phosphate level of 3.7 mg/dl (1.19 mmol/L) (reference range, 2.7–4.5 mg/dl) and creatinine level of 2.8 mg/dl (0.7–1.2 mg/dl). High serum parathyroid hormone (PTH) level of 742 pg/ml (reference range, 10–69 pg/ml) and the findings of parathyroid ultrasound imaging confirmed the diagnosis of primary hyperparathyroidism (PHP) due to a single parathyroid adenoma. Diuretics, calcitonin and bisphosphonates were prescribed to manage the hypercalcemic crisis. Parathyroidectomy was postponed due to unstable vital signs.

Four months later, the patient was admitted to the emergency department due to the sudden onset of dyskinesia of the limbs, movements of the eyeballs upward and a loss of consciousness for approximately 5 min. The brain CT images shown in Figure 1b revealed encephalomalacic changes with gyriform calcification over the areas of the old infarction. Although the patient was undergoing treatment with bisphosphonates, serum calcium levels were still between 11.8 and 12.5 mg/dl, with persistent impaired renal function, and a progressive increase in PTH levels was observed, which had increased to 903 pg/ml before surgical intervention. Parathyroidectomy was performed, and the postoperative PTH level was 6.7 pg/ml; serum calcium and

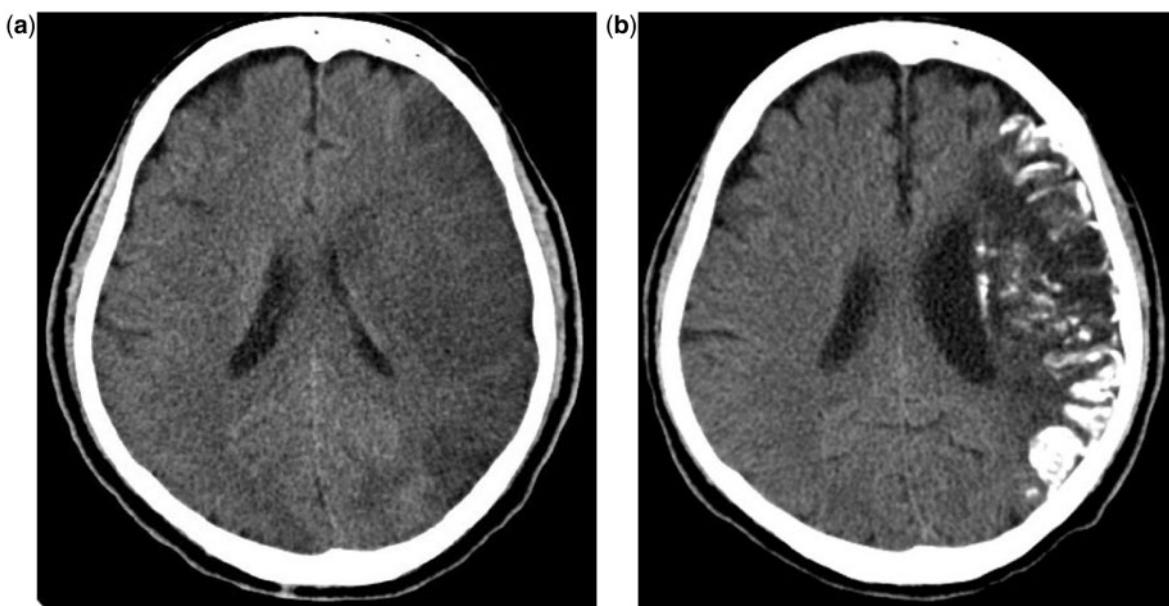


Figure 1. (a) Left fronto-temporo-parietal lobes edema with effacement of sulci and compression of the left lateral ventricle. (b) Large territorial infarct of the left middle cerebral artery with encephalomalacic change and gyriform calcifications.

creatinine levels normalized gradually. Subsequent brain CT images revealed no increment of gyriform calcifications, and the clinical frequency and severity of the seizures decreased.

Discussion

Seizure is known to worsen the prognosis of stroke and complicates the management of an acute stroke.¹ In a recent study, the number of cases with epilepsy secondary to stroke was approximately 11%, and cortical involvement and large lesion size increase the risk.¹ Moreover, cerebral calcification may be associated with some neurological manifestations including seizure.² However, the calcification after ischemic stroke is rare and is typically discovered years after the acute event, and this process may be accelerated by elevated calcium–phosphate cross-product in patients with chronic renal failure.³

PHP is most commonly a result of a single overactive parathyroid gland, and the majority of patients (>85%) are asymptomatic; this is only definitely cured by parathyroidectomy.⁴ However, it may be associated with some complications such as ischemic stroke and impaired renal function and may cause progressively elevated hypercalcemia, particularly in those with high PTH levels.^{4,5} In addition, hypercalcemia caused by PHP may induce cerebral vasospasm and has been reported to play a role in the pathogenesis of epileptic discharges with subsequent seizures.⁵ In our case, we presented a patient with underlying PHP who suffered

from cerebral infarction with prolonged hypercalcemia and impaired renal function despite undergoing treatment with bisphosphonates. Four months later, the patient then developed postinfarction seizure and intracranial calcification. Intracranial calcification may have been aggravated by persistent elevated calcium–phosphate cross-product levels, and in combination with hypercalcemia may have played a role in the development of poststroke epilepsy in this patient. Therefore, patients with ischemic stroke concurrent with symptomatic PHP should receive parathyroidectomy as early as possible to avoid potential predisposing factors of post-stroke seizures to avoid further brain damage.

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