Pseudogout – a rare manifestation of hungry bone syndrome after focused parathyroidectomy

CH Tai¹, HB Oh¹, JE Seet², KY Ngiam¹

¹Division of General Surgery (Thyroid and Endocrine Surgery), University Surgical Cluster, Department of Surgery, National University Health System, Singapore

²Department of Pathology, National University Health System, Singapore

ABSTRACT

Pseudogout, also known as calcium pyrophosphate deposition disease, is a rheumatological condition arising from accumulation of calcium pyrophosphate dihydrate crystals in connective tissues. We present a case of a 56-year-old Bangladeshi woman who underwent focused right inferior parathyroidectomy for primary hyperparathyroidism from a right inferior parathyroid adenoma. On the first post-operative day, she complained of left elbow painful swelling with redness and warmth. Arthrocentesis of left elbow was done due to suspicion of septic arthritis. Two weeks prior to this surgery, she had sudden bilateral knee swelling was diagnosed in her home country of bilateral knee osteoarthritis with effusion and arthrocentesis showed no crystals. Aspiration of left elbow showed calcium pyrophosphate crystals, associated with post parathyroidectomy hypocalcemia, hypomagnesemia confirming pseudogout. Her uric acid level was normal. Bilateral wrist x-rays showed triangular fibrocartilage complex chondrocalcinosis. The patient's condition improved with colchicine and naproxen, as well as calcium and magnesium replacement. Her left elbow swelling and pain resolved. Pseudogout flare is a rare but known sequelae after parathyroidectomy. Early recognition and expeditious treatment is essential.

KEYWORDS

Pseudogout – Parathyroidectomy – Hyperparathyroidism – Calcium pyrophosphate deposition disease – Chondrocalcinosis – Parathyroid surgery

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CORRESPONDENCE TO

Chia Hui Tai, E: chiahui.tai@mohh.com.sg

Introduction

First reported by McCarty in 1962, pseudogout is an acute attack of calcium pyrophosphate deposit-induced synovitis, which results from disturbances of calcium–phosphate metabolism.¹ Hungry bone syndrome is a known phenomenon of rapid, profound and prolonged hypocalcaemia associated with hypophosphataemia and hypomagnesaemia, and is exacerbated by suppressed parathyroid hormone (PTH) levels, following parathyroidectomy.² We present a case of pseudogout which manifested after focused parathyroidectomy. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Case history

A 56-year-old Bangladeshi woman with a background of hypertension, hyperlipidaemia and diabetes mellitus presented with frequent urination, generalised weakness and body ache for two months. She previously had bilateral knee swelling which was treated as osteoarthritis. Arthrocentesis yielded 150 ml aspirate with no negatively birefringent crystals. She was diagnosed to have primary

hyperparathyroidism based on serum calcium of 2.53 mmol/l (normal range 2.15–2.55 mmol/l), serum phosphate of 0.95 mmol/l (0.85–1.45 mmol/l), serum magnesium of 0.43 mmol/l (0.75–1.07 mmol/l) and raised intact parathyroid hormone (iPTH) of 26.7 pmol/l (1.3–9.3 pmol/l; Fig 1). Parathyroid scintigraphy and ultrasonography showed a right inferior parathyroid adenoma. She underwent focused parathyroidectomy with the removal of 2 × 3 cm right inferior parathyroid adenoma.

On the first postoperative day, she complained of an acute onset of painful left elbow swelling with redness and warmth. Wrist and hand joints were swollen but painless. Arthrocentesis of left elbow was performed due to suspicion of septic arthritis. Joint fluid showed a white blood cell count of 35,000 cells/μl with presence of positively birefringent rhomboid-shaped calcium pyrophosphate crystals seen on polarised light microscopy (Fig 2). X-rays of both hands showed extensive triangular fibrocartilage complex chondrocalcinosis (Fig 3). Blood investigations revealed serum calcium of 1.87 mmol/l, serum phosphate of 1.39 mmol/l, serum magnesium of 0.27 mmol/l and iPTH of 3.3 pmol/l, characteristics of hungry bone syndrome (Fig 1).

Figure 1 Preoperative, intraoperative and postoperative serum calcium, magnesium, phosphate and intact parathyroid hormone levels. There is a significant drop of serum calcium from 2.53 to 1.57 mmol/l and serum magnesium from 0.62 to 0.27 mmol/l

Figure 2 Rhomboid-shaped calcium pyrophosphate crystals seen on polarised light microscopy of joint fluid sample (Hemacolor stain, original magnification $\times 20$)

The diagnosis of pseudogout flare was made, associated with hypocalcaemia and hypomagnesaemia, exacerbated

by suppressed parathyroid hormone after parathyroidectomy. Intravenous replacement of calcium and magnesium was administered. Colchicine and naproxen were given and the patient's symptoms resolved spontaneously. Her iPTH was 7.4 pmol/l and serum calcium, magnesium and phosphate were normalised (Fig 1). She was discharged well on sixth postoperative day with oral calcium and magnesium supplements, and remained asymptomatic.

Discussion

Literature on incidence of acute pseudogout following parathyroidectomy is scarce. A Medline search identified about 30 reported cases of pseudogout in relation to parathyroidectomy since 1973.

Pseudogout commonly affects the knees, followed by the shoulders, wrists and ankles. Crystal shedding, has been suggested as the trigger of joint inflammation, precipitated by profound reduction in serum calcium and magnesium levels, causing partial dissolution of crystals with subsequent release from the cartilage matrix into the joint fluid.^{5,4} Such attacks have been reported within 24 to 48 hours after parathyroidectomy.^{5,5} The phagocytosis of these crystals is the probable cause in provoking the acute inflammatory reaction within the joints involved.⁵

Figure 3 Faint opacities (red) of amorphous chondrocalcinosis within triangular fibrocartilaginous complex (yellow)

Diagnosis of pseudogout is established through clinical presentation of pain and swelling of the joint following parathyroidectomy, coupled with hypocalcaemia and hypomagnesaemia. The hallmark of this arthropathy is the radiological finding of chondrocalcinosis.⁶ Definite diagnosis is made by polarised microscopy which differentiates calcium pyrophosphate deposition crystals which are positively birefringent from monosodium urate crystals which are negatively birefringent. Coexistence of both monosodium urate and calcium pyrophosphate deposition crystals in the same joint during an acute monoarthritis had been reported.⁷ In such cases, patients are usually known to have renal impairment or gout. It is likely that there is chronic crystal deposition in the joint in which secondary acute deposition of another type of crystals predominates during a flare.

Rapid resolution can be achieved after correction of the precipitating cause and anti-inflammatory agents, steroids and colchicine. Careful examination and work up is important to achieve correct diagnosis and avoid unnecessary therapy such as antibiotics or arthroscopic washout. As profound hypocalcemia and hypomagnesemia can precipitate pseudogout, especially with previous history of arthralgia, pre- and postoperative serum calcium and serum magnesium analysis should be performed and corrected to normal, especially in the postoperative period.

Conclusion

Although rare, pseudogout flare is a known but commonly misdiagnosed condition after parathyroidectomy for hyperparathyroidism. Despite the diagnostic challenges, a high index of suspicion, checking serum magnesium and calcium levels with synovial fluid analysis are important in guiding the treatment strategy. More studies are required to elucidate the mechanisms and predictability of pseudogout in patients with parathyroid adenoma.

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