Peri-articular 'hard tumours' in soft tissues

Subhash Varma, Anil Bhansali, S S Gill, Savita Kumari, Surjit Singh

A 17-year-old man presented with painless, progressively increasing, non-simultaneous, peri-articular swellings evolving for the last 7 years. He had undergone repeated drainage of white chalky material and received adequate antitubercular therapy without any relief. He subsequently developed multiple non-healing sinuses. There was no history of colicky pain, graveluria, dyspnoea, excessive intake of antacids and vitamin D preparations, trauma or family history of similar disorder. Examination revealed pallor, axillary and inguinal lymphadenopathy and multiple, soft-to-firm, non-tender swellings of varying sizes ($2-5 \times 3-8$ cm) with non healing sinuses at left shoulder, both hips and right elbow (figure 1). The mobility of the left shoulder and right elbow joints was markedly restricted. The rest of the examination was normal.

On investigation he had a haemoglobin of 9.2 g/dl and total leucocyte count of $10 \times 10^9/l$ with 90% polymorphs. Biochemistry on normal diet schedule revealed serum sodium of 132 mmol/l, potassium 3.8 mmol/l, fasting glucose 6 mmol/l, urea 4.9 mmol/l, creatinine 53 μ mol/l, calcium 2 mmol/l (normal 2–2.6) corrected for albumin, inorganic phosphorous 2.23 mmol/l (1–1.4), ionised calcium 1.1 mmol/l (1–1.4), alkaline phosphatase 49.7 U/l and intact parathormone (PTH) 5 pg/ml (12–72). Arterial blood gas analysis was normal. His 24 hour urinary calcium was 300 mg (100–400), phosphate 275 mg (600–1200), creatinine clearance 97.2 ml/min, tubular reabsorption of phosphate 97% (85–90%) and TmP/GFR 2.9 mmol/l (0.82–1.45).

His radiological survey, including computed tomography (CT) scan, is shown in figure 2. Extensive soft tissue calcification in the regions shown in figure 2 was confirmed by ^{99m}Tc -MDP bone scan. Aspirated fluid from the soft tissue was rich in calcium, phosphate, and proteins.

Figure 1 The patient (reproduced with his permission)

Postgraduate Institute
of Medical Education
and Research,
Chandigarh, India
Department of
Internal Medicine
S Varma
S Kumari
S Singh
Department of
Endocrinology
A Bhansali
Department of
Orthopaedics
S S Gill

Accepted 4 January 1999

Figure 2 Corresponding CT scans

Questions

- 1 What is your diagnosis?
- 2 What are other disorders that mimic this condition?
- 3 What are the management strategies?

Answers

QUESTION 1

Peri-articular swellings with sinuses and soft tissue calcification as shown in figures 1 and 2, normocalcaemia, hyperphosphataemia with supranormal TmP/GFR and otherwise normal renal functions, suggest a diagnosis of hyperphosphataemic tumoral calcinosis.^{1,2}

QUESTION 2

Other disorders associated with peri-articular soft tissue calcification are milk alkali syndrome, sarcoidosis, vitamin D intoxication, systemic sclerosis/CREST syndrome and chronic renal failure. Hypercalcaemia predominates in all except the last two disorders.

QUESTION 3

Treatment with phosphate-binding antacids along with dietary restriction of calcium and phosphate has been helpful.³ Surgical resection of soft tissue calcified masses is indicated when these cause discomfort, interfere with function, or become cosmetically unacceptable. Recurrences are rare after complete surgical resection. Preliminary studies have shown the efficacy of calcitonin therapy since this hormone increases renal phosphate wasting.⁴

Discussion

Tumoral calcinosis is a disorder with autosomal recessive or an autosomal dominant inheritance with variable clinical expressivity.^{2,5} It is characterised by peri-articular soft tissue cystic and solid tumorous calcium deposits in association with hyperphosphataemia, and elevated serum calcitriol levels but normocalcaemia and normal renal functions.^{1,2} However, hyperphosphataemia is not consistently present and may be documented in only one third of patients.¹

Hyperphosphataemic patients are more frequently black individuals of either sex with a positive family history and manifest disease with multiple lesions before 20 years of age.¹ Common sites of these soft tissue tumours, in order of frequency, are around the hip, elbow and shoulder joints. These tumours are usually painless, firm-to-hard, lobulated, firmly attached to the deep fascia and occasionally infiltrating into the muscle and tendons.¹ Sometimes the lesions cause ulceration of the overlying skin with formation of a sinus that drains chalky material. Other manifestations include anaemia, low-grade fever, splenomegaly and regional lymphadenopathy.³ Our patient had extensive soft tissue involvement around the hip, shoulder and elbow joints with infiltration into the trapezius and serratus anterior muscles, multiple sinuses and regional lymphadenopathy.

Hyperphosphataemia and supranormal TmP/GFR are present in one third of patients

Learning points: tumoral calcinosis

- clinical: soft tissue, peri-articular tumorous swellings.
- biochemical: hyperphosphataemia, supranormal TmP/GFR, normocalcaemia and normal renal function
- radiology: soft tissue peri-articular calcification
- treatment: phosphate- and calcium-restricted diet; phosphate-binding antacids; surgical excision

while serum calcium; alkaline phosphatase and renal functions are normal.² Serum calcitriol is elevated in most patients while serum parathormone levels are low or normal.² However, affected subjects are in positive calcium and phosphate balance. Irregular, densely calcified lobules with occasional fluid levels confined to the soft tissues are hallmarks of tumoral calcinosis on radiology.¹ The cystic character of the lesion and its lack of contact to the bone can be confirmed by non-contrast CT or bone scan as shown in our case. Interestingly, vascular or visceral calcification does not occur. A dental abnormality consisting of short bulbous root and calcific deposits obliterating the pulp chamber, characteristic of hyperphosphataemic tumoral calcinosis,⁵ was also present in our case. Histopathology reveals multiloculated cysts filled with calcareous material with foreign body giant cells in thick fibrous walls.

The pathogenetic abnormalities in tumoral calcinosis are increased renal reclamation and enhanced intestinal absorption of phosphate. It is attributed to elevated renal phosphate reabsorption threshold, enhancement of other phosphate transport systems independent of PTH, and increased calcitriol synthesis due to abnormal regulation of renal 1 α -hydroxylase activity.^{1,2} Increased dietary calcium absorption by calcitriol in turn suppresses PTH.² Normal serum calcium in these patients is a consequence of precipitation of calcium phosphate salts in the soft tissues.¹ Repeated local trauma resulting in tissue damage with fat necrosis may be a predisposing factor in normophosphataemic patients.⁶

Our patient received a phosphate- and calcium-restricted diet and 20 ml of aluminium hydroxide gel with each meal. The calcareous tissue at the elbow and hips was excised which resulted in healing of the sinuses and restoration of the joint mobility.

Final diagnosis

Hyperphosphataemic tumoral calcinosis.

Keywords: tumoral calcinosis; peri-articular calcification; hyperphosphataemia

1 Prince MJ, Schaefer PC, Goldsmith RS, Chausmer AB. Hyperphosphataemic tumoral calcinosis: association with elevation of serum 1,25-dihydroxy-cholecalciferol concentrations. *Ann Intern Med* 1982;**96**:586–91.

2 Lyles KW, Halsey DL, Friedman NE, Lobaugh B. Correlation of serum concentrations of 1,25-dihydroxy vitamin D, phosphorous and parathyroid hormone in tumoral calcinosis. *J Clin Endocrinol Metab* 1988;**67**:88–92.

- 3 Davies M, Clements MR, Mawer EB, Freemont AJ. Tumoral calcinosis: clinical and metabolic response to phosphorous deprivation. *Q J Med* 1987;242:493-503.
- 4 Salvi A, Cerdulli B, Cimino A, Zuccato F, Giustina G. Phosphaturic action of calcitonin in pseudotumoral calcinosis (letter). *Horm Metab Res* 1983;15:260.
- 5 Lyles KW, Burkes EJ, Ellis GJ, *et al*. Genetic transmission of tumoral calcinosis: autosomal dominant with variable clinical expressivity. *J Clin Endocrinol Metab* 1985;60:1093-6.
- 6 Kindbolm LG, Gunterberg B. Tumoral calcinosis: an ultrastructural analysis and consideration of pathogenesis. *APMIS* 1988;96:368-76.

Fever of unknown origin

S Anuradha, N P Singh, S K Agarwal, N C Krishnamani

A 68-year-old man presented with a history of low-grade, continuous fever and malaise for 3 years. There was no associated history of cough, breathlessness, palpitations, headache, vomiting, joint pains, rash, urinary or bowel disturbances. The patient had been investigated on many occasions in the past for the fever. The investigations, including haemoglobin, blood counts, peripheral smear examination, kidney and liver functions tests, chest X-ray and ultrasonography of the abdomen, were all normal. The only abnormality detected was a persistently elevated erythrocyte sedimentation rate (ESR) of between 65 and 130 mm in the first hour. The patient had received several courses of antibiotics and was currently receiving antitubercular drugs prescribed empirically by a practitioner.

Examination revealed a conscious, febrile male with pulse 100 beats/min regular, and blood pressure 130/70 mmHg. The respiratory, cardiovascular, abdominal and neurological examination was unremarkable. The laboratory investigations of the patient are summarised in the table. A magnetic resonance imaging (MRI) scan of the thorax is shown in the figure.

Table Laboratory investigations

Investigations	Observed value (normal range)
Haemoglobin (g/l)	110 (120-140)
Total leucocyte count ($\times 10^9/l$)	8.4
ESR (mm 1st hour)	66 (0-20)
Fasting blood sugar (mmol/l)	5.0 (4.2-6.4)
Blood urea nitrogen (mmol/l)	5.3 (3.6-7.1)
Serum creatinine ($\mu\text{mol/l}$)	100 (<133)
Alanine transaminase (IU/l)	24 (0-30)
Aspartate transaminase (IU/l)	23 (0-30)
Alkaline phosphatase (IU/l)	100 (<200)
Total proteins (g/l)	70 (60-80)
Serum protein electrophoresis	increase in the gamma globulin fraction
ANA, RA, VDRL and Elisa for HIV 1 and 2 were all negative	
Urine examination, chest X-ray, ECG, and ultrasound abdomen were all normal	

**Department of
Medicine, Maulana
Azad Medical College,
and Associated Lok
Nayak Hospital, New
Delhi - 110 002, India**
S Anuradha
N P Singh
S K Agarwal
N C Krishnamani

Correspondence to
Dr S Anuradha, 3B/4, First
Floor, Gangaram Hospital
Road, New Delhi - 110 060,
India

Accepted 14 January 1999

Figure MRI of the thorax

Questions

- 1 What is your provisional diagnosis?
- 2 How would you investigate the patient further?
- 3 Describe the MRI findings.
- 4 What is your final diagnosis?