Paget's Disease of the Bone

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Introduction

Paget's disease of bone (PDB) is a localised disorder of bone remodelling, characterised by enhanced resorption of bone by giant multinucleated osteoclasts followed by formation of disorganised woven bone by osteoblasts. The resultant bone is expanded, weak and vascular, causing bone pain brittleness and deformity. This condition which is uncommon below 40 years, has a prevalence rate of 3.6% after 40 years in UK which is the highest [1]. It is rare in India, China and other Asian countries. The exact etiology of this condition is not known though many feel it is due to slow viral infection which is unproven. We report a case of PDB in this issue, being a rare disorder.

Case Report

70 year old ex-serviceman presented with history of progressive breathlessness and anginal pain for six months. He also gave history of increase in head size, bilateral hearing loss and deformity of left thigh of 10 years duration. He had left knee joint pain for the past two years. He gave history of suffering from myocardial infarction 14 years back and had been on treatment since then with nitrates, aspirin and beta blockers. There was no family history of similar

illness.

Clinical examination revealed, gross enlargement of skull with prominent blood vessels over the scalp (Fig 1). He had elongation and bowing of left thigh with osteoarthritis of left knee joint (Fig 2). He was normotensive and his vital parameters were normal. There was no pallor, icterus or lymphadenopathy. Pedal oedema was present. Skin over the scalp or thigh was not warm. Fundus examination did not reveal any angioid streaks in retina. Cardiovascular system examination revealed presence of S3. Other systems were clinically normal.

Investigations : Skull radiograph (Fig 3) showed marked thickening of calvarium with well demarcated internal

Fig. 1 : Clinical photograph of the patient showing enlarged head

Fig. 2 : Clinical photograph showing enlargement and bowing of left thigh

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Fig. 3 : Skull radiograph showed marked thickening of calvarium with "cotton wool" appearance of the cranial vault

border of the inner table. There was "cotton wool" appearance of the cranial vault due to combined effects of osteoclastic and osteoblastic activity. Radiograph of left femur showed (Fig 4) enlargement of the bone with cortical thickening, patchy sclerosis with coarsened trabecular pattern. There was also enlargement and sclerosis of iliac, ischial and pubic bones on the left side. In Fig. 5, there is gross narrowing of knee joint space with intercondylar spiking. Chest radiograph revealed gross cardiomegaly. Ultrasound scan of abdomen was normal.

Serum alkaline phosphatase was 1180 IU/L, calcium - 8.8mg/dl, phosphorus-3.9mg/dl, uric acid - 5.6 mg/dl and urinary calcium - 190 mg/day. Blood count and metabolic profile were normal. Audiogram showed bilateral sensory neural hearing loss. Patient was put on 20 mg of Tab Alendronate daily and anti inflammatory agents. Calcium supplements 1 g daily and vitamin D 400 IU were also given. Alendronate was continued for about six months till alkaline phosphatase became normal and pain subsided. Individual is on regular follow up. Though he has no musculoskeletal symptoms he gets frequent anginal pain and has features of ischaemic cardiomyopathy.

Discussion

Many patients of PDB are asymptomatic and the disease is detected by accidental finding of an elevated alkaline phosphatase level or characteristic radiological abnormality. Others present with bone pain, skeletal deformity, pathologic fractures, increased cardiac output (when disease affects >35% of skeleton) and nerve compression. The progression of the disease is characterised by initial lytic phase, a mixed lytic and blastic phase and the sclerotic or burned out phase seen late in the disease process. The radiological signs of

Fig. 4 : Radiograph of left femur showing enlargement of bone with cortical thickening, patchy sclerosis and coarsened trabecular pattern

Fig. 5 : Left knee joint radiograph with gross narrowing of joint space and intercondylar spiking

these three stages may be found in the same patient at different sites [2]. Hearing loss is common due to pagetic involvement of the bones of the inner ear. Skull involvement may also produce cranial nerve palsies, basilar invagination, cerebellar dysfunction or obstructive hydrocephalus. Development of osteosarcomatous degeneration heralded by the presence of a soft tissue mass, localised pain and a rise in alkaline

phosphatase level, is a rare complication occurring in 0.2% cases.

Paget's disease is easily diagnosed on radiography as there is enlargement of the affected bone. Osteoblastic metastases from prostatic carcinoma and lymphoma are important differential diagnoses. Metastatic lytic areas are less well delineated than pagetic lytic areas and in pagetic bones cortical thickening and adjacent thickened trabeculae are very characteristic. In sarcomatous degeneration of the pagetic bone trabecular pattern is affected by appearance of sunray spicules and osteolysis. Soft tissue extension causes typical "sunburst" picture. Disodiumetidronate therapy may cause a pseudosarcomatous pattern, which heals when calcitonin is administered [3]. Activity of the disease can be assessed by measurement of bone thermolabile alkaline phosphatase and other indices of bone resorption like urinary excretion of total hydroxyproline, pyridinoline and deoxypyridinoline. Osteocalcin is a less reliable index of disease activity [4].

The treatment of PDB has undergone major changes in the last few decades with the development of specific inhibitors of osteoclast mediated bone resorption (calcitonin, plicamycin, etidronate, gallium nitrate) and more potent biphosphonates such as alendronate and pamidronate. Important indications for treatment of PDB are, involvement of the skull, vertebral bodies, long bones and pelvis near the hip, deafness, disabling pain, high-output congestive heart failure, planned surgery on pagetic bone and hypercalcemia usually from immobilisation. Second generation oral biphosphonate

(alendronate 40 mg daily) should be the first choice of therapy if available. Intravenous pamidronate, clodronate and tiludronate are other alternatives. When these drugs are given daily supplementation with elemental calcium (1g) and vitamin D (800 IU) is indicated to prevent secondary hyperparathyroidism. Since the advent of second generation biphosphonates, disease activity can now be well controlled for a prolonged period after stopping therapy compared to calcitonin where the action is short lived [5]. NSAIDs are used to treat pain associated with osteoarthritis when bones near joints are involved.

Elective knee or hip joint replacement for severe osteoarthritis, corrective osteotomy for bowing deformity and neurosurgical interventions can be undertaken under cover of biphosphonate or calcitonin therapy, though surgery on pagetic bone can be difficult due to increased vascularity. This case had all the features of PDB and has been under follow up for a long time.

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An eighth-grade teacher was leading a discussion on the qualifications for being President of the United States. After the teacher commented that a person must be a natural-born citizen, one of the students raised her hand. "Does that mean that if you were born by Caesarean section then you can't be President?"

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