

CASE REPORT

A rare incident of Paget's disease of bone in early adult life

Harishchandra Rai, Shaila M Pai, Anitha Dayakar, Vivek Javagal

Department of Oral Pathology and Microbiology, KVG Dental College and Hospital, Sullia, Karnataka, India

Address for correspondence:

Dr. Harishchandra Rai,
Department of Oral Pathology and Microbiology,
KVG Dental College and Hospital, Sullia - 574 237,
D.K, Karnataka, India.
E-mail: hrishrai@gmail.com

Received: 16-03-2012

Accepted: 01-09-2014

ABSTRACT

Paget's disease of bone (PDB) is characterized by a focal alteration of bone remodeling, which leads to bone with anomalous structure and altered mechanical properties associated with pain and complications. It is more common in Western Europe where as rare in Africa and Asia. The disease is more common in men of older adults and mean age of occurrence is 59 ± 14 years. But it is rarely encountered in patients younger than 40 years of age.

Key words: Alkaline phosphatase, Paget's disease of bone, reversal lines, younger age

INTRODUCTION

Paget's disease of bone (PDB) was first described in 1877 by Sir James Paget, a British surgeon and originally named the condition Osteitis deformans.^[1] The disease is characterized by a focal alteration of bone remodelling, which leads to bone with anomalous structure.^[2] Paget's disease is uncommon in Asians.^[3] The disease is more common in men of older adults and mean age of occurrence is 59 ± 14 years. But it is rarely encountered in patients younger than 40 years of age.^[2] Here, we are reporting a rare case of Paget's disease of bone occurring in 26 years young adult.

CASE REPORT

A 26-years-old male patient reported to our institution with a complaint of swelling in the right side of the mandible and in the right supraorbital region since 5 years. History revealed that the onset of these swellings were slow and progressive. Patient developed a dull aching pain in the right side of lower jaw since few days and subsequently developed numbness in the lower lip of same side. Patient had undergone root canal treatment on 26 and 36 four years ago and there was no relevant medical history. Extraoral examination revealed facial asymmetry with widening of the inferior border of mandible on the right side as well as a bulge over the right supraorbital region [Figure 1]. Intraoral examination revealed a swelling extending from midline to ramus of mandible on the right side

measuring about 14×7 cm. Mucosa over the swelling was normal in color. The swelling was hard in consistency, sessile and non-tender and not fixed to the underlying structures.

Radiographic examination reveals enlarged body of the right side of mandible. An ill-defined radiolucency measuring about 7.5×2 cm is seen extending from the condylar rod to the right angle of the mandible. There is also an ill-defined radiolucency of size 2.5×1.5 cm extending from the distal side of 48 to the mesial side of 46. A multilocular diffuse radiolucency can also be seen at lower border of mandible [Figure 2].

The plain computed tomography (CT) scan study shows the bilateral involvement of frontal bone with complete obliteration of frontal sinuses and right sphenoid sinuses, partial obliteration of right ethmoid sinus and bilateral maxillary sinuses. Few expansile lytic lesions in mandible with break in the outer cortices, largest measuring 2×1.8 cm (TD \times AP) in the region of right lower third molar causing break in the inner cortex and predominantly involving bilateral condylar process and ramus of right mandible [Figure 3].

There was high elevated serum alkaline phosphatase level, that is 825 Bodansky units. Incisional biopsy was done on the right side of the mandible near external oblique ridge below third molar. Moderate bleeding was encountered.

Histopathological report showed bony trabeculae with numerous prominent basophilic reversal lines and entrapped osteocytes. Bony trabeculae are lined with osteoblasts and there was also evidence of few multinucleated osteoclasts. Marrow spaces were filled with fibro-vascular connective tissue with large number of blood vessels filled with RBCs [Figures 4 and 5].

Based on the clinical, radiographic, CT scan, biochemical and histopathological findings, diagnosis of PDB was rendered.

Access this article online

Quick Response Code:



Website:
www.jomfp.in

DOI:
10.4103/0973-029X.141373

DISCUSSION

PDB is a localized bone disorder that affects widespread areas of the skeleton through increased bone remodelling. The pathologic process is initiated by overactive osteoclastic bone resorption followed by a compensatory increase in osteoblastic new bone formation. New Pagetic bone is structurally disorganized and more susceptible to deformities and fractures.^[4] There is a high prevalence in Western Europe with an incidence of 3-4% in middle aged people, increasing to 10% in the elderly.^[5] PDB is occasionally described in early adult life that is, below 40 years of age.^[2]

PDB is diagnosed relatively often among the adult population and its prevalence increase with age. It has been reported on few occasions in subjects aged under 40 years.^[6] S Holgado *et al.*, studied that 5.7% of the patients were diagnosed before 40 years of age.^[2] Renier and Audran

suggested that PDB probably starts in youth but is not diagnosed until later.^[7]

The etiology of the disease is unknown. A viral cause has been proposed based upon evidence of a paramyxoviral infection of these cells, but a specific virus has not yet been isolated. But there is also hypothesis that vitamin D deficiency in children may express later as Paget's disease.^[8] It has been known for many years that PDB sometimes occurs in more than one member of a family. Pedigree studies led to the suggestions that in some unusual families, susceptibility to the disorder may have an autosomal dominant mode of inheritance.^[9] Ethel and others suggested that first degree relatives of patients with PDB have increased risk of developing the disorder, especially if the affected relatives have early age at diagnosis or deforming bone disease. The family members sharing a common environment may be more likely than unrelated persons to have common exposure to an infectious agent or to transmit the agent to each other through personal contact.^[10] Goode suggested that mutations affecting the SQSTM1 gene that encodes the P62 protein often found in PDB patients, although environmental factors also play important role in disease etiology.^[11]



Figure 1: Extra oral swelling at the lower border of the mandible and supraorbital region on the right side

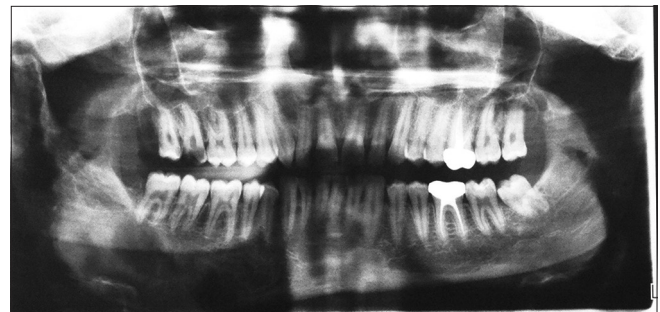


Figure 2: OPG shows a multilocular diffuse radiolucency on the right side of mandible in relation to 46, 47, 48

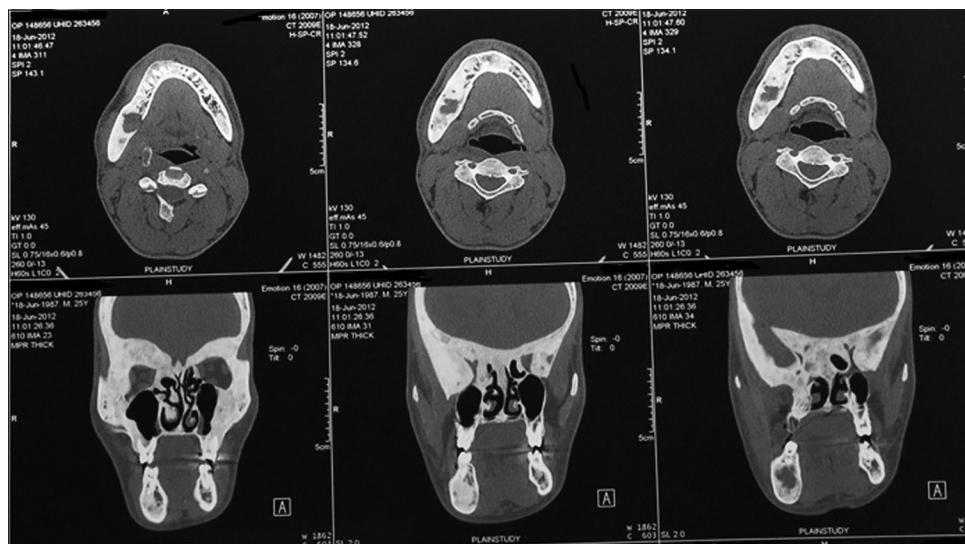


Figure 3: Computed Tomographic scan showing expansile radiolucent lesion involving the right mandibular bone

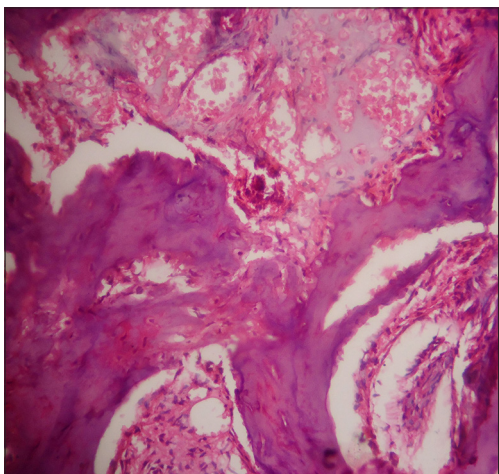


Figure 4: Photomicrograph showing highly vascular bone marrow (H&E, x400)

The disease is characterized by abnormal remodelling of the bone and is divided into three phases. Initially there is osteolytic phase in which excessive bone resorption occurs due to over-activated osteoclasts, then mixed phase with features of resorption and sclerosis both. The last phase is the burnt out phase or sclerotic phase where new bone formation occurs irregularly and excessively by osteoblasts.^[12] PDB can occur in either polyostotic or monostotic forms. Polyostotic form is the most common type but, recent trend show that numbers of monostotic cases are increasing up to 40%.^[13] Choma *et al.* suggested that appendicular and monostotic bone involvement was more frequent in the younger age-group although these differences not statistically significant.^[14]

The complicating features of Paget's disease are bone pain, deformity; pathological fractures Pagetic arthritis, deafness, cranial nerve palsies and spinal stenosis.^[15] Sarcomatous change affects around 1% of patients, the commonest type is osteosarcoma (70-80%) followed by fibrous histiosarcoma (20%), chondrosarcoma (5-10%) and angiosarcoma (1%). People with PDB are at an increased risk of developing heart failure with Figures of 3-4%.^[15]

Diagnosis is ultimately made through image and laboratory findings. Radioisotope bone scanning is the most sensible method to detect early lesions.^[16] Serum alkaline phosphatase (AP) is the most sensitive and widely used biochemical marker of the disease. It is elevated due to the action of increased osteoblastic activity.^[17] Manero Ruiz and others have suggested that in a young adult with high AP values will include PDB in the differential diagnosis.^[18] Urinary hydroxyproline level also increased in PDB.^[14] Image findings rely on disease progression to be classified in three distinct stages; lytic phase, with initial resorption characterized by osteolysis, established by osteoclastic activity; mixed phase, with vascular and osteoblastic repair, leading to thickening and distortion of cortical and trabecular bone; and the blastic

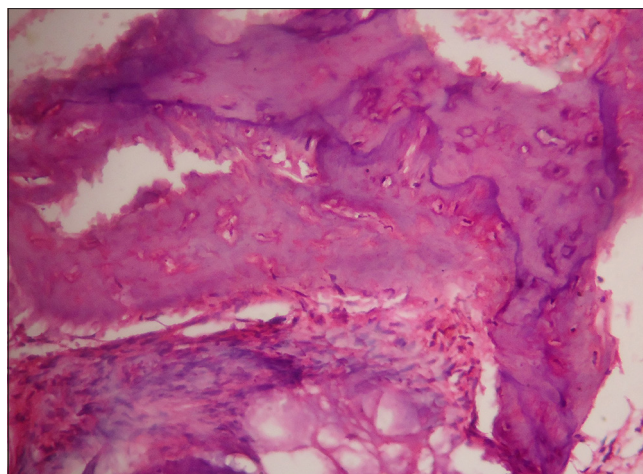


Figure 5: Photomicrograph showing bony trabeculae with prominent reversal lines (H&E, x400)

phase, which cures appositional new bone with a sclerosing scarring aspect.^[16]

Histopathology in PDB shows osteolysis which is followed by a compensatory increase in bone formation induced by osteoblasts recruited to the area. This is associated with accelerated deposition of lamellar bone in a disorganized fashion. The resorbed bone is replaced and the marrow spaces are filled by an excess of fibrous connective tissue with a marked increase in blood vessels, causing the bone to become hypervascular.^[17] Abnormally enlarged trabeculae reveal mosaic pattern of reversal lines that have formed due to continuous bone deposition accompanied by simultaneous disordered bone resorption. The short broken reversal lines are pathognomonic of PDB. The end stage of the disease shows a typical jigsaw puzzle or mosaic pattern of cemental lines representing randomly oriented bone cemented together.^[1]

Among Bisphosphonates, orally administered etidronate, tiludronate, alendronate and risedronate as well as intravenous pamidronate and zoledronic acid have been widely used for the treatment of PDB. Alendronate and risedronate are particularly potent oral anti-resorptive drugs for the treatment of PDB, with effects that are comparable with those of intravenous pamidronate and zoledronic acid.^[19] The most widely recommended protocols for the treatment of PDB with oral bisphosphonates is 40 mg/day of alendronate for 6 months and 30 mg/day of risedronate for 2 months.^[20]

CONCLUSION

The PDB is rarely encountered in younger age-group that is, below 40 years of age; here we reported a case of PDB in 26 years aged male patient. Increased serum AP is the most sensitive and widely used biochemical marker of the disease along with clinical, radiographic findings and histological findings comprising of reversal lines and highly vascular bone marrow, favour the diagnosis of Paget's disease of bone. As

many authors have suggested, the disease may have started and gone unnoticed in younger age but gets noticed in the later age group. So, most of the PDB have been diagnosed in older adults.

REFERENCES

1. Sekar B, Augustine D, Murali S. Paget's disease of Mandible-A case report and review of literature. *J Orofac Sci* 2010;2.
2. Hologado S, Rotes D, Guma M, Monfort J, Olive A, Carbonell J, et al. Paget's disease of bone in early adult life-Concise report. *Ann Rheum Dis* 2005;64:306-8.
3. Bhat K, Balakrishnan C, Mangat G, Bajan K, Ashavaid T, Joshi VR. Paget's disease of the bone: A report of three cases. *J Assoc Physicians India* 2006;54:571-4.
4. Jameson LJ. *Harrison's Endocrinology*. 2nd ed. New York: McGraw-Hill Press; 2010. p. 388-90.
5. How TL, Gerald HM. Paget's disease. *Gm J* 2012;31-5.
6. Haddaway MJ, Davie MW, McCall IW, Howdle S. Effect of age and gender on the number and distribution of sites in paget's disease of bone. *Br J Radiol* 2007;80:532-6.
7. Renier JC, Audran M. Progression in length and width of pagetic lesions and stimation of age of disease onset. *Rev Rheum Engl Ed* 1997;64:35-43.
8. Karunakaran K, Murugesan P, Rajeshwar G, Babu S. Paget's disease of the mandible. *J Oral Maxillofac Pathol* 2012;16:107-9.
9. Kim GS, Kim SH, Cho JK, Park JY, Shin MJ, Shong YK, et al. Paget's bone disease involving young adults in 3 generation of a Korean family. *Medicine (Baltimore)* 1997;76:157-69.
10. Siris ES, Ottman R, Flaster E, Kelsey JL. Familial aggregation of Paget's disease of bone. *J Bone Miner Res* 1991;6:495-500.
11. Goode A, Layfield R. Recent advances in understanding the molecular basis of paget's disease of bone. *J Clin Pathol* 2010;63:199-203.
12. Sau R. Paget's disease of bone. *Clin Calcium* 2007;17:1769-72.
13. Hampannavar AS, Tripathy S, Akkina N, Sharma A. Paget's disease of humerus presenting with recurrent fractures: A case report. *Webmedcentral Orth* 2011;2:WMC001624.
14. Choma TJ, Kukio TR, Islinger RB, Murphey MD, Temple HT. Paget's disease of bone in patients younger than 40 years. *Clin Orthop Relat Res* 2004;202-4.
15. Thomas DW, Tate RJ, Shepherd JP. Mandibular deformity associated with paget's disease. Case report. *Aust Dent J* 1994;39:162-4.
16. Almedia LP, Scignoli JA, Dos Santos SC, Passos LF, Ribeiro SL. Paget's disease of bone and its complications to delay in diagnosis. *Acta Reumatol Port* 2011;36:288-91.
17. Whyte MP, Daniels EH, Murphy WA. Osteolytic Paget's bone disease in a young man. Rapid healing with human calcitonin therapy. *Am J Med* 1985;78:326-32.
18. Manero Ruiz FJ, Urruticoechea Arana A, Medrano San Idefonso M, Pecondon Espanol A. Bone Paget's disease in the young adult. *Rev Clin Esp* 2004;204:532-4.
19. Bagur A, Mautalen C, Arce G. Paget's disease in a vertebral body: Sixteen years of evolution in a young patient. *J Bone Miner Res* 1998;13:1491-2.
20. Iba K, Takada J, Wada T, Yamashita T. Five-year follow-up of Japanese patients with Paget's disease of the bone after treatment with low-dose oral alendronates: A case series. *J Med Case Rep* 2010;4:166.

How to cite this article: Rai H, Pai SM, Dayakar A, Javagal V. A rare incident of Paget's disease of bone in early adult life. *J Oral Maxillofac Pathol* 2014;18:147-50.

Source of Support: KVG Dental College and Hospital, Sullia, Karnataka, **Conflict of Interest:** None declared.