



Osteochondroma: Clinico pathological study in a tertiary care hospital

Lakshmi KS¹, Niranjan Gowda MR², Jayanthi KJ³, Veni U⁴

¹Associate Professor Department of Pathology, Sanjay Gandhi Institute Of Trauma & Orthopaedics, Bangalore, Karnataka, India.

²Professor Department of Pathology, Sanjay Gandhi Institute of Trauma & Orthopaedics, Bangalore, Karnataka, India.

³Assistant Professor Department of Pathology, Sanjay Gandhi Institute of Trauma & Orthopaedics, Bangalore, Karnataka, India.

⁴Research Assistant Department of Bio-Chemistry, Sanjay Gandhi Institute of Trauma & Orthopaedics, Bangalore, Karnataka, India.

Corresponding Author:

Dr. Niranjan Gowda MR E-Mail address: nirumand@gmail.com

Abstract:

Background: Osteochondromas (OC) are common benign bone tumours presenting as bony protuberances in immature skeleton of children and adolescents. Literature search revealed that there are limited studies on this in Indian population.

Purpose: The aim of the study is to enumerate the clinico pathological details of the patients with osteochondroma in a tertiary care centre over a period of 7 years.

Materials and Methods: A retrospective descriptive study of seven years was conducted at a tertiary care hospital of South India from June 2015 – May 2022. Clinico pathological profile of 35 patients diagnosed with osteochondroma on histopathology were analysed. Epidemiological details of these patients were obtained from the hospital records.

Results: 36 cases of osteochondromas from 35 patients were evaluated. 74.3% of the patients presented between 10 – 20 years of age. Male patients were predominantly affected, with OC seen in 74.3 % of them. 91.7% of the lesions were pedunculated. Solitary lesions were seen in 94.2% of the patients. Distal femur was the most commonly affected single bone (36.1%). Rare sites like scapula, rib, vertebra and pubic rami were affected in 22.2% of the cases.

Conclusion: Osteochondromas are cartilage capped benign bone tumours affecting long bones of skeletally immature patients. Scapula being the third common bone affected in this study, OC should be considered in the differential diagnosis of bony scapular swelling. Centrally located OC can remain asymptomatic for long and present with malignant transformation.

Key words: Osteochondroma, Benign bone tumour, Exostosis, Long bones.

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Introduction:

Osteochondroma as defined by WHO is a benign neoplasm consisting of a cartilage capped bony projection on the surface of bone, containing a marrow cavity that is continuous with that of underlying bone^[1]. They are popularly known as osteocartilaginous exostosis or cartilage capped exostosis^[2]. Osteochondromas particularly affect children and adolescents around the knee joint. Metaphysis of long bones particularly lower end of femur and upper end of tibia are commonly involved. The other long bones affected are upper end of femur, upper end of humerus, upper end of fibula. Rarely carpal bones, tarsal bones, spine, patella, flat bones like scapula, sternum and skull may be affected.^[3,4]

These tumours are considered as the common benign tumours of bone accounting for 10- 15% of all the bone tumours and 20 – 50% of the benign bone tumours. They can be sessile or pedunculated and the later being more common.^[5] Studies have shown that osteochondromas are known to occur in 1 – 3 % of the population, but the true prevalence is difficult to estimate as majority are asymptomatic and are detected incidentally.^[6] Solitary lesions are the most prevalent type seen in 85% of the patients, whereas Hereditary multiple exostosis are seen in around 15% of the patients as autosomal dominant disorder.^[3,4]

Materials and Method:

This is a seven year, cross sectional and a retrospective study conducted in the Department of Pathology, Sanjay Gandhi Institute of Trauma & Orthopaedics, from June 2015 – May 2022. The study included 35 patients diagnosed with osteochondroma on histopathology. Hospital records of these patients were reviewed to obtain their clinical and epidemiological details. The data obtained was analysed to find the common age and symptom at presentation, gender predilection and common site of occurrence.

Results:

35 patients with 36 lesions of osteochondroma were evaluated for their age and symptoms at presentation, site and type of involvement

Age and symptoms at presentation:

Majority of the patients, presented between 10 and 20 years of age accounting for 73.5% of the cases. The youngest age at presentation was 10 years of age. Only 09 of 35 patients (26.5%) were between 21 and 30 years of age, the oldest patient being 28 yrs. (Table 1) . 74.3% of the patients were male, with majority of them presenting before 20 yrs (Table 2)

23 of 35 (65.7%) patients had both pain and swelling of the affected site. Swelling and pain alone were seen in four and two patients respectively. Two of the patients had difficulty in squatting. Patient with involvement of 5th rib had symptoms of spinal cord compression which initially started with lower limb weakness and presented with paraplegia. Patient with involvement of spinous process of lumbar (L5) vertebrae had swelling at the back with radiating pain in the right lower limb. Only two of the 35 patients were diagnosed incidentally. (Table 3)

Site and type of involvement:

91.7% (33 of 36) of the lesions were pedunculated. Only two of the 36 lesions were sessile in nature. 33 of 35 patients (94.2%) had solitary lesion whereas only two of the patients had multiple osteochondromas.

22 of 36 cases of OC (61.1%) were seen in the lower limb, of which 21 (58.3%) of them had involvement around knee joint involving distal femur and proximal tibia predominantly. Distal femur was the most commonly involved site seen in 13 of 36 cases (36.1%). Proximal tibia and proximal fibula osteochondroma was seen in five and three patients respectively. Distal tibia was involved in one patient. 5 of 36 cases (14 %) of osteochondroma were seen in upper limb with proximal humerus and pharynx



involvement seen in two patients each. Distal radius was involved in one patient.

Rare sites of occurrence of OC was seen in our study accounting for 22.2% of the cases. This included scapula, vertebrae, rib and bilateral pubic rami. Scapular involvement was seen in four patients. Three of them had the lesion in the medial border and one patient had lesion in the body of scapula. Vertebral involvement was seen in a 10 year old boy involving the spinous process of L5 vertebrae. 25 year old male patient had OC of left 5th rib diagnosed on MRI. It was seen arising from the medial aspect of the posterior end of left 5th rib, in the para vertebral region. The lesion was extending into the extradural aspect of the spinal canal at the level of D5-6, compressing the spinal cord. He presented to our institute with paraplegia. This lesion showed malignant change on histopathological examination. (Table 4)

Discussion:

Osteochondromas are common benign bone tumors. They account for 10 – 15% of all bone tumors and 20 – 50 % of benign bone tumors.^[3,4,5] They are even considered to be developmental malformation rather than true neoplasm.^[7]

Osteochondroma is known to have male predominance with male: female ratio ranging from 1.6–3.4: 1.^[8] Study conducted by Bernard SA et al had M:F ratio of 2.7 :1. In our study, male patients accounted for 74.3 % of the patients with a M: F ratio of 2.9 :1. Though they are commonly seen during the first three decades of life, most of the lesions are seen during the period of rapid skeletal growth^[2,7]. All of our 35 patients who presented were within the first three decades of life, and 74.3% of the patients were below 20 yrs of age.

Osteochondromas can be solitary or multiple, pedunculated or sessile. Solitary OCs are more common accounting for around 85% of the cases^[3,4]. This correlated with our study where in 94.3% of the patients had solitary lesions. 94.1% of the lesions were pedunculated. In a

study conducted by Saglik .Y et al pedunculated lesions were seen in 64.8% of the patients with solitary OC and sessile lesions were found in 76% of the patients with hereditary multiple osteochondroma.^[5] In our study out of the two patients with multiple OC , one of them had a sessile lesion in the pubic rami bilaterally and the other patient had a pedunculated lesion in the upper end of tibia and fibula.

Swelling and pain was the major complaint seen in 65.7% of the patients in our study unlike other studies where OC is predominantly an incidental finding.^[2] In our study we had two incidental cases.

Long bones of lower extremities are more often affected than the upper extremities. They particularly are common in the metaphysis of long bones around the knee.^[9,10] In the present study 58.3% of the OC's were located around the knee with distal femur being the most commonly affected bone accounting for a total of 13 Of 36 cases (36.1%). Various studies have shown OC around knee ranging from 37.1% to 50%.^[2] Distal femur, proximal tibia and proximal humerus are the most common sites of occurrence of OC.^[3,7] Proximal tibia was the second commonest bone affected in our study accounting for 13.9% of the cases. Proximal tibial involvement was 22% in study conducted by Saglik Y et al.^[5] Distal tibia was affected in one patient (2.9%).

In the present study upper limb involvement was seen in 14.7% (5 of 34) of the patients. Literature study revealed that proximal humerus is a commonly involved long bone following distal femur and proximal tibia. Unlike in other studies proximal humerus was rarely affected in our study and was seen only in 2 of 36 cases (5.5%). Gregory RG et. al had involvement of humerus seen in 23% of the cases.^[4] Saglik Y et al had OC of humerus in 11% cases. In literature, phalynx is not as commonly affected as humerus, whereas in our study phalynx was equally affected with 2 cases (5.5 %) . Small bones of hands and feet were affected in 8.3% patients in a study conducted



by Saglik Y et al. Distal radius involvement was seen in one patient.

Osteochondromas of axial skeleton is uncommon and about 1 – 4% are located in spine. They are commonly diagnosed at an average age of 32 years. OCs commonly affect the cervical vertebrae with C2 being the most frequent site followed by thoracic vertebrae. They commonly involve the spinous and transverse process of the vertebrae. Lower vertebrae are rarely affected. OCs affecting the lumbar vertebrae commonly show involvement of the lamina.^[11,12] In our study we had one case of OC (2.7%) involving the spinous process of lumbar vertebrae, L5. He was a 10 year old boy who presented with swelling in the lower back and radiating pain in the right lower limb. Studies have shown osteochondromas of vertebrae are more commonly asymptomatic but can rarely cause radicular pain or spinal compression symptoms when it grows into the spinal canal.^[13]

OC rarely affects bones like scapula, ilium, pubic rami, clavicle and ribs which develop by intramembranous ossification.^[8,9] Whereas in our study 22.2% of the total cases were seen involving these rare locations, like the scapula, pubic rami, rib and vertebra. We had four patients with OC of scapula (11.1%) and one young female patient aged 18 years had involvement of bilateral pubic rami. 10 year old boy had OC of spinous process of L5 vertebra. Another male patient aged 25 years had OC of the left 5th rib diagnosed on MRI. The lesion was seen on the medial aspect of the posterior end of 5th rib. It was extending into the spinal canal at D5-6 level causing vertebral scalloping and compression of the spinal cord. The lesion had a cartilage cap of 1.5cm thickness. On histopathological examination diagnosis of chondrosarcoma was rendered.

Malignant transformation of OC is a rare complication accounting for 1 – 5 % in solitary osteochondroma and is one of the severe complications of OC.^[2,5] Sudden growth of the tumour after puberty, cartilage thickness of more than 1 cm, extensive calcifications and

destruction of the adjacent bone should raise the suspicion of malignant transformation. OCs located in the ribs, shoulder, pelvis are more prone for malignant transformation as they can be asymptomatic for a long time.^[5]

Conclusion:

Osteochondromas are benign cartilage capped bone tumours seen in children and adolescents with male predilection. They predominantly affect the long bones, particularly around the knee. Though OCs of the flat bones is uncommon, scapula was the third most commonly involved bone in our study following distal femur and proximal tibia. Hence any bony swelling of scapula, osteochondroma should be considered in the differential diagnosis. Centrally located OCs have a higher chance of malignant transformation as they go undiagnosed for a long time owing to their location. Malignant transformation though rare, is a severe complication; hence regular follow up is essential.

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Age	Number	Percentage
10 – 20 years	26	74.3%
21- 30 years	09	25.7%
Total	35	100

Table 1: Age distribution of Osteochondroma

Age	Male	Percentage	Female	Percentage
10 – 20 yrs	21	60%	05	14.3%
21 – 30 yrs	05	14.3%	04	11.4%
Total	26	74.3%	09	25.7%

Table 2: Gender distribution of Osteochondroma



Symptoms	Numbers	Percentage
Swelling and pain	23	65.7%
Swelling only	04	11.4%
Pain only	02	5.7%
Incidental finding	02	5.7%
Difficulty in squatting	02	5.7%
Weakness of lower limb	01	2.8%
Radiating pain lower limb	01	2.8%
Fracture	Nil	0

Table 3: Symptoms at presentation

Site of occurrence	Numbers	Percentage
Distal femur	13	36.1%
Proximal tibia	05	13.9%
Scapula	04	11.1%
Proximal fibula	03	8.3%
Proximal humerus	02	5.5%
Phalynx (Hand)	02	5.5%
Pubic Rami (Bilateral)	02	5.5%
Distal radius	01	2.7%
Distal tibia	01	2.7%
L5 vertebra	01	2.7%
Rib	01	2.7%
Site not known	01	2.7%

Table 4: Location of Osteochondroma





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Figure 1: Intraoperative photograph of excision of an osteochondroma.

Figure 2 : Surgically resected specimen of osteochondroma.



Figure 3: Plain radiograph showing sessile osteochondroma of pubic rami.



Figure 4: Plain radiograph showing multiple pedunculated osteochondromas of lower end of femur, upper end of tibia and fibula.

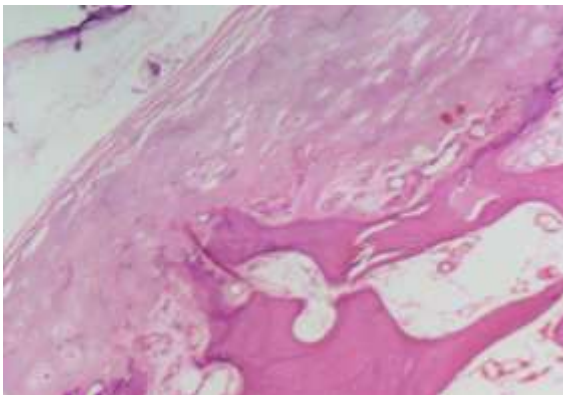


Figure 5: Cartilage capped bony trabeculae perichondrium (H&E 100x)

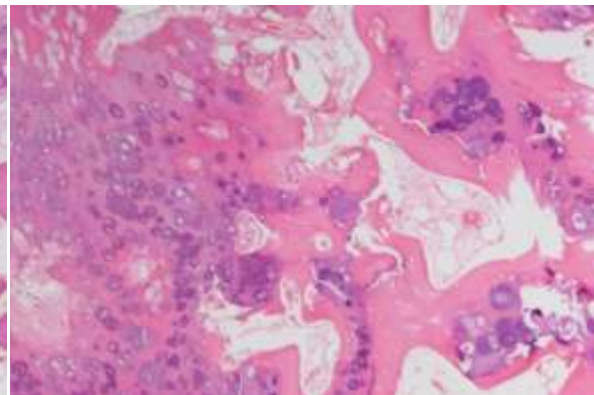


Figure 6: Permeation of the bony trabeculae with cellular and pleomorphic chondrocytes (H&E 100x)

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