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A study on osteochondromas from the right and left iliac wing in a tertiary care hospital

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Abstract
Background: Osteochondromas are the most common of benign bone tumors that are recognized by a cartilage-capped bony mass that arises generally from the metaphysis or diaphysis of a long bone. They account for approximately 40% of all benign bone tumors.
Aim: The present study investigated the number of cases treated at our institution for a period of two years of solitary osteochondromas.
Methods: For all the osteochondroma cases, radiographic examination, CT, X-ray, MRI were performed to identify the solitary, sessile or pedunculated osteochondromas. The tumor was excised entirely by extraperiosteal resection. Precautions were taken not to damage the other bone areas. The excised tumor was sent for histopathology studies for the confirmed diagnosis of osteochondromas. Definitive diagnosis is usually established on histopathological examination. The presence of cortical and cancellous bone, both of which are continuous with the corresponding components of the parent bone, covered by a hyaline cartilaginous cap is diagnostic.
Results: A total of seven osteochondroma (OC) cases were reported to the orthopaedic OPD with in a period of two years. In all the seven cases of osteochondromas, the patients were complained with pain at the iliac region and were removed surgically because they give functional complaints for instance due to compression on nerves or vessels they were unable to do their routine physical activities. Out of seven cases, four patients were identified with single solitary OC at left iliac wing and three cases with single OC at right iliac wing by physical examination, radiographs, X-ray, CT, MRI scans and confirmed further by histological examinations.
Conclusion: The tumor was excised entirely by extraperiosteal resection. Surgical dissection is usually the best procedure in the cases where pain, cosmetic reasons, neurovascular compromise, abnormal growth, skeletal deformity, decreased motion of the adjacent joint or in cases with evidence of malignant transformation is noticed. Recurrences after complete surgical resection are rare and are probably caused by failure to remove the entire cartilaginous cap.

Keywords: osteochondroma, right iliac wing, left iliac wing, radiological findings, histological examination

Introduction

Osteochondroma also called as osteocartilaginous exostosis and it is a developmental anomaly in which subperiosteal physeal cartilage germ grows and matures by enchondral ossification. Later they become bone protuberances surrounded by a cartilage layer. They generally affect the extremities of the long bones in an immature skeleton and deform them. They usually occur singly, but a multiple form of presentation may be found with autosomal dominant inheritance also known as multiple hereditary exostosis. They have a very characteristic appearance and are easily diagnosed. They account for approximately 40% of all benign bone tumors. It is generally believed that malignant transformation of osteochondroma towards secondary peripheral chondrosarcoma is estimated to occur in 0.5–5%. They usually occur in the second decade of life and grow during the adolescent growth spurt [1, 2]. The most common complaints of patients with osteochondromas are pain, swelling, cosmetic deformity, and limitation of movements of adjacent joints. The distal metaphysis of the femur and the proximal metaphysis of the tibia and humerus are the most commonly affected bones. Flat bones are rarely affected. Crestal border of the ilium is a rare but not unusual site for osteochondroma. Osteochondroma is rarely found in the pelvic bone and reports of solitary pelvic osteochondroma are also rare [3, 4]. The incidences of OC for Asian countries like India is 18.5% [5]. The prevalence of OC is estimated at 1:50,000 persons within the general population and seems to be higher in males (male-to-female ratio 1.5:1) [6, 7] . Malignant transformation of a solitary osteochondroma may occur in 1-2% of patients, while for osteochondromas in the setting of HMO syndrome the occurrence is between 1% and 25%. [8, 9]

The diagnosis of an osteochondroma requires radiological depiction and, in some cases, particularly if there is a suspicion of malignancy, histological examination is also needed [10, 11]. The treatment of choice for osteochondroma is surgical unless the skeleton is still immature; for a symptomatic solitary lesion, a partial excision is suggested. The present study investigated the number of cases treated at our institution for a period of two years of solitary osteochondromas.

Materials and Methods

The present study is a prospective study conducted in the Department of Orthopedics, Tertiary care hospital, Visakhapatnam, India from the period of February 2017 to February 2019. A total of 7 patients with a definite diagnosis of OC, including solitary osteochondromas were included in the study. An informed consent form was taken from each patient or from their relatives. Complete details regarding gender, tumor localization, age at the first diagnosis, age upon symptom presentation or when the tumor was found, local recurrence and malignant transformation of osteochondroma, family history, and clinical symptoms and signs before surgery and after surgery were taken from each patient as different independent variables. The suspected cases with OC without a final pathological diagnosis and lacked sufficient medical information were excluded in the present study. All lesions acquired by biopsy or resection were analyzed at the Department of Clinical Pathology. For all the cases, radiographic examination was performed to identify the solitary, sessile or pedunculated osteochondromas. Plain radiographs are often diagnostic, the most characteristic feature being the extension of the medullary canal of the parent bone into the osteochondroma. CT scan serves as a very good modality for demonstrating the cortical and medullary continuity, measurement of thickness of the cartilaginous cap and to evaluate for signs of malignancy. MRI is the imaging modality of choice for evaluating the thickness of the cartilaginous cap. Normally, the cap is only a few millimetres thick in adults and any thickness more than 2 cms should be viewed suspiciously.

The tumor was excised entirely by extraperiosteal resection. Precautions were taken not to damage the other bone areas. The excised tumor was sent for histopathology studies for the confirmed diagnosis of osteochondromas. Definitive diagnosis is usually established on histopathological examination. The presence of cortical and cancellous bone, both of which are continuous with the corresponding components of the parent bone, covered by a hyaline cartilaginous cap is diagnostic.

Statistical analysis

Continuous variables were expressed as the mean and standard deviation. Descriptive statistics were performed to calculate the frequency and percentages of the aforementioned variables. T-test was carried out to evaluate the differences of continuous variables between two genders. Chi-square test was applied to assess the differences of dichotomous variables. Statistically significant difference was defined as P value of<0.05. The statistical analysis was done using the SPSS 24.0 software (Chicago, Illinois).

Results

A total of seven osteochondroma (OC) cases were reported to the orthopaedic OPD with in a period of two years. In all the seven cases of osteochondromas, the patients were complained with pain at the iliac region and were removed surgically because they give functional complaints for instance due to compression on nerves or vessels they were unable to do their routine physical activities..

Out of seven cases, four patients were identified with single solitary OC at left iliac wing and three cases with single OC at right iliac wing (Figure 1) by physical examination, radiographs, X-ray, CT, MRI scans and confirmed further by histological examinations in a Tertiary care hospital.

Osteochondroma cases at left iliac wing

In the four cases of OC from left iliac region, 3 were males and one female. Majority of the cases were reported from males in the age group varying from 20-30 years (Table 1). The four presented to our outpatient department with complaints of solitary swelling over the left pelvis. Among the 3 cases reported in the male gender, two patients gave the information that, 2 years back they have noticed a small swelling of the left iliac region and the third patient identified a small swelling one year back. In the female patient the swelling was identified one year back. In all the four cases, the swelling progressed to the current size. The patients complained that, swelling caused the severe pain while walking for long distances, upon long standing and climbing steps. They felt difficulty while sleeping in the left lateral position. In 3 cases there was no history of trauma and there was no history of fever, loss of appetite or loss of weight. However a female patient complain about fever but there was no loss of appetite and weight. The general physical and systemic examinations were within normal limits.

Radiographs of the pelvis revealed a solitary, sessile osteochondroma arising from the outer left iliac wing just below the iliac crest. Clinical examination revealed a solitary bony hard swelling over the left iliac bone measuring around 5cm × 4cm × 1cm in one cases and 4 cm × 3 cm × 1cm in size in two cases and 2.8 cm x 3 cm in female patient case. The borders were clear and not well defined in all the 4 cases and it continues with the cortex of the bone and the metaphysis of the bone was widened. There was no local rise in temperature or skin changes visible over the swelling. The swelling was specific only to the iliac bone and the other body regions didn't showed the swelling. An osteochondroma appears as a stalk through X-ray findings and emerging from the surface of the bone. MRI of pelvis showed sacroilial joints were normal with small bone island is noted in the left iliac bones. Well defined cauliflower pattern lesion was noted arising from the left iliac bone from the gluteal surface. The stalk measured in different sizes in all the 4 cases. There is cartilage gap, which is bright in FS images, it was variably thickened in all the four cases with homogenous signal intensity with smooth surface. There was no marrow edema in the iliac bone and adjacent soft tissues. Hip joints have no abnormality in all the cases. The tumor was excised entirely by extraperiosteal resection. The excised tumor was sent for histopathology studies for confirmed diagnosis of osteochondroma. FNAC smears revealed chondroid material and occasional giant cells and few polyhedral cells showing uniform nuclei. No cellular atypical features are seen. Microscopy revealed structure of bone along with tumour consisting cap composed of mature cartilage resembling epiphyseal plate and inner lamellar bone and marrow. This confirms the diagnosis of OC in all the 4 cases. There was no reoccurrence of the OC after one and half year of follow-up in all the 4 cases.

Osteochondroma cases at right iliac wing

A total of three male patients in the age varying from 20-30 years were reported to the OPD orthopaedic department with chief complaints of a swelling in the right iliac region for the last 9

months to one year. In all the 3 cases the tumor seems as a solitary, painless small swelling initially and later slowly increased to its current size. The swelling was non tender, well defined, bony hard in consistency and continuous with the iliac crest. In size resembles the lemon size. Patients did not complain of swelling in any other areas of the body. In all the 3 cases there was no history of trauma and there was no history of fever, loss of appetite or loss of weight. The family, occupational and drug histories were insignificant in all the 3 cases. On local examination, there was a solitary, spherical swelling measuring nearly 4x3 cm in two cases and 5cm x 4cm x 1cm in one case in the right iliac wing. The skin covering the mass was normal. The local temperature was not raised in all the 3 patients. Radiographic studies of pelvis showed a sessile bony out growth from the right iliac crest without any indications of focal radiolucencies or cortical destruction. Preliminary diagnosis of osteochondroma was based on the clinical and radiological findings (X-ray, CT and MRI scan). MRI detects the continuity of the palpable mass with the cortex of the affected bone and to differentiate an osteochondroma from other surface bone lesions. X-ray of hip with femur and knee anterior-posterior and lateral views suggested that exophytic out growth noted from the lateral margin of right iliac bone with extension into the adjacent soft tissues. The lesion is irregular in shape with dense sclerotic and lytic areas in matrix. By performing bloc resection of the tumour it was removed in all the 3 patients. The resected specimen demonstrated a cartilaginous cap overlying the bony swelling. Histopathological examination confirmed that they are osteochondromas. There was no instances of recurrence at one and half year of follow up in all 3 cases.

Table 1: Demographics of the left iliac OC cases

Age (Years)	Male	Female	Statistics
1-10	0	0	't' value: 1.0
10-20	1	0	Df = 4
20-30	2	1	'p' value: 0.37 (Insignificant)

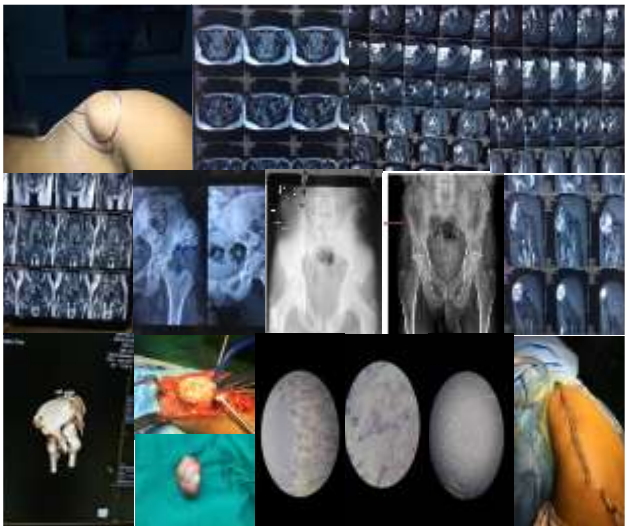

Fig 1: Physical and clinical findings of Osteochondromas of left and right iliac wings

Discussion

Osteochondroma is the most common benign bone tumor and the most common precursor for secondary chondrosarcoma. One hundred percent of osteochondromas present as solitary lesion. The diagnosis was done using local examination, X-rays, CT, MRI and histological examination. A total of seven osteochondroma (OC) cases were reported to the orthopaedic OPD with in a period of two years. In all the seven cases of osteochondromas, the patients were complained with pain at the iliac region and were removed surgically because they give functional complaints for instance due to compression on nerves or vessels. From the literature survey, it was found that most of the previous studies are retrospective analytical and case studies and very few were reported as prospective studies. The current study was a prospective study performed on 7 osteochondroma cases. Out of seven cases, four patients were identified with single solitary OC at left iliac wing and three cases with single OC at right iliac wing by physical examination, radiographs, X-ray, CT, MRI scans and confirmed further by histological examinations. Out of seven patients, 6 were male and one was female patient. Males were more susceptible than females in the current study which was similar to the findings of Wodajo *et al*. (2008) [12]. Excision of osteochondroma is usually curative [13]. Bottner *et al*. described the surgical treatment of symptomatic osteochondroma in 86 patients. They found that 93.4% of the pre-operative symptoms resolved after surgery and that 4.7% of the patients developed postoperative complications; 7% of the whole patients had minor complications [14]. Some authors have used Computed Tomography (CT) to diagnose the condition, whilst others have used plain x-ray and Magnetic Resonance Imaging (MRI). However in the present study all those methods were employed in the diagnosis of OC. Histopathological examination helps to detect the presence of cortical and cancellous bone, both of which are continuous with the corresponding components of the parent bone, covered by a hyaline cartilaginous cap is diagnostic. Supreeth *et al*. (2019) [15] reported a 15-year-old boy presenting to us with an osteochondroma of the iliac wing and is a rare sessile variant which causes him an extreme pain and mechanical block to squatting, sitting cross-legged, and walking. The tumor was surgically removed by extraperiosteal resection. The patient was followed up for 1 year. He did not suffer from a recurrence or symptoms of pain or weakness after 1 year [15].

Recurrence may be seen when the removal is incomplete. Multiple recurrences or recurrence in a well excised lesion should raise the suspicion of malignancy. Removed osteochondromas should be examined for malignant transformation towards secondary peripheral chondrosarcoma. Patients should be well instructed and regular follow-up for early detection of malignancy seems justified. EXT 1 tumor suppressor gene is the factor responsible for this lesion. The inactivation of both the copies of this gene is required for the development of the exostoses [16]. Most of the osteochondromas can be managed by observation alone. Surgical treatment in the form of en bloc resection is usually indicated for pain, cosmetic reasons, neurovascular compromise, abnormal growth, skeletal deformity, decreased motion of the adjacent joint or in cases with evidence

of malignant transformation. Recurrences after complete surgical resection are rare and are probably caused by failure to remove the entire cartilaginous cap [17].

Conclusion

Osteochondroma also called as osteocartilaginous exostosis and it is a developmental anomaly in which subperiosteal physeal cartilage germ grows and matures by enchondral ossification. It is benign tumour rarely turns to osteosarcoma. It is usually detected by radiographic findings and histopathological examination. Surgical dissection is usually the best procedure in the cases where pain, cosmetic reasons, neurovascular compromise, abnormal growth, skeletal deformity, decreased motion of the adjacent joint or in cases with evidence of malignant transformation is noticed. Recurrences after complete surgical resection are rare and are probably caused by failure to remove the entire cartilaginous cap.

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