

Decision making regarding management in varying presentations of osteochondroma- Our experience

Dr. D. R. Ramprasath¹, Dr. V. Thirunarayanan¹

¹(Department of Orthopedic Surgery, Government Royapettah Hospital, Chennai, India)

Abstract: Osteochondromas display varying presentations depending on the age, site, duration, associated inflammation, fracture, neurovascular involvement, malignant transformation. In our series, we have managed 11 cases of osteochondroma through a range of treatment options including conservative management. 2 cases had cosmetic problem alone, 2 had neurological symptoms (foot drop), 2 had deformity, 2 had pain (bursitis, malignancy). 2 had vascular involvement and one had restriction of joint movement. Marginal excision and biopsy was done in 9 cases, wide excision in one case and reassurance without surgery in one case. Limb threatening (neurovascular encasement) and life threatening (malignant transformation) conditions were managed surgically as early as possible. Others were managed after analysing the tumour morphology, topography and the demand of the patient. Post operatively, all the operated patients had an uneventful follow up and adequate recovery from their presenting symptoms.

Keywords: Bursitis, encasement, karyotyping, malignancy, osteochondroma

I. Introduction

Solitary osteochondroma is the most common benign tumour of bone with 33% incidence. Various theories regarding its origin (including evagination of chondrocytes from growth plate) have been proposed. This tumour commonly arises in the second and third decades and is most commonly seen around the knee joint. Symptoms arising from osteochondroma are commonly attributed to cosmesis, inflammation, fracture, restriction of joint movement, neurovascular encasement, malignant transformation. The aim of our study is to identify and treat based on the parameters encountered in different presentations of osteochondroma.

II. Materials And Methods

Ours is a descriptive prospective study involving 11 patients with sex ratio of M:F=7:4, and age distribution from 8-24 years, done from May 2011 to April 2015, at Department of Orthopaedic surgery, Government Royapettah Hospital, Chennai, India.

Case Description

2.1 Case 1. A 17 years old male patient with osteochondroma distal femur presented with pain. MRI showed bursitis overlying osteochondroma (Fig. 1). Marginal excision was done and subjected to histopathological examination.

2.2 Case 2. A 16 year old male patient presented with osteochondroma posterior surface of distal femur and vascular claudication. CT angiogram demonstrated kinking of popliteal artery (Fig. 2). The popliteal artery was dissected free from the tumour (by vascular surgeon) and then excised.

2.3 Case 3. A 14 years old male presented with huge osteochondroma from anteromedial aspect of neck of fibula growing behind the posterior surface of tibia at the level of vascular trifurcation. CT angiogram demonstrated vascular encasement (Fig. 3). The trifurcating vessels were dissected free from the tumour (by vascular surgeon) and tumour mass excised.

2.4 Case 4 and Case 5. A 14 years old male and 10 years old female presented with osteochondroma from proximal fibula and ipsilateral foot drop (Fig. 4). Nerve conduction study was done and the level of nerve involvement was found to be at the level of tumour. The common peroneal nerve was dissected free from the tumour and excision done.

2.5 Case 6. A 24 years old female with **multiple** exostosis. The symptomatic exostosis was in the right proximal radius with limitation of right elbow movement (Flexion 0-80°, fixed in supination) (Fig. 5). Through anterolateral approach for elbow, the tumour mass including the radial head was excised and posterior capsular release was done.

2.6 Case 7. A 14 years old male with **multiple** osteochondroma in the proximal humerus presented with cosmetic deformity. Through posterior Berger and Buckwalter approach, (Fig. 6) after isolating the axillary nerve, three tumour masses adjacent to each other were excised.

2.7 Case 8. A 8 year old female child presented with migration of radial head proximal to the elbow joint. Already excision of osteochondroma of distal ulna (Masada et. al. Type IIb) was done elsewhere. Corticotomy was done in proximal ulna and gradual lengthening of ulna was done using UMEX external fixator with distraction device (Fig. 7). Radial head got relocated as the ulna was gradually lengthened (Fig. 8). ExFix was removed after consolidation of the regenerate.

2.8 Case 9. A 21 years old male presented with osteochondroma distal femur with cosmetic problem (Fig. 9). Marginal excision was done.

2.9 Case 10. A 23 years old male presented with osteochondroma distal femur since childhood with sudden increase in size over the past 1 year (Fig. 10). We suspected malignancy in this patient. So, after consultation with tumour board, wide excision was done. Post operative histopathological examination of the excised mass revealed chondrosarcomatous change in the cartilaginous cap alone.

2.10 Case 11. A 12 years old female presented with **multiple** exostosis in the right forearm (Masada et. al. Type IIb) (Fig. 11), proximal humerus and proximal tibia. Since she did not have any specific complaints, we managed this patient conservatively.



Fig. 1

Fig. 2

Fig. 3

Fig. 4

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Fig. 6

Fig. 7

Fig. 8



Fig. 9

Fig. 10

Fig. 11

III. Figures And Tables

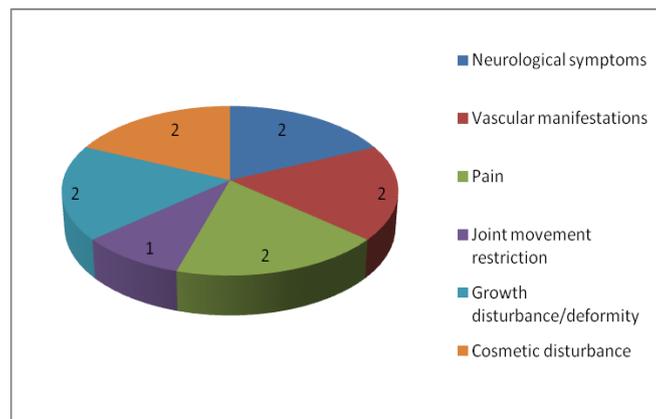


Fig. 12. The various presentations of osteochondroma

IV. Results

All the patients were followed up for a period of minimum 6 months and maximum 3 years. None of them had any recurrence of the lesion. Their preoperative symptoms were relieved adequately with good functional improvement. Case 6 post operatively had range of movement 0-120°, with full supination and pronation movements. No instability was reported. We lost follow up of Case 10 who expired after 15 months (of unknown cause).

V. Discussion

Although pain is one of the most common symptoms in patients with osteochondroma, this alone cannot be taken as an indication for surgery. The indications for surgery should be considered cautiously in patients whose only symptom is pain, and they should be informed about the risks of pain secondary to surgery itself [1]. 16.2% of patients had persistent pain even after surgery[1].

Those patients in whom cosmesis is the main indication for surgery were fully satisfied and most of them also agreed to undergo surgery when recurrence was noted [1].

Patients presenting with foot drop should undergo evaluation of lumbar spine also, apart from nerve conduction study for peripheral nerve. One such case of foot drop due to osteochondroma arising from inferior articular facet of L3 vertebra has been reported [2]. In the literature, there are reports of patients with paraesthesia secondary to compression of lateral popliteal nerve having fully recovered, but those with motor weakness of the ankle did not recover completely[3]. In our study involving 2 cases of foot drop, recovery was noticed in both cases. Also, there are possibilities that peroneal neuropraxia can occur as a complication of surgery[1].

Vascular involvement may be in the form of arterial compression, arterial encasement, arterial pseudoaneurysm[4] or venous thrombosis[5]. In our series, in Case 2, popliteal artery compression recovered completely. In Case 3, the tumour was encasing the trifurcation, hence, we could not excise the tumour in toto, leaving behind some remnants. MRI is the investigation of choice to demonstrate relationship between osteochondroma and pseudoaneurysm [4]. Angiography provides a useful map for preoperative planning [4]. The pathogenesis of venous thrombosis is based on Virchow's triad[5]. Prophylactic excision of exostosis is therefore indicated in the region of major vessels [6][7].

Although overall incidence of chondrosarcoma arising from osteochondroma is 1% in solitary osteochondromas and 5%[8] in multiple osteochondromas, various studies have their own incidences in a wide range. The average age of patients developing secondary chondrosarcoma is 30.7 years[3]. This is in contrast to average age of 45 years for chondrosarcoma in general [9][10][11][12][13]. Most authors believe that when the cartilage cap is thicker than 1 cm, malignancy must be seriously suspected[9][13][14][15]. Most of the secondary chondrosarcomas were Grade II[9]. The recurrence after surgery is reported to be 78% after simple excision and 15% after wide resection[9]. Our patient died of unknown cause inspite of wide resection, 15 months after surgery.

We have done karyotyping in patients with multiple exostosis and could not find any abnormality. Probably a deeper search for genetic loci particularly in chromosomes 8, 11 and 19 could have revealed an abnormality [16].

There are several studies[17][18] where ulnar lengthening has been performed in order to correct the radial head dislocation. Additionally, corrective radial osteotomy has been advised in those patients with radial

bowing. Since distal ulna contributes 10% more than distal radius, to the growth of bones, osteochondroma arising from distal ulna leads to asymmetric growth of ulna and radius hence causing dislocation of radial head [17][19][20]. In our case, the tumour was arising from distal ulna and there was no radial bowing, hence ulnar lengthening alone was performed.

Osteochondromas have also been noted in talus [21], calcaneum [22], cervical spine [23], thoracic spine [24], lumbar spine [2][25], subscapular [26] and extraskelatal regions (sole of foot [27], dorsum of foot [28]).

VI. Conclusion

Even though osteochondroma is a commonly encountered bone tumour, the treatment cannot be generalised for all the cases. Individual variations in the form of site, clinical appearance, neurological involvement, vascular compromise, malignant transformation should be taken into consideration before planning management. Investigations like MRI, CT angiogram, nerve conduction study, karyotyping, apart from tissue biopsy may be helpful in select group of patients. Also, these investigations will help the treating surgeon against litigations in the court of law (in case the patient sues the surgeon for any negligence).

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