A CLINICO PATHOLOGICAL STUDY OF BENIGN TUMORS OF THE BONE IN NORTHERN KERALA

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ABSTRACT

INTRODUCTION

The pathological significance of benign tumors of the bone lies in the fact that they can be dangerous, as they grow rapidly and compress the important adjacent structures though they do not metastasize. Few of them have potential for malignant transformation. They are classified based on the cell of origin such as bone, collagen tissue, bone, vascular elements, adipose tissue and cartilage. Following types are generally recognized like Osteoma, Osteoid Osteoma, fibrous dysplasia, enchondroma, aneurismal bone cyst, osteoblastoma and osteochondroma.

AIM

To review the incidence of benign bone tumors in the northern part of Kerala and to analyze the various pathological patterns among these patients.

MATERIALS AND METHODS

73 patients attending the Kannur Medical College Hospital, Kannur with benign tumors of bone whose pathological specimens were studied for histopathological nature, classified and were analyzed.

RESULTS AND CONCLUSIONS

Eight types of benign tumors were encountered in this study. Majority of them were asymptomatic and surgical treatment was undertaken based on the standard protocol and found to be effective. Patients of younger age were commonly involved than later age. Histopathological studies compared to other authors were significant in all of them.

KEYWORDS

Tumors, Bone, Osteoma, Osteochondroma, Osteoblastoma, Fibrous dysplasia, enchondroma and aneurismal bone cyst.

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INTRODUCTION: A large variety of benign tumours of the bone are described in the medical literature and text books. Their incidence varies according to the geographical pattern, sex, history of trauma, familial and associated systemic diseases. They also vary in regards to their clinical presentation and requisition of diversified diagnostic and therapeutic options. Most often they are asymptomatic and difficult to diagnose.[1] In general eight types are named; they are Osteoma, Osteoid Osteoma, osteochondroma, osteoblastoma, giant cell tumour, aneurismal bone cyst, fibrous dysplasia and enchondroma. These are basically divided into categories based on their cell type like bone-forming, cartilage-forming, as well as connective tissue and vascular.[2] Osteomas commonly occur in membranous bones of para nasal sinuses, skull and long bones.[3] When these tumours grow on bone they are called as homoplastic and if they develop in other tissue they are called heteroplastic.[4] Increased incidence of Osteoma is found in people with habit of swimming in cold water and inflammation is thought to be one of the mechanisms.[5] Multiple Osteoma patients are likely to have underlying conditions such as Gardener's syndrome.[6] Osteochondroma represents nearly 30% of the benign tumours of bone and are commonly found in femur and tibia in their metaphysic and diametaphysis but project out of underlying bone. They occur within 4 decades of life and hereditary and autosomal forms appear much earlier in life and cause limb shortening and deformity.[7] Giant cell tumours account for 22% of all the benign tumours of bone. They appear between 20 and 40 years in the long bones.[8,9] The present study is attempts to know the incidence of these tumours in the northern part of Kerala and their clinical and histological pattern.

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MATERIALS AND METHODS: The present study was conducted at Kannur medical College Hospital, Anjarakandy, Kannur District, Kerala between September 2007 and October 2012. This study has the approval of the ethical committee of the college. The study included patients attending the departments of Orthopedics and General surgery and Otorhinolaryngology with different complaints related to the location of the benign bone tumours. All the

patients were diagnosed using CT scan, and other radiological investigations. Haematological and other investigations were conducted prior to subjecting them for surgery. The excised specimens and material was received at the department of pathology and Histopathological Examination. All the pathological reporting was done by the author. 10% neutral buffered formalin fixation was used for bone specimens. The biopsy fragments with cancellous bone fragments and tumour tissue with small amounts of bone were decalcified and fixed in one overnight step through the use of 5% trichloroacetic acid. Ethylene diaminetetraacetic acid (EDTA) dissolved in 10% buffered formalin was also used in few specimens. For rapid diagnosis 5% nitric or 20% formic acid were used. After paraffin embedding, blocks were trimmed, placed in the freezer for 30 minutes and then on an ice tray before 3-5 µm sections are cut. Haematoxylin-eosin stains were used routinely for morphological diagnosis. Ehrlich's formula for Haematoxylin was used to get the best differential staining of calcified bone, Osteoid and cement lines. All the data was analyzed by using standard statistical methods.

OBSERVATIONS AND RESULTS: Among the 73 specimens received 46 were from the Orthopedics department, 21 were from Surgery and 6 were from ENT department. The specimen belonged tom patients aged from 17 to 50 years with a mean age of 34.60±7.82. There were 51 males and 22 were females. 42 patients belonged to tribal areas, 21 from rural back ground the remaining were from urban areas. The familial incidence was elicited in 9 patients, among them 4 were Osteoma, two were aneurismal bone cyst and 3 were fibrous dysplasia.

Age Group	Male	Female	Tribal	Rural	Urban
15-20	07	02	05	02	02
21-25	08	03	04	05	02
26-30	11	06	06	07	04
31-35	13	04	04	07	06
36-40	06	03	02	04	03
41-45	03	02	01	01	03
46-50	03	01	00	01	03

Table 1: Showing the age, sex and geographical location of the patients (n=73)

Type of Bone tumor	Male		Female		Radiological sign	Pathological sign
	n	%	n	%		
Osteoma	05	9.80	02	9.09	Pedunculated/ sessile homogenous opacities within the sinuses	Osseous tissue comprising of condensed bone with a well-defined border, without surface irregularities or satellite lesions.
Osteoid Osteoma	04	7.84	01	4.54	central calcifications sur-rounded by the nidus (ovoid translucency)	Intra cortical Dense sclerosis around the Nidus. Periosteal reaction.
Osteoblastoma	04	7.84	02	9.09	Large nidus size not involving the cortex of bone.	Nidus is formed by dense sclerotic woven bone and tumor trabeculae frequently connecting the surrounding bone.
Osteochondroma	18	35.29	07	31.81		Cartilaginous cap surrounded by demineralized cortical bone.
Aneurismal bone cyst	02	3.92	01	4.54	Radiolucent cystic lesions occupying metaphysic eccentrically. 'Soap bubble' appearance due to erosion of the cortex of the bone and elevation of the periosteum.	Blood filled cysts divided by connective tissue septae and contain mix of osteoclasts, giant cells, and reactive woven bone.
Fibrous dysplasia	06	11.76	03	13.63	Ground glass appearance. Endosteal scalloping, bony expansion and a thick reactive bone 'rind'.	Fibrous stroma with a cellular component, with mutated fibroblast cells and osteoblasts of varying activity.
Giant cell tumor of the bone	07	13.72	03	13.63	Lytic cystic lesion, well defined non-sclerotic margins, Cortical thinning and Expansile remodeling.	Giant cells with osteoclasts surrounded by spindle-like stromal cells and other monocytic cells.
Enchondroma	05	9.80	03	13.63	Stippled calcification, endosteal scalloping, with areas of ossification or expanded cortex.	Masses of hyaline cartilage in a lobular formation.
Total	**51**	**100**	**22**	**100**		

Table 2: Showing the radiological, histopathological type of tumor among the gender (n=73)

DISCUSSION: Benign tumours of bone are usually asymptomatic as reflected by Eyesan SU, et al[1] in their study of surgical considerations of benign tumours of bone. In the present study among the 73 patients confirmed by histopathology for benign tumours of bone, 56 (76.71%) patients were asymptomatic when compared to 15

(20.54%) patients presenting with pain, symptoms of vascular compression and gait abnormalities. The radiological signs of Osteochondroma in this study were thick periosteal reaction, endosteal scalloping and cortical hook. Surgical removal of the tumour was done without recurrence till the tome of reporting. When there is mineralization in osteochondroma conventional radiology[10] is enough to diagnose but in its absence C T Scan or MRI may be used. MRI gives good pictures of arterial and venous compression by these tumors.[11] Giant cell tumours constitute 20% of all benign tumours of bone and they appear between 20 and 40 years of age.[12] They occur usually in the knee (50-65%). In the present study the incidence was 13.72% in both the sexes and knee was involved in all the patients. Histopathological study showed giant cells with osteoclasts like function surrounded by spindle-like stromal cells and other monocytic cells. Similar view was expressed by Chakarun CJ, Turcotte RE et al from their studies.[8,9] These tumours are benign but likely to recur after surgery in 20- 30% of patients and malignant transformation in 10% of patients.[13] Pathologic fracture is observed in 11 to 37% of the patients.[14] In the present study out of 10 patients 3 patients (30%) presented with pathologic fracture. Osteoblastoma accounts for 14% of the benign tumours of bone.[15] The tumours usually involve bones of axial skeleton among patients of 2nd and 3rd decades.[16,17] The diagnosis is confirmed by biopsy which showed large nidus formed by dense sclerotic woven bone and tumour trabeculae connected with surrounding bone. It has usually a good prognosis and a low recurrence rate of around 15-20%.[18] In the present study 6 patients presented with Osteoblastoma and were treated medically and 3 unresponsive patients were radio-therapy and surgery. This line of management is also reported by McLeod RA et al.[19] Bertoni F et al reported malignant transformation of these tumors.[20] Osteomas can be homoplastic or heteroplastic arising from membranous bones of para nasal sinuses, skull bones.[21] Osteoid Osteomas rarely grow more than 1.5 Cms are composed of Osteoid and woven bone to make 12% of all benign tumours of bone. More than half of these appear in tibia or fibula. In the present study 5 patients reported with this tumour. Histopathological study of these tumours showed dense fusiform reactive sclerosis. These tumours are found in young males less than 40 years with most common symptom of pain.[22,23] Histopathological reports of Osteoid Osteoma in this study showed interconnected trabeculae, thin and/or broad sheets surrounded by the host bone which is strong and made up of varying mixtures of woven and lamellar bone. Similar reports were observed in the study by Kransdorf MJ, et al.[24] Assoun et al. reported 63% of accuracy in diagnosing Osteoid Osteoma by CT scan than MRI.[25] Preoperative administration of tetra-cycline and the use of UV light for examination during the procedure in this study enhanced the surgeon's view of the nidus. Fibrous dysplasia accounting for 5-7% of all benign bone tumors,[26] presents in two forms; monostotic and/ or polyostotic. Nearly 3/4ths of them are monostotic form.[27] Polyostotic FD commonly affects the craniofacial bones, but may also affect the ribs, femur or tibia.[28] In the present study the Histopathological pictures consisted of fibrous stroma with a cellular component, with mutated fibroblast cells and osteoblasts of varying activity. Dahlin in their text book quoted similar pattern of histology.[29] Monostatic fibrous dysplasias are managed surgically by paring especially occurring in maxilla in this study. Aneurysmal bone cysts are benign tumours accounting for 9% of all bone tumors.[30] The most common sites are femur, tibia, humerus and fibula.[31] In the present study 3 patients were treated for Aneurysmal bone cyst and histopathology showed blood filled cysts divided by connective tissue septa and contain a mixture of osteoclasts, giant cells and reactive woven bone. It is in concurrence with a similar study by Kransdorf MJ et al.[32] All the 3 patients were subjected to curettage and bone grafting for reconstruction in this study. There were no recurrences till time of reporting even though recurrences are reported in the literature as high as 31%.[30] Enchondroma are account for 2.6% of all benign tumours of the bone.[33] More than 59% of these occur between 10 and 39 years of age.[33] The present study showed the Histopathology examination as masses of hyaline cartilage in a lobular formation. Marco RA, et al[34] found similar histology picture and they observed that these tumours are commonly found in the bones of hands and feet similar to present study. Usually Enchondroma are solitary but when they are multiple the conditions is described as Ollier's disease. In the present study there were 8 patients with Enchondroma presenting with pain, which were surgically treated with intralesional excision followed by filling with autologous bone graft. In a similar study by Marko et al patients were treated in the same protocol.[34] The ten years recurrence rate following surgery even after 10 years is around 0.04%.[35] There were no recurrences in the patients treated in the present study till the time of reporting.

CONCLUSIONS: Benign tumours are encountered in young patients frequently but the tumours may occur in later ages also. The patients are asymptomatic in 79.45% of the patients. The diagnosis was based on radiological and pathological studies. Treatment was necessary only in symptomatic patients and close monitoring of the growths in the remaining. Pathological fractures were seen patients with Aneurysmal bone cysts and Giant cell tumours. Similarly, active treatment was necessary in these two types because of malignant transformation. The surgical treatment adopted in this study was found to be reasonably effective as found by other authors mentioned in the discussion.

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