

Tumour-like Lesions— Are We Over Treating Them?

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Abstract

Introduction: Tumour-like lesions of the bone is area frequently used term but has have not yet been clearly defined. There are no definite guidelines available for their management. The present study was aimed to evaluate the tumour-like lesions and their management.

Case Report: A total of 164 cases of tumour-like lesions managed by the senior author in a Cancer Institute during the past three decades were systematically analyzed. By and large non-aggressive and non-operative treatment was given in all conditions. Outcome of conservative management of tumour-like lesions was very encouraging on long-term follow-up .

Conclusions: Most of the cases with lesser interventions produced better results. They need to be treated only if they are symptomatic or likely to produce a pathological fracture. Even in such situations, one need not take a radical approach.

Keywords: Tumour-like lesions, Cystic lesions, Fibrous lesions.

Introduction:

Tumor-like lesions of bone are lesions having appearance and cytogenetic characteristics of neoplasm, but their clinical behavior supports a non-neoplastic nature [1,2,3]. Significance of the tumor-like bony lesions is that they are very common and their radiological appearance mimics that of true bone tumors including malignant lesions. Tumor-like bone lesions can be latent like non-ossifying fibroma, active like juvenile bone cyst, or aggressive like aneurysmal bone cyst [4]. As they are not tumors, basics of tumor surgery need not be applied to them.

Materials and Methods

Since 1988, the number of tumor-like lesions treated by the senior author is given in Table 1 [5, 6].

Cystic lesions

Simple bone cyst

Site-wise distribution on our series is given in Table 2. Relative distribution of the cases is consistent with available literature [7, 8]. All cases in humerus were presented with

pathological fracture following trivial trauma. Diagnosis is done by clinical presentation, typical X-ray appearance, and computed tomography (CT)-guided aspiration of the fluid through the cortical break. If aspirated fluid looks like that of simple bone cyst, Depo-Medrol injection is done through the same needle. Most of humeral lesions were treated non-operatively by simple immobilization (Fig. 1 and 2). These include cases that sustained repeated fracture. Two cases were treated by closed titanium nailing, without removing the lesion (Fig. 3). Seven cases in upper femur presented with pathological fracture. Other four lesions in femur were incidental finding. Nine cases of upper femur were treated by surgery. Those presented with pathological fracture three were treated by proximal femoral nail (PFN). In two cases, fibula K-wire composite was used to fix the fracture (Fig. 4). Patients presented without fracture were treated with bone grafting without implants. Free fibula graft was impacted in two cases (Fig. 5). Iliac crest graft was used in one case. No attempt was done to completely remove the lesion. One lesion in fibula and one small lesion in neck

of femur were treated by Depo-Medrol injection (Fig. 6). In calcaneum, one case presented as pathological fracture (Fig. 7). This was immobilized in plaster and non-weight-bearing. All other lesions in calcaneum were incidental finding. One such case was treated by curettage and bone grafting and another case was treated by injection Depo-Medrol. Other three cases were left untreated. Lesion in radius was left untreated after taking biopsy. Two cases presented with pathological fracture treated by plaster immobilization and it healed. Lesion in ulna was treated by excision and fibula grafting (Fig. 8).

Aneurysmal bone cyst

All cases treated surgically till 2010. Thereafter, cases when diagnosis was uncertain were also treated by curettage and bone grafting. 16 cases were treated with sclerotherapy with polidocanol during 2011 and 2018 [9,10] (Fig. 9 and 10). This includes case earlier treated with curettage and G bone grafting that came with recurrence (Fig. 11).

Intraosseous ganglion

Five cases were treated by bone grafting. Four cases were in the lower end of tibia and one in lower fibula. Two cases underwent curettage bone grafting. Another two cases diagnosed as intraosseous ganglion, by imaging was advised curettage. They did not come for surgery. On enquiry, they were

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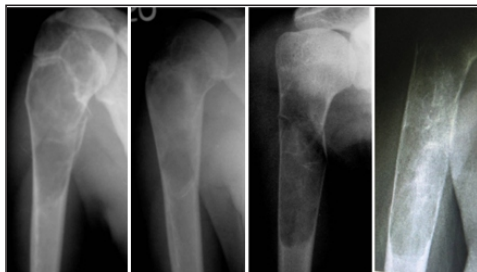


Figure 1: Two cases treated by simple immobilization.

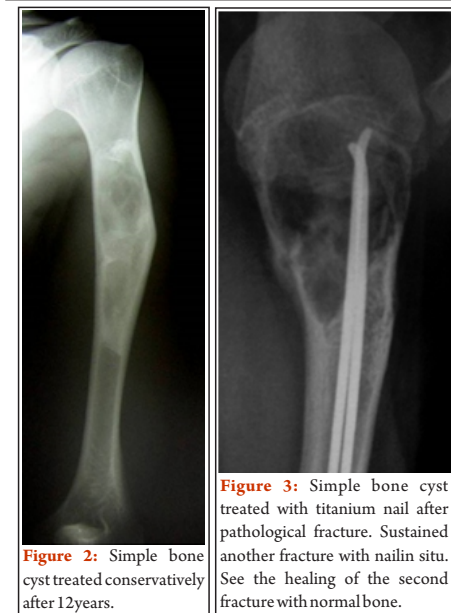


Figure 2: Simple bone cyst treated conservatively after 12 years.

Figure 3: Simple bone cyst treated with titanium nail after pathological fracture. Sustained another fracture with nail in situ. See the healing of the second fracture with normal bone.

asymptomatic except for occasional pain which subside with reduced physical activity for 4–5 days. One case in the lower end fibula was associated with thickened peroneal tendon. In that case, cavity was opened, mucinous material let out and wall curetted. No graft used.

Fibrous lesions

Fibrous dysplasia

Of the eight cases in upper femur, six were treated by fibular grafting (Fig.12,13,14). Other two underwent internal fixation, without removing the lesion. There were six cases of fibrous dysplasia in tibia (Fig. 15), four cases in ribs, three each in humerus and radius, two in ulna (Fig.16), and one in fibula in our series. Except a case of lesion in humerus, all were left alone. One case of



Figure 4: Simple bone cyst presented with pathological fracture treated by fibula graft.

lesion in humerus was treated by fibular grafting (Fig.17). There were four cases of polyostotic fibrous dysplasia in our series.

Osteofibrous dysplasia

Three cases were in tibia, one in fibula, and one in ulna. Two cases in tibia presented as swelling. All others presented with pathological fracture. Biopsy was taken in all of them. All left alone after fracture healed.

Fibrous cortical defect and non-ossifying fibroma

All cases were incidental findings. Diagnosis is by X-ray, classical CT appearance [11] and in cases where there is a cortical defect, trucut biopsy. All cases were left alone.

Hematopoietic (eosinophilic granuloma [EG]) four cases treated with curettage and bone grafting. Other four cases left alone after true cut biopsy (Fig.18 and 19). Follow-up varies from 25 years to 1 year. The first review is after 3 months which include clinical examination and repeat X-ray. Further, follow-up depends on the pathology. In latent lesions like fibrous cortical defect, they are contacted by phone to make sure that they had no symptoms related to the lesion. In other cases, they are followed up clinically and radiologically at 6 months, 1 year, and 2 years.

Results

Simple bone cyst

In simple bone cyst upper humerus, lesion healed at the area of fracture and rest of lesion remains same (Fig.1). Over the years

surrounding cortex got thickened so that the patient is able to undertake heavy manual labor (Fig.2). Five cases presented with the second fracture. This includes the case treated with closed titanium nail (Fig.3). They were treated with further immobilization. Fracture healed along the portion of the lesion where the fracture occurred. Upper femur lesion treated with bone graft, fully healed. Fibula imperceptibly got incorporated (Fig.12). In the boy presented with pathological fracture treated by PFN, follow-up after 2 years showed flattening of the head suggestive of segmental avascular necrosis though patient is asymptomatic. Cases where fibula K-wire composite was used to fix the fracture got the best results as shown in Fig. 6. Lesion in calcaneum treated with bone grafting healed well. There was partial healing in fracture case. In other cases, radiological appearance remained same. The patient remained asymptomatic. One case that was treated by Depo-Medrol injection got infected. Lesion in ulna grafted fibula got incorporated. Lesions in radius remain asymptomatic in the last follow-up.

Aneurysmal bone cyst

Of the 17 operated cases, three cases recurred. One case of lesion in neck of femur, initially presented with pathological fracture, treated by excision and internal fixation from our institution, after having recurrence underwent total hip replacement from another hospital. In one case treated by curettage and bone grafting, there was



Figure 5: Simple bone cyst treated by fibula graft.



Figure 6: Case treated by steroid injection alone.



Fig. 7: Simple bone cyst calcaneum presented with pathological fracture.

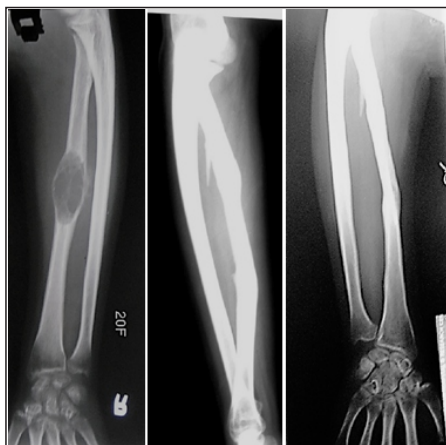


Figure 8: One of our early cases where simple bone cyst was overtreated by resection and replacement with fibula.

recurrence on review after 6 months. As he was asymptomatic, it was decided to observe. No further increase in size was noted at final follow up after 2 years. Hence, nothing was done. In cases treated by sclerotherapy, the results are as follows: Complete obliteration of the cavity occurred in two cases (Fig. 9). Partial obliteration of the cavity occurred in nine cases (Fig. 10). This includes case of recurrence of lesion after curettage (Fig. 11). Five cases remained without radiological changes. Even in cases without radiological changes, there was no progress of lesion and the patients were asymptomatic. Two cases in the group underwent surgery. These cases were found



Figure 9: Aneurysmal bone cyst healed with single polidocanol injection.

to be less vascular preoperatively.

Fibrous dysplasia

In three cases treated by fibula grafting, fibula gave support to the weak area and lesion did not progress further at follow after 3 years (Fig. 12). All these patients were >15 years of age. Other three cases in upper femur and in the case of lesion humerus treated by fibula grafting, lesion progressed dissolving the grafted fibula. All the three cases in upper femur ultimately fractured and treated by internal fixation using metallic implants. This includes a 9-year-old boy who presented with pathologic fracture initially treated with plaster (hip spica) and fracture united. Later, fibula grafting was done. It got refractured and treated by plate and screw (Fig. 14). He later sustained pathological fracture of the opposite femur which was found to be due to fibrous dysplasia. Same boy earlier had

pathological fracture of ulna which was having features of fibrous dysplasia. In one case of lesion in humerus, treated by fibula grafting, fibula was getting involved by the disease process over the years (Fig. 17). In all other fibrous lesions that are left alone, there was no further progress of lesion after skeletal maturity. Cases presented with deformity of the leg, there was no significant increase in the deformity (Fig. 15). Follow-up extends from 2 years to 12 years. However, in children, lesions continue to grow proportionate to the growth of the child (Fig. 16).

Osteofibrous dysplasia

Lesions partially healed with healing of fracture. At final follow-up, there was no further increase in size of lesion and patients were asymptomatic.

EG

Cases treated by bone grafting healed completely. Biopsy induced healing in rest of cases (Fig. 18 and 19).

Discussion

A number of non-neoplastic lesions of bone resemble a neoplasm. Often, the distinction between these lesions and benign tumors is arbitrary [12]. In the

Table 1: Number of cases of Each Lesion	
Lesion	number
Cystic lesions	
Simple bone cyst	56
Aneurysmal bone cyst	33
Intraosseous ganglion	9
Fibrous lesions	
Osteofibrous dysplasia	5
Fibrous cortical defect	16
Non-ossifying fibroma	8
Hematopoietic [19]	
Eosinophilic granuloma	8

Table 2: Site of Lesion	
Bone	No
Upper humerus	34
Upper femur	11
Calcaneum	6
Ulna	1
Fibula	2
Radius	2



Figure 10: Before and after polidocanol injection.



Fig. 11: Aneurysmal bone cyst recurrence successfully treated by polidocanol injection.

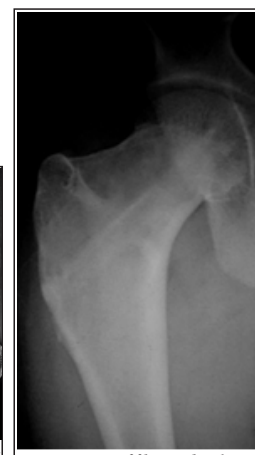


Fig. 12: Case of fibrous dysplasia 3 years after fibula grafting

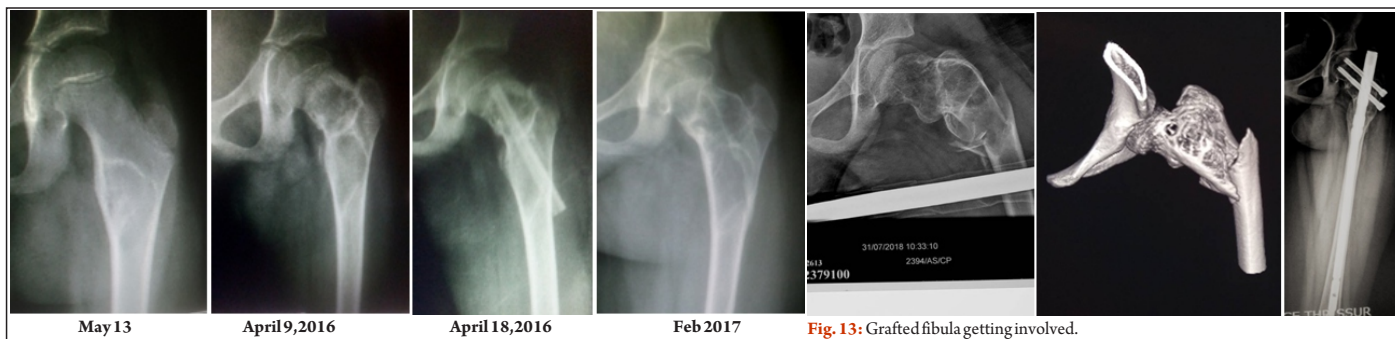


Fig. 13: Grafted fibula getting involved.



Fig. 14: Initial fracture healed by hip spica. In spite of fibula grafting got refractured.

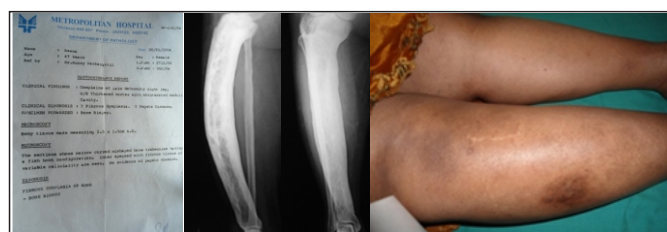


Fig. 15: Case of fibrous dysplasia. Neither the lesion nor the deformity progress at 14-years follow-up.



Fig. 16: A 3-years follow-up of cases that were left alone.



Fig. 17: Grafted fibula getting involved by fibrous dysplasia.

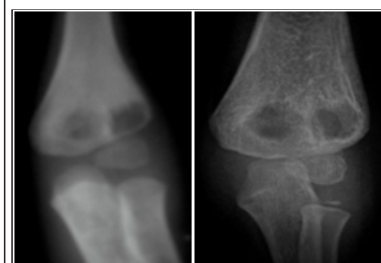


Fig. 18: Eosinophilic granuloma show signs of healing in x X-ray after 6months.

WHO classification of bone tumors, there is a group of lesions named as “Tumors of undefined neoplastic nature” [13]. In the earlier publication of the World Health Organization edited by Schajowicz, these lesions were called tumor-like lesions and this term is more popular and well accepted even now [14]. Tumor-like lesions are not neoplasms. Although there is a difference of opinion regarding etiology and pathophysiology of individual lesions, it is generally accepted as due to structural

changes that had happened either in intrauterine life, as in fibrous dysplasia or later in life, and as in aneurysmal bone cyst [12]. Following are the most accepted theories regarding individual lesions.

Simple bone cyst

Venous obstruction theory by Cohen [15] regarding simple bone cyst is generally accepted and explains the following aspects.

1. Chemical constituents of the fluid in cysts are similar to serum,

2. Drilling, reaming, and fracture help healing as it opens vascular channels between cyst and the venous system.

3. Cyst fluid is the cause and obstacle to healing.

4. Lesions occur in the rapidly growing and remodeling area of cancellous bone [16]. The author feels that there is no role for removal of the lesion and bone grafting is over treatment except in peritrochanteric area, where fibula grafting had a definite role.

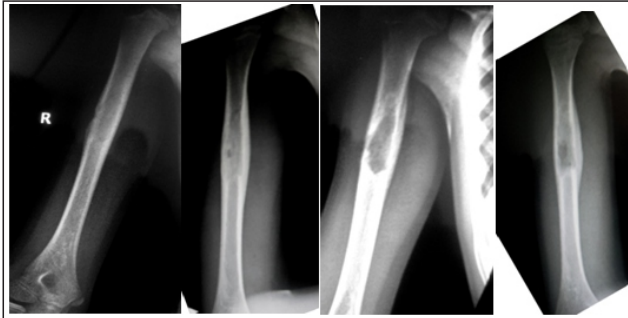


Fig. 19: Magnetic resonance imaging MRI reported as Ewings. Took open biopsy. Report eosinophilic granuloma EG. Nothing else was done. Follow-up after 2 months shows lesion fast healing without any other treatments.

Aneurysmal bone cyst

It is a lesion that develops during growth [9]. Local post-injury alterations in hemodynamics related to venous obstruction or arteriovenous fistulas are important in the pathogenesis of aneurysmal bone cysts, a concept that is supported by angiographic data [16,17]. These vascular malformations cause secondary bone changes. This explains the use of sclerosants in the treatment of this condition. Sclerosants, in general, act by direct damage to the endothelial lining, triggering a coagulation cascade, and thrombotic occlusion of blood vessels [9]. There are earlier reports of spontaneous remission of ABC in literature [18]. In that report, there was increase in size of the lesion after biopsy, and later, it healed as happened in one of our case. Cases responded to autogenous marrow is reported [19]. Author's recommend treatment for ABC is by injection of sclerosing agent.

Fibrous dysplasia and osteofibrous dysplasia

The etiology has been linked with a mutation in the gene that occurs after fertilization in somatic cells and is located at chromosome 20q13.2-13.3. All cells that derive from the mutated cells manifest the dysplastic features. The clinical presentation varies depending on where in the cell mass the mutation is located and the size of the cell mass during embryogenesis when the mutation occurred [20]. In the setting of monostotic fibrous dysplasia, the mutated cells are thought to be limited to the affected bone. Competitive growth disadvantage compared with the non-mutated cells and increased rates of apoptosis of the mutated cells are

responsible for dampening the activity in monostotic fibrous dysplasia lesions with age. The graft appears to have served as a bridge for fibrous dysplasia cells to reach a previously unaffected bone [21]. Progress of lesion in our case (Fig. 13,14,17) validates this hypothesis. The author feels that in fibrous dysplasia and osteofibrous dysplasia avoid surgery as far as possible except in peritrochanteric area. Here, fixation with implant is better than using fibula. Non-ossifying fibroma and fibrous cortical defect are common lesions. The two terms are used interchangeably. Although it is generally agreed that nonossifying fibroma is more appropriately applied to a larger lesion and fibrous cortical defect to defects confined to cortex [5, 13]. The origin and histogenesis of these lesions are still debated, but an unrecognized, local traumatic insult (or insults) to the periosteum resulting in focal hemorrhage and edema is consistent with both the natural history of fibrous cortical defects and their propensity to occur at osseous sites of muscular attachment [16]. Author feels that there is absolutely no role for surgery in these conditions.

Eosinophilic Granuloma: proliferation of specific histiocytes (Langerhans cell histiocytosis) can manifest in various forms. Localization to one or a few bones has been known as EG. The classic type of EG may resolve spontaneously, with no clinical or surgical intervention [22]. Often, a biopsy alone is enough to incite healing [23]. This had happened in four cases in our series (Fig. 18 and 19). Cases of EG of the thoracic spine presenting as vertebra plana usually undergo progressive healing and restoration of vertebral height [24]. Indomethacin seems to be effective for treating EG bone in children [25]. Author feels that there is no role for surgery in EG. In spite of these facts, tumor-like lesions are generally treated aggressively like osteoclastoma if not like osteosarcoma. Senior author too had treated them aggressively in the initial phase of the study (Fig. 8). Later, experience clearly shows that this has to be discouraged. They

are to be treated only when they produce problem like pathological fracture or likely to produce deformities like shepherd crook deformity. Mirels had given additional score for lesions of peritrochanteric area [26]. That is why we had done prophylactic fixation in lesions of upper femur (Fig. 4, 5, 12, 13). In a case of simple bone cyst upper femur, in our series, patient presented with pathological fracture at the age of 28. Till then, he was asymptomatic. Aneurysmal bone cyst was an exception to the general statement till recently. Success of treatment of aneurysmal bone cyst with percutaneous sclerotherapy using polidocanol had made the treatment of that lesion also as simple as other tumor-like lesions. However, as significant number of ABC is secondary, surgical treatment still had a definite role in that lesion.

Treatment protocol suggested by the author

- Simple bone cyst- Simple immobilization with or without Depo-Medrol injection.
- Aneurysmal bone cyst- polidocanol injection
- Fibrous lesions-No treatment. If fractured plaster immobilization
- EG- Biopsy induces healing.
- Lesions in peritrochanteric areas are exceptions. They need operative treatment.

Conclusions

As tumor-like lesion of the bone is not neoplasm, they need not be treated as aggressively as other bone tumors. Most of the cases can be left alone. They need to be treated only if they cause problems or likely to produce problem. Even in such situations, one need not be radical.

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