



PROSPECTIVE SHORT TERM ANALYSIS OF FUNCTIONAL OUTCOME IN BENIGN BONE TUMOURS MANAGED WITH CURETTAGE AND ILIAC CREST AUTOGRAFT

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Abstract : Benign bone tumours are commonly treated with curettage and bone grafting to eliminate the disease and to prevent pathological fractures. The aim of our research is to study the functional outcome in management of benign bone tumours with curettage and iliac crest bone graft. 15 patients with benign bone tumours managed with curettage and iliac crest bone grafting were prospectively analyzed from July 2014 to December 2015 in government general hospital, Chennai. The variables taken were age, sex, location of the tumour, type and stage of the tumour. Amount of bony incorporation and period of bony union were assessed with serial x-rays and functional outcome were evaluated with Enneking's functional scoring. We found better bony integration with giant cell tumour when compared to other benign tumours. Younger the age of the patient, better was the bony incorporation. More than 50 percentage of the patients had excellent functional results as per Enneking's scoring. None of the patients had recurrence at 1 yr follow up. Thus we conclude that, in established bone tumours treated with curettage, iliac crest autograft is ideal to maintain the structural and functional continuity.

Keyword : Benign Bone Tumours, Iliac Crest Autograft

BACKGROUND:

Despite the development of bone substitutes and allograft(1), autogenous bone grafting remains the gold standard in the management of benign bone tumours as it is well incorporated in benign lesions and non-immunogenic(2). Curettage and iliac crest bone grafting is still the standard treatment regime followed for managing benign bone tumours (3), despite donor site morbidity and prolonged recovery time (4). But studies indicating whether the iliac crest autograft for benign bone tumours are sufficient enough to fill the bone defects and prevent pathological fracture and whether it gives good functional outcome in such patients are lacking.

AIM OF THE STUDY:

To study the bony incorporation and functional outcome following iliac crest bone grafting for benign bone tumours managed with curettage.

MATERIALS AND METHODS:

15 cases of benign bone tumours treated at Government General Hospital, Chennai during the period of July 2014 to December 2015 were analyzed after getting proper informed consent. Detailed history elicited about the symptoms and details of previous procedures if any. All the patients were clinically examined and investigated with regional x ray, CT, MRI and a needle biopsy for histopathological examination. X-ray chest and when necessary CT chest was done to rule out pulmonary metastasis in GCT cases. The benign tumors were graded with Enneking staging(5). All the tumours were treated with adequate curettage and cortico-cancellous bone grafting taken from anterior iliac crest. Also, per-op tumour material were taken and sent for histopathological confirmation of tumour. Peri-articular fractures were stabilized with implants/ plaster of paris. Non-weight bearing for lower limb tumours was advised. All the patients were followed up at immediate post-op, after 3 weeks, 6 weeks, 6 months and 12 months. The least follow-up was 5 months. Serial X rays were taken and looked for bony incorporation. Functional outcome was also assessed. The age and sex distribution are as follows:

Table 1

Age	No. of Patients
5-20 yrs	5
20-40 yrs	6
40-60 yrs	4

Table 2

Sex	No. of Patients
Male	11
Female	4

The most common locations of the tumours were distal femur and distal radius.

Table 3

Location of tumour	No. of Patients
Distal Femur	4
Distal Radius	4
Proximal tibia	2
Proximal femur	2
Proximal Humerus	1
Metatarsal	1
Calcaneal	1

Table 4

Type of the Tumour	Stage of tumour-Enneking	No. of Patients
Giant cell Tumour	Latent	3
	Active	2
	Aggressive	2
Fibrous dysplasia		5
Aneurysmal Bone cyst		3

RESULTS:

The findings in our study are as follows:

The amount of bony incorporation(6) was assessed by taking serial radiographs. We have found that giant cell tumours showed complete and earlier bony incorporation when compared to the other benign tumours. But, further long term studies are required in this direction.

Table 5

Type of Tumour	No. of Patients	Average period of bony union in weeks
Giant cell tumour	7	18.2
Fibrous dysplasia	5	20.8
Aneurysmal Bone cyst	3	22.5

No significant variation in period of bony union was found with regard to site of the tumour.

Table 6

Site of the tumour	No. of Patients	Average period of bony union in weeks
Distal femur	4	18.3
Distal radius	4	19.6
Proximal tibia	2	20.9
Proximal femur	2	23.9
Proximal humerus	1	22.3
Others	2	19.6

We observed in our study that younger the age, better and faster was the bony union.

Table 7

Age of the Patient	No. of Patients	Average period of bony union in weeks
5-20 yrs	5	16.1
20-40 yrs	6	19.4
40-60 yrs	4	24

Out of 15 cases, 10 cases showed complete graft incorporation and 5 cases showed incomplete graft incorporation. Giant cell tumour showed better bony incorporation than other benign tumours.

Table 8

Type of Tumour	No. of Patients with Complete Graft incorporation	No. of Patients with Incomplete Graft incorporation
GCT	6	1
Fibrous dysplasia	3	2
Aneurysmal Bone Cyst	1	2

Patients were also analyzed based upon the Enneking scoring system(7)(8) and by radiological evaluation.

Table 9

Enneking's score	No. of Patients	Percentage of total Patients
Excellent 24/30 (80%)	8	53.3%
Good 18/30-23/30 (60-79%)	3	20%
Fair 12/30-17/30 (40-59%)	3	20%
Poor <12/30 (<40%)	1	6.7%

We have analyzed this scoring system for all 15 patients. We got excellent results in 8 cases (53.3%) and Good results in 3 (20%) cases, fair results in 3 (20%) cases and poor result in 1 case. None of the patients presented with recurrence of the tumour at one year follow up.

Complications:

One patient with distal femur giant cell tumour who was treated with curettage and bone grafting alone, had presented with pathological fracture after 3 months. He was again operated with repeat bone grafting and stabilization done with locking compression plate. Two patients had sustained superficial skin infection which were treated conservatively with antibiotics and wound dressings. One patient had paresthesia over the distribution of lateral cutaneous nerve at graft harvested side.

CASE ILLUSTRATION:

CASE 1

Age/Sex: 21/Male; IP No: 90361;

Diagnosis: Fibrous dysplasia of right distal femur;

Treatment: Extended curettage with bone grafting and plate augmentation with distal femur LCP Post-op Enneking's score: 24/30(Excellent)

Pre-op x-ray



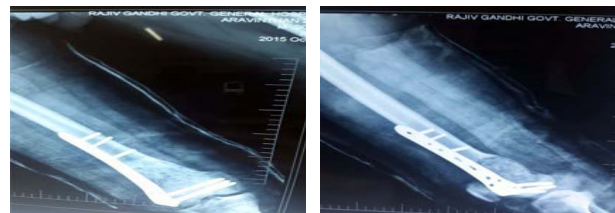
MRI



Post-op



3 Months



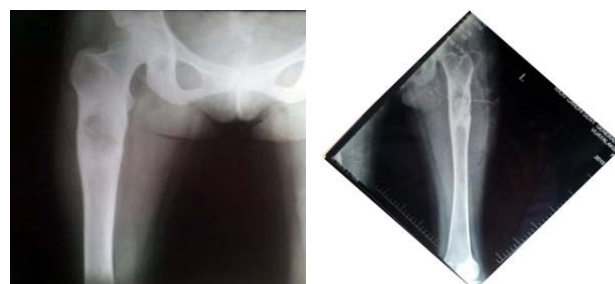
CASE 2

Age/Sex: 30/Male; IP No: 99630;
Diagnosis: Chondromyxoid fibroma of left tibial tuberosity;
Treatment: Curettage and bone grafting.
 Post-op Enneking's score: 26/30(Excellent)
Pre-op **Post-op**



CASE 3

Age/Sex: 16 years/Female; IP No: 85909;
Diagnosis: Fibrous dysplasia of right Proximal Femur;
Treatment: Curettage and Bone Grafting
 Post-op Enneking's score: 23/30(Good)
Pre-op **Post-op**



CASE 4

Age/Sex: 14/Female; IP No: 69267;
Diagnosis: Aneurysmal bone cyst I Metatarsal Rt Foot;
Treatment: Curettage & Bone grafting
 Post-op Enneking's score: 25/30(Excellent)
Pre-op



Post-op



DISCUSSION:

Autografts remain the gold standard as they are osteo-conductive as well as osteo-inductive and have osteogenic cells, BMP etc(6). Most of the time, the amount of graft required is small and harvesting graft from the anterior iliac crest is sufficient. These grafts are non-immunogenic and represent a good alternative to replace missing bone. Cancellous autograft also possesses living cells that participate in the bone repair process(9). In our study we have used Enneking's scoring system for the functional evaluation and the clinical outcome of surgery. The mean Enneking's score at an average follow up of 12 months was 24.75points (82.5%) (10). Giant cell tumour being the commonest benign tumour treated by us in our series and distal femur being the commonest site, excellent results were seen in 8 out of 15 cases and good results in 3 cases. Short term prospective analysis of functional results and bony incorporation in benign bone tumours treated with adequate curettage and anterior iliac crest bone grafting had showed excellent results in our study.

CONCLUSION:

- In established benign bone tumours with structural defect after curettage, iliac crest autograft is ideal to maintain structural and functional continuity.
- Younger patients show faster and complete bony incorporation when compared to the older patients.
- Giant cell tumours show complete bony incorporation after bone grafting when compared to other benign bone tumours.

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