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A study of 16 patients with aneurysmal bone cyst treated with Intralesional methylprednisolone

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Abstract
Background and Objectives: This study aimed to evaluate the clinical and functional outcomes of MPSS for Aneurysmal bone cysts.
Methods: In the Department of Orthopedics, a study of 16 patients with Aneurysmal bone cysts treated with Injection Methyl Prednisolone was conducted. Information on the patients was compiled from clinical details, case files, and procedure records. This was a prospective study. Patient follow-up was for a minimum of 6 months to a maximum of 24 months (2 years).
Results: Excellent or good pain relief and function were obtained in 16 patients after percutaneous intra-lesional MPSS injection.
Conclusion: Present study suggests that Patients treated with Inj. MPSS for Aneurysmal bone cysts can provide good clinical and radiological results after an intermediate duration of follow-up. The study was free of complications, and the overall functional and clinical outcome showed excellent results.

Keywords: Aneurysmal bone cysts (ABCs), MPSS

Introduction
Aneurysmal bone cysts (ABCs) are not much common and are expansile lytic tumors diagnosed in adolescence with an incidence of 1.3-1.5/100,000, constituting approximately 1% of all benign bone tumors [1, 2]. It was first described by Jaffe and Lichtenstein [3] in 1942. The prevalence is equal among both male and female patients. The origin of the lesion remains controversial. Typical features include cortical thinning, lytic, expansile, eccentrically located lesion in the metaphysis and a sub-periosteal thin shell of bone. There are 3 different clinical presentations, from latent to active and rarely aggressive forms. The aggressive form has similar features to telangiectatic osteosarcoma.
The different available treatments are embolization, cryosurgery and curettage with bone grafting/ cementing, selective arterial embolization, radiotherapy, sclerotherapy etc. Surgical and adjuvant treatment have a high rate of complications as well as re-occurrence. Percutaneous MPSS injection therapy has emerged as a safe and effective treatment method for aneurysmal bone cyst in recent years and obviates the surgical complications and promotes ABC healing [4].
The main objective of this study was to assess the clinical and radiological outcome of MPSS (1g in 10 ml distilled water) in ABC. Secondary objectives were to assess clinical efficacy in terms of pain and to analyze recurrence and complications.

Materials and Methods
A prospective study at the tertiary-center with the 16 patients diagnosed with primary ABC managed by MPSS was included. Out of 16 patients 6 were females and 10 were males with the mean age of 13 years (range: 4–18 years). All patients presented with active or aggressive ABC based on the Capanna classification [5]. Classical ABC on pathologic analysis was seen in 10 patients. The mean follow-up was 17.1 months (range: 8–24 months). Two had less than 1 year of follow-up, including no patient lost to follow-up; only clinical efficacy and complications were studied in these cases. All patients with ABC were investigated with plain X-Ray, CT/MRI pre-operatively. Percutaneous biopsy was performed on all the suspected patients and a histological diagnosis was obtained. After the biopsy report, treatment was

started.

All patients with secondary aneurysmal bone cyst were excluded from the study. On follow Xray and MRI were done at 3 months, 6 months, 1 year and 2 years interval. VAS score was used for pain assessment.

The following data were systematically collected

Table 1: Patients Data

Patient	1	2	3	4	5	6	7	8	9	10
Gender	F	F	M	M	F	M	M	M	F	F
Age	5	6	7	9	9	10	10	11	11	12
Location	Tibia	Tibia	Humerus	Metatarsal	Femur	Humerus	Tibia	Humerus	Tibia	Humerus
No. of injections	1	1	2	2	1	1	1	1	1	1
Post procedure VAS	0	0	0	0	0	0	3	0	0	0
Ossification	Complete	Partial	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete
Complications	-	Pain	-	-	-	-	-	-	-	-

Table 2: Patients Data

Patient	11	12	13	14	15	16
Gender	M	M	F	M	M	M
Age	12	13	14	14	16	17
Location	Humerus	Metatarsal	Tibia	Tibia	Tibia	Tibia
No. of injections	1	1	2	1	1	2
Post procedure VAS	0	0	0	0	0	0
Ossification	Complete	Complete	Complete	Absent	Complete	Complete
Complications	-	-	-	-	-	-

Radiological classification according to Rastogi

Table 3: Rastogi Classification

Degree	**I**	**II**	**III**	**IV**
Characteristic	Residual lesion <25%	Residual lesion 25-50%	Residual lesion 50-75%	Residual lesion >75%
Result	Excellent	Good	Poor	Unresponsive

Procedure

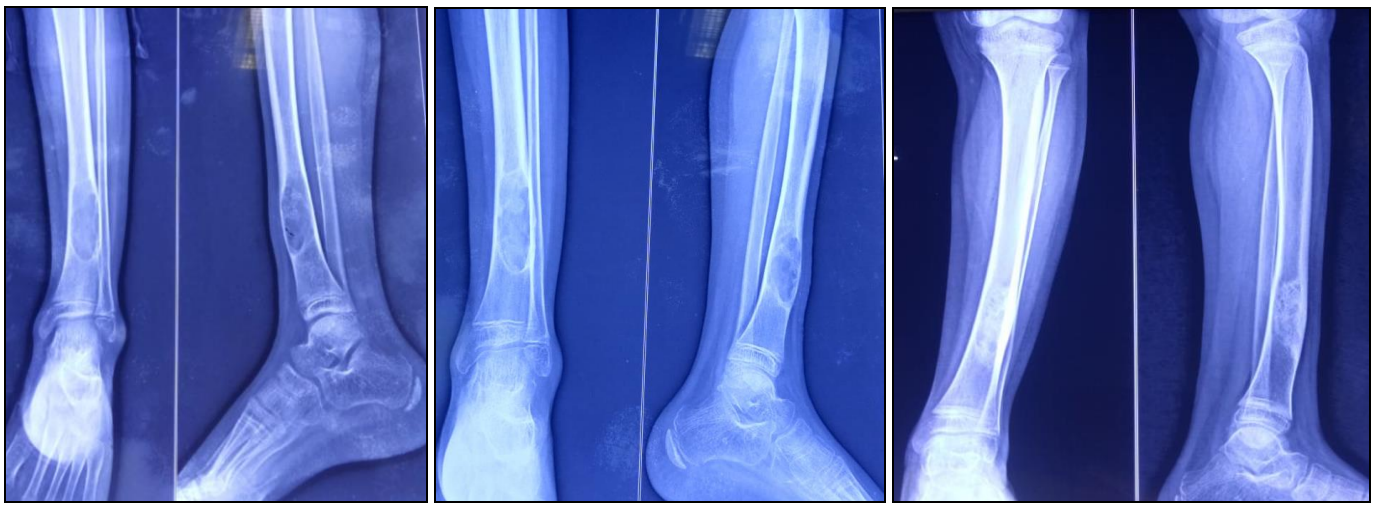
The advantage and risks of the procedure were explained to the patients and relatives and written consent was obtained. It was performed under Short general anesthesia on a simple table, supine position. Prophylactic antibiotics were given half an hour before MPSS injection. Painting and Draping was done. An 11-gauge bone marrow biopsy needle is inserted into the lesion with the IITV guidance until it reaches the largest lytic portion of the tumor. The cyst walls were manually scarified using the end of the needle to break the non-healed septa and the content inside the cavity was aspirated.

Then, 1g methylprednisolone in 5 ml of the syringe and another syringe containing 10 ml distilled water were attached to the bone marrow biopsy needle. The solution was injected into the lesion. A pressure dressing was applied and maintained for 3 days.

Hospital stays were of 2-3 days. In case of non-ossification or persisting pain, repeat injection was suggested; the interval between injections was 8 weeks.

Patients were asked to avoid strenuous activity and contact sports until the radiological healing. On each follow-up, the treatment response was recorded with complications and functional assessment.

Statistical analysis: We used the Chi-square test and Student's t -test to analyze our results. A p value < 0.05 was considered significant.



Pre-Operative Post Op 1 Month Post Op 6 months

Result

In the group with up to 2 years' follow-up (n=16), ossification was completed in 14 cases (87.5%) partial in 1 (6.25%) and absent in 1 (6.25%) case. There were no recurrences. Pain resolved (VAS = 0) in 15 patients (93.75) by 3 months after injection course. One patient had persistent pain after the second injection. There was one case of inflammatory reaction with spontaneous resolution. There were no cases of infection or complex regional pain syndrome. Improvement in the functional score correlated positively with the reduction in the size of the lesion. The functional score at the end of the final follow-up was significantly better than that at the end of the initial treatment.

Discussion

In the present study, a complete resolution with minimally invasive treatment for ABC was seen in 88% of cases. The constant presenting symptoms were pain on exertion and difficulty in daily activity (i.e., writing and walking running etc). Many cases were presented with the bony cortical irregularities. VAS score was used to determine the pain severity and treatment efficacy.

There is still controversy exists about the origin of ABCs. Classically it has been considered as AV fistula/malformation in the bone, but it may be denovo [7] or post traumatic [6]. The success of treatment depends on obstructing vascularity by sclerosing agents [7]. Other treatment options along with sclerotherapy are cryosurgery, curettage with bone grafting/cementing, embolization, selective arterial embolization, radiotherapy, etc. Curettage with or without bone grafting for this lesion is the treatment of choice n. However, there are chances of recurrence with curettage and bone grafting [8] and the physeal plate was at risk of damage. Considering the complications of other invasive procedure of treating ABC are not performed routinely. Inj. MPSS can be used safely with fewer complications.

Satisfactory result was obtained with complete ossification in 14 patients (87.5%). Only 1 (6.25%) patient showed partial ossification and absent ossification was seen in 1 (6.25%) patient. These findings are similar to study by Marcove *et al*. [9] who used curettage and cryotherapy and got value of 90% (63% to 100%). Maximum of 2 injections of MPSS was given to the patients. Even after the completion of the treatment, radiological and clinical improvements in the patients were recorded and this is suggestive of ongoing healing process. Only 1 patient with the absent ossification was treated with curettage and bone grafting later on.

No major complications were observed in our study. Only 1 patient had complained of local injection site pain. There is potential scope of MPSS treatment in ABC of various bones of body.

Conclusion

Results of injection MPSS are relatively satisfactory. Intra-lesional Methyl prednisolone injection is an effective and safe method with a low rate of relapse that promotes ABC healing. It is minimally invasive procedure with less cosmetic complications. Injection MPSS achieves quick resolution of the cyst without major complications.

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