



## A unique method for treatment of intramedullary bone cyst

Dr. Vishal Rathod<sup>1\*</sup>, Dr. Hemant Bhandari<sup>2</sup>

<sup>1</sup> Senior Registrar, Shatabdi Hospital, Mumbai, Maharashtra, India

<sup>2</sup> Senior Professor & Consultant, Bombay Hospital, Mumbai, Maharashtra, India

**Corresponding Author:** Dr. Vishal Rathod

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### Abstract

This study presents a novel technique for treating solitary intramedullary bone cysts, particularly focused on using decompression via normal cortex access in the proximal femur, employing flexible reamers for intramedullary nail placement and autologous bone grafting. This method aims to reduce complications associated with traditional surgical approaches, such as neurovascular damage and pathologic fractures. Results indicated a minimally invasive, cost-effective procedure with early patient recovery and no observed recurrence, highlighting its potential applicability in various surgical settings despite the limitation of lacking histological diagnosis confirmation.

**Keywords:** Solitary intramedullary bone cyst, proximal femur, decompression

### Introduction

A solitary bone cyst is benign fluid-filled lesion seen as radiolucent lesions with a thinned overlying cortex on X-ray<sup>[1]</sup>, which may lead to pathologic fractures<sup>[2]</sup>.

The exact pathogenesis of a solitary bone cysts is unknown, but one such hypothesis states that the mechanism involves venous obstruction leading to an increase in intraosseous pressure resulting in cyst formation<sup>[3]</sup>. These cysts are commonly seen in the metaphyseal regions of the long bones, more commonly in proximal femur and the proximal humerus<sup>[2]</sup>

This study is aimed to describe the technique and present the results of intramedullary reaming followed by the use of an autologous bone graft for the treatment of bone cysts in a long bone.

### Case Report

A 28-year-old man presented with a 15-month history of left hip pain. The pain being localized and dull-aching in nature, with no aggravating factors. No swelling or stiffness was observed around the joints.

The proximal femur region was tender; however, no swelling or skin changes were observed. The patient had a full active range of movement in the hip, symmetrical to the other side

Initially, he was treated with non-steroidal anti-inflammatory drugs and physiotherapy, with little improvement. An X-ray revealed a lucent lesion just below the lesser trochanter in the proximal metaphyseal region occupying the shaft of the femur in the proximal extent, following which an MRI was ordered showing a focal well-defined oval lesion within the medullary cavity of the proximal metaphyseal region of the femur, measuring 4.8x2.6x2.6 mm with minimal overlying thinning of the cortex, displaying characteristics of an osteoid osteoma.

The procedure was performed under spinal anaesthesia with the patient in the supine position with affected limb on a traction table. The position of the nidus was localized preoperatively from the distance of the greater trochanter. Via a 5 cm skin incision several centimetres

proximal to the tip of the greater trochanter, this being similar to the one used for proximal femur nailing.

The guide wire was inserted from the greater trochanter area under image intensifier X-ray control till a few millimetres proximal to the lesion. The wire position was confirmed in both AP and lateral planes. Initially, the proximal reamer used for nailing was used, followed by curettage.

Subsequently, flexible intramedullary reamers of different sizes were used to ream the medulla under C-arm guidance. Following reaming, bone grafting was performed to fill the lacunae created by reaming which was obtained from the bone bank were used for cancellous grafting and were minced using a bone grinder. The prefilled funnel tube is inserted into the canal and snugly fits into the intramedullary canal, preventing graft slippage into the soft tissues.

The metallic punch is malleted into the tube, pushing the graft into the canal, which is confirmed using an image intensifier to ensure proper filling of the tunnel.

Once the lacuna was filled with the graft the tip is plugged with bone wax. The wounds are washed and closed layer by layer in a standard fashion.

The postoperative period was uneventful, with no surgical site oozing. Rehabilitation involved non-weight-bearing ambulation with a walker.

### Discussion

Initial treatment offered to a patient of bone cyst is a conservative treatment which includes bone traction, splint, and plaster support after pathological fracture occurs, failing which surgical options are used.

Various surgical methods described simple bone cysts including crushing of the cyst wall and on lay grafting<sup>[6]</sup>, total resection with bone grafting<sup>[5, 6]</sup>, curettage combined with bone grafting<sup>[3]</sup>, allografting with freeze-dried crushed cortical bone<sup>[7]</sup>, total resection with and without bone grafting

However, the initial treatment which included a simple curettage alone had a success rate of open procedures ranges from 55% to 65%, with a 35%–45% of patients experience

recurrence of the cyst, and requiring additional open surgical procedures. [4-7]. However, these aggressive surgical options have led to more serious complications such as infection, coxa Vara, physeal damage, epiphyseal arrest and shortening of the limb, increased intraoperative blood loss, intraoperative fractures, and a prolonged period of postoperative immobilization.

Our method does not require special expensive equipment and is applicable in every surgical unit. The osteogenic elements of bone marrow or bone marrow substitutes could also promote cyst healing by stimulating bone formation [8]

### Result

The patient had no recurrence on follow up and full painless range of motion.

### Drawbacks

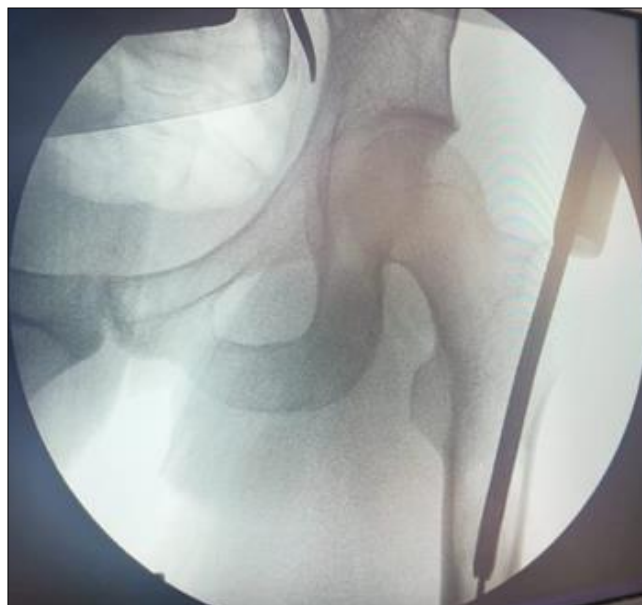
Because of the rarity of intramedullary bone cysts, there is a paucity of case reports and series for such cases and also major drawback of this method and study is the loss of histological confirmation of the diagnosis.



**Fig 1:** Showing mri with contrast -a well demarcated 4.8x2.6x2.6 cm focal lesion within proximal metaphyseal region of proximal left femur



**Fig 2:** Xray showing focal defect in proximal femur



**Fig 3:** Demonstrating steps of successive remaining with as done in femur intramedullary nailing



**Fig 4:** Demonstrating filling the funnel with bone graft for filling the defect



**Fig 5:** Post operative xray, the bone cyst cavity filled with bone graft

### Conclusion

Our case shows that this method is a minimally invasive, safe, simple, and cost – effective procedure and it allows an early return to weight bearing and recreational activities.

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