

Pathological Fracture of Subtrochanteric Femur in Children with Simple Bone Cyst - Case Report

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ABSTRACT

Introduction: Simple bone cyst (SBC) described as benign non-neoplastic serous-filled bone lesion which commonly affect children and has prevalence less than 1% in the general population. The diagnosis often in children with pathological fracture occurred. The management is determined based on the clinical conditions, and optimal strategy to minimize the surgical complications.

Case Presentations: We reported a case of 5-year-old female complained of pain in her left thigh after slipped. Physical and radiological examination revealed deformity with fracture of left subtrochanter femur. Curettage and biopsy were consequently done, followed with bone graft and fixation using plate and screw. Biopsy result confirmed our suspicion of SBC. Five months postoperatively, patient had been done activity without difficulties and walk normally with no leg length discrepancy.

Discussion: By reason of this fracture scarcity, the management standard had not yet concluded. Surgical curettage and cyst excision along with bone grafting still become recommendation choice to manage SBC. Nevertheless, we treat the patient with locking plate and screw to ensure proper rotation and adequate curettage to avoid recurrency, besides of its cost-effectiveness.

Conclusion: From this case the result was satisfactory with curettage, bone graft, and fixation with locking plate and screw for pathological subtrochanter femur fracture treatment in children with SBC.

Clinical Importance: Vigilant diagnosis and preoperative planning are crucial in recognizing pathological fracture, especially in trivial, low-

energy trauma to ensure the best outcome for the patient.

Keywords: Simple bone cyst, pathological, fracture subtrochanteric, children

INTRODUCTION

Simple bone cyst (SBC) described as benign non-neoplastic serous fluid-filled bone lesion which commonly affect children and has prevalence less than 1% in the general population. SBC mostly occurs in proximal humerus and femur, and the distal femur case was a rare one, SBC around the limbs which bears weight, commonly demand surgical intervention. Indication for surgical were continued pain, impending or recurrent fracture, also secondary deformity prevention. The diagnosis of SBC was found incidentally from the radiological examination. Pathological fractures are very unusual, and a history of trauma is rarely reported^{1,2}. Among all children fractures, subtrochanteric fractures accounting only 4-17% of children fractures³. In younger ages, particularly those which no ambulatory, nonaccidental trauma must be rated as potential mechanism. For children whom suffer fractures from apparently low-energy trauma, pathologic fracture from a cyst of bone, osteomyelitis, metabolism disorder, etc should be excluded⁴. At about 80% that this cyst were reported around ten to twenty years of age located in proximal femur and humerus, around 85% were diagnosed if the symptoms comes with fractures

pathologically and pain. The etiology and pathogenesis of SBC in this ages had not been identified⁵.

The management is determine based on the clinical conditions, and optimal strategy to minimize the surgical complications⁴. Surgical intervention were indicated if bone cyst with pathological fractures, specifically in weight-bearing limbs. Many treatments were available for simple bone cyst. Injection of steroids were highly used because of low risk and cost also its high healing rate. Nonetheless, recovery percentage reported low, and had to done it several times⁶. In general, the patient was followed closely according to standard follow-up with clinical and radiological examination of the 8 months. In the postoperative rehabilitation phase, patients are usually able to do daily activities after 4-8 months without assistive devices. Even though there's no chance of metastasis or malignancy, repetition of cyst could lead into burden because of children's activity during growth and demands for several surgeries and long-term treatment. Hence, minimally invasive also accurate managements were needed⁷.

CASE REPORT

A case of 5 years old female complained of pain in her left thigh after falling 6 hours before admitted with Visual Analog Scale 8/10. Patient was playing in front of the house, fell and slipped with his left thigh bumped to the asphalt. There's no history loss of consciousness, blurred vision, vomiting nor bleeding. Before the fall, patient was able to carry out normal activities without complaints. Patient never complained of pain the left thigh before.

Primary survey in this patient was clear and the vital signs were normal. Secondary survey showed deformity, shortening 3 cm, angulation, external rotation, tenderness and soft tissue swelling over the left thigh with restricted range of movement (Figure 1). Imaging of thigh (Figure 2) revealed fracture left subtrochanter femur and area lytic lesion with diameter more than 2/3 was

found in metaphysis. Immediate skin traction (Figure 3) conduct in Emergency Department, our patient then brought to ward for advanced assessment.



Figure 1.



Figure 2.



Figure 3.

Being a rare cases in children, the team encounter burden in order to choose suitable management for the case. After multiple discussion family sign the informed consent. For this case, the surgeon preferred to attempt the lateral approach. The patient placed in a supine position under general anaesthesia. Aseptic management, open reduction, curettage and biopsy were

consequently done, followed with bone graft synthetic and fixation using small DCP locking plate titanium. The operation went well, the patient got the antibiotic, pain management, and fluid after operation. Biopsy result confirmed our suspicion of SBC



Figure 4.

The patient was on regular follow up after 1, 3, 5, 6, 7 months post operation, at the time when radiological examination revealed callus formation, small DCP plate and screw internal fixation and bone cement with adequate apposition and leg length discrepancy 0,5 cm (Figure 5). Five months after surgery patient was able to do daily activities, walk normally without assistive device with VAS 1/10 (Figure 6).

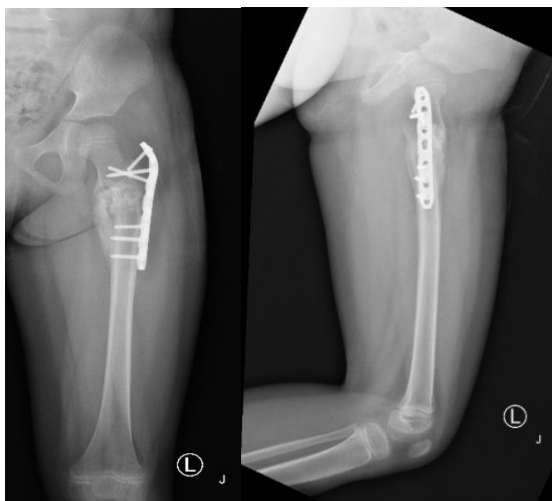


Figure 5.



Figure 6.

DISCUSSION

The SBC described as benign tumor that happens in the epiphysis of the long diaphysis. SBC pathogenesis and etiology in children hadn't been clearly identified⁸. The patient comes with pathological fracture, the most SBC's general complication. Major concerns occurs toward the treatment of SBC's pathological fractures. SBC described as benign pathological lesion, and the etiology of it still unknown. Theory which suspected nowadays is mechanical trauma and bone veins obstruction. SBC could be asymptomatic clinically, might be not found nor affected the quality of life. In pursuance of some scholar, SBC might cure natural as the child grows⁵. Nonetheless, radiological and clinical assessment of the lesion might not had any difference, even if it's asymptomatic and growing slow, indication to biopsy still recommended. In general, fast-growing lesion require a biopsy. Biopsy must be appropriately done with a full-planning preoperative of the patient which significantly affects the prognosis⁹. SBC could cause unstable fractures and weight-bearing bones fractures which demand surgical curettage and bone graft with osteosynthesis simultaneously. Fractures that stable could be managed conservatively. Repetition of cyst following fracture recovery demand curettage with or without bone graft¹⁰.

Children who diagnosed SBC with fracture of subtrochanteric femur rarely happens and these fractures still challenging to manage. There were several surgical options in the literature which include conservative management, bone graft, curettage and bone grafting, decompression with drill hole, cannulated screws¹¹. Patient's age becomes the major factor in selecting treatment option³. SBC's treatment indication is to prevent pathologic fracture and symptom management, especially pain. Excision of cyst and curettage with bone graft were the optimal option to manage SBC. Based on a meta-analysis study, SBC recovery percentage following surgical curettage was comparable (90%) whether allograft or autograft was used. Healing percentage following conservative treatment ranged from 27% to 100%. Nevertheless, healing percentage after conservative treatment varied based on anatomic location. High failure percentage was showed on SBC located in calcaneal and humeral¹². Generally, patient under 5 years old might be treated either with closed reduction and spica casting with or without traction. Patients over 12 years old and adolescents were recommended to be treated with interlocking intramedullary nailing¹³. In our case, the patient had a subtrochanter fracture caused by SBC. Because of the rareness of this fractures, there's still no gold standard on management is available. Nevertheless, we treat the patient with locking plate and screw to ensure proper rotation and adequate curettage to avoid recurrency, besides of its cost-effectiveness. Current available study showed no significant effect in outcome between intramedullary nailing and plate and screw fixation, even for older children with less remodeling potential. ORIF with plate and screw had good result compare to intramedullary nail specifically in anatomy restoration, but longer operative time and more soft tissue dissection than intramedullary nail¹⁴. Our patient had good prognosis with complete resolution after 7 months of surgery.

CONCLUSION

From this case, the result was satisfactory with curettage, bone graft, and locking plate fixation and screw for treatment of pathological subtrochanteric femur fracture in children with SBC.

Clinical Importance

Vigilant diagnosis and preoperative planning are crucial in recognizing pathological fracture, especially in trivial, low-energy trauma to ensure the best outcome for the patient.

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