Treatment of unicameral bone cyst: Decompression with cannulated hydroxyapatite screws and curettage using endoscopic-assisted technique

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Background: Several treatment options exist for unicameral bone cysts (UBCs), including injection of steroid or bone marrow cells, decompression by drilling, and curettage and bone grafting. Previous studies have reported variable outcomes in the literature. The therapeutic purposes of UBCs are a relief of pain and prevention of pathological fracture. Because UBCs occur in pediatrics and are self-limited disease, the less-invasive treatments are feasible. Currently, we introduced decompression with cannulated hydroxyapatite (HA) screw and curettage by use of endoscopy. We report here our clinical outcomes and discussed their advantages and indication.

Patients: From 1991 to 2014, 33 cases with UBCs (25 males, 8 females) were treated in our hospital. The mean age was 16.1 years old (range 4-68) and the follow-up period was 26.5 months (range 4-120). The tumor location was the femur in 13, humerus in eight, calcaneus in nine, others in three.

Method: 25 cases were treated surgically, 8 cases were observed. In surgical group, 15 patients were treated by curettage and bone grafting (10 artificial bones such as β-tricalcium phosphate, 4 allografts, 1 autologous bone graft). Among them, 4 patients were operated with endoscopic-assisted technique. 5 were treated by cannulated HA screw and 5 by steroid injection.

Result: In observation group, UBCs size of was persistent but the patients became painless at the last follow-up. In surgical group, UBCs size were decreased in12 cases. However, UBCs recurred in 5 cases (20%). 3 were after steroid injection and two were treated with cannulated HA screw. Two were treated by repeated insertion of HA screw and 3 were performed curettage and bone graft. All patients obtained pain relief after the second procedure.

Discussion: Since the pathogenesis of UBCs remains unknown, the most appropriate treatment for UBCs is still controversial. It is likely to depend on the site, size and symptoms.The most commonly theorized mechanism of UBCs are high intraosseous pressure due to venous obstruction. Open curettage with or without bone grafting, or with a bone graft substitute is a reliable method but seems invasive, especially for pediatrics. Insertion of cannulated HA crew is a feasible procedure for decompression of UBCs. However, we experienced recurrence cases who required the second procedure. Appropriate number and insertion site of HA screws should be carefully considered preoperatively. HA screw decompression is a safe and easy method and repeated insertion is possible. This procedure might be best indicated for the proximal femur.We introduced endoscopic-assisted curettage technique from 2013. Futani et al. first introduced this procedure and reported that it avoided the risk of postoperative pathological fracture. They made a small fenestration of 5x5 mm so as not to reduce the strength of the calcaneus. We made one portal on the lateral side of UBCs and this was sufficient to see the lesion and to complete curettage. This procedure is less-invasive and easy to observe the inside of UBCs. No recurrence occurred by endoscopic curettage.

Conclusion: We performed several surgical treatments on 25 UBCs of 33, Recurrences occurred in 5 cases. Decompression with cannulated HA screw was a useful modality for UBCs. Curettage of UBSs involving an endoscopic-assisted technique and filling of the defect with β- tricalcium phosphate is a feasible method and minimally invasive for the pediatric patients.


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