Joint preserved reconstruction after curettage in giant cell tumor of bone arising in the distal radius: Case report

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ABSTRACT

INTRODUCTION: Giant cell tumor of bone is a locally aggressive tumor. Preserved joint reconstruction for tumors in the distal radius is challenging, especially when there is extraosseous extension and less subarticular bone.

PRESENTATION OF CASE: To preserve the joint, we developed a new reconstruction technique using β-tricalcium phosphate (TCP) with strong compressive resistance.

DISCUSSION AND CONCLUSION: Giant cell tumor of bone in the distal radius was treated by curettage and bone grafting, plus the use of β-TCP. This new method will preserve joint function.

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1. Introduction

Giant cell tumor of bone is a locally aggressive, benign tumor, and occurs in patients 20–45 years of age. The distal end of the radius is the third most common site affected, after the distal femur and the proximal tibia. The tumors occur in the epiphyses around joints [1,2]. In the case of the distal radius, reconstruction is difficult, especially when associated with extraosseous extension of the tumor and less subarticular bone [3]. This paper reports a new reconstruction method using β-tricalcium phosphate (TCP) with strong compressive resistance, after curettage, to preserve joint function.

2. Case report

The patient was a 32-year-old female. She had noticed pain in the left wrist for the previous six months, and was referred to our institute. Physical examination revealed swelling and tenderness at the wrist. Laboratory studies showed no remarkable findings. A plain radiograph showed an expansive and ill-defined osteolytic lesion involving the distal epiphysis of the radius (Fig. 1A). Magnetic resonance imaging (MRI) of the lesion showed homogeneous low-signal intensity on a T1 weighted image and heterogeneous intermediate and high signal intensity on a T2 weighted image (Fig. 2A–C). Computed tomography (CT) failed to detect the cortex at the flexor, radial or dorsal sides of the lesion (Fig. 2D). A needle biopsy was performed, and the diagnosis was giant cell tumor of bone. After curettage of the lesion, the cavity was treated by filling with anhydrous alcohol for 5 min as adjuvant therapy, for the purpose of decreasing a possible recurrence. As for reconstruction, shaped cortical bone from the ilium was applied to the radial and ulnar sides of the distal radius. Cuneiform shaped β-TCP blocks were placed between the autografts (Superpore hard-type: Department PENTAX New Ceramics Division HOYA Corporation) and fixed with Kirschner’s wires (Fig. 1B). Local recurrence was not observed on follow up fourteen months after the operation, and complete incorporation of the graft was seen (Fig. 1C). The range of motion in the wrist was slightly restricted on distal flexion, but function remained excellent, without any complications. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

3. Discussion

The rate of recurrence of giant cell tumor of bone treated after simple curettage has been reported to range between 30% and 50% [2]. Therefore, wide resection is accepted in an effort to prevent recurrence [4]. Several methods after resection have been used to reconstruct the distal radius, including nonvascularized, and vascularized grafts with an excellent osteogenic potential, and complete and partial arthrodesis of the wrist [3,5]. The consequence of wide resection is a complete loss of wrist function.

Several adjuvant methods have been reported to reduce the rate of recurrence after curettage of giant cell tumor of the bone, including the use of liquid nitrogen, phenol, ethanol and polymethylmethacrylate bone cement. With these methods, recurrence rates have been reported in the range of 7–10% [2,6,7]. In the cur-
Fig. 1. Giant-cell tumor of bone in the distal radius. Plain radiographs have an osteolytic and expansive lesion (A). Shaped iliac cortical bone is put on both sides of the wrist, and a β-TCP block with high compressive strength is put between the autografts. Kirschner wires are used for fixation (B). Complete incorporation was seen 14 months after the operation (C).

Fig. 2. Giant-cell tumor of bone in the distal radius. The lesion has homogeneous low-signal intensity on a T1 weighted image (A) and heterogeneous intermediate and high signal intensity on a T2 weighted image with (B) and without (C) fat-suppression on MRI. CT images show an expanded but thin cortex (D).

In the current case, ethanol was used as the adjuvant. The recurrence rate with ethanol previously was reported to be 9.5% [7].

Reconstruction of a large subarticular osseous defect is challenging after curettage, especially in cases with extraosseous extension and less subarticular bone. In the current case, a specific type of β-TCP, which is characterized by high compressive strength, was used. Moreover, no crack was observed when fixing with Kirschner wire.

4. Conclusion

Giant cell tumor of bone in the distal radius was treated by curettage and bone grafting, plus the use of β-TCP. The grafted bone was successfully incorporated. This new method will preserve joint junction.
Conflict of interest
None declared.

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None.

Ethical approval
Because of the case report, the ethics committee was not held.

Consent
A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution
Akio Sakamoto: study design, data collections, data analysis and writing.

Guarantor
Akio Sakamoto accepts the full responsibility for the article.

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