Simple bone cysts treated by multiple drill-holes

23 cysts followed 2–10 years

Tetsuya Shinozaki, Satoru Arita, Hideomi Watanabe and Masaki Chigira

We treated 23 simple bone cysts by the multiple drill-hole method and reviewed them a mean of 5 (2–10) years later. 11 cysts were located in the humerus, 9 in the femur, 2 in the tibia, and 1 in the pubis. The cysts recurred in 15 cases after the initial operation. 12 recurrent cysts were treated with reoperations. At the follow-up, good bone formation with no sign of recurrence was seen in 15 cases. A residual cyst was found in 8 cases, but further treatment was not considered necessary.

Department of Orthopedics, Gunma University School of Medicine, 3-39-22 Showa, Maebashi, Gunma, 371 Japan
Tel +81 272 20-7111. Fax -8275
Submitted 95-09-17. Accepted 96-02-26

We have demonstrated that venous obstruction in the bone is one of the causes of simple bone cysts (Chigira et al. 1983, 1986, 1987). Thus, since 1981, we have treated simple bone cysts by multiple drill-holes and we have left the Kirschner wires used for drilling in situ (Chigira et al. 1983). We report the outcome of this method after 2–10 years.

Patients

We reviewed 23 cases of simple bone cyst treated by the multiple drill-hole method at our hospital from 1981 to 1992. The patients were a mean of 13 (3–31) years old when they were first seen. There were 11 men and 12 women. 11 cysts were located in the humerus, 2 in the tibia, 9 in the femur and 1 in the pubis. 13 cases (9 humerus, 4 femur) had a pathological fracture at the first examination. In such cases, the multiple drill-hole operation was performed after bone union was achieved, and if the cyst had not disappeared. The diagnosis was based on radiographs and aspiration of characteristic fluid from the cyst cavity. The patients were followed for a mean of 5 (2–10) years after the first operation.

Methods

All cysts were treated by the multiple drill-hole method, as described previously (Chigira et al. 1983). Briefly, the cyst was perforated, under an image intensifier with several Kirschner wires (1.2–2.0 mm in diameter), which were left in situ after drilling (Figure 1). The outcome of the treatment was classified radiographically as described previously (Chigira et al. 1986), i.e., poor, no clear improvement; good, improvement allowed the bone to bear the patient's weight, although a residual cyst could be seen in the area; excellent, a uniform frosted-glass type area was observed with no residual cysts. The Kirschner wires were removed after the cyst had healed or bone growth in children was complete (Figure 1).

Results

The cyst recurred or healed unsuccessfully in 15 cases after the initial operation. Such recurrences were usually evident in radiographs within 3–4 months. 12 of these patients had expanding residual cysts and were reoperated on to prevent a pathological fracture (Figure 2). The duration between the first and second operations ranged from 4 months to 4 years. 3 cases required a third operation because of residual cyst expansion. The intervals between the second and third operations ranged from 1.5 year to 4.5 years. However, 3 cases in which the cyst recurred after the initial operation required no further treatment, since the residual cystic cavities did not grow. The results were classified as excellent in 15 cases (Figures 1 and 2) and good in 8 cases. No further surgical treatment was necessary in cases with a good result, since the patients had no complaints and the residual cyst stopped growing. In no case was the result considered poor.

Discussion

We have shown that venous obstruction in the bone is

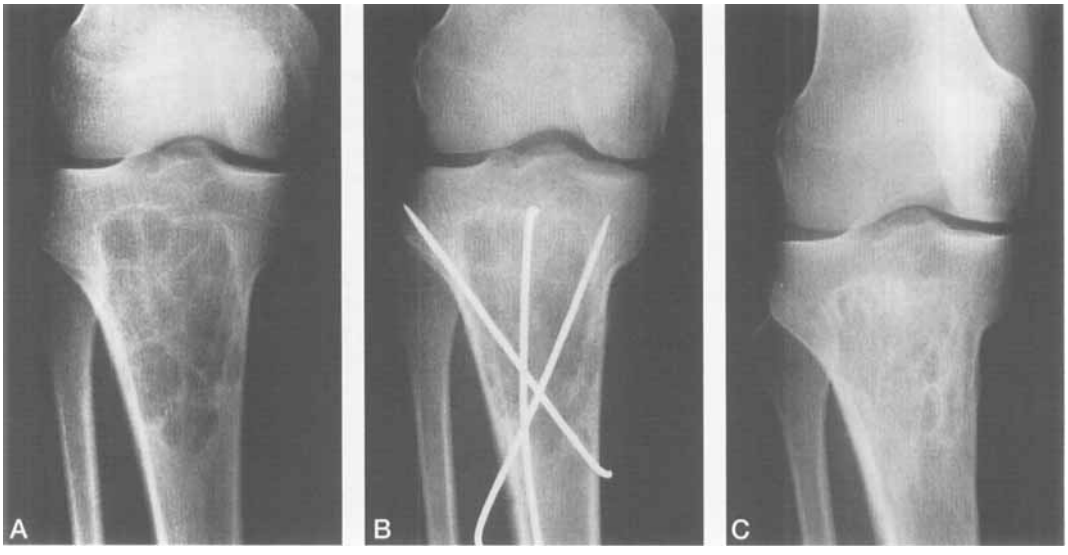

Figure 1. 16-year-old girl. Simple bone cyst in proximal tibia (A). Multiple drilling (B). Healed cyst after 1994 (C).

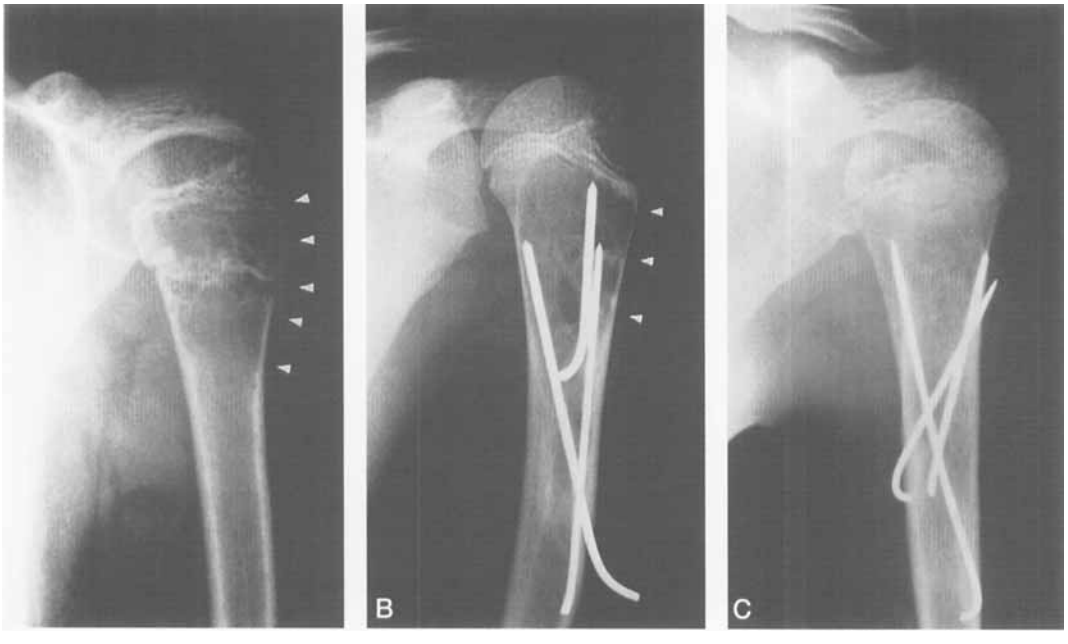

Figure 2. 11-year-old boy. Cyst with pathological fracture in the proximal humerus (A). A second drill–hole operation was necessary after 25 months because of a residual cyst (B). The radiographs show good bone formation in the cyst 8 months after the second operation (C).

one of the causes of simple bone cyst (Chigira et al. 1983, 1986, 1987, Watanabe et al. 1994). Therefore, we have evaluated the effect of multiple drilling of the cyst walls with stainless-steel wires which can be performed percutaneously under an image intensifier.

In our series, two thirds of the cysts recurred. A reoperation which included the removal of K-wires and drilling with new wires was done in 12 cases. In 3 cases with recurrent cysts, a similar, third operation was necessary. We consider this failure rate acceptable; the multiple-drill hole method is simple.

The cyst wall should be fully perforated in several places to avoid a recurrence (Chigira et al. 1983, 1986). We speculate that K-wires keep the holes in the cyst wall open, and permit fluid to escape along the wires (Chigira et al. 1983). Thus we leave the K-wires

in situ until bone formation is complete. In children, we leave the wires in place until bone growth stops (Chigira et al. 1983, 1986).

Acknowledgements

We are very grateful to Professor Eiichi Udagawa, Department of Orthopedics, Gunma University School of Medicine, for valuable discussions. We thank Mr. Kiichi Osawa for his technical assistance in taking photographs.

References

Chigira M, Maehara S, Arita S, Udagawa E. The aetiology and treatment of simple bone cysts. J Bone Joint Surg. (Br) 1983; 65: 633-7.

Chigira M, Shimizu T, Arita S, Watanabe H, Heishiki A. Radiological evidence of healing of a simple bone cyst after hole drilling. Arch Orthop Trauma Surg 1986; 105: 150-3.

Chigira M, Takehi Y, Nagase M, Arita S, Shimizu T, Shinozaki T. A case of multiple simple bone cysts: with a special reference to their etiology and treatment. Arch Orthop Trauma Surg 1987; 106: 390-3.

Watanabe H, Arita S, Chigira M. Aetiology of a simple bone cyst: a case report. Int Orthop 1994; 18: 16-9.