Mennen clamp-on plate fixation of periprosthetic fractures of the humerus after shoulder arthroplasty—a report on 3 patients

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The clamp-on plate described by Mennen (1989) was originally developed only for shaft fractures of the forearm. The therapeutic spectrum has subsequently been expanded to include treatment of periprosthetic fractures of the femur (Liu et al. 1995, Otremski et al. 1998, Kamineni and Ware 1999, Kligman and Roffman 1999). Jähnich et al. (2000) described the use of the Mennen plate for humeral shaft nonunions. Kamineni and Ware (1999) treated 2 periprosthetic humeral head fractures after previous shoulder arthroplasty. We describe our experience of 3 such cases.

Case 1

An 81-year-old woman suffered a periprosthetic humeral fracture after a fall, 3 years after a cementless shoulder arthroplasty with a bi-rotational head system for a proximal humerus 4-part fracture (Neer IV). The humeral shaft was unstable and radiographs showed a periprosthetic fracture with a nonunion near the tip of the stem, and cranial migration of the prosthesis in the gleno-humeral joint (Figure 1). We used an anterior approach for fixation with two wire cerclages. For further stabilization, a medium-sized Mennen plate was applied to the humeral shaft. Cancellous bone grafts were applied. At 20 months, radiographs showed a complete bony union and there was no pain (Figure 2). The Constant score was 38 points.

Case 2

A 93-year-old woman sustained a distal periprosthetic fracture up to the tip of the stem following a fall, 4 months after a cementless modular shoulder arthroplasty had been implanted due to an ipsilat-

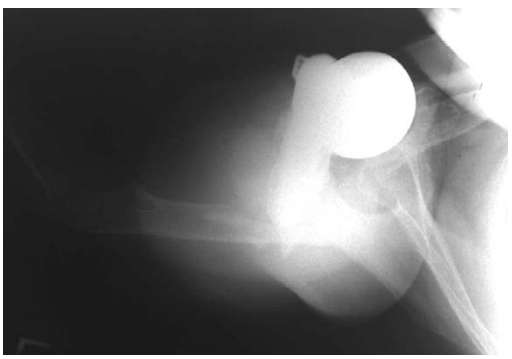

Figure 1. Case 1 (81 years old. Periprosthetic fracture with a nonunion near the tip of the stem (type C according to Campell et al. 1998), and a known cranial migration of the prosthesis in the humero-glenoidal joint.

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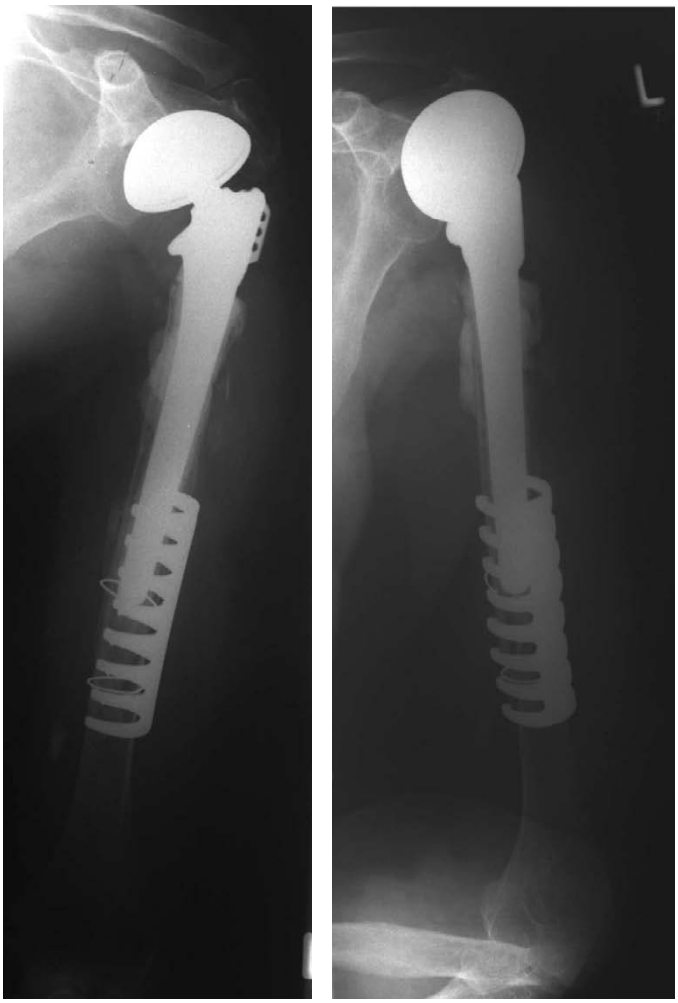

Figure 2. Complete bony union 20 months postoperatively.

eral 4-part fracture dislocation (Neer VI). An anterior approach was used to reduce and fix the fracture with a medium-sized Mennen plate. Because of the possibly of nonvital fragments, osteoporosis and high age, we applied additional bone cement. The patient was pain-free 8 weeks after the operation, but died 4 months later due to cardiac insufficiency.

Case 3

A 70-year-old man (with a left-sided apoplectic insult) was diagnosed with a periprosthetic fracture of the left humerus following a fall, 6 years after cementless modular humeral head arthroplasty for a humeral head multipart fracture. Radiographic evaluation showed a significantly displaced fracture located, as with the other cases, at the tip of the stem. The anterior approach was used and a medium-sized Mennen plate was implanted. The fracture had healed 3 months after surgery. The patient died due to a new apoplectic insult 7 months later.

Discussion

Nonoperative treatment of periprosthetic humeral fractures may result in delayed union and secondary shoulder stiffness (Kligman and Roffman 1999). Kligman and Roffman (1999) reported a favorable outcome with the Mennen plate in 2 periprosthetic fractures. It is widely agreed that dislocated periprosthetic fractures of the humerus require surgical treatment.

All of our cases involved the oblique type of fracture. The therapy recommendations were derived from the fracture classification system presented by Campbell et al. (1998). Replacement of the stem with cerclages and bone grafting is recommended for B and C fractures with an unstable prosthesis. Anatomical repositioning and plate fixation are indicated if the stem is in a tight position (Cameron and Iannotti 1999). In accordance with the recommendations of Cameron and Iannotti (1999), an osteosynthesis with additional cement was used in the 93-year-old patient (case 2) due to the poor bone quality. The use of additive bone grafting in the implantation of Mennen plates for periprosthetic fractures is widely debated. Kligman and Roffman (1999) have promoted supplementary autologous bone grafting, which contrasts with the work of Jähnich et al. (2000), where bone grafting was never used. In our patients, all fractures healed within 3 months. We used bone grafting in case 1 (the 82-year-old female patient) because of a nonunion. Bone grafting is probably seldom necessary to supplement the Mennen plate.

We consider that Mennen plate fixation for periprosthetic fractures of the humerus with a tight stem is a useful method, and only mildly invasive.

No competing interests declared.

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