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Femoral fracture following hip arthroplasty

In 1,961 primary total hip arthroplasties performed during a 14-year period, 11 proximal ipsilateral femoral fractures occurred postoperatively. Seven were located distally to the tip of the femoral stem; none was a comminuted fracture. Six of the fractures were primarily revised with a long-stem prosthesis. The results after 5 (1–8) years were good.

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A postoperative femoral fracture is a well-known complication following total hip arthroplasty (THA) (Olerud 1979). Bethea et al. (1982) presented a classification indicating that the treatment should depend on the type of fracture. However, fractures following revision arthroplasties were also included in their study.

We have studied the long-term fate of femoral fractures after primary THA.

Material and methods

Between August 1968 and December 1982, 1,961 primary THA–669 in men and 1,292 in women–were performed at the Department of Orthopedics in Malmø. In 6 men and 5 women, a postoperative fracture of the proximal femur occurred after 58 (2–142) months. The age of the patients at the time of the fracture was 70 (50–78) years. All the fractures were classified according to Bethea et al. (1982) (Figure 1). There were seven Type-A fractures (six transverse and one spiral), four Type-B fractures, and no Type-C comminuted proximal fracture.

The radiographs were studied for signs of stem loosening, such as a radiolucent zone and/or subsidence of the stem. Healing of the fracture was evaluated by clinical and radiographic examinations.

The follow-up was made 54 (12–92) months after the fracture.

The following case reports are presented to illustrate some of the clinical problems (Table 1).

Case 1. A 55-year-old male alcoholic with rheumatoid arthritis had a cervical hip fracture in 1974 with postoperative infection treated with antibiotics. In 1975, a THA was performed after which a dislocation occurred 4 months postoperatively. Four years later, he had a Type-A dislocated femoral fracture below the implant after a fall in his home. After traction for 1 month, an open adaptation was made with cerclage wirings. Radiographic evidence of callus developed during the prolonged traction and the patient was mobilized. Definite radiographic signs of stem loosening were seen 4 months later just before the occurrence of a refracture during walking. Revision with a long-stem prosthesis was performed in 1980. Redislocation later occurred during periods of intoxication, but no clinical signs of stem loosening were observed. The patient died in 1982.

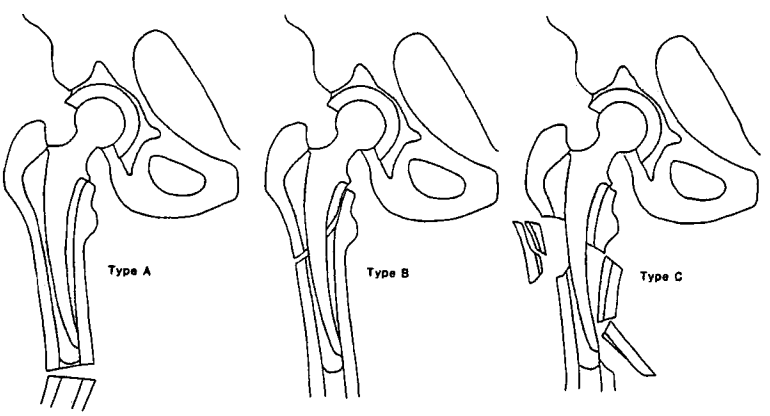

Figure 1. Types of femoral fracture classified according to Bethea et al. (1982).

Table 1. Diagnosis and outcome of postoperative femoral fractures.

Primary diagnosis[a] Age at fracture/ sex	Prefracture signs of radiographic loosening	Fracture type	Treatment	Outcome	Secondary treatment
1. C 61/M	–	A	Traction and cerclage wires		Refracture 4 months postoperatively Long stem prosthesis
2. RA 65/F	+	A	Non-weight bearing		Long stem prosthesis 24 months postoperatively due to loosening
3. OA 50/M	–	A	Non-weight bearing	Healed	–
4. CDH 73/F	–	A	Long stem prosthesis + Partridge bands		Revised 17 months postoperatively with a Küntscher intra-medullary nail and a Müller straight stem prosthesis due to curving of the stem
5. C 74/F	–	A	Traction for 10 weeks	Healed	–
6. OA 70/F	+	A	Long stem prosthesis + Partridge bands	Healed	–
7. OA 78/F	–	A	Long stem prosthesis	Healed	–
8. OA 61/M	+	B	Long stem prosthesis	Healed	–
9. OA 73/M	–	B	Cerclage wires	Healed	–
10. OA 55/M	+	B	Long stem prosthesis	Healed	–
11. OA 71/M	+	B	Long stem prosthesis	Healed	–

a. C = Cervical femoral fracture, OA = primary coxarthrosis, RA = rheumatoid arthritis, CDH = congenital dislocation of the hip.

Case 4. In 1972, a 63-year-old female with bilateral congenital dislocation of the hip had a Charnley THA inserted on the right side. The outcome of the operation was successful, but 10 years later the patient fell and sustained a Type-A fracture just distal to the stem. After traction for 2 weeks, revision with a Charnley long-stem prosthesis was performed. The fracture was also stabilized with Partridge bands. Half a year later, she had a Charnley THA operated into her left hip. One year postoperatively, the long-stem prosthesis bended; the fracture had not healed. She now had a second revision with a Müller CDH straight-stem prosthesis in a Küntscher nail. The outcome was still successful 2 years later.

Case 9. A 65-year-old male had a Charnley THA inserted in 1970 because of arthrosis. Eight years later, he had a Type-B femoral fracture and was treated for 2 weeks in traction. No radiographic signs of loosening were observed. After an open reduction and cerclage wiring, he was mobilized and released from the hospital 3 weeks postoperatively. No further complications were noted. The patient died in 1983.

Results

There was no difference in the frequency of femoral fracture as related to the diagnosis of the hip disease. In 5 patients, signs of loosening–radiolucent zones of 2–10 mm – were recorded.

Nine patients stated that a fall was the immediate cause of their fracture. However, 1 patient (Case 10) had sustained his Type-B frac-

ture when dressing, and another (Case 3) sustained a Type-A stress fracture during a walk.

Surgical treatment with substitution of a long-stem prosthesis was carried out primarily in 6 patients. Five of these healed, but for special reasons 1 patient (Case 4) required a second revision after 17 months. Cerclage wiring after traction was not successful in Case 1 with a Type-A fracture, but this wiring provided primary healing in the Type-B fracture of Case 9.

Closed treatment was primarily carried out in 4 patients. Non-weight bearing was successful only in the patient with the stress fracture, but failed in the patient with obvious radiographic signs of loosening. Traction provided healing after 10 weeks in Case 5 with a Type-A fracture, whereas Case 1 was operated on with cerclage wiring after 4 weeks of traction. Two patients had Partridge bands, which caused multiple bone resorptions as observed radiographically 2 years postoperatively.

The patients primarily operated on with a long-stem prosthesis left the hospital after 24 (11–31) days. The conservatively treated patients–excluding the patient with the stress fracture–had to stay in the hospital for 91 (45–110) days.

There were no instances of postoperative infection or thromboembolism.

Discussion

Radiographic signs of stem loosening were present in 5 of our 11 cases. Even asymptomatic loosening is an indication for a primary surgical treatment of the fracture. Otherwise, there is an obvious risk of a later clinical loosening requiring revision when the bone stock may be even more impaired.

The aim of our operative treatment was to firmly stabilize the fracture by insertion of a long-stem prosthesis passing the fracture. In preoperative planning, an adequate stem length can be prefabricated if necessary by shortening an ultralong stem. Attention must be paid to the risk of cement intrusion into the fracture. Generous grafting of cancellous bone will support the fracture healing. The main disadvantage of using a long stem is the insertion of a large amount of cement in the distal femur (Bethea et al. 1982). However, after a follow-up time of an average of more then 4 years, we have not had to revise any of these long stems owing to loosening.

Cerclage wiring alone may be adequate if the stem of the femoral prosthesis is firmly anchored and the spiral fracture is not dislocated; however, this method does not provide sufficient stability to permit immediate mobilization. There does not seem to be any indication for Partridge bands, which may cause local bone resorption and do not provide adequate fixation. Case 4 had to be revised owing to curving of the 36-cm-long Charnley stem prosthesis. Since 1983, the metal of the stem has been changed in order to prevent this type of complication.

If an ultralong stem prosthesis with cement is unsuitable or impossible to insert, the method described by Olerud (1979) may be considered using a Küntscher nail in combination with the Müller straight-stem prothesis, which provides a cementless femoral fixation.

Early revision permits early mobilization with reduced risk of nonunion, and seems to be the treatment of choice in Type-A and B fractures.

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