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PERTROCHANTERIC FRACTURES OF THE FEMUR

A Comparative Study of Internal Fixation with Angle Nail-Plates and Flexible Condylar Nails

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Two methods of internal fixation of pertrochanteric fractures of the femur, angle nail-plates and flexible condylar nails, were compared in a retrospective clinical study, with emphasis on the results and indications as related to the age and physical condition of the patients.

Key words: angle nail-plate; flexible condylar nail; pertrochanteric fracture

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The advantages of stabilization of pertrochanteric fractures of the femur with condylar nails in old people or patients in a poor physical condition are claimed to be: a quicker surgical procedure, with minimized stress, a low complication rate and the possibility of immediate weight-bearing. In young people anatomic reduction and fracture fixation, together with a longer period of non-weight-bearing, essentially reduces the risk of a posttraumatic coxarthrosis and is therefore often preferred (Martinek et al. 1976).

However pertrochanteric fractures of the femur are mainly an injury of old age and therefore the aim has always been to stabilize these fractures quickly and adequately by internal fixation in order to mobilize the patients as soon as possible (Hauck 1948, Küntscher 1966, Lezius 1950, Pugh 1955, Scheuba 1966).

In 1965 osteosynthesis of pertrochanteric fractures by means of a 130° angle nail-plate, according to Scheuba (1966), was introduced into our hospital. Since 1972, however, we have used almost exclusively condylar nails according to Ender & Simon Weidner (1970). Related papers from our clinic have been published by Moritz & Scheuba (1970) and Passl et al. (1975). The aim of the present study was to compare the results of these two types of internal fixation, considering the criteria mentioned above.

PATIENTS AND METHODS

During the period August 1965–December 1968, 322 patients were admitted with pertrochanteric fracture of the femur (Series I). Of this number, 205 were operatively treated with 130° angle nail-plates. In the second period, August 1972–December 1975, 331 out of a total of 333 patients admitted with the same type of fracture were treated with flexible condylar nails (Series II).

As can be seen in Table 1, the mean age of the patients in the first period was 72 years, compared with 78 years in the second period. The sex ratio was the same in both periods. Thus the essential difference was in the choice of treatment.

Moreover, during the first period, 36 per cent (117/322) of the fractures were not internally fixed, because of the greater operative risk of applying the 130° angle nail-plate, compared with only 1 per cent (2/333) in the second period, where condylar nails have been preferred.

RESULTS

The differences in the surgical management of pertrochanteric fractures implied in the two types

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Table 1. Comparison of the two clinical series with regard to number of patients, mean age and sex

	Series I (130° angle nail-plates)	Series II (Ender nails)
No. of patients	322 operated on: 205=64%	333 operated on: 331=99%
Mean age	72 years	78 years
sex ♀	239=74%	245=74%
♂	83=26%	88=26%

of treatment, angle nail-plates and condylar nails, are listed in Table 2. With the application of Ender nails 3 days were gained in preoperative preparation time. In addition, the average operation time and the need for blood transfusions could be reduced by approximately two-thirds.

With Ender nailing postoperative infections were reduced by a factor of two. The postoperative complication rates are shown in Table 3. Implant failures of the 130° angle nail-plate were encountered in 7 per cent (14/205) of cases, corrosion problems in 2 per cent (3/205) and penetration of the nail tip through the femoral head in an additional 5 per cent (10/205). These complications resulted in reoperations in 11 per cent (22/205) of cases.

By comparison, implant failures were not observed in cases fixed by Ender nails. Nail penetration was encountered in 2 per cent (8/331) of cases and in an additional 4 per cent (14/331) the nails slipped distally in the knee region. All these patients had particularly serious complaints in the hip or in the knee. In 1 per cent (3/331) of cases a supracondylar fracture was sustained peroperatively. Following these complications reoperation was performed in 8 per cent (25/331) of cases. However, in 7 per cent (22/331) of cases the reoperation was only a simple removal of the nails protruding into the knee region or a change of nails protruding through the femoral head.

The mortality rate in the Ender nailing group was significantly lower than in the group treated by angle nail-plates (Table 3). In 24 per cent of the patients operated with Ender nails an outward rotation of the leg of 10–20 degrees was

Table 2. Comparative surgical data for 130° angle nail-plates and flexible condylar nails

	Series I (130° angle nail-plates)	Series II (Ender nails)
Treatment		
operative	205=64%	331=99%
non-operative	117=36%	2= 1%
Average period from admission to operation	6 days	3 days
Average operating time	93 min	38 min
Average number of blood transfusions	2.8	1.1

Table 3. Complications

	Series I (130° angle nail-plates)	Series II (Ender nails)
Infections (in operated patients):	$n=205$	$n=331$
wound healing by second intention	8	6
osteomyelitis	2	2
gas gangrene	1	–
Total	11	8
Implant failures:	$n=205$	$n=331$
deformation of the nail	8	–
breakage of the plate	6	–
corrosion	3	–
nail perforation	10	8
nail slipping	–	14
Iatrogenic supracondylar fracture:	–	3
Reoperation:	22	25
Mortality:		
operated patients	33=16%	43=13%
non-operatively treated patients	63=54%	1

encountered. These patients were, however, not essentially restricted in their mobility.

DISCUSSION

The most important advantage of the treatment of pertrochanteric fractures of the femur by means of condylar nails is the stability of this osteosynthesis, allowing immediate weight-bearing. It is for this reason that we now treat these fractures in old patients almost exclusively with condylar nails. From the third day following the operation all the patients are allowed to bear weight on the extremity, regardless of the results of the reposition. The patients fixed with 130° angle nail-plates are first allowed weight-bearing on the operated extremity after 8 days, provided that medial cortical support has been achieved. With a lack of medial support weight-bearing is allowed 6–8 weeks after operation.

Despite the advantages of condylar nails the particular dangers of this method must be emphasized. In 3 of the first 100 operations a peroperative supracondylar fracture of the femur occurred on a level with the point of insertion of the nails. This complication did not occur again, and was undoubtedly due to faulty operating technique. Other complications such as perforation of the femoral head and distal slipping of the nails are caused by the impaction of the fragments at weight-bearing in unstable fractures, which are most often reduced with a gap across the fracture line. The nail slips distally within the medullary cavity or if it can not move sufficiently in a distal direction it may penetrate farther into the femoral head even perforating it. This damage, however, can be eliminated simply and quickly by changing the nail, a procedure which, however, delays the mobilization of the patient unnecessarily, and requires readmission to hospital.

The advantages of fracture stabilization by flexible condylar nails, in particular the quicker surgical procedure and the possibility of immediate weight-bearing, outweigh the rather rare complications encountered. Especially as far as old people and patients in a poor general condition are concerned, we consider the treatment of pertrochanteric fracture of the femur by means of condylar nails to be an important step forward.

In young people, however, an exact reduction of a pertrochanteric fracture is to be preferred, thus reducing the danger of a posttraumatic coxarthrosis. Furthermore these patients can presumably tolerate a longer period of non-weight-bearing. For this reason the treatment of pertrochanteric fractures by means of condylar nails should be confined to old patients and those in a poor physical condition.

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