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TROCHANTERIC AND SUBTROCHANTERIC FRACTURES

One Year Follow-up of a Prospective Study of Ender and McLaughlin Osteosynthesis

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The clinical and social status of 110 patients with trochanteric and subtrochanteric fractures was evaluated in a prospective and comparative study 1 year after Ender or McLaughlin osteosynthesis.

In both groups the mortality rate during the first year was 21 per cent. There were no significant differences between the two groups concerning pain, hip movement, walking ability or the social status of the patients. Of the 110 patients surviving the first year, 35 per cent were unable to walk, 20 per cent walked with a cane or crutches and 30 per cent had periodic pains in the hip or knee. About 20 per cent of the patients admitted from their own home now lived in nursing homes.

Key words: fracture sequelae; subtrochanteric fracture; trochanteric fracture

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Treatment of trochanteric and subtrochanteric fractures by Ender nailing was described by Ender & Simon-Weidner (1970). When the present study was planned, no prospective and controlled study had been published concerning the Ender method.

The operative results and the problems during the healing phase have been discussed in a companion paper (Høgh et al. 1981). In the present report, the clinical and social status of the patients who survived the first year after the operation are evaluated. The results in this prospective and randomized study are compared with other long-term observations, which are based on retrospective series.

PATIENTS AND METHODS

At the time of the operation the series included 145 patients. At the examination 1 year later, 15 patients in the Ender group and 16 in the McLaughlin group had died, and a further 4 patients refused to participate in the follow-up examination. Thus, the present series includes 110 patients, of whom 54 were operated on by the Ender technique and 56 by McLaughlin osteosynthesis.

Eleven patients in the Ender group and 8 patients in the McLaughlin group had subtrochanteric fractures. These fractures were regarded as unstable, and considered together with the unstable trochanteric fractures (Høgh et al. 1981). The mean age on admission was 76 years. At the follow-up examination the mean age was 72 years (Ender 71 years, McLaughlin 76 years). In the Ender group there were 36 females and 18 males. The McLaughlin group included 47 females and 9 males.

Objective hip assessment was performed using the Stinchfield hip assessment chart (Stinchfield et al. 1957). Stinchfield's chart considers pain, mobility of the hip and walking ability. The clinical assessment was combined with an X-ray examination of the hip. Significant changes in the social status following the hip fracture were recorded.

RESULTS

Two patients in each group had severe hip pain. Eight patients in the Ender group and 9 patients

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in the McLaughlin group complained of moderate pain. Seven and 6 patients in the two groups, respectively, had mild pain. There was no difference in hip mobility between the two groups. A normal range of movement of the hip according to Stinchfield was found in 38 per cent of the patients in both groups.

The walking ability was reduced to "impossible or almost so" for 18 patients in the Ender group, and for 21 patients in the McLaughlin group. A cane or a pair of crutches was used permanently by 11 patients in the Ender group, and by 13 patients in the McLaughlin group. Thus 25 patients in the Ender group and 29 patients in the McLaughlin group walked without the use of a cane. Prior to the hip fracture 3 patients in the Ender group and 6 patients in the McLaughlin group were unable to walk. Sixteen patients in the Ender group and 7 patients in the McLaughlin group used a cane permanently.

The assessment of the results according to Stinchfield is shown in Table 1. The difference between the number of patients with failures (Stinchfield fair plus poor) in the two groups is not significant. In Table 2 the material is divided according to the primary stability of the fractures. Among patients with stable fractures a statistically significant lower number of failures occurred in the McLaughlin group compared with the Ender group.

The X-ray examination 1 year after the operation showed that all fractures had healed. In 2 patients in each group the osteosynthesis material had penetrated the femoral head. One patient in the Ender group developed necrosis of the femoral head, and had a total hip replacement one and a half years after the primary operation. One patient in the McLaughlin group had chronic osteitis around the former fracture site.

Table 1. Evaluation of the clinical status of the hip, 1 year after osteosynthesis, using Stinchfield's hip assessment chart

	Ender nailing $n=54$	McLaughlin osteosynthesis $n=56$
Excellent	26 (48%)	19 (34%)
Good	12 (22%)	28 (50%)
Fair	11 (20%)	6 (11%)
Poor	5 (9%)	3 (5%)

$\chi^2 = 2.88$. $0.10 > P > 0.05$ (see text).

Table 2. Evaluation of the clinical status, 1 year after the operation, using Stinchfield's assessment chart. The material is divided into primary stable and unstable fractures

	Ender nailing		McLaughlin osteosynthesis	
	Stable $n=26$	Unstable $n=28$	Stable $n=32$	Unstable $n=24$
Excellent	14	12	11	8
Good	3	9	19	9
Fair	7	4	2	4
Poor	2	3	0	3

Fisher's exact test: $P < 0.05$ (see text).

A correlation between X-ray findings and the symptoms of the patients was only demonstrable in some cases. In the Ender group severe pain was related to knee disability in 2 cases. Moderate pain was related to prominence of the pins in the knee region in 6 cases, to penetration of the femoral head in one case, and to caput necrosis in one case. In the McLaughlin group severe pain was correlated with osteitis and penetration of the femoral head in 2 cases, while moderate pain in 9 cases was related in 5 to prominence of the osteosynthesis material in the trochanteric region. No correlation between the X-ray examination and the range of movement of the hip could be demonstrated.

An external rotation of more than 20 degrees was observed in 22 patients in the Ender group. The external rotation did not affect the walking ability.

The mortality of the patients was 21 per cent in both groups during the first year after the operation. In both groups the mortality of the patients coming from nursing homes or mental hospitals was higher (14 per cent) than that of the patients who came from their own home (10 per cent). This difference was not statistically significant. After the operation many patients did not return to their own home. In the Ender group 11 of the 39 patients admitted to the hospital from their own home lived in nursing homes 1

year after the operation. In the McLaughlin group 5 out of 35 patients coming from their own home now lived in nursing homes.

DISCUSSION

The present 1 year follow-up examination, including a clinical assessment, an X-ray examination and an analysis of social dependency, did not demonstrate any significant difference between Ender and McLaughlin osteosynthesis. This is in contrast to the operative results which showed a higher frequency of technical problems and reoperations when using the Ender method (Høgh et al. 1981).

The reports which compare the Ender operation with other operative methods usually focus on problems in the operative phase and the healing period (Wynn Jones et al. 1977, Jensen et al. 1980a, b). The studies of the long-term results of Ender or McLaughlin osteosynthesis usually discuss the mortality and the social problems (Hansen & Neidhardt 1970, Hult & Nilsson 1978, Jensen & Tøndevold 1979, Raugstad et al. 1979). These long-term observations are retrospective studies taking place a few months to several years after the operation. It is not possible to compare our observations, that 70 per cent of the patients in both the Ender and the McLaughlin groups had no pain 1 year after the operation, with other studies. Neither is it possible to compare the observation of a normal range of movement in the hip in about 40 per cent of the patients in both groups with other series.

Kuderna et al. (1976) stated that "all patients, who walked before the hip fracture, also walked after Ender osteosynthesis". The mean age in this material, however, was 68 years, while the mean age in our material was 76 years on admission. The main reason for one third of our patients being unable to walk was generalized disease or mental disorder. This observation is in accordance with Jensen et al. (1979). Öhman et al. (1968) made a clinical assessment of McLaughlin osteosynthesis and found 27 per cent poor results. Our percentage of 16 poor plus fair in the McLaughlin group seems better, but our criteria of assessment are not identical. Wynn Jones et al. (1977) and Raugstad et al. (1979) found external rotation of the leg in about 30 per cent of the patients after Ender osteosynthesis. As in our series this had no influence on the walking ability.

The mortality of patients with trochanteric fractures has been reported to be about 25 per cent during the first year after the operation (Ceder et al. 1979, Dahl 1980, Raugstad et al. 1979). This corresponds to our figure of 21 per cent. The mortality of patients admitted to the hospital from their home because of hip fracture was only 10 per cent, which is slightly more than in corresponding groups without hip fractures (Dahl 1980, Jensen & Tøndevold 1979).

Reports from Scandinavian countries on social dependency after hip fracture state that 20 per cent of the patients, who lived in their own home before the hip fracture, had moved to nursing homes or mental institutions after the operation (Ceder et al. 1979, Jensen et al. 1979). We found a similar frequency, but a few more patients in the Ender group than in the McLaughlin group had moved to nursing homes (11 versus 5 patients). This was not correlated with the age of the patients since the mean age in the Ender group was 5 years lower than the mean age in the McLaughlin group.

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