

POSTERIOR VERSUS LATERAL APPROACH FOR HIP ARTHROPLASTY

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In a study of two groups of 100 patients each, with a similar composition (age, sex and indications for surgery), operations for total hip arthroplasty took half as long and the blood loss was clearly less when using the posterior route in one group compared with Charnley's conventional approach in the other group. These are important considerations for elderly patients with a high operative risk. Radiologic assessments showed that with the posterior approach there was a wider variation in the location of the cup in the frontal plane. However, this has not caused any inconvenience during the short observation period to date. No comparison has been made of the functional results over an extended period.

Key words: hip surgery; total hip replacement; surgical approach; bleeding and hip surgery

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Major advances in hip surgery have been achieved during the last two decades, chiefly through the work of Charnley (1972). His operative method, with a lateral approach and trochanteric osteotomy, is generally accepted but many surgeons have found that it takes a long time (Thompson & Culver 1975, Sculco & Ranawat 1975, Koide et al. 1974).

The present retrospective study concerns 100 patients who underwent total hip arthroplasty via posterior incision and 100 having the same operation via a lateral incision as described by Charnley. The two groups were compared with respect to the duration of the operation, the amount of blood transfused, the operative complications and the position of the acetabular cup in a frontal radiographic projection.

PATIENTS AND METHODS

An analysis of the two groups of patients according to age and sex is given in Table 1. The indication for surgery was osteoarthritis, rheumatoid arthritis or persistent disability after fracture of the femoral neck or acetabulum (Table 2). Cases of infection after earlier prosthetic surgery were excluded but the groups do contain patients with no signs of infection after an earlier Judet or Moore prosthesis.

The 100 patients in one group were operated on with one of the approaches at the Department of Orthopedics at Gävle Hospital during the period May 1973 to December 1974 and the other approach was used in 100 patients at the Department of Orthopedics at Falun Hospital during the period January to December 1974.

The posterior approach was undertaken largely as described by Lubinus & Jacobsen (1973). The incision ran laterally over the proximal femoral shaft and then curved away in a dorsal direction. Fascia lata and gluteus maximus were split along the fibres. The short rotator muscles

were cut and were not re-sutured. The femur was cut through at the neck after dislocation, which only occasionally required the prior removal of osteophytes from the acetabular rim. The patient lay straight on one side and the cup was positioned in about 15–20° anteroversion at an angle of 40–45° in the frontal plane. The operation was performed with the Brunswick instrumentarium.

Table 1. Mean age and sex distribution in the two groups.

	Posterior approach	Trans-trochanteric approach
Mean age	66 years	66 years
Men/women	48/52	46/54

Table 2. Indications for the operation.

	Posterior approach	Trans-trochanteric approach
Osteoarthritis	80	81
Rheumatoid arthritis	9	9
Persistent disability after fracture	11	10

In the Charnley group the patient was supine. A lateral incision was made and the trochanter was cut with a Gigli saw. The acetabulum was ground out fairly extensively and the cup was positioned at an angle of about 45° in the frontal plane but with no antero- or retroversion. In keeping with Charnley's basic principles, attempts were made to lateralize and distalize the trochanter when making re-attachment, the aim being to increase the leverage of the gluteal muscles. The instruments advocated by Charnley were used.

Antibiotics were administered prophylactically in both groups (Cloxacillin 4 g daily for 1 week, starting on the morning of the operation).

The operations with the posterior approach were performed by one of four surgeons (of whom three were senior surgeons), while ten surgeons (five of them senior) were involved in the Charnley group.

A neuroleptic anaesthesia (Pavulon–Leptanal) was used in all cases with the posterior approach, while epidural anaesthesia predominated in the lateral group.

The total amount of blood transfused was

compared in the two groups instead of studying the degree of per- and postoperative bleeding. The indications for transfusion appear to have been similar in the two hospitals (subjective and objective hypovolaemia, haematocrit below 30) and therefore this amount should give a comparable picture of the total blood loss.

Postoperative dislocation has been included in the comparison if it could be demonstrated radiologically but not if it was only subjective partial dislocation or a feeling of dislocation upon flexion, medial or lateral rotation of the hip.

The position of the acetabular cup has been measured only in the frontal plane. This was done by a radiologist for a random sample of 30 patients in each group. The angle between the cup and a line joining the two tubercles was calculated. It would have been desirable to assess the position of the cup in a lateral projection too, but no X-rays of this projection were available for many of the patients in the Charnley group.

Prophylactic treatment for thrombosis was given, in conjunction with the posterior approach, only in the form of Lohman bindings on the leg postoperatively and oxyphenbutazon 0.1 g \times 3. In the Charnley group, every patient received Macrodex prophylactically for thrombosis (500 ml on the day of the operation, followed by 500 ml on the 3rd and 5th days postoperatively).

The patients have been followed for at least 1 year after the operation.

RESULTS

The average duration of the operation and the amount of blood transfused are shown in Table 3. Even when the comparison is confined to operations performed by senior surgeons, the difference in average duration is still considerable (55 and 112 minutes, respectively).

Table 3. Average duration of operation and amount of blood transfused per- and postoperatively.

	Posterior approach	Trans-trochanteric approach
Duration of operation	55 min	122 min
Blood transfused	650 ml	1600 ml

Blood loss, as reflected by the amount transfused pre- and postoperatively, is clearly smaller with the posterior approach. In this group, moreover, no blood transfusion at all was required in 28 cases, compared with only one case with the lateral approach.

A comparison of major complications noted in the case records is given in Table 4.

Table 4. Complications.

	Posterior approach	Trans-trochanteric approach
Death	1	0
Sciatic paresis	3	1
Dislocation	1	1
Deep infection (suspected)	1	1
Haematoma	1	0
Infarct	(1) fatal	1
Thrombosis	1	7
Pulmonary embolism	0	4
Slight trochanter problem	0	2

The operative technique caused no problems in either group. In one case in the Brunswik material, however, the shaft of the prosthesis perforated the femur; re-operation gave a satisfactory result.

The position of the cup in the frontal plane resulted in an average angle of 43° for patients in the Brunswik group and 44° for those with the lateral approach. As shown in Figure 1, however, the posterior approach gave a wider dispersion around the mean.

DISCUSSION

The transtrochanteric approach used to be and in many places still is the conventional route for total hip arthroplasty. However, as this operation takes rather a long time and problems are encountered with the trochanter (Lubinus & Jacobsen 1973, Buchholz & Noach 1973, Thompson & Culver 1975), many authors

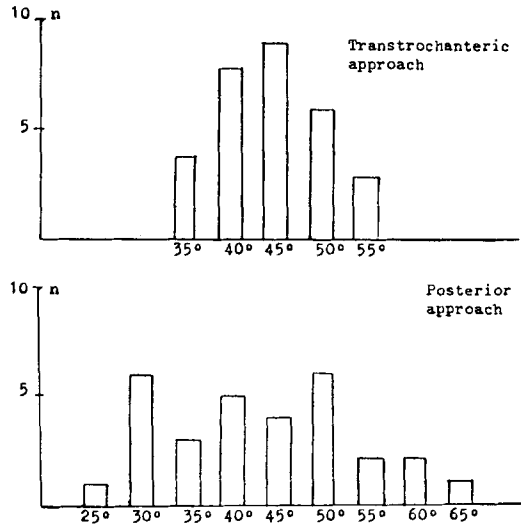


Figure 1. Distribution of the cup position in the frontal plane determined radiographically.

prefer other surgical incisions, such as those described earlier by Kocher (1911) and Osborne (1930). With the posterior approach, an operation with the Brunswik prosthesis is reported by Lubinus & Jacobsen (1973) to take an average of 50 minutes, whereas with the transtrochanteric route it takes more than 2 hours (Thompson & Culver 1975, Sculco & Ranawat 1975, Koide et al. 1974).

The two groups which are compared in the present study have practically identical distributions as far as sex, age and indications for the operation are concerned. The clear, statistically significant differences which have been found between them in the duration of the operation and the blood loss must be regarded as of major importance, considering that this type of operation is performed as a rule in old patients with a high operative risk. Apart from the approach and the surgeons involved, the two groups differ in principle only in the type of anaesthesia. Total arthroplasty with epidural anaesthesia gives a lower blood pressure during the operation and a smaller loss of blood (Jacobson & Wigren 1972, Sculco & Ranawat 1975), in addition to

the shorter duration (Sculco & Ranawat 1975). With the same type of anaesthesia, the difference between the groups would therefore presumably be still more marked. Whether Macrodex given prophylactically for thrombosis should cause more bleeding in the Charnley group is difficult to say.

In the present group with the lateral approach, the trochanter posed no problems, in contrast to other studies (Weaver 1975, Thompson & Culver 1975). Neither was postoperative dislocation any problem in either of the groups studied. The single instance in the transtrochanteric group occurred 40 days after the operation; the joint was reduced and the patient has been free from symptoms ever since. The only dislocation with a Brunswik prosthesis occurred in the second postoperative month; traction therapy was given for 4 weeks and the patient was free from symptoms at follow-up one and a half years after the operation. In this case the position of the cup in the frontal plane was acceptable but a lateral projection showed 5–10° retroversion, which may have contributed to the dislocation.

It is commonly considered that dislocation after hip arthroplasty occurs more frequently with the posterior approach. However, in a survey of late results of 1350 Brunswik prostheses with this approach, Lubinus (1973) found only five dislocations, which is one of the lowest figures for a large material of total hip replacements. This may be due to the greater depth of the Brunswik cup compared with Charnley's, as well as to its larger head on the shaft and its position with about 20° anteroversion. With the transtrochanteric approach and Charnley's instruments, the frequency of dislocation in several other reports is relatively high: three dislocations after 100 operations (Dall 1975), six after 126 (Thompson & Culver 1975) and, from Sweden, 13 after 283 (Bergström et al.

1973); Charnley (1973) himself had six dislocations among 185 patients followed for 9–10 years.

Many factors would seem to contribute to a dislocation. Lubinus (1973) mentions the position of the cup, retro- or anteroversion of the prosthetic shaft and the length of its neck. In the present group with the posterior approach, the position of the cup in the frontal projection showed a definitely wider variation radiographically. It is possibly somewhat more difficult to site the cup correctly when the patient is in a lateral rather than a supine position. In the same way as Lubinus (1973), we have found that with experience it is not difficult to ensure the correct position of the cup with the posterior approach.

The death in the group with the posterior approach concerned a man of 73 with heart disease. The operation took 45 minutes and the patient lost 300 ml of blood. He died on the 4th postoperative day and autopsy revealed old as well as fresh cardiac infarcts but no sign of pulmonary embolism.

There were more cases of sciatic paresis after the posterior approach but none of the four patients in the two groups combined required bandaging on this account at the follow-up examination. This paresis disappears as a rule within 1–4 months (Lubinus & Jacobsen 1973) and its frequency with the posterior approach is reported to be about 1 per cent.

One case of suspected deep infection has been noted in each group. Both patients had a persistently high ESR 1 year after the operation but no radiographic or subjective symptoms of infection. The observation time is too short and the number of cases too small to warrant further discussion of this parameter.

In the case of venous thrombosis and pulmonary embolism, the diagnostic criterion is of major importance and may have differed between the two groups. However, one cannot ignore the possibil-

ity that the higher frequency of pulmonary embolism in the transtrochanteric group and perhaps even the seven cases of calf thrombosis had to do with the longer duration of the anaesthesia and the operation.

The operative technique did not cause any problems in either group. We were unable to confirm the opinion of Thompson & Culver (1975) that the posterior approach is less suitable for patients with malposition of the hip in lateral rotation.

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