Dislocation of hip prostheses

BACKGROUND In the literature, the dislocation rate for hip prostheses is stated to be 2–3 %. Dislocation may have several causes, such as aspects of the patient, the surgeon, the type of prosthesis or the operation. The objective of this study was to identify the frequency, causes and treatment of dislocation in our department.

MATERIAL AND METHODS The material encompasses all patients operated on with a hip prosthesis at the Department of Orthopaedics, Haugesund Hospital, from 1987 through 2011. Information has been collected retrospectively from databases and patient records after an average of 6.1 years.

RESULTS During this period, altogether 2 236 patients underwent total hip arthroplasty. Of these, 548 received an ITH prosthesis with a large caput (32 or 28 mm in diameter), while 1 290 received a 22 mm Charnley prosthesis. Lubinus Spll was used in 299 and Landos Corail in 99 patients, all with a caput diameter of 28 mm. In 75 patients (3.4 %) the prosthesis had become dislocated. There was no significant difference in dislocation frequency among the four types of prosthesis. Prostheses with a caput diameter of 32 mm were dislocated significantly less frequently than the others (2.0 % and 3.6 %, p = 0.03)

INTERPRETATION Overall, our results correspond to findings made by others. In this retrospective material, approximately one-third of the patients with dislocated hip prostheses experienced multiple dislocations.

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MAIN MESSAGE

A little more than 3 % of the hip prostheses became dislocated.

Prostheses with a large caput diameter had a lesser tendency to become dislocated.

Approximately one-third of the patients whose prostheses became dislocated experienced multiple dislocations.

Dislocation tendency or instability is a key quality indicator for hip replacement surgery. After prosthesis failure, dislocation is the most common major complication from such surgery, and is most likely an increasing problem (1). As opposed to failure, dislocation occurs a short time after the operation, most often within a month. In the literature, the dislocation frequency is reported to be 2–3 % (2–13).

The causes stem from several factors (7, 8). These may include aspects of the patient, the surgeon, the type of prosthesis or the operation. The cause may also be of a purely mechanical nature, with incorrect placement of parts of the prosthesis. It may involve retroversion or excessive anteversion, or combinations of incorrect placement of both the femoral and the acetabular component. An insufficiently tight capsule or limp muscles may contribute to instability. The abductor musculature may fail because of nerve or arterial injuries, especially after revision surgery. Trauma, such as a fall, may also cause dislocation. Some have found a higher dislocation frequency in cases of sequelae of a fracture of the collum than of arthrose (5), as well as higher frequencies after revision surgery. Recently, attention has been devoted to the correlation between prosthesis diameter and the risk of dislocation (13–16).

As part of the quality control of our hip replacement surgery, the purpose of this review is to determine the dislocation frequency for hip prostheses in our department and the prevalence of various risk factors, including prostheses with a small caput diameter.

Material and methods

The material encompasses all patients who underwent hip prosthesis surgery at the Department of Orthopaedics, Haugesund Hospital, from 1987 through 2011. Information has been collected retrospectively, on average 6.1 years after the primary surgery. We have received data printouts from the Norwegian Arthroplasty Register, have reviewed our local database with demographic data and supplemented this with information from patient records as needed. Parts of the data set have previously been published in the Journal of the Norwegian Medical Association (17).

At our department, hip replacement surgery is under taken by or under the supervision of a specialist in orthopaedic surgery. As a routine, the femoral part is placed in a neutral position or with a slight anteversion. We seek to place the acetabular component at an approximately 45° angle to the frontal plane and with no or only a slight anteversion.

For the analyses, we used the software package Statistica for Windows, Release 10, 2010 (Stat Soft Inc, Tulsa, OK). P-values < 0.05 were considered as statistically significant, irrespective of method. The project has been assessed and approved by the Data Protection Officer.

Results

During the period, a total of 2 236 patients underwent hip replacement surgery. Of these, 28 % were men. Average age at the time of operation was 69.9 years, with 68.0 years for men and 70.6 years for women. Lateral access was used for 2 158 (96.5 %) of the operations. For the remaining, frontal access with mini-invasive technique was used. Altogether 271 patients (12 %) were operated on with the aid of trochanteric osteotomy.

1 290 patients were operated on with a Charnley prosthesis with a caput diameter of 22 mm, and 548 with an ITH prosthesis with a caput diameter of 32 mm (350 patients) or 28 mm (198 patients). Of those who received an ITH prosthesis, 41 had a cementless acetabular cup. Lubinus SP2 was used in 299 patients and Landos Corail in 99, both types with a caput diameter of 28 mm.

Our review, undertaken on average 6.1 years after the primary operation (variance: 0.2–23 years), revealed that the prosthesis had become dislocated in 75 patients (3.4 %). Their average age at the time of surgery was only insignificantly higher than for the others, and there was no significant gender difference. The first dislocation occurred on average 3.4 years post-operatively (spread: 1 day – 22 years). The median time until the first dislocation amounted to 55 days.

The review of patient records provided information on the mechanism of injury in 68 of these 75 patients. In 59 patients (87 %) the first dislocation occurred during daily activities, such as rising from a chair, and in nine it occurred after a fall (13 %). In total, these 75 patients accounted for 177 recorded dislocations. All the 177 repositionings with the exception of one were made closed. We have total figures for dislocations in 72 patients – of these, 29 patients had only one case of dislocation, 19 had two cases and 24 patients had 3–28 dislocations (recurring dislocations).

These 24 patients were candidates for more comprehensive interventions, and 20 of them underwent repeat surgery. Of these, 11 underwent repeat surgery with the aid of PLAD technique (PLAD = posterior labrum augmenting device), which inserts an extra mechanical obstacle at the back of the acetabulum. Three of these had experienced a further dislocation incident after the procedure. Nine others underwent revision surgery and achieved stability. In four of these, an extension of the femoral component was undertaken, and in four others an excessively steep acetabulum was replaced. In one patient, ossification along the edge of the acetabulum was removed. In those 350 patients who received a prosthesis with a caput diameter of 32 mm the dislocation frequency was 2.0 %. There was no significant difference between the dislocation frequency of the four types of prosthesis. However, dislocations occurred far less frequently in those 350 patients who received a prosthesis with a caput diameter of 32 mm, when compared to the remaining 1 886 patients (2.0 % and 3.6 %, p = 0.03).

For recurrent dislocations, there was no significant difference in prevalence among the four models of prosthesis, and there was no significant difference in the dislocation frequency between a frontal mini-invasive access and lateral access.

Discussion

Our dislocation frequency of 3.4 % for hip prostheses corresponds broadly with the findings made by others (2–12). The causes of dislocations stem from a variety of factors, and often no explanation can be found. Like others, we found no correlation between dislocation and advanced age (15). Others have come to the opposite conclusion (12). Average age at surgery was nearly 70 years, and the onset of dementia may sometimes be a cause in this age group (4). Other studies, like ours, have not revealed any gender differences (7, 8, 15), although two studies found that women have a higher dislocation frequency (6, 12).

Several studies have found increased dislocation frequency for posterior access and good results for lateral access, which is our standard method (6, 8, 12, 16, 18–20). We found no significant difference between lateral and frontal access.

Like our study, three studies (13, 15, 16) found a lower dislocation frequency for large prosthesis heads – 32 mm in diameter. One study concluded that for this reason, 32 mm heads should be used (15). Previously, there has been some reluctance to propose this alternative because of increased wear to the plastic component, but better-quality plastic materials have provided a solution to this problem (15). Two other studies found no such correlation (2, 6). The prosthesis models have different constructions, with differing length of the neck and varying caput diameter. This may have an effect on their tendency to become dislocated (8, 13, 14, 19).

Technical problems during the operation, such as incorrect placement of prosthesis components, too steep or incorrectly rotated acetabular component, are often quoted as causes of dislocation (3, 21). One study found no correlation between too steep an acetabulum and dislocation (7). On rare occasions, an incorrectly rotated femoral component may also be the cause (3).

Insufficient experience in the surgeon may also be a contributory cause of dislocation (2, 10, 19). All the relevant operations included in our study had been conducted by, or under the supervision of, experienced surgeons.

Several studies distinguish between early and late (after five years) dislocations (19, 22, 23). The higher risk of dislocation immediately after the operation is concurrent with numerous other studies (3, 7, 15, 24). In case of late dislocations, wear of the acetabular component may have an effect (19, 22, 23), and this may be an indication for operative revision (22, 23). The acute problem can nearly always be solved with a closed repositioning (3, 6, 15, 25). Sometimes an open repositioning may be needed because of a pinched capsule or tendon (3). The finding that only one-third experience a single dislocation accords with other reports (24).

For many dislocations a definitive explanation cannot be found (26). A little more than one-third experienced recurring dislocations (3, 4, 9), and these patients were candidates for repeat surgery to achieve stabilisation (3, 6, 18, 27). Another study showed that approximately 50 % would need repeat surgery (28). Prior to repeat surgery and correction, an attempt must be made to reveal the cause of the problem (18, 24, 29). This may be difficult, and regular x-ray examinations often fail to provide a full explanation for the dislocation (7). To detect incorrect placement a CT scan is required, which will show the position of the femoral as well as the acetabular component (26). The most effective procedure consists in reorienting a retroverted acetabular component (18). Extension of the femoral component to give it a longer neck may also be relevant (25).

Like others, we also found satisfactory results from the use of PLAD (30, 31).

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The author has completed the ICMJE form and declares no conflicts of interest.

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