Dislocation following total hip replacement: the Avon Orthopaedic Centre experience

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ABSTRACT

INTRODUCTION The aim of this study was to determine the incidence and outcome of dislocation after total hip arthroplasty at our unit.

PATIENTS AND METHODS In total, 1727 primary total joint arthroplasties and 305 revision total hip arthroplasties were performed between 1993 and 1996 at our unit. We followed up 1567 (91%) of the primary hip arthroplasties and 284 (93%) of the revision hip arthroplasties at 8–11 years after surgery. Patients were traced by postal questionnaire, telephone interview or examination of case notes of the deceased.

RESULTS The dislocation rates by approach were 23 out of 555 (4.1%) for the posterior approach, 0 out of 120 (0%) for the Omega approach and 30 out of 892 (3.4%) for the modified Hardinge approach. Of dislocations after primary total hip arthroplasty, 58.5% were recurrent. The mean number of dislocations per patient was 2.81. Overall, 8.1% of revision total hip arthroplasties dislocated. 70% of these became recurrent. The mean number of dislocations per patient was 2.87. The vast majority of dislocations occurred within 2 months of surgery.

DISCUSSION To our knowledge, this is the largest multisurgeon audit of dislocation after total hip arthroplasty published in the UK. The follow-up of 8–11 years is longer than most comparable studies. The results of this study can be used to inform patients as to the risk and outcome of dislocation, as well as to the risk of further dislocation.

KEYWORDS

Dislocation – Total hip replacement – Audit

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Dislocation is the most common complication of total hip arthroplasty after aseptic loosening with an incidence ranging from 0.5 to nearly 10% (Table 1). This paper describes the Bristol experience of dislocation following primary and revision hip replacement in a 4-year cohort of patients with 8–11 years' follow-up. More than 20 consultant surgeons, their registrars and senior house officers, as well as clinical fellows, research fellows and visiting surgeons performed total hip arthroplasty. This represents a wide variability in experience, ability and seniority. The previous largest study was also multisurgeon.⁷

We undertook an audit of all total hip arthroplasties and revision total hip arthroplasties performed at our unit between 1993 and 1996. Rates of dislocation, risk of recurrent dislocation and the time to dislocation after surgery are described. The outcome of those patients suffering recurrent dislocation is also detailed.

Patients and Methods

A postal questionnaire was sent to all patients who underwent total hip arthroplasty or revision total hip arthroplasty at our unit between January 1993 and December 1996. All non-responders were sent a second questionnaire. Overall, 80% of patients responded. An attempt was made to contact by telephone all those who responded to neither questionnaire. The notes of all deceased patients were traced. Patients were asked whether they had experienced any episodes of dislocation or instability. The notes of all positive responders and all deceased patients were examined.

Patients underwent either a posterior, Hardinge or Omega approach in the majority of cases. In the posterior approach, the short external rotators were divided, but not the insertion of gluteus maximus tendon. When closing the

Table 1 Published incidence of dislocation

Reference	Year	Hips	Dislocations	%
Charnley ¹	1972	582	9	1.5
Eftekhari ²	1976	1400	8	0.5
Ritter ³	1976	502	7	1.4
Robinson <i>et al.</i> ⁴	1980	316	12	4.0
Fackler and Poss ⁵	1980	1443	34	2.4
Ali Khan <i>et al.</i> ⁶	1981	6774	142	2.1
Woo and Morrey ⁷	1982	10500	331	3.2
Ekelund ⁸	1992	162	15	9.2
Turner ⁹	1993	561	25	4.5
Paterno <i>et al.</i> ¹⁰	1997	560	32	6.0
Fender <i>et al.</i> ¹¹	1999	1080	54	5.0

wound, the capsule was not repaired, but the short external rotators were sutured to the edge of gluteus medius. The transgluteal approach was as described by Hardinge, but performed in the lateral and not supine position. The Omega approach was as described by Learmonth and Allen¹² and was performed either by, or under supervision of, the originator.

Results

Dislocation following primary hip replacement

Between 1993 and 1996, 1727 primary total hip arthroplasties were performed at our unit. Of these, 1377 patients

Table 2 Number of dislocations per patient (primary THA)

Dislocations (n)	Patients (n)
1	22
2	8
3	5
4	5
5	3
6	9
7	0
8	1

were contacted either by post or telephone. A total of 190 patients had died by the time of follow-up. The notes of the deceased were examined. There were 160 patients lost to follow-up. Follow-up was thus 1567 out of 1727 (90.7%).

Of the 1567 primary total hip arthroplasties, 555 were performed through a posterior approach, 120 through an Omega approach and 892 through a modified Hardinge approach. The dislocation rates by approach were 23 out of 555 (4.1%) for the posterior approach, 0 out of 120 (0%) for the Omega approach and 30 out of 892 (3.4%) for the modified Hardinge approach. The difference between the Omega and the other two approaches is statistically significant when analysing the data with the chi-squared test. The difference between the posterior and modified Hardinge approach is not statistically significant when analysing the data with the chi-squared test.

Figure 1 Time to first dislocation in those patients who had undergone primary hip replacement.

Figure 2 Time interval between first and second dislocation.

Of the 1567 patients, 53 (3.4%) dislocated their prosthesis following primary hip arthroplasty. Of these, 22 patients (41.5%) had a single episode of dislocation. The mean number of dislocations per patient was 2.81. The number of dislocations per patient is shown in Table 2.

The time to first dislocation following primary hip arthroplasty is shown in Figure 1. Eighteen (34%) dislocations occurred within 1 month of surgery and 34 (64.2%) occurred within the first 3 months of surgery.

The time between first and second episode of dislocation is illustrated in Figure 2. Twenty-four of 31 (77.4%) of second dislocations occurred within 2 months of the first dislocation.

Risk of revision

Ten out of 31 (32.3%) of those patients who suffered more than one dislocation underwent revision surgery for their instability. Two patients underwent revision of the cup, one underwent stem revision, two had the liner of their modular acetabular component exchanged to a long posterior wall, two had a posterior lip augmentation device added and one was revised to a constrained cup.

One patient with cerebral palsy also underwent an adductor tenotomy at the time of re-attachment of their greater trochanter.

Seven of 10 (70%) of these patients suffered no further dislocations after their revision surgery.

The one patient who underwent revision of the femoral prosthesis and one of those patients who had their cup revised have suffered further dislocations but have not undergone further surgery.

The one patient who underwent revision to a posterior lip augmentation device suffered three dislocations in the

following year and underwent re-revision of the entire acetabular component and achieved stability.

Dislocation following revision total hip replacement

Between 1993 and 1996, 305 revision total hip arthroplasties were carried out at our unit. Of these, 228 patients were contacted and 21 were lost to follow-up. The case notes of the 56 patients who had died were examined. Of these 284 patients, 6 revisions were performed for instability.

Twenty-three out of 284 (8.1%) revision hip arthroplasties dislocated. Four out of 6 (66.7%) revisions for instability re-dislocated. Of these, 7 out of 23 (30.4%) suffered a single dislocation. The mean number of dislocations per patient was 2.87. Table 3 illustrates the number of dislocations recorded and the time to first dislocation is shown in Figure 3.

Fifteen (65%) of the 23 dislocations occurred within 2 months and 20 (87%) occurred within 3 months of surgery.

Table 3 Number of dislocations per patient (revision THA)

Dislocations (n)	Patients (n)
1	7
2	8
3	1
4	2
5	1
6	2
7	1
8	1

Figure 3 Time to first dislocation in those patients who underwent revision hip arthroplasty.

The time between first and second dislocation is illustrated in Figure 4. Fourteen of 16 (87.5%) suffered their second dislocation within 3 months of the initial dislocation. One patient suffered a second dislocation at 6 months and another patient at 2 years.

Risk of revision for instability

Eight of 16 (50%) of those patients with recurrent dislocation following revision hip replacement underwent revision for instability. Two patients underwent revision of the cup, one underwent stem revision, two had both components revised, one had the liner of their modular acetabular component exchanged to a long posterior wall,

one had a posterior lip augmentation device added and one was treated in skeletal traction. Four of the 8 (50%) patients achieved stability following these procedures.

Both patients who underwent revision of only their acetabular component suffered further dislocations. One of these has since undergone re-revision to a captive cup to achieve stability. The second has not undergone further surgery.

The one patient undergoing revision of only the femoral component suffered further dislocations. This patient has since had the acetabular component revised but continues to dislocate.

One female patient with an unstable hip died during a period of skeletal traction whilst awaiting definitive treatment.

Figure 4 Interval between first and second dislocation in those patients suffering recurrent dislocation following revision hip replacement.

Discussion

Factors implicated in affecting rates of dislocation include: (i) patient factors, such as gender, weak hip musculature, excessive alcohol intake and age; (ii) surgical factors, such as surgical approach, capsular excision or repair, positioning of implant, and previous hip surgery; and (iii) implant factors, such as femoral neck length, offset and head diameter.

In the Turner series,⁹ of 561 patients, 5.49% of female patients dislocated, whilst only 2.8% of male patients dislocated. Paterno *et al.*¹⁰ showed a marked increase in dislocation amongst patients with a history of heavy alcohol intake (7%) compared with those with lower alcohol consumption (5%). Ekelund *et al.*⁸ had a dislocation rate of 9.2% in a cohort of patients all aged 80 years or older.

Robinson *et al.*⁴ compared the lateral transtrochanteric approach with the posterior approach. There were no dislocations in the group of patients who underwent the lateral approach, compared with a 4% rate of dislocation in the group of patients who underwent the posterior approach. However, the patients undergoing the lateral approach suffered from a significantly higher rate of other complications such as trochanteric bursitis, breakage of cerclage wires and sciatic nerve palsy. They also had longer operative times and more intra-operative bleeding. We have found no difference in dislocation rates between the posterior and modified Hardinge lateral approach, but the Omega lateral approach resulted in no dislocations.

In our series, 3.4% of patients undergoing primary total hip replacement suffered dislocation following primary total hip replacement. This is in line with other published series. The dislocation rate for the Hardinge approach is comparable to the Trent Arthroplasty Survey.¹¹ The dislocation rate for the Omega approach is extremely low and this, in part, may be due to all these operations being performed by the originator of the approach or under his direct supervision. In addition the Omega approach has the advantage of preserving the posterior structures and not endangering the superior gluteal nerve.

Nearly half of patients (41.5%) who dislocated, suffered a single episode of dislocation and subsequently achieved stability.

Dislocation is much more likely in the first 3 months following surgery, thereafter the risk declines. Of these single episodes of dislocation, 77.3% occurred within 3 months of surgery.

If the patient were to suffer from recurrent instability, the second dislocation is likely to occur within 3 months of the initial dislocation (in our series, 87.1% of second dislocations occurred within 3 months of the first).

Dislocation after revision total hip replacement is both more common (8.1%) and more likely to be recurrent (69.6%).

To our knowledge, this is the largest multisurgeon audit of dislocation after total hip arthroplasty published in the UK. The follow-up of 8–11 years is longer than most comparable studies.

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