



Outcomes of 807 Thompson hip hemiarthroplasty procedures and the effect of surgical approach on dislocation rates



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ABSTRACT

The majority of displaced intracapsular fractures in our unit are managed with a Thompson hip hemiarthroplasty. Recent UK guidance from the National Institute for Health and Care Excellence has, however, advised against the continued use of the Thompson implant in patients with hip fracture. The aim of this study was to review the outcomes and complications after Thompson hip hemiarthroplasty, including the impact of modern surgical approaches and cementing, whilst controlling for confounding factors.

We reviewed the outcomes following Thompson hip hemiarthroplasty from a series of 807 cases performed between April 2008 and November 2013. Of these, 721 (89.3%) were cemented and 86 (10.7%) uncemented. A total of 575 (71.3%) procedures were performed in female patients. The anterolateral approach was performed in 753 (93.3%) and the posterior approach with enhanced soft tissue repair in 54 (6.7%).

Overall, there were 23 dislocations (2.9%). Dislocation following the posterior approach occurred in 13.0% (seven of 54) in comparison to 2.1% (16 of 753) with the anterolateral approach (odds ratio (OR) 8.5 (95% confidence interval (CI) 2.8–26.3), $p < 0.001$). Patients were discharged home in 459 cases (56.9%), to a care home or other hospital in 273 cases (33.8%). Of the total number of patients, 75 died during their admission (9.3%), and 51.8% (338 of 653) returned home within 30 days. The 30-day mortality was 7.1% (57 cases) and the 1-year mortality was 16.6% (116 of 699).

We recommend against the continued use of the posterior approach in hip hemiarthroplasty, as enhanced soft tissue repair did not reduce the dislocation rates to an acceptable level in this series utilising the Thompson implant. Our findings, however, demonstrate satisfactory results for patients treated with the Thompson hip hemiarthroplasty performed through an anterolateral approach. We suggest that the continued use of this implant in a carefully selected patient cohort is justifiable.

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Introduction

The majority of displaced intracapsular fractures are managed with either a cemented or uncemented hemiarthroplasty [1]. Dislocation is a serious complication of hip hemiarthroplasty, and it is associated with a significantly increased rate of mortality from the procedure [2]. The reported rates of dislocation after hip hemiarthroplasty vary from 1% to 22% [3]. There is debate over the most appropriate surgical approach for hip hemiarthroplasty. In the UK, the National Institute for Health and Care Excellence (NICE) guidelines paper recommends surgeons “consider an anterolateral approach in favour of a posterior approach for

hemiarthroplasty surgery” in hip fracture [4]. The Scottish Intercollegiate Guidelines Network (SIGN) reports that “while the trend is in favour of anterior approach, the use of an approach with which the surgeon is familiar is most likely to lead to lower complications” [5].

Past evidence suggested a higher dislocation rate for both hip hemiarthroplasty and total hip arthroplasty with a posterior approach [6–10]. However, the posterior approach as it was first described involved wide soft tissue dissection and no attempt to perform capsular repair or reattachment of the short external rotators of the hip [11–13]. Modern modifications to this technique have attempted to reduce the dislocation risk with more minimal dissection, preservation and repair of the capsule and anatomical reattachment of the short external rotators [14,15]. This has led to resurgence in the use of the posterior approach, particularly in elective total hip arthroplasty, and recent data suggest low

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dislocation rates comparable to the anterolateral approach [9,16,17].

One recent study reported a 0% dislocation rate in 77 total hip arthroplasty procedures performed for femoral neck fracture through a modern posterior approach [18]. Another study describing the use of an enhanced soft tissue repair posterior approach reported no dislocations in 205 hemiarthroplasties [14]. By contrast, a 4.5% hemiarthroplasty dislocation rate with a posterior approach has been reported despite soft tissue repair [19]. This study was limited by its reporting on a mix of unipolar and bipolar implant designs in 385 procedures over a 10-year period without multivariate analysis controlling for surgeon grade, implant design or patient cognitive impairment [19].

Surgical experience has been shown to affect the rates of dislocation after both hip hemiarthroplasty and total hip arthroplasty [20,21]. Cognitive impairment is also associated with dislocation [22]. NICE guidance on implant choice is to avoid the Austin Moore or Thompson implants in favour of proven femoral stems with an Orthopaedic Data Evaluation Panel (ODEP) rating of at least 3B [4]. Implant cementing is recommended over uncemented hemiarthroplasty [4].

The aim of this study was to review outcomes and complications after Thompson hip hemiarthroplasty procedures performed for femoral neck fracture at our unit. In particular, we aimed to determine these with the use of modern surgical approaches and cementing whilst controlling for confounding patient and surgical factors.

Patients and methods

In our unit, all patients with displaced intracapsular femoral neck fracture receive a cemented Thompson hip hemiarthroplasty (Stryker, Newbury, UK), an uncemented Thompson hip hemiarthroplasty, or a cemented total hip arthroplasty. Cemented Thompson hemiarthroplasty is performed in the vast majority of cases except in cases of advanced frailty with anaesthetic advice against cementing. Total hip arthroplasty is performed at the surgeon's discretion in medically fit patients with satisfactory mobility outside their homes.

A search of our electronic theatre management system (Sapphire, Newgate Technology, Fife, UK) was performed to identify all hip hemiarthroplasty procedures between 1 April 2008 and 24 November 2013 (final follow-up date 21 February 2014). Hip fractures managed with total hip arthroplasty or internal fixation were excluded from the search. In July 2011, during the study period, the orthopaedic department moved from Stirling Royal Infirmary to the newly opened Forth Valley Royal Hospital.

A total of 823 consecutive Thompson hip hemiarthroplasty procedures were identified. In addition to the theatre management system, the hospital electronic patient records and national SMR-01 data set was interrogated. Following this, 16 cases were excluded, as electronic demographic records were unavailable. Therefore, 807 hemiarthroplasties performed in 786 patients were included in the study. Mortality was calculated from a combination of the hospital records of death during the primary or subsequent admissions, and deaths in the community were identified from the National General Register Office for Scotland.

The theatre record for every case included an electronic operation note that was reviewed to determine operative factors including the operating and assistant surgeon grade, surgical approach used, cementing, side, intraoperative complications and closure techniques. The records were also reviewed to identify any procedures performed after the initial surgery to identify dislocations and revision surgery.

The majority of surgeons used the anterolateral approach when performing hip hemiarthroplasty. Two consultant surgeons with extensive hip arthroplasty experience preferred the posterior approach and used this in all their patients, performing a repair of the capsule and external rotators during closure. Both were also experienced in the use of the Thompson implant. All patients were mobilised the day after surgery and discharged when deemed safe from reviews by medical staff, physiotherapists and occupational therapists.

The primary outcome measures investigated were dislocation, infection, return to own home on discharge and 30-day and 1-year mortality.

Following the guidance of the National Research Ethics Service, this study was considered 'service evaluation' and did not require research and ethics committee approval.

Statistical analysis

Statistical analysis was performed using SPSS version 20 (IBM, Armonk, NY, USA). For each outcome under investigation, a multiple variable linear regression analysis was performed controlling for all potential confounding variables. Statistical significance was ascribed when the p -value was <0.05 .

Results

In our series of 807 Thompson hip hemiarthroplasties (786 patients), 721 (89.3%) were cemented and 86 (10.7%) uncemented. A total of 575 (71.3%) procedures were performed in female patients and 417 (51.7%) were performed in the left hip. The mean age was 83 (56–101). The anterolateral approach was performed in 753 (93.3%) and the posterior approach in 54 (6.7%). A representative post-operative radiograph of a cemented Thompson hip hemiarthroplasty is shown in Fig. 1.

The mean delay to surgery was 2 days (0–47), and the mean length of stay was 26 days (1–649). The full range of implant sizes were available and used in the patient population, and implant size was included in the analysis of the risk factors for dislocation.

Intraoperative fracture occurred in 15 cases (1.9%), of which 14 were cemented. The operating surgeon was a consultant in five cases and a trainee in 10. Ten were managed with intraoperative cabling, whereas the others were minor and not thought to be at a risk of further propagation. No dislocations occurred in this group and no further surgery was required in any case. No cases returned to theatre for missed fractures.

The overall reoperation rate was 4.1% (33 of 807) including dislocations and infections detailed below. There were two cases of periprosthetic fracture, both following falls. One was sustained 10 days post-operatively in a cemented implant and was revised to a cemented bipolar hemiarthroplasty. The second occurred 3 months post-operatively and it was internally fixed.

Dislocation

There were 23 dislocations (2.9%), and all but one dislocation occurred within 72 days of surgery (mean 23.7 days; range 1–150 days). There was no difference in the dislocation rate for cemented implants in comparison to uncemented implants ($p = 0.487$). All cases were taken to theatre and closed reduction attempted in the first instance. Open reduction was necessary in 12 cases (52.2%). In total, seven of the 23 dislocations (30.4%) were revised, of which three revisions were performed at the time of first dislocation. Of the revisions, three were revised to a Girdlestone, two to a bipolar prosthesis, one to total hip arthroplasty and one converted from uncemented to cemented Thompson hemiarthroplasty. No further dislocations occurred in any revised prosthesis. Of the 20 cases that

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