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Complications following hemiarthroplasty for displaced intracapsular femoral neck fractures in the absence of routine follow-up

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ABSTRACT

INTRODUCTION Hemiarthroplasty is the most commonly performed surgery for displaced intracapsular femoral neck fractures. At present, it is not routine practice to follow up these patients despite the risk of all the complications associated with arthroplasty. This study aimed to determine the prevalence and nature of complications occurring following hemiarthroplasty that re-presented to this centre in the absence of routine postoperative follow-up.

METHODS Consecutive patients undergoing uncemented hip hemiarthroplasty for displaced intracapsular femoral neck fractures at a district general hospital between 2004 and 2009 were identified. Data were collected from the hospital database on all complications relating to the index procedure, further surgery performed and mortality.

RESULTS There were 490 hemiarthroplasties performed in 477 patients (mean age: 80 years, 75% female). Of these, 110 (22%) were referred postoperatively for specialist orthopaedic review. The prevalence of any complication following hemiarthroplasty was 12% (*n*=59) and the prevalence of hemiarthroplasty failure was 8% (*n*=40). The most common indications for failure were periprosthetic fracture (28%), aseptic femoral loosening (25%) and unexplained pain (25%). Persistent hip pain and poor mobility accounted for most complications not requiring further surgery (*n*=15). The mortality rate within 30 days and 1 year of hemiarthroplasty was 6% (*n*=31) and 29% (*n*=146) respectively.

CONCLUSIONS In the absence of routine follow-up, complications were encountered frequently in patients undergoing hip hemiarthroplasty, with most requiring further surgery. Appropriate services should be implemented to allow timely referral for orthopaedic assessment, and enable the early identification and treatment of postoperative complications.

KEYWORDS

Complications – Hemiarthroplasty – Failure – Femoral neck fracture – Follow-up – Mortality

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Over 70,000 femoral neck fractures occur in the UK each year.[1] Displaced intracapsular femoral neck fractures interfere with the blood supply to the femoral head. Although total hip replacement has recently been recommended as a treatment option for a subgroup of patients sustaining this injury,[2] hemiarthroplasty remains the treatment of choice for the majority.[3]

In the UK, it is not routine practice currently to review patients following hip hemiarthroplasty in the outpatient clinic.[1] However, these patients are at risk of all the complications associated with arthroplasty such as loosening, dislocation and infection. Studies have reported failure rates following hemiarthroplasty as high as 24% during follow-up.[4–6] In addition, complications not related to prosthesis failure (eg wound infections, poor mobility and persistent pain) may also require input from the orthopaedic team. Without routine follow-up, referral to the outpatient clinic or readmission to hospital is required for patients with complications following hip hemiarthroplasty. The aims of the present study were to determine the prevalence and nature of complications occurring following hip hemiarthroplasty that re-presented to this centre in the absence of routine postoperative follow-up.

Methods

Consecutive patients undergoing hip hemiarthroplasty for displaced intracapsular femoral neck fractures at a single district general hospital (Alexandra Hospital, Redditch) between January 2004 and December 2009 were identified from the institution's prospective electronic database. In all cases, surgery was performed using an uncemented Austin Moore prosthesis.

All data were collected initially from the hospital database. Patient case notes were reviewed if any of the required data were unavailable or if further clarification was needed regarding events. The electronic database included access to all operative records (including operation notes), details

Table 1 Causes of failure following hip hemiarthroplasty (*n*=40)

Indication for failure	Number of patients (% of all failures)	Underwent further surgery	Not fit	Declined surgery
Periprosthetic fracture	11 (28%)	9	1	1
Aseptic loosening	10 (25%)	5	4	1
Unexplained pain	10 (25%)	6	2	2
Deep infection	8 (20%)	8	0	0
Dislocation	1 (3%)	1	0	0
Total	**40**	**29**	**7**	**4**

Table 2 Surgical reinterventions following hip hemiarthroplasty

Indication for failure	Mean time to failure (range)	Surgery performed	Outcome
Periprosthetic fracture (*n*=9)	0.56 yrs (6 days – 3.0 yrs)	ORIF with plates and cables (*n*=9)	No further surgery (*n*=7); re-fracture needing ORIF and long stem THR (*n*=1); removal of metalwork for pain and impingement (*n*=1)
Deep infection (*n*=8)	0.18 yrs (15 days – 0.7 yrs)	Removal of prosthesis, washout and debridement (*n*=8)	Further washout and debridement (*n*=5); no further surgery (*n*=3)
Unexplained pain (*n*=6)	0.75 yrs (6 days – 1.5 yrs)	THR (*n*=6)	No further surgery (*n*=5); dislocation of THR requiring closed reduction (*n*=1)
Aseptic loosening (*n*=5)	1.2 yrs (0.5 – 2.2 yrs)	THR (*n*=5)	No further surgery (*n*=5)
Dislocation (*n*=1)	2 days	Open reduction (*n*=1)	Girdlestone arthroplasty (*n*=1)

ORIF = open reduction and internal fixation; THR = total hip replacement

regarding all hospital admissions, discharge letters and clinic letters. Bereavement records were linked to the database. The database included details of all deaths registered with the appropriate authorities, even if they had occurred outside this hospital, and provided the dates for any patient deaths.

Data were collected on patient demographics, details of the hemiarthroplasty procedure, postoperative complications, the need for surgical reintervention (including the date, indication, nature of procedure) and mortality during follow-up. In line with current practice,[1] patients were not reviewed routinely in clinic following hospital discharge. Patients experiencing postoperative problems were therefore referred back to the orthopaedic clinic by general practitioners, elderly care physicians and physiotherapists or readmitted to hospital. Relevant data from all clinic attendances were extracted from the outpatient letter written by the orthopaedic surgeon.

Outcomes of interest were complications following hemiarthroplasty (prevalence and nature of complication) in the absence of routine follow-up and mortality (at 30 days and 1 year). Complications were divided into major and minor. Major complications were defined as any failure of the prosthesis that would require surgical intervention. For the purposes of this study, any surgical interventions performed after the initial hemiarthroplasty procedure but within the index hospital admission (ie before hospital discharge) were also counted as major complications. Minor complications were any problem relating to the initial hemiarthroplasty surgery that required referral to the outpatient clinic but did not require surgical intervention. This study was approved and registered with the appropriate hospital review board.

Results

During the study period, 490 uncemented Austin Moore hip hemiarthroplasties were performed in 477 patients (13 bilateral). The mean age at time of hip fracture was 80 years (range: 53–100 years) and 366 (75%) of fractures occurred in women.

A total of 110 patients (22%) were referred to and subsequently reviewed in the hospital's orthopaedic outpatient clinic or were admitted to the hospital and had an orthopaedic review. There were 59 patients with complications relating to the initial hemiarthroplasty surgery, giving a prevalence of 12% for all complications. These are considered in further detail below.

The mean follow-up duration for patients with complications related to the initial hemiarthroplasty surgery (*n*=59) was 3.1 years (range: 0.5–7.2 years). The remaining 51 patients reviewed following hemiarthroplasty had no complications related to the surgery that required any treatment. Reasons for referral for orthopaedic review in these cases were either suspected mechanical problems relating to the prosthesis (*n*=34, 67%) with loosening, fracture, dislocation and subluxation used in the documentation of the referring

Table 3 Minor complications following hip hemiarthroplasty

Complication	Number of patients
Persistent hip pain	8
Poor mobility	4
Hip pain and poor mobility	3
Superficial infection	3
Significant lower limb muscle wasting	1
Total	**19**

medical practitioner or suspected wound problems such as infection or haematoma (*n*=17, 33%). As there were no indications for further follow-up in these 51 patients after initial orthopaedic review, they were subsequently discharged.

Major complications

There were 40 hemiarthroplasties that failed during the follow-up period, giving a prevalence of failure of 8%. The mean time to failure was 0.64 years (range: 2 days – 3.0 years). The most common indications for failure were periprosthetic hip fracture (28%), aseptic femoral component loosening (25%) and unexplained pain (25%) (Table 1). Of the 40 failures, 11 patients did not undergo further surgery (7 were deemed medically unfit and 4 declined further surgery).

Surgical reintervention

There were 29 hips (73% of the failures) requiring a total of 38 further surgical reinterventions (Table 2). Of the failures undergoing surgical reintervention (*n*=29), the most common surgical procedures performed were revision to total hip replacement (*n*=11) or open reduction and internal fixation with plates and cables for periprosthetic hip fractures (*n*=9). Subsequently, 9 (31%) of these patients required additional surgical procedures, with 5 of these being for additional washout and debridements for deep infection. Of all 29 patients undergoing further surgery, 4 procedures were performed during the index hospital admission (range: 2–15 days following hemiarthroplasty). These reinterventions were for periprosthetic fracture (*n*=1), deep infection (*n*=1), unexplained pain (*n*=1) and dislocation (*n*=1), with details provided in Table 2.

Minor complications

There were 19 patients who suffered a minor complication seen in clinic (Table 3). Persistent hip pain and poor mobility accounted for 15 of these complications. The three patients with superficial wound infections were treated successfully with oral antibiotics.

Mortality

A total of 236 patients died (243 hips), giving an overall mortality rate of 48%. The mean time to death was 1.2 years (range: 1 day – 6.4 years). The mortality rate within 30 days of hemiarthroplasty surgery was 6% (*n*=31) and at 1 year it was 29% (*n*=146).

Discussion

The present study demonstrated that in the absence of routine follow-up after hip hemiarthroplasty, complications represented frequently to this hospital. The overall complication rate was 12% and there was a failure rate of 8%.

Strengths of this study include a large consecutive cohort of hip fracture patients treated at a single institution with the same prosthesis over a six-year period. The main limitation was the lack of routine follow-up for all patients following hemiarthroplasty. In light of this, the complication rate demonstrated is likely to be an underestimate of the true rate and should therefore be considered as a minimum rather than an absolute rate. However, in the UK it is currently not routine practice to follow this cohort of patients up in clinic.[1]

In addition, the aim of this study was to determine the prevalence and nature of complications that occur in the absence of routine follow-up with a view to considering whether changes are needed to provide improved clinical care to this large elderly patient population following surgery. A further limitation is that guidelines published in 2011 recommend the use of femoral stems other than the Austin Moore and Thompson prosthesis, and cemented stems are preferred to uncemented in routine hemiarthroplasties.[2] These guidelines were published after the present study (2004–2009) had concluded, and during the study period the uncemented Austin Moore prosthesis was the standard used for displaced intracapsular neck of femur fractures at this hospital.

The most common modes of hemiarthroplasty failure in this study were periprosthetic fracture, aseptic loosening, unexplained pain and deep infection. These modes of failure are well recognised in the literature, especially when using uncemented prostheses.[4,5,7] Similarly, the mortality following femoral neck fracture in this study was comparable to published figures at 30 days and 1 year.[8,9] A number of factors have been demonstrated to contribute to these significant mortality rates such as delay to theatre and medical co-morbidities.[9,10]

In addition to the major hemiarthroplasty failures, a number of patients were reviewed in clinic with minor complications from their index hip surgery. Most of these minor complications were related to persistent hip pain and poor mobility, both of which can be problematic following uncemented hemiarthroplasty.[4,5] In contrast to patients with major hemiarthroplasty complications or failures, it is likely that a proportion of patients with minor complications were not referred back for orthopaedic review. This may be because issues such as hip pain, poor mobility and superficial wound infections can often be managed in the community by the general practitioner and physiotherapists. These minor complications further highlight the potential problems patients can experience following hemiarthroplasty surgery, which may not become apparent to the orthopaedic team.

Although routine follow-up for all patients following hip fracture surgery is not recommended currently, it is recognised that adopting such practice would pose significant problems. Hip fracture patients comprise a large group of elderly patients, with a mean age of 80 years in this study. By definition, patients undergoing uncemented hemiarthroplasty are frail individuals who often have multiple co-morbidities.[4] It would therefore be challenging and logistically difficult to review this patient population routinely in orthopaedic clinics. Indeed, outcome studies have encountered such difficulties in following up this group of patients.[11]

A further consideration is that it is unlikely that all patients require orthopaedic review following hip fracture surgery. This is highlighted in the present study with almost half of patients (51/110, 46%) referred back to clinic following hemiarthroplasty not having any major or minor complications related to their surgery. However, the case for following up patients after arthroplasty for intracapsular fractures should be given fair consideration as the latest hip fracture guidelines recommend that fitter and more mobile patients should be offered a total hip replacement.[2] These patients are likely to demand more from their prosthesis and would have been followed up if they had received the operation on an elective basis.

In light of the present study findings that complications are not infrequent following hemiarthroplasty performed for hip fractures, it is recommended that patients should have access to timely orthopaedic assessment and review when required. One potential solution is a fast track service by which general practitioners, elderly care physicians, physiotherapists and other healthcare professionals can refer patients back to the local hospital's orthopaedic team. This could take the form of a dedicated orthopaedic hip fracture clinic held one day or session per week. Specialist trauma nurse practitioners could assist in the triaging of these referrals for clinic review and filter out any non-urgent or inappropriate referrals.

Published recommendations from the British Orthopaedic Association have suggested that orthopaedic units in a position to offer longer term follow-up in hip fracture patients could assess outcomes at 120 days and 1 year.[1] Although the publication suggests this information would allow questions on functional outcome and implant survival to be better addressed in this patient population, such a strategy would also allow the early identification of any complications. A further suggestion is telephone follow-up at 30 days, which has already been shown to be achievable and affordable in the Scottish hip fracture audit.[1,12] In addition to reporting on outcome following hip fracture surgery, this telephone interview would act as a triaging service so that patients with significant complications can be identified and reviewed subsequently in an appropriate orthopaedic clinic.

Conclusions

The present study has demonstrated that in the absence of routine follow-up, complications frequently re-presented to this hospital following hip hemiarthroplasty with the majority requiring surgical reintervention. Knowledge of the common modes of hemiarthroplasty failure (periprosthetic fracture, aseptic loosening, unexplained pain, deep infection) and the relative frequency of each of these is important for the surgeon when obtaining informed patient consent. If patients are not to be followed up routinely after hip hemiarthroplasty, appropriate services should be in place to allow timely referral for orthopaedic assessment. This will allow complications to be identified and treated early, thereby providing a better quality of clinical care for hip fracture patients.

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