Audit

Early failure of total hip replacements implanted at distant hospitals to reduce waiting lists

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Aim: In the years 1990–1993, in an effort to reduce waiting-list time, a small number of patients were sent from Exeter to hospitals in London to undergo elective total hip replacement. No medium- or long-term follow-up was arranged. Our aim was to audit the outcome of these hip replacements.

Patients and Methods: Review of the records of the referring medical practices, Regional Health Authority, local orthopaedic hospital and the distant centres at which the surgery was performed identified 31 cases. A total of 27 hip replacements in 24 patients were available for clinical and radiological review.

Results: 12 (44%) hips have so far required revision surgery, at a mean of 6.5 years. Of these, three (11%) have been for deep infection. A further three hips (11%) are radiologically loose and are being closely monitored. Two patients (7%) suffered permanent sciatic nerve palsy.

Conclusions: Patients whose surgery was performed locally over a similar time period have a published failure rate of only 4.9%. This difference is highly statistically significant ($P < 0.001$). The causes for such a difference in outcome were analysed and include surgical technique, implant selection and absence of follow-up. In the light of this evidence, we would like to urge the government to address waiting list problems by investing in the local infrastructure. Expanding those facilities where properly audited and fully accountable surgeons operate must be the way forward.

Key words: Total hip replacement – Early failure – Audit

At the end of the first quarter of 2002, 259,416 patients were waiting for elective orthopaedic surgery.¹ Successive UK governments have focused on this issue and devised various strategies to try to reduce waiting-list times. One of these initiatives has been to contract distant hospitals to perform the surgery for an agreed fee. In the years 1990–1993, a small number of patients were, therefore, sent from Exeter to hospitals in London to undergo elective total hip replacement. No medium- or long-term follow-up was arranged by either the referring

health authority or the distant hospitals at which the surgery was performed. It subsequently became apparent that a number of these hips were failing at an early stage and had to be revised at our institution. Our aim was to audit the outcome of these hip replacements.

Patients and Methods

As the surgery was performed at a distant site, there was no record of the identity of these patients at the local

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orthopaedic centre. Letters requesting details of these patients were, therefore, sent to all the general practice surgeries in the North and East Devon area, to the Director of Public Health, to the local audit office and to the four London hospitals involved. Review of all the available records of the general practice surgeries and of the Hip Research Unit database in Exeter identified 31 cases in 28 patients. No patient details could be obtained from the distant centres at which the surgery was performed. One of the patients had died of causes unrelated to surgery, one was a revision procedure and two more were too frail to be examined and unable to communicate. Therefore, a total of 27 primary hip replacements in 24 patients were available for clinical and radiological review. All of these patients have been seen and are now under regular follow-up at the Princess Elizabeth Orthopaedic Centre.

Assessment included obtaining all available history relating to the surgery in London, progress since that time, clinical and radiological examination and determination of the Charnley modification of the D'Aubigne-Postel,² Harris,³ and Oxford⁴ hip scores.

Clinical data relating to the revision surgery at our unit were collected prospectively and entered in the OrthoChart (Ortho-Graphics Inc., Salt Lake City, UT, USA) database.

Earliest available and most recent radiographs were examined jointly by the two authors. Assessment included evidence of failure of the socket or stem, the presence and extent of lucent lines around the socket,⁵ and stem^{6,7} and focal osteolysis at the cement-bone interface of the stem as defined by Sporer *et al.*⁸ Heterotopic ossification was classified according to Brooker *et al.*⁹ All X-rays were digitised and wear measured using the OrthoChart software.

Statistical analysis was carried out using two-sided Fisher's exact test. Results were deemed significant for *P* values smaller than 0.05.

Results

Patients' demographics

There were 17 arthroplasties in women and 10 in men. The mean age at the time of surgery was 68.4 years (range, 54–81 years). The diagnosis was primary osteoarthritis in 25 cases with rheumatoid arthritis and osteoarthritis secondary to congenital hip dislocation in 1 case each. They all underwent primary total hip arthroplasty with 20 Ultima

Table 1 Complications

	London (<i>n</i> = 27)	Exeter (<i>n</i> = 325)	<i>P</i> -value
Deep infection	3 (11%)	4 (1%)	0.01
Permanent foot drop	2 (7%)	0	0.006
Dislocation	2 (7%)	16 (4.9%)	> 0.5
Failures for all reasons requiring revision	12 (44%)	16 (4.9%)	< 0.001

Figure 1 Clinical scores (Harris score for function out of 47, Harris score for pain out of 44).

(Johnson and Johnson), 4 AML (De Puy) and 3 Muller-type stems. There were 23 cemented all-polyethylene and 4 uncemented acetabular components.

Clinical results

Mean follow-up was 10.2 years (range, 9–12 years). Of the 27 hips involved, 12 (44%) have so far failed and required revision surgery. The mean time to failure was 6.5 years (range, 3 months to 10 years). Of these, 3 (11%) were for deep infection and required two-stage revision; the infection recurred in one case and a Girdlestone excision arthroplasty was performed. Of the 9 aseptic failures, 3 were revised for loosening of the acetabular component alone and 6 for both femoral and acetabular loosening.

Figure 2 78-year-old man, osteoarthritis secondary to congenital dislocation of the hip. Left side operated in Exeter in 1989, right side in London 1990. Highly positioned socket, with failure to restore the physiological centre of rotation; no bone graft used. 3.3 cm shortening, permanent sciatic nerve palsy.

Figure 3 79-year-old woman, protrusio acetabuli. Hip replaced in 1992 with direct cementation of a polyethylene cup in the depth of the socket. Revised for aseptic loosening at 4 years.

Figure 4 66-year-old man. Malpositioning of the cup with lateralisation. Excentric cement mantle, excessive in zone 3, deficient in zone 1.

The clinical scores are shown in Figure 1. The complications that could be identified from the patient assessment or retrospective case notes analysis are shown in Table 1.

Radiological results

Three (11.5%) cups that have not yet been revised have radiolucent lines in all three acetabular zones;⁵ one of these hips also shows osteolytic areas in zones 2 and 3 of the femur (5% of the interface).⁷ One more hip shows osteolysis in zone 3 of the femur and a further one has lucent lines in zones 1, 2, 6 and 7 of the femur.

Eight patients showed evidence of heterotopic ossification, of which one was grade 2 and one grade 3.

The mean annual linear wear rate was 0.2 mm/year (range, 0–0.45 mm/year), with all the implant heads being 30 or 32 mm.

A number of technical errors were identified which may have contributed to the high failure rate (Figs 2–4).

Revision surgery

The revision surgery at our institution to date has taken approximately 45 h of surgical time, excluding patient transfers and anaesthetic time. The mean in-patient stay was 22 days (263 days in total).

Discussion

Primary total hip replacement surgery carried out at the local orthopaedic centre during the same time period has a published revision rate for septic and aseptic loosening of 4.9% with no sciatic nerve palsies in 325 cases (Table 1).¹⁰ We found a significantly higher ($P < 0.001$) long-term failure rate following total hip replacement in patients sent for surgery to distant hospitals as part of a waiting list initiative, compared to those patients who had the same procedure performed locally. The reasons for this difference in results include prosthesis selection, with large-headed components and correspondingly thin polyethylene, now known to be associated with increased particulate debris production and osteolysis,¹¹ surgical technique (Figs 2–4), lack of accountability and absence of long-term follow-up.

We have made extensive efforts to locate these patients so that they can be assessed and placed under appropriate long-term local follow-up. The lack of record keeping highlights one of the many areas of concern raised by our review. Unlike those patients operated upon at the local orthopaedic centre, no medium- or long-term follow-up was arranged. As a result, those patients whose hips have failed often presented at a late stage, with extensive bone

Figure 5 79-year-old woman. Superior migration of the cup with extensive acetabular bone loss. Deep infection.

loss around the failed arthroplasty, requiring much more prolonged and complex reconstructive surgery than might have been the case had the problem been detected earlier (Fig. 5). Indeed, the need to avoid further late presentations prompted our decision to locate these patients. It is also well recognised that acute deep infection following total hip replacement can be resolved in the majority of cases if joint debridement and washout is performed promptly, but if presentation and diagnosis are delayed, major two stage revision surgery is required.¹² This further highlights the imperative of having a local, nominated accountable surgeon by whom the patient can be reviewed urgently in the event of such complications, and by whom regular follow-up needs to be arranged.

The issue of delegating complex surgery to practitioners who are not accountable for their results or complications is currently a subject of intense discussion. The debate has, however, been stifled by the lack of evidence for or against this practice, and joint replacement overseas on British patients is currently being encouraged.¹³ We believe that our paper is the first evidence that major surgery carried out at a distant site may have an inferior outcome, and possibly be of disastrous human and financial cost to the community. In the light of this evidence we would like to urge the UK Government to address waiting list problems by investing in the local infrastructure. Expanding those facilities where properly audited and fully accountable surgeons operate must be the way forward.

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