



Medical audit

Revision hip arthroplasty activity in a single UK health region: an audit of 1265 cases

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Revision hip arthroplasty is an operation which is steadily increasing in number and can often be technically challenging. We have utilised a regional hip register (the Trent Regional Arthroplasty Study) to analyse the epidemiology of revision hip arthroplasties in a single UK health region.

The study shows that of the large number (1265) of procedures performed over a 7-year period (1991–1997), the majority were performed by general orthopaedic surgeons, with 91 different surgeons performing the operation and only two surgeons performing more than 20 procedures per year.

Of more than 100 prosthetic combinations used for the procedure, the Charnley prosthesis was the most common (38.3% of acetabular revisions and 37.5% of femoral revisions). The same component was also the most commonly explanted (43%).

There was an even geographical spread across the region with revision hip arthroplasty being performed in all hospitals with an orthopaedic in-patient facility.

Prospective audit of this large and varied cohort is necessary to determine differences in outcome (if any) between 'specialist' hip surgeons and general orthopaedic surgeons.

Key words: Audit – Arthroplasty – Hip – Orthopaedics – Replacement – Revision

National hip registers, such as those of Sweden and Norway, have demonstrated the usefulness of arthroplasty registers to describe the epidemiology of joint replacement surgery and can also be used as a tool in descriptive studies assessing patient risk factors, implant safety and the efficacy of improving surgical and cementing techniques.¹ Results can also be compared to other institutions with similar registers.

The Trent Regional Arthroplasty Study (TRAS) was set up in 1990 to prospectively register all primary total hip and knee arthroplasties (THA & TKA) in the Trent region which has a population of 4.7 million. In 1991, it was extended to include revision hip arthroplasties (RHA) and revision knee arthroplasties (RKA). It is the only register of its kind in the UK. Moreover, it has been utilised to provide outcome measures with

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Table 1 Cumulative number of THAs per hospital and per consultant, January 1991 to June 1998 (10 teaching hospitals)

Hospital	No. of consultants	Total no. of RHAs performed	Range of total no. of RHAs/consultants
A	7	59	1-45
B	6	83	1-23
C	10	193	1-110
D	16	96	1-19
E	6	51	1-26
F	10	131	1-44
G	6	53	1-30
H	14	250	1-197
I	10	148	1-86
J	10	59	1-20
Total	10	1123	

Table 2 Cumulative number of RHAs per hospital and consultant, January 1991 to June 1998 (10 district general hospitals)

Hospital	No. of consultants	Total no. of RHAs performed	Range of total no. of THAs/consultants
K	3	30	3-18
L	2	3	1-2
M	4	13	2-5
N	1	6	6
O	5	43	2-21
P	1	1	1
Q	1	3	3
R	3	13	3-6
S	2	11	1-10
T	4	6	1-2
Total	10	129	

regard to primary THAs.² One hundred surgeons working in 25 different hospitals participate in TRAS and, to June 1998, the register contained data on 20,500 THAs, 16,452 TKAs, and 1265 RHAs. In this paper, we report on the epidemiology of RHA in the Trent region.

Patients and Methods

Index data were captured via a standard form completed by the operating surgeon at the time of revision surgery and included the patient's demographic, as well as operative and technical details. Completed forms were returned to the TRAS office at the University Department of Orthopaedic Surgery, based at the Glenfield Hospital, Leicester. The TRAS employs a full-time peripatetic clerk who manually checks hospital and theatre records to ensure that all primary and revision THAs and TKAs are included on the register. The data forms relating to RHAs were checked and verified by the authors and the information extracted was then entered on to a computerised database by a dedicated arthroplasty clerk. The computerised database was then manually checked by the authors for inaccurate, duplicate and incomplete entries and any such records were then verified against the original entry form.

Results

Ninety-one surgeons performed 1265 RHAs on 1198 patients. The procedures were performed in 20 National Health Service (NHS) and 5 private hospitals. For descriptive purposes, the NHS hospitals were divided into: (i) teaching; and (ii) district general hospitals. Tables

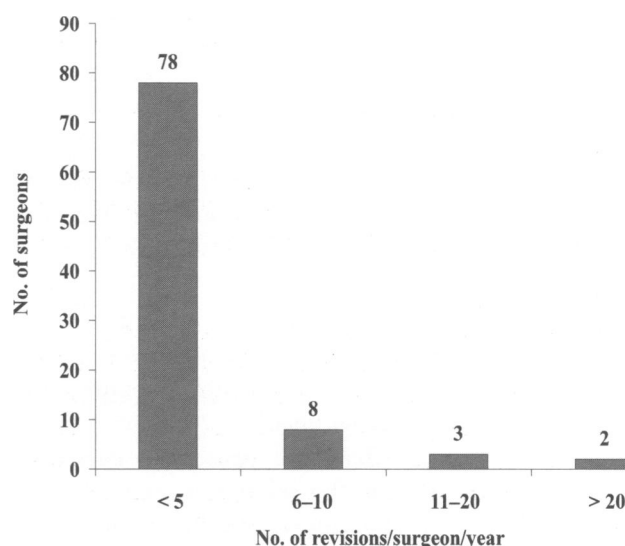


Figure 1 Number of revisions performed/surgeon/year

1 and 2 show a summary of the number of procedures per hospital and consultant. Even though there was an even geographic spread of activity across the region, 1123 procedures (88.7%) were performed in only 10 of the 20 NHS hospitals. The average patient age was 68.47 years (range 14-93 years), with 60% of procedures being performed on patients aged 70-90 years. In 1997, RHA procedures accounted for 9.3% of the overall THA activity in the Trent region.

Only 2 of the 91 surgeons performed more than 20 revision procedures on average per year (Figure 1). Five surgeons performed 492 procedures (39%), whereas the remaining 773 procedures (61%) were performed by 86 surgeons. Figure 2 shows the total number of RHAs

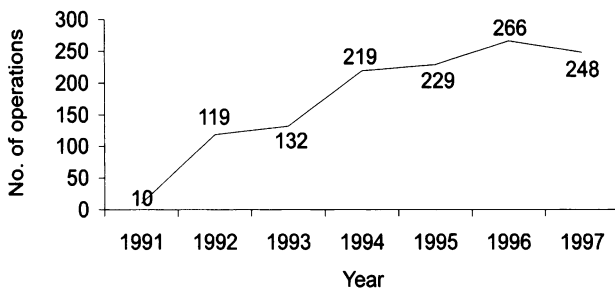


Figure 2 Trend of activity in region/year

being performed in the region per year, illustrating that there has been a gradual increase in the number of these procedures performed.

Consultant surgeons performed 88% of the procedures while 8.4% were performed by higher surgical trainees. Only 2.8% of the revisions were performed by non-career-grade surgeons. However, comparing the surgeon grade with the grade of assistant, there was only a 53% consultant supervision rate of trainees with 36% of trainees being assisted by staff-grade surgeons, associate specialists or senior house officers, and 11% by other trainees.

Aseptic loosening was the major indication for revision in 877 cases (69.5%), while infection and dislocation were the reasons for revision in 120 (9.5%) and 116 (9.1%) cases, respectively. A total of 1124 (88.9%) cases had single stage revisions while 75 (6%) had 2-stage revisions and 49 (3.9%) underwent definitive excision arthroplasty. The Charnley (Depuy Int., Leeds, UK) was the most common implant being revised (43% of cases) probably due to the large usage of this implant for primary THAs within the region (Table 3). It was also the most commonly used implant in revision surgery accounting for 38.3% of cases of acetabular revisions and 37.5% of femoral revisions (Tables 4 and 5). The majority of both femoral and acetabular implants were cemented (Table 6). Over 100 different femoral and/or acetabular implant types were used as the revision implants, 30% of which were used less than 10 times.

It was noted that, in over half the procedures, both femoral and acetabular components were revised, whereas acetabular-only revisions accounted for slightly more than femoral-only revisions (Table 7). There were 74 hybrid procedures (5.8%) of which the majority (54 cases, i.e. 73%) had an Elite stem (Depuy Int., Leeds, UK) and a Trilogy cup (uncemented) (Zimmer, Wiltshire, UK) implanted by a single surgeon. Bone grafting using various techniques was carried out in 564 cases (45%) and not used in 467 cases (37%), while in 234 cases (18%) it was not recorded whether bone grafts were used or not.

Table 3 Types of implants removed at revision

Type of implant	Number of revisions	%
Charnley (Depuy Int. Ltd, Leeds, UK)	547	43.2
Howse (J&J, Berkshire, UK)	128	10.1
Muller (Stratec Medical, UK)	47	3.7
Lord (Bacneux, France)	47	3.7
Furlong (JRI Ltd, London, UK)	32	2.5
Exeter (Howmedica Int. Ltd, UK)	30	2.4
Unrecorded	99	7.9
Others	335	26.5

Table 4 Types of new acetabular prostheses implanted (921 acetabulae revised)

Prosthesis type	Number of times used	%
Charnley (Depuy Int. Leeds, UK)	353	38.3
Elite (Depuy Int. Leeds, UK)	166	18
Trilogy (Zimmer, Wiltshire, UK)	79	8.6
Furlong (JRI Ltd, London, UK)	69	7.5
Muller (Stratec Medical, UK)	68	7.4
Others	186	20.2%

Table 5 Types of new femoral implants (877 femoral revisions)

Type of prosthesis	Number of times used	%
Charnley (Depuy Int., Leeds, UK)	329	37.5
Exeter (Howmedica Int., London, UK)	139	16
Elite (Depuy Int., Leeds, UK)	104	11.8
Furlong (JRI, London, UK)	59	6.7
Muller (Stratec Medical, UK)	56	6.4
Others	190	21.6

Table 6 Cemented versus uncemented prostheses inserted

	Femoral prosthesis (877)	Acetabular prosthesis (921)
Cemented	729	734
Cementless	148	187

Table 7 Type of component revised (total 1265)

	Number
Femoral component only	222 (17.6%)
Acetabular component only	266 (21%)
Femoral and acetabular components	655 (51.8%)
Excision arthroplasty	49 (3.9%)
Unrecorded	73 (5.7%)

Discussion

The need for a national arthroplasty register has been called for on numerous occasions and is currently being actively discussed among orthopaedic surgeons,^{3,4} the Scandinavian experience having proved the usefulness of such registers. Indeed, the TRAS is comparable to the

Swedish and Norwegian national hip registers in terms of staffing, administration and the day-to-day running.⁵

This review highlights that RHA procedures are performed mainly by consultant grades (88%), reflecting that this type of surgery is considered technically demanding and requiring a certain level of expertise. However, there are very few high volume surgeons in the region, with 2 surgeons (2.2%) performing a large number of procedures, whereas 78 surgeons (85.7%) perform less than 5 procedures per annum (Figure 1). This indicates that the majority of general orthopaedic surgeons are performing revision surgery on a very infrequent basis, and may not have the opportunity to build up the level of expertise required. It is also worrying that, even though higher surgical trainees performed only 8.4% of the procedures, there was a consultant supervising them in only half the number of operations.

A total of 1123 procedures (88.7%) were performed in 10 NHS hospitals (averaging at 14.97 procedures/hospital/year; Table 1) and 129 procedures (10.2%) in 10 different NHS hospitals (amounting to 1.72 revisions/hospital/year; Table 2). This also illustrates that RHA is being performed in some hospitals, primarily district general hospitals, much less frequently than in other larger or more specialised units. It would be interesting to see what the complication rates of various units are if outcome studies were performed.

The increase in number of recorded revision procedures being performed over the years is probably due to an improving rate of data collection, awareness of the study and thus more forms being completed since the early stages of the TRAS, as well as coinciding with the appointment of consultants with specialist interest in RHA.

The overall revision rate of 9.3% is comparable to those of 9–10% from other international centres,¹ and certainly the rates of revision for aseptic loosening – with or without osteolysis (69.5%) and infection (9.5%) – are acceptable.⁶ However, the revision rate for dislocation (9.1%) than is generally higher than expected.⁶

Cemented implants were the most commonly used, with the Charnley implant accounting for the majority.⁷ This study demonstrates the fact that there are a large variety of different types and combinations of implant

designs in current use, highlighting that there continues to be a diverse approach to RHA. Indeed, the pattern is similar with regard to primary THA and this has been well documented previously.^{7–9}

Previous evidence suggests that primary THAs performed by low volume providers resulted in more adverse outcome, i.e. higher mortality rates, more infections and higher revision rates.¹⁰ It is clear from our study that RHA, which is a technically demanding operation associated with higher complication rates, continues to be largely in the domain of the non-specialist surgeons. Further research is now necessary to examine the results of RHA within this large cohort to clarify whether those of patients undergoing surgery within a specialist environment are superior to those within a non-specialist environment.

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