Are national guidelines for total hip replacement in the UK reflected in practice?

A ABRAHAM¹, L HAJIPOUR¹, AR INNES², H PHILLIPS³, AW McCASKIE¹

¹Department of Orthopaedics, Freeman Hospital, Newcastle upon Tyne, UK

²Department of Orthopaedics, Wansbeck General Hospital, Ashington, Northumberland, UK

³Department of Orthopaedics, Norfolk and Norwich University Hospital NHS Trust, Norwich, UK

ABSTRACT

INTRODUCTION A cross-sectional study was performed to compare the practice of total hip replacement (THR) in the UK against national guidelines.

MATERIALS AND METHODS A postal questionnaire was sent to all fellows of the British Orthopaedic Association.

RESULTS Of the 1587 questionnaires sent out, 966 (60.9%) were returned. Of these, 706 (73.1%) were available for data collection and analysis.

CONCLUSIONS Consensus was observed in several areas including the use of pre-admission clinics and modern cementing techniques. Facilities deemed necessary for THR surgery such as HDU/ITU back-up, ultra-clean air and dedicated orthopaedic wards are almost universally available. However, a lack of consensus is evident in many areas including the process of obtaining written consent, thrombo-embolic prophylaxis, duration of antibiotic prophylaxis, supervision of trainee surgeons and follow-up arrangements. The proliferation in the range of implants, particularly aimed at 'younger' patients, available to surgeons has once again been highlighted.

KEYWORDS

Total hip replacement – Hip – Arthroplasty – Audit – Postal questionnaire

CORRESPONDENCE TO

Professor A W McCaskie, Department of Orthopaedics, Freeman Hospital, Freeman Road, Newcastle upon Tyne NE7 7DN, UK

T: 0191 222 5659; E: a.w.mccaskie@ncl.ac.uk

About 60,000 total hip replacements (THRs) are undertaken within the National Health Service in England and Wales annually. This is a commonly performed operation for pain and disability resulting from hip joint disease. The benefit to a patient's quality of life in maintaining a pain-free, independent life-style and its cost effectiveness for private and public healthcare systems is well recognised.

Total hip replacement: guide to best practice was published in October 1999.¹ It was a consensus document from the British Orthopaedic Association (BOA) and the British Hip Society (BHS). It sought to 'inform surgeons, trusts and purchasers and also improve the care of patients with disorders of the hip joint'. It acknowledged the variation amongst surgeons with regard to implants used, surgical techniques and postoperative surveillance. The lack of long-term clinical evidence on various contentious aspects of THR meant that the guide to best practice was offered in general terms, encouraging practitioners to continue taking into account the individual requirements of each patient

and would be updated in 2004–2005 taking into account emerging evidence.

The aim of our study was to compare the recommended practice in *Total hip replacement: guide to best practice* against those currently practised in the UK.

Materials and Methods

A total of 1587 fellows of the British Orthopaedic Association were identified. A questionnaire printed on two sides of A4 was sent out to each fellow for completion. An accompanying covering letter outlined the aims of the study. Fellows whose practice did not include THR were asked to check an appropriate box and return the questionnaire. Those performing THR were requested to complete the questionnaire, which required completion of tick boxes or insertion of free-flow text. A stamped addressed envelope was enclosed to facilitate return of the completed questionnaires.

Questions corresponded to specific guidelines published in the *Total hip replacement: guide to best practice* and this was indicated in the covering letter. A sample questionnaire is illustrated in the Appendix.

Results

Of the 1587 questionnaires sent out, 966 (60.9%) were returned. Of these, 61 were from retired fellows, 192 from surgeons not practising THR and 7 returned due to incorrect addresses. This left 706 responses (73.1%) for analysis (Fig. 1). Of 172 registered members of the British Hip Society, cross checking with membership lists revealed that responses had been received from 88 members.

About 80% of surgeons saw patients for 20 min or more at the first consultation. Just over 16% saw patients for less than the recommended 20 min (Fig. 2). In all, 670 surgeons (94.9%) had access to pre-admission clinics, which have been shown to reduce the number of cancelled operations.

Written consent for THR was obtained by consultants and senior house officers (SHOs) in almost equal measure. Together, they performed almost 80% of such procedures. Specialist registrars obtained written consent in 15% of

cases. A small percentage of this procedure was undertaken by pre-registration house officers and nurse practitioners (Fig. 3). The commonest early complications routinely explained were infection, dislocation and DVT/PE. Each of these were included in the written consent by about 95% of surgeons; 80% included the major long-term complication of aseptic loosening and over half the possibility of leg length discrepancy (Fig. 4).

The range of other medical specialities that were available on site is summarised in Figure 5. Medical, HDU (or ITU) facilities were accessible on site for nearly 95% of surgeons. The range of surgical specialities on site was less accessible.

Implants used routinely and in younger patients are described in Figures 6 and 7. Charnley, Exeter, Stanmore, Muller, or Lubinus designs were the standard acetabular implant of choice for two-thirds of surveyed surgeons and the standard femoral implant for nearly 75%. These designs comply with the National Institute for Clinical Excellence (NICE) current benchmark of a revision rate of less than 10% at 10 years and have been grouped as 'NICE compatible' in Figures 6 and 7. Of the 706 responses, 83 (11.8%) were from surgeons who referred 'younger' patients to

other colleagues. NICE-compatible acetabular and femoral designs were used by about a third of surgeons who operated on 'younger' patients. Other designs accounted for the remainder of the acetabular and femoral prostheses used routinely and in 'younger' patients. The use of canal plugging and retrograde cement pressurisation was used by 674

(95.5%) and 668 (94.6%), respectively. Overall, 149 surgeons (21.1%) were confident in senior trainees operating unsupervised. The rest insisted on supervision regardless of trainee seniority.

Use of mechanical and chemical prophylaxis is summarised in Figure 8. Early mobilisation after surgery (83%), compression stockings (72%) and chemoprophylaxis with low molecular weight heparin (LMWH, 61.1%) were the most commonly used methods. Together, they also comprised the most commonly used regimen being used as a combination by 17.6% of surgeons. Of the 706 surgeons, 523 used Cefuroxime and Cefradine was the next most commonly used (68). Antibiotic cover was usually provided for at least 24 h postoperatively in 74.2% of cases (Fig. 9).

The pattern of follow-up arrangements was variable and no consensus opinion was discernible. The results showed that 410 (58.1%) routinely discharged patients, 204 (28.9%) surgeons provided long-term follow-up, 92 (13.1%) discharged patients from clinical review but performed regular life-time radiographic surveillance. Timing of discharge appeared to be based on the time elapsed since surgery or on the age of the patient. Of the 410 who routinely discharged patients, 70 surgeons made exceptions for younger patients.

Discussion

A total of 1587 fellows of the BOA were sent questionnaires to expand on their practice of THR. A response rate of 60.9% was obtained and, of these, 73.1% were valid responses. This compares favourably to a smaller survey published by Best *et al.*² in 1998 which predated the *Total hip replacement: guide to best practice* published in October 1999. Best *et al.*² obtained a response rate of 70.9% from 402 questionnaires, with 63.5% valid responses from surgeons practising THR in three UK health regions – Trent, East Anglia & Oxford and Northern & Yorkshire. Our study encompassed issues from the pre-operative preparation of the patient right through to follow-up and discharge. It, therefore, highlights important areas for debate within the orthopaedic profession in the quest for standardisation and best practice of THR.

The BOA recommendation for first consultation is that it be a minimum of 15–20 min.¹ Our study shows that just over 80% of surgeons are able to comply with this. The reasons for the sizeable minority being unable to comply with a 15–20 min consultation were not explored formally; however, many respondents commented on having to see too many patients in a given clinic. A pre-operative assessment clinic was used in preparation for surgery by 95% of surgeons. The use of pre-operative clinics has been shown to reduce the number of operations cancelled especially if anaesthetic staff are involved in the assessment. It also provides an opportunity for patient education and rehabilitation planning with the involvement of physiotherapists, occupational therapists and nursing staff.³

To the best of our knowledge, this study is the first in the published medical literature to report on attitudes to the consent process in arthroplasty. In an increasing medicolegal climate, this is highly relevant to practice. The General Medical Council (GMC) has provided clear guidelines on this process, the recommendation being for consent to be obtained by the operating surgeon.⁴ With the time interval that exists between listing for surgery and admission for THR, in most NHS units written consent is best obtained at the time of admission. Our study shows that this procedure of written consent was performed by the consultant only 41% of the time and SHOs (41%) were equally widely used. SpRs obtained consent in 15% of cases. SHOs form a greater proportion of trainees than SpRs and this probably accounts for their increased use. That they should be just as likely as consultants to obtain written consent is, however, a cause for concern. Clearly, some SHOs are more experienced than others with a sound knowledge of the THR procedure. Written consent as an important legal agreement between patient and surgeon is best obtained by the individual responsible for that patient's care.

Infection, dislocation and deep vein thrombo-embolic disease are well recognised early complications. All three

were routinely included in the written consent by 92% of surgeons. Aseptic loosening is the most common cause for a THR to be revised,⁵ but surprisingly only 78% of surgeons routinely included it in the written consent in combination with infection, dislocation and thrombo-embolic disease.

The use of ultra-clean air theatres and intravenous antibiotics has been shown to reduce the incidence of post-operative infections.^{6,7} Eight units reported the lack of ultra-clean air facilities and 11 units did not have dedicated orthopaedic wards and, therefore, did not match best practice guidelines. A broad-spectrum cephalosporin was the most commonly used antibiotic; Cefuroxime was used by 74% of surgeons. The BOA recommendation is for antibiotic cover for the first 24–36 h after operation. Our study showed that 24-h cover or longer was provided by nearly three-quarters of all surgeons surveyed; 12 surgeons failed to complete the section on antibiotic use.

Cement reactions causing cardiorespiratory complications and the exacerbation of concomitant medical conditions in an elderly cohort of patients are well recognised causes of death following THR. The operation may be followed by severe systemic complications and it is re-assuring that the great majority of hip replacements are performed in hospitals with good cover from other medical disciplines.

Prophylaxis for DVT/PE is controversial. The rates of peri-operative DVT have been extensively studied but, to date, there is no conclusive proof of either increased risk of life-threatening pulmonary embolism associated with THR or of long-term chronic venous insufficiency.^{8–11} The BOA recommended the use of chemoprophylaxis with caution taking into consideration the risks of bleeding and wound complications associated with these agents. Mechanical methods of DVT prophylaxis have, however, been recommended as an alternative given their relatively safe profile in spite of a relative paucity of evidence to support their efficacy.^{9,12}

Our study shows that, surprisingly, chemoprophylaxis is used almost universally. Low molecular weight heparin (LMWH) and aspirin are used by 61% and 31%, respectively. Of surgeons, 83% practised early mobilisation routinely and 72% used compression stockings. Early mobilisation with compression stockings and LMWH was the single most popular combination of DVT/PE prophylaxis being used by just over a sixth of those surveyed.

There has been a sustained proliferation in the variety of implants available for THR observed by other authors.^{13,14} Some 90 different designs of acetabulae and 74 designs of femoral components were used by the surgeons questioned. The NICE recommends the use of implants which have a published clinical follow-up of a minimum of 10 years. In the absence of 10-year survival data, the recommendation is for the implanted prosthesis to be the subject of an on-going ethically approved prospective trial with a minimum of 3 years' revision-rate experience consistent with a benchmark

revision rate of 10% at 10 years.¹⁵ The Charnley Monobloc, Exeter, Muller, Lubinus and Stanmore prostheses are the only designs of THR with the desired minimum of 10-year survival data. These designs were used by 71% of surgeons as the standard acetabular implant and by two-thirds of surgeons as the standard femoral implant. In 'younger' patients, the use of these established designs was even less frequent. Charnley, Exeter, Muller or Stanmore acetabular and femoral designs were used in 'younger' patients by only a third of surgeons surveyed. Modern cementation techniques have been shown to improve the longevity of cemented implants.^{16,17} In this regard, 95% of surgeons used canal plugging and canal pressurisation techniques. Training orthopaedic surgeons is part of the arthroplasty surgeon's remit and was reflected in our study – 79% of surgeons provided complete supervision of all trainees with the remainder allowing senior trainees to operate unsupervised.

Aseptic loosening is the most common indication for revision THR. The incidence of aseptic loosening varied between surgeons, design of implants and method of fixation.⁵ Surveillance of the primary THR, by way of out-patient follow-up, therefore, has an important role in the early detection of aseptic loosening. The *Total hip replacement: guide to best practice* advises a minimum of an AP and lateral X-ray at 5 years and each 5 years thereafter. Of surgeons, 27% followed all THRs indefinitely with a further 13% performing radiological follow-up only. The remaining 60% routinely discharged patients with the median discharge time being 1 year. Nurse-led clinics are a developing trend but were used by only 38 surgeons. At present, they seem to contribute to a very small part of routine orthopaedic follow-up.

Conclusions

This is the only reported nation-wide survey in the UK addressing several areas of THR practice and predates any meaningful data from the National Joint Register (NJR). It also serves as a benchmark of practice against which future NJR data can be compared. The findings of our study provide a good assessment of current THR practice in the UK against acceptable standards outlined by the BOA. Consensus appears to be emerging in several areas including the use of pre-admission clinics and modern cementing techniques. Facilities deemed necessary for THR surgery such as HDU/ITU back-up, ultra-clean air and dedicated orthopaedic wards are almost universally available. However, a lack of consensus is still evident in many areas including the process of obtaining written consent, Thrombo-embolic prophylaxis, duration of antibiotic prophylaxis, supervision of trainee surgeons and follow-up arrangements. The proliferation in the range of implants available to surgeons has once again been highlighted. Of particular concern is the use of unproven

implants in the 'younger' patient, a phenomenon clearly influenced by economic and market forces and the knowledge that conventional cemented designs give poor results in the young patient.

Acknowledgements

We wish to thank Mr Malcolm Macnicol, former President of the BOA, who endorsed this study and provided access to contact details for BOA fellows, and to Miss Rhoda Anderson for secretarial assistance.

References

1. British Orthopaedic Association. *Total hip replacement: a guide to best practice*. London: BOA, 1998.
2. Best AJ, Fender D, Harper WM, McCaskie AW, Oliver K, Gregg PJ. Current practice in primary total hip replacement: results from the National Hip Replacement Outcome Project. *Ann R Coll Surg Engl* 1998; **80**: 350–5.
3. Barnes PK, Emerson PA, Hajnal S, Radford WJ, Congleton J. Influence of an anaesthetist on nurse-led, computer-based, pre-operative assessment. *Anaesthesia* 2000; **55**: 576–80.
4. <http://www.gmc-uk.org/global_sections/sitemap_frameset.htm> [accessed 22 August 2003].
5. Malchau H, Herberts P, Ahnfelt L. Prognosis of total hip replacement in Sweden. Follow up of 92,675 operations performed in 1978–1990. *Acta Orthop Scand* 1993; **64**: 467–506.
6. Learmonth ID. Prevention of infection in the 1990s. *Orthop Clin North Am* 1993; **24**: 735–41.
7. Persson U, Persson M, Malchau H. The economics of preventing revisions in total hip replacement. *Acta Orthop Scand* 1999; **70**: 163–9.
8. Fender D, Harper WM, Thompson JR, Gregg PJ. Mortality and fatal pulmonary embolism after primary total hip replacement *J Bone Joint Surg Br* 1997; **79**: 896–9.
9. Murray WD, Carr AJ, Bulstrode CJK. Pharmacological thromboprophylaxis after total hip replacement. *J Bone Joint Surg Br* 1995; **77**: 3–5.
10. Warwick D, Williams HR, Bannister GC. Death and thromboembolic disease after total hip replacement. *J Bone Joint Surg Br* 1995; **77**: 6–10.
11. Mehta JS, Nicolaou N, Kyriluk S, Fordyce MJF. Venous leg ulcers after hip replacement. *J Bone Joint Surg Br* 2003; **85**: 960–2.
12. Hui AC, Heras-Palou C, Dunn I, Triffitt PD, Crozier A, Imeson J *et al*. Graded compression stockings in the prevention of deep vein thrombosis after hip and knee replacement *J Bone Joint Surg Br* 1996; **78**: 550–4.
13. Murray DW, Carr AJ, Bulstrode CJK. Which primary total hip replacement? *J Bone Joint Surg Br* 1995; **77**: 520–7.
14. Tennant TD, Goddard NJ. Current attitudes to total hip replacement in the younger patient: results of a national survey. *Ann R Coll Surg Engl* 2000; **82**: 33–8.
15. <<http://www.nice.org.uk/cat.asp?c=510>> [accessed 22 August 2003].
16. Davies JP, Harris WH. *In vitro* and *in vivo* studies of pressurization of femoral cement in total hip arthroplasty. *J Arthroplasty* 1993; **8**: 585–91.
17. Mulroy Jr RD, Harris WH. The effect of improved cementing techniques on component loosening in total hip replacement. An 11-year radiographic review. *J Bone Joint Surg Br* 1990; **72**: 757–60.

Appendix

Copy of questionnaire sent out

National Audit of Total Hip Replacement Practice Supported by the BOA

INSTRUCTIONS

If your practice does not include hip replacement please tick here _____
and return the form

Questions require either a tick in the box or some text

Note: Text appears on both sides

OUT-PATIENT CONSULTATION

		Tick
How long do you allow for an initial consultation for hip replacement?	Up to 10 minutes	
	Up to 20 minutes	
	Up to 30 minutes	
	Other (text)	

PRE-ADMISSION CLINIC

Do you use a managed pre-operative assessment system?	YES	
	NO	

CONSENT

What grade of doctor most commonly obtains written consent?	Senior House Officer	
	Specialist Registrar	
	Consultant	
	Other (text)	
Which complications are routinely included in the consent?	Death	
	Infection	
	Dislocation	
	Aseptic loosening	
	Thrombosis and embolism	
	Leg length inequality	
	Neurovascular problems	
	Other (text)	

HOSPITAL FACILITIES

Does your hospital have on-site medical back-up?	YES	
	NO	
Does your hospital have on-site General Surgery back-up?	YES	
	NO	
Does your hospital have on-site Urology Surgery back-up?	YES	
	NO	
Does your hospital have on-site Vascular Surgery back-up?	YES	
	NO	
Does your hospital have on-site HDU/ITU facilities?	YES	
	NO	
Does your hospital have dedicated Orthopaedic wards?	YES	
	NO	

THEATRE FACILITIES

Does your theatre have an ultra-clean air system?	YES	
	NO	

IMPLANT AND SURGERY

What is your standard acetabular implant?	(Text)	
What is your standard femoral implant?	(Text)	
What implants do you use in 'younger' patients?	(Text)	
If you use cement, do you utilise canal plugging and pressurised retrograde gun technique?	YES	
	NO	

SUPERVISION

When performed by a surgeon in training, does a consultant always supervise the hip replacement?	YES	
	NO	

PROPHYLAXIS

Which, if any, type of mechanical thromboprophylaxis do you use?	Early mobilisation	
	Calf pump system	
	Foot pump system	
	Compression stocking	
	None	
	Other (text)	
Which, if any, type of chemical prophylaxis do you use?	Aspirin	
	Heparin	
	Low molecular weight heparin	
	Warfarin	
	None	
	Other (text)	
What is your antibiotic regimen for prophylaxis against infection?	Agent (text)	
	Dose, frequency and duration (text)	

FOLLOW-UP ARRANGEMENTS

What is your follow-up routine?	(Text)	
Do you discharge your patients from clinical follow-up?	YES	
	NO	
If yes, when do you discharge them?	(Text)	
After discharge, do you maintain radiological follow-up?	YES	
	NO	
If yes, at what intervals?	(Text)	