Minimal access surgery for total hip arthroplasty – current beliefs and activity profile in the UK

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ABSTRACT

INTRODUCTION There is a strong drive from patients, industry and the media to perform total hip arthroplasty (THA) through a minimal access incision. Currently in the UK, the exact definition and uptake of this procedure is not known.

PATIENTS AND METHODS A postal questionnaire was sent to all consultant orthopaedic surgeons in the UK registered with the British Orthopaedic Association.

RESULTS Of those performing THA, 23% have performed minimal access hip surgery (MAS). Of users, 63% perform less than 20 cases per year, 62% use the mini-posterior approach, and 12% intend to perform MAS in the future. There is an association with specialisation. The mean and mode scar sizes for MAS were 9.9 cm and 10 cm, respectively.

CONCLUSIONS MAS is increasing in popularity but is currently performed in small numbers by those with a specialist interest in hip arthroplasty. Because no long-term results have been published regarding this procedure, it will be important to ensure that standards of implantation are not jeopardised and training remains critical. Cases should be registered with the National Joint Registry using the current definition of scar size less than 10 cm.

KEYWORDS

Hip arthroplasty – Incision – Approach – Scar

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There is increasing interest to perform total hip arthroplasty (THA) through a small incision. It may be argued that minimal access hip surgery (MAS) is a logical extension of less invasive methods that have popularised other fields such as arthroscopy and laparoscopy.¹ Users of smaller incisions perceive that there is more rapid patient rehabilitation, less postoperative pain and reduced blood loss. As a result of publicity in the popular press and on the internet, marketing efforts by implant companies and surgeons, patient demand is increasing. Several techniques have been described, although the quoted merits of one technique may not hold true for the other approaches. There are concerns that many surgeons may try to offer the procedure without the necessary training or before any long-term clinical benefits are known. Many opposers believe that smaller incisions will jeopardise standards of implantation.^{2,5}

Currently in the UK, the exact definition and the uptake of the procedure is not known. We set out to study the uptake of the procedure, the training undertaken by those who perform the procedure, the level of interest in performing the procedure in the future, and to explore the relationship

between specialisation, volume of surgery and uptake of the procedure.

Patients and Methods

All consultant orthopaedic surgeons registered with the British Orthopaedic Association in the UK were sent a simple, anonymous, postal questionnaire in December 2004. This requested information on specialisation, training undertaken and number of cases performed per annum by standard and minimal access incisions. Consultants were asked for the availability of specialist instrumentation, and their quoted length of scar for both techniques.

Closure of the return was at 6 weeks. Results were analysed using Microsoft Excel software.

Results

Of 1650 questionnaires sent out, 856 were returned (52%). Of these, 112 consultants have retired or no longer practise in the NHS and were excluded from further evaluation and

Figure 1 Approach used for minimal access hip surgery.

Figure 2 Volume of MAS cases performed.

154 consultants have specialised in other areas and no longer perform THA (18%).

Of the remaining 546 consultants who perform THA, 130 (23%) perform minimal access hip surgery. The approaches used are shown in Figure 1. The most common approach is the mini-posterior approach (62%). Only 3% use fluoroscopic screening.

Of THA consultants, 42% have observed minimal access hip surgery. Of these, 64% have observed a consultant in the UK and 48% abroad. In addition, 25% have attended a course. Of those currently not performing MAS, a further 12% intend to perform it in the future.

The volume of minimal access cases performed is shown in Figure 2. Of those that perform MAS, the majority (63%) perform less than 20 cases per year.

Regarding training, 54% of those who perform MAS have attended a course, and 47% have observed surgery. Only 6% perform MAS despite not attending a course nor observing surgery.

Regarding specialisation, 36% of those who declared a specialist interest in hip arthroplasty perform MAS. Some 48% of British Hip Society (BHS) members, and 48% of those that had completed a hip fellowship perform MAS. In addition, 16% of non-BHS members and 14% of non-hip fellows perform the technique. Only 5% of those without a specialist interest in hip arthroplasty perform MAS (Fig. 3).

Regarding access to specialist instruments, 57% of those who perform the technique have access to specialist retractors in the NHS sector, and 52% in the private sector.

With regard to scar size, the mean and mode quoted scar size for a standard THR scar was 15.6 cm and 15 cm, respectively. For MAS, the mean and mode sizes were 9.9 cm and 10 cm, respectively.

Figure 3 Relationship with specialisation for MAS users.

Discussion

In the last few years, improvements in operative technique and instrumentation have allowed surgeons to perform THA through smaller incisions than previously used. Minimal access surgery for hip arthroplasty is widely promoted in the popular press, on internet sites and by implant manufacturers with claims that it results in less bleeding, less pain, and a shorter hospital stay. Combined with intensive physiotherapy instruction pre-operatively, the technique may allow the earlier discharge of patients which, in turn, may lead to cost-saving by optimising bed occupancy. Earlier mobilisation of patients may reduce the risk of venous thrombo-embolic disease.⁴ Long-term benefits or consequences have yet to be proven. Surgeons may feel pressured to offer the procedure, to be seen to 'hop on the bandwagon' before peer-reviewed benefit has been published.²

The minimum scar size possible is dictated by the diameter of the acetabular component,⁵ but body mass index, gender and patient musculature may all play a part in determining the minimum achievable incision size.⁶ There has not been a consensus agreement as to the definition of minimal access hip surgery, and some alternative definitions and terms have been trademarked by implant companies. This makes reported results difficult to compare. The National Joint Registry Minimum Dataset Committee, in compiling the second dataset have used the definition as a scar size of less than or equal to 10 cm.

Several techniques have been described, including the posterior approach, the anterolateral, the anterior and the two-incision approach, with or without fluoroscopic guidance.^{8–12} Customised instrumentation including smaller retractors with extended handles, angulated reamers and implant introducers may be beneficial in performing the technique to prevent excessive trauma or traction of soft tissues, and are being aggressively marketed by manufacturers.¹³

It is becoming increasingly difficult to assess objectively the short-term difference, as a patient who is aware of a smaller scar may automatically rehabilitate faster than a patient with a larger scar size. Blinding the patient to the incision size is difficult.³

Berger *et al.*¹⁴ reported 97% of patients meeting physiotherapy criteria for same-day discharge with the two-incision technique, with a mean time to return to work of 8 days. There were no complications from the rapid rehabilitation programme.¹⁴

Wenz *et al.*¹⁵ compared 124 cases performed through a minimal access posterior approach with 62 via a direct lateral approach and found significantly earlier ambulation, less transfer assistance but a similar length of stay in the minimal access group. The operative time was shorter with less estimated blood loss and transfusion requirements, but

this may just be comparing a posterior approach with a lateral approach rather than the effect of the small incision.¹⁵

Chimento *et al.*¹⁶ randomised patients to either an 8-cm or a 15-cm incision. They found a reduction in blood loss and incidence of limp in the 8-cm incision group but no difference at the 1-year or 2-year follow-up.¹⁶

de Beer *et al.*¹⁷ compared 30 patients with direct lateral incisions less than 10 cm in length with 30 patients with standard incision lengths, and found no significant difference with respect to operating time, postoperative blood loss, complication rate or length of stay. At 6 weeks' post-operatively, there was no difference in either the Oxford or Harris Hip Scores. They concluded that there does not appear to be any clinical advantage in performing minimal access hip surgery in the short term.¹⁷

Ogonda *et al.*¹⁸ randomised 219 total hip arthroplasty patients to a standard 16-cm incision or a minimal access incision (equal or less than 10 cm) using a posterior approach. Surgery was performed by a single surgeon using cementless components. The authors found no significant difference in the early postoperative period between the two groups with respect to pain scores, blood requirements, component position, walking ability or length of stay, and no difference in functional outcome scores at 6 weeks' postoperatively.¹⁸

Wright *et al.*¹⁹ reported no dramatic clinical benefit of a mini-posterior approach other than cosmetic appeal. At best, it was reported that there was a higher Harris Hip Score but this was not clinically significant. There was no significant difference in blood loss or length of stay.¹⁹

Opposers of the technique point to concerns regarding component positioning, increased intra-operative complication rate, and no long-term benefit to patients. Woolson *et al.*²⁰ compared 50 patients with posterior approach incisions less than 10 cm with 85 standard incisions and found no significant difference in surgical time, blood loss, transfusion rate or hospital stay. However, a slightly higher rate of infection, acetabular malpositioning and poorer fit and fill of the socket was found in the small incision group.²⁰

Archibeck and White²¹ have demonstrated a learning curve of approximately 10 cases for the two-incision approach, but the figure may extend beyond this. They reported that low surgeon volume was associated with an increased complication rate. Operative time was increased during the learning curve.²¹

Pagnano *et al.*²² retrospectively reviewed the outcome of the two-incision technique with the standard posterior technique and reported longer operative times and substantially more complications (14%) in the two-incision group compared to 5% in the standard posterior approach group.²²

Bal *et al.*²³ compared 96 consecutive total hip replacements performed using a single mini-incision using the direct lateral approach with 89 consecutive patients performed using the two-incision technique. Some 10% of

patients in the two-incision group required repeat surgery because of a femoral fracture, and 25% sustained an injury of the lateral femoral cutaneous nerve. The overall complication rate in the lateral approach group was 6%, with a 3% re-operation rate. The authors reported a decreasing complication rate with increasing experience.²³

Fehring and Mason²⁴ reported 3 cases of catastrophic complications following minimally invasive hip surgery that presented to their tertiary referral centre, and issued a warning regarding the uptake of new procedures without sufficient training or before techniques are appropriately validated.

NICE has recently issued guidance on the use of the single mini-incision hip replacement. It supports the use of the procedure, and quotes benefits of less tissue trauma, less blood loss, less pain but recommends that the procedure should only be used in appropriately selected patients by clinicians with appropriate training in the technique.²⁵ NICE has previously issued guidance on the two-incision approach. It states that outcome results are poorly reported and mainly focus on short-term data such as hospital stay and operating time rather than function of the prosthesis. The Specialist Advisors were concerned about the potential for malposition of the components and stressed the importance of training for this technique. The advisors recommended that surgeons should receive adequate training before performing this procedure. NICE require more evidence on the long-term safety and efficacy of this procedure.²⁶

This current study is the largest survey of consultant activity and opinion in the UK and gives an interesting insight into current practice. We are surprised by the rapid uptake of this technique, especially given the lack of convincing evidence for its effectiveness. Approximately 4% of cases reported to the National Joint Registry in the first annual report were performed using a minimal access approach.²⁷ This figure has risen to 6.5% in the second annual report.²⁸ Amongst our responders, 12% of surgeons who currently do not perform the technique, intend to perform it in the future, and there has been a high level of education or observation of other surgeons. It is re-assuring that the greatest uptake is amongst surgeons with a specialist interest in hip arthroplasty as this would satisfy NICE recommendations. However, most users were performing less than 20 cases per year. Low-volume activity has been reported to be associated with an increased complication rate.²⁰

Although a definition is required for joint registry and coding purposes, we believe that minimal access hip surgery as a concept involves more than the size of the operative scar, with the soft tissue dissection becoming much more important. Some surgeons anecdotally in responding to our questionnaire felt that they had been using a minimal access approach for many years as their standard approach

in the correct build of patient without marketing it as such. The high uptake rate probably to some degree reflects refinement of operative technique, increased appreciation of anatomy, improved retractors and availability of cementless implants all of which allow a surgeon to reduce the size of the external scar. Although many surgeons oppose a definition of minimal access surgery that uses scar length, the consensus from this study is that a scar equal to or less than 10 cm is an appropriate definition. This is in agreement with the definition chosen by the National Joint Registry minimum dataset committee.

Regarding the limitation of our study, although the response rate was only 52%, this is the largest current poll of consultants in the UK regarding this issue. We feel that the snapshot of consultants who responded is representative of the UK consultant body as a whole, as the percentages of consultants no longer performing THRs (18%) and the percentage performing less than 10 THR cases per year (6%) are comparable to figures produced by the National Audit Office when auditing all UK consultants regarding THR practice previously.²⁹

Conclusions

There appears to have been a rapid uptake in the use of the minimal access approach to total hip arthroplasty. Currently, almost a quarter of consultants are offering the procedure, but in small volumes. Because no long-term results have been published regarding this procedure, it will be important to ensure that standards of implantation are not jeopardised and training remains critical. Cases should be registered with the National Joint Registry using the current definition of scar size less than 10 cm.

Acknowledgement

We wish to acknowledge Smith and Nephew for funding the administration costs of this study.

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