

Five Year Follow-up of One Stage Bilateral Total Hip Arthroplasty

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ABSTRACT

We report on the medium term outcome of five patients (ten hips) who underwent one stage bilateral total hip arthroplasty. Both Harris Hip Scores and Oxford Hip Scores improved postoperatively as did range of motion. There was no radiographic evidence of loosening in any hip arthroplasty involved in this study, however one revision surgery was needed due to periprosthetic fracture. There were no increased medical complications. Based on our limited experience, we believe that one stage bilateral total hip arthroplasty is safe in selected patients.

Key Words:

One stage, Bilateral total hip arthroplasty, Medium term outcome

INTRODUCTION

It is estimated that 15% to 25% of patients who need total hip arthroplasty (THA) require bilateral procedures¹. In both the USA² and Europe³, there are physicians who advocate that bilateral THA should be performed simultaneously. Potential benefits of one stage bilateral THA include a single episode of anaesthesia reduced cost, shorter hospital stay and better functional recovery⁴.

However, there are concerns with perioperative complications associated with one stage bilateral THA. These complications include increased incidence of ectopic ossification^{1,4}, higher prevalence of deep vein thrombosis⁵, reduced range of motion², greater risk of pulmonary complications⁶, and increased rates of mortality and morbidity in patients with medical problems⁷.

As a result, there are currently very few orthopaedic centres worldwide that routinely perform one stage bilateral THA routinely, and published literature regarding the outcome of one stage bilateral THA, especially in Asia, is sparse. To date, there are no published studies regarding outcomes of one stage bilateral total hip arthroplasty in Malaysia. In this

study, we review the medium term outcome of eight THA which were performed as one stage bilateral THA, and assessed the complications encountered as a result of this procedure.

MATERIALS AND METHODS

Between June 2000 and June 2002, five patients were assessed to be suitable candidates for one stage bilateral THA. Patients were recommended to undergo one stage bilateral THA if both hips were severely symptomatic, were otherwise physically fit, had no active diseases, and scored less than three on the American Society of Anaesthetists (ASA) score⁸. Other inclusion criteria included significant flexion contracture bilaterally, and patient willingness to have both hips replaced during one procedure. Informed consent was obtained from each individual prior to surgery, and patients were fully informed of the potential benefits and complications.

Surgical Technique and Hip Implant

All the operations were performed using the anterolateral approach. All the hip replacements were performed with cemented polished triple-taper femoral stem (C Stem, DePuy) and cemented cross-linked polyethylene S-shaped flange acetabular component (Ogee, DePuy). All the hips were implanted with the 22 mm diameter femoral heads. Operative technique was similar for all patients. The side operated first was usually the one that was more symptomatic; if the operation on the first side was concluded uneventful, the operation was continued on the other side after the surgical team had rescrubbed. None of our patients required any postponement after the operation on the first side.

All patients received general anaesthesia with epidural anaesthetic administered via an indwelling catheter. Patients were monitored for 24 hours post operatively in the high dependency unit. Postoperative management also included 48 hours of intravenous antibiotics, low molecular weight heparin and thrombo-embolic deterrent (TED)

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Table I: Demographic and clinical data for the 5 patients who underwent one stage bilateral THA from June 2000 to June 2002

| Patients | Age (years) | Sex | Diagnosis | ASA score |
|----------|-------------|--------|--------------------|-----------|
| Case 1 | 75 | male | osteoarthritis | 2 |
| Case 2 | 25 | male | avascular necrosis | 1 |
| Case 3 | 60 | female | osteoarthritis | 2 |
| Case 4 | 49 | female | avascular necrosis | 1 |
| Case 5 | 34 | male | osteoarthritis | 1 |

Table II: Average pre- and post- operative scores based on HHS and OHS systems

| Patients | Harris Hip Score | | | | Oxford Hip Score | | | |
|----------|------------------|---------|----------|---------|------------------|---------|----------|---------|
| | Right Hip | | Left Hip | | Right Hip | | Left Hip | |
| | Pre-op | Post-op | Pre-op | Post-op | Pre-op | Post-op | Pre-op | Post-op |
| Case 1 | 54 | 75 | 44 | 72 | 32 | 20 | 34 | 20 |
| Case 2 | 44 | 90 | 48 | 95 | 48 | 16 | 50 | 18 |
| Case 3 | 38 | 95 | 39 | 95 | 45 | 12 | 46 | 12 |
| Case 4 | 42 | 98 | 42 | 98 | 43 | 12 | 44 | 13 |
| Case 5 | 40 | 92 | 39 | 90 | 46 | 14 | 42 | 14 |

stockings for thromboprophylaxis. Patients were mobilised as tolerated with full weight bearing as tolerated. The post operative protocol was identical for all patients.

Clinical Evaluation

Patient assessment was undertaken preoperatively and again postoperatively at six weeks, six months, one year, and annually thereafter using a clinical hip score based upon the Harris Hip Score (HHS)⁹ and Oxford Hip Score (OHS) systems¹⁰. A group of independent examiners (not the operating surgeon) conducted the clinical and functional assessment for this study.

Radiographic Evaluation

Radiographic evaluation (antero-posterior view of the pelvis and a lateral radiograph of the hip) were performed preoperatively, early postoperatively (within 6 weeks), 1 year, and annually thereafter. All radiographs were examined by a radiologist to check for evidence of loosening of the arthroplasty. Any radiolucent lines were compared with those on previous radiographs to determine if there was evidence of progression, indicating possible loosening, or if they were stable and non-progressive. Radiographs were also examined for gross evidence of symmetry or changes in the thickness of the polyethylene suggestive of wear or fracture of the component. Any radiographic change in the position or alignment of the component was also noted.

RESULTS

Demographic data for all five patients is shown in Table 1. All patients were still alive at the time of the last follow up and no patients were lost to follow up. The preoperative diagnosis was primary osteoarthritis for six hips (60%) and avascular necrosis (AVN) for the remaining four hips. No obvious risk factors associated with AVN were identified in any patients studied.

The mean age at the time of surgery was 48.6 years old (range - 25 to 75 years). The study sample consisted of three males and two females. Mean follow up time was 5.1 years (range - 4.5 to 6.4 years).

The mean surgical time was 5.7 hrs (range -5 to 6.5 hrs). The mean hospital stay was 11.2 days (ranged from 7 to 18 days). During surgery, the average volume of blood loss was 1550 ml (range -1200 to 1800ml); Patients were transfused with an average of 2.5 units (range - 2 to 3 units) of blood transfusion.

Clinical and Radiographic Evaluation

The mean pre-operative HHS was 43/100 (range, 38 to 54) and the average post operative score was 90/100 (range, 72 to 98), whereas the OHS mean pre-operative score was 43 (range, 32 to 50) and 15 (range, 12 to 20) after surgery. The average range of flexion was improved from 55° (range, 34 ° to 80 °) to 110 ° (range, 90 ° to 118 °) after operation (Table II). Postoperatively, all patients reported satisfaction with the surgery, increased function and reported either no pain or a small amount of pain but no compromise in activities.

There was no radiographic evidence of loosening in any THA studied. There was also no heterotopic ossification appearance noted in any of the cases.

Complications of Surgery

There were no systemic or local complications associated with surgery, both intraoperatively and postoperatively, and no superficial wound or deep tissue infection was reported. Of the patients studied, none suffered dislocation or nerve palsy postoperatively. Additionally, none of the patients developed any medical complications; in particular, there was no clinical evidence of thromboembolic events among any of the patients.

Revision Surgery

In August 2002, one patient (case 2) sustained periprosthetic fracture (type 2, Vancouver classification (11)) in a traffic accident. The femoral component was revised with a long femoral stem (C Stem, DePuy) and supplemented with an extramedullary plating system. The fracture united 2 months post surgery and the femoral implant achieved stable fixation at the latest follow up (3 years after revision surgery).

DISCUSSION

This study demonstrates that medium term clinical outcome of one stage bilateral THA is comparable to that of unilateral THA¹⁴. We did not find any significant difference in the functional outcome of bilateral THA, (as evaluated by the HHS and range of movement) when compared to those of unilateral THA¹⁴. This is in contrast to the report by Wykman and Olsson¹⁵ who found suboptimal gain in the range of movement and improvement in gait in patients undergoing bilateral THA. It has also been reported that there is an increased rate of heterotopic ossification in patients who undergo a one stage procedure¹⁶, but in this evaluation, we did not observe any such increase.

All patients were admitted to high dependency unit for observation for 24 hrs immediately after surgery. As this is our pilot study, this was a precaution to prevent medical complications, and did not truly reflect clinical needs. Since we are increasingly confident regarding immediate postoperative management and duration of surgery is now shorter, there is no reason why these future patients undergoing this procedure should not be managed in the ward in the immediate postoperative period.

Contrary to popular belief, our study showed that one stage bilateral THA is not associated with higher medical complication rates⁷. However, it is important to note that all of our patients were ASA grade 1 or grade 2 and therefore at decreased risk for such complications. Patients with significant co-morbidities (ASA grade 3 or 4) have been reported to have higher incidence of peri- and post-operative complications in both the two stage and one stage operations¹². In addition, our unit is a dedicated hip and knee arthroplasty centre where one stage bilateral arthroplasty, especially total knee arthroplasty, is performed routinely.

One of the major controversies regarding the safety of one stage bilateral total hip arthroplasty is the potentially higher prevalence of pulmonary fat embolism⁵. In this study, we did not encounter an increased incidence of thromboembolic events among our patients. This could be due to the small number of patients in this study. Other possible explanations

are improvement in anticoagulation therapy and the use of early post-operative mobilisation. We believe that patients who undergo bilateral THA are able to achieve better mobilisation as soon as they overcome the initial post-operative pain, whereas for patients who have unilateral THA, pain on the un-operated hip tends to act as a deterrent to mobilisation. Similar observations were made by Ritter and Stringer².

Although the duration of surgery was on average 5 hrs, the total estimated blood loss (1550 ml) was less than 1 _ time that of the average unilateral THA blood lost (1039 ml)¹³. It is also interesting to note that our patients did not require more blood transfusions than patients who underwent unilateral THA¹³. Estimated blood loss and transfusions performed in these patients is comparable to other centres that perform similar operations^{4,5}.

One of the major advantages of this operation is cost savings. The average length of hospital stay was only 11 days, less than double the inpatient stay of the average unilateral THA, which is currently 7 days. Together with a reduced cost of anaesthesia (one time administration of anaesthesia) and medication, this will represent a substantial saving of the total cost for each patient who has severe bilateral hip problems and decides to undergo THA. Indirectly, it will also reduce the economic burden and waiting list times for the public health system, especially in countries like Malaysia.

One of the limitations of this study is the small sample. The other main difference between this study and others is that the population of patients is different from that in Western countries, and this might partially account for some of the differences in complications that we observed. This is an on going study and we are in the process of recruiting more suitable patients. We also hope to follow up the patients who participated in this study over a longer period of time and present long range clinical outcomes and the survival rates for THA patients.

CONCLUSION

One-stage bilateral THA provides a favourable medium term clinical and radiological outcome. With careful patient selection (ASA < 3), it can be as safe as unilateral THA, provided that the operation is performed in arthroplasty centre where the appropriate personnel and equipment for the operation and for post-operative patient care are available. A larger patient population study and a longer patient follow up will likely provide stronger evidence to support the advantages of this operation.

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