# Results of primary total hip replacement with special attention to technical difficulties encountered in a cohort of Saudi patients

*Asim M. Makhdom* MD, *Mohammed J. Al-Sayyad,* MD, FRCSC.

## ABSTRACT

**الأهداف:** إلقاء الضوء على تجربتنا والصعوبات التي واجهتنا في عمليات تبديل مفصل الورك الأولي (THR) لدى مجموعة من مرضى المملكة العربية السعودية.

**الطريقة:** تمت مراجعة قاعدة البيانات خلال الفترة من فبراير 2002م إلى ديسمبر 2007م لعمليات استبدال الورك الأولي في مستشفى جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية. وسلطنا الضوء على 58 عملية استبدال (54 مريضاً). وقد تم جمع هذه المعلومات من الملفات الطبية، والفحوص السريرية، وصور الأشعة. بعد دراسة التقارير الطبية للعمليات تم تصنيف الصعوبات الجراحية إلى صعوبات متعلقة بكل من الفخذ، والجوف الحقي للمفصل والأنسجة الرخوة للمفصل وصعوبات مشتركة فيما سبق وقد تمت متابعة المرضى لمدة سنتين على الأقل.

**النتائج:** تلخصت أسباب الجراحة فيما يلي: 50% من المرضى المصابين بالتهاب المفاصل الرضحي، و16.6% من المصابين بالتنخر الوعائي الناتج عن فقر الدم المنجلي، و 9.2% من المصابين بالتهاب العظام والمفاصل التنكسي، و 9.2% من المصابين بالتنخر الوعائي المجهول السبب، و 7.4% من المصابين بالتهاب المفاصل الرثواني ووصلت أسباب الجراحة 14.7% في أمراض أخرى. ولقد شملت المشاكل الفخذية كلاً من ضيق القناة الفخذية في 27.7% من المرضى، و تبدل موضع الفخذ القريب في 5.5%، فيما شملت مشاكل الجوف الحقي كلاً من الكسر المنخسف للجوف الحقي في 14.8% وخلل البنية العظمية للجدار الخلفي للجوف الحقي في 5.5%، وشملت مشاكل الأنسجة الرخوة المحفظة المتضيقة في 14.8% وكذلك انكماش العضلات في 11.1%.

**خاتمة:** توجد مسببات مختلفة لأمراض الورك لدى السعوديين والتي كانت بمعظمها رضحية المنشأ بالمقارنة مع سلسلة الدراسات في البلاد الغربية. ننصح الجراحين القائمين على عمليات استبدال مفصل الورك للمرضى السعوديين بعمل خطة تحضيرية مكثفة وذلك قبل العملية الجراحية من أجل التغلب على الصعوبات التي ظهرت في دراستنا.

**Objectives:** To illustrate our experience and the difficulty faced in primary total hip replacement (THR) in Saudi patient population.

**Methods:** We retrospectively reviewed our database between February 2002 to December 2007 for primary THR cases at King Abdul-Aziz University Hospital, Jeddah, Saudi Arabia and identified 58 hips (54 patients). Patients data were collected from patient's medical records, clinical examination, and x-ray films. Operative reports were examined for the difficulty encountered during surgery and was classified into femoral, acetabular, soft tissue and combined difficulties. Patients follow up was a minimum of 2 years.

**Results:** The indication of surgery was posttraumatic arthritis in 50%, sickle cell anemia related avascular necrosis in 16.6%, primary osteoarthritis in 9.2%, idiopathic avascular necrosis in 9.2%, rheumatoid arthritis in 7.4%, and other indications were 14.7%. The femoral obstacles included narrow femoral canal in 27.7% and proximally migrated femur in 5.5%. Acetabular obstacles included protrusio acetabuli in 14.8% and structural posterior acetabular bone defect in 5.5%. Soft tissue obstacles included tight capsule in 14.8% and muscle contracture in 11.1%.

**Conclusion:** Our Saudi patient population has shown different pathology of their hip disease in which most of the hips being posttraumatic as compared to series published in the west. We advised those who intend to tackle THR in this population to perform extensive preoperative planning in order to be able to anticipate the difficulty demonstrated by our experience.

***Saudi Med J 2010; Vol. 31 (8): 904-908***

*From the Department of Orthopedic Surgery, Faculty of Medicine and Health Sciences, King Abdul-Aziz University, Jeddah, Kingdom of Saudi Arabia.*

*Received 27th March 2010. Accepted 21st June 2010.*

*Address correspondence and reprint request to: Dr. Asim M. Makhdom, Department of Orthopedic Surgery, Faculty of Medicine and Health Sciences, King Abdul Aziz University, PO Box 6108, Makkah 21955, Kingdom of Saudi Arabia. Tel. +966 (2) 6677099. E-mail: Makhdomas@hotmail.com*

Total hip replacement (THR) is not a very common procedure to be carried out in Saudi Arabia especially when compared with total knee replacement. In addition, there are no clear figures until now to show the situation regarding the statistics of THR in Saudi Arabia and few articles have discussed hip replacement in Saudi population.[1-3] Furthermore, in western industrialized countries the incidence of hip osteoarthritis is much higher than Saudi Arabia as per our observation were primary osteoarthritis of the hip is not a common entity and most of the patients present with posttraumatic arthritis. Those reasons directed us to carry this investigation. The aim of this article is to evaluate the intraoperative difficulty encountered during our experience in primary THR in a Saudi patient population focusing on the wide variety of indications of a such procedure in Saudi patients, reporting on their demographics and intraoperative findings.

**Methods.** We retrospectively reviewed our database between 15th of February 2002 to 26th of December 2007 for primary THR cases at King Abdul-Aziz University, Jeddah, Saudi Arabia. Fifty-four patients were identified (58 hips); all patients had their primary THR performed by the senior author. Consent was obtained from all patients in addition to the Research Ethical Committee Agreement. All patients were conservatively managed with protected weight bearing, analgesics, non-steroidal anti-inflammatory drugs in the initial managements of their hip pain and all patients had failed this conservative treatment protocol. Personal data were collected, patient's age, gender, body mass index, indication for the THR, and site of the hip replacement, co-morbidity, preoperative and postoperative hemoglobin level. Operative reports were also reviewed for difficulty encountered during surgery and was classified into femoral, acetabular, soft tissue and combined difficulties. Postoperative complications, duration of hospitalization, time of surgery and type of implants were also collected in this study. On follow up, x-ray films were reviewed for loosening on acetabular and femoral side. Sixty-eight percent of our patients had general anesthesia and 32% had epidural anesthesia. Patients were placed in a lateral decubitus position. Surgery was performed through direct lateral approach to the hip joint with standard operative technique. After dislocation of the hip, culture was obtained from the synovium and femoral head especially in patients with sickle cell disease and rheumatoid patients. Patients with cementless THR were allowed partial weight bearing for the first 6 weeks after surgery but after that, they progressed to full weight bearing. All patients received deep venous thrombosis prophylaxis in form of low molecular weight heparin. Clinical assessment was performed during the period of the follow up at out patient's clinic including inquiry on pain and activities of daily living. All posttraumatic patients underwent a preoperative 3 dimensional reconstruction computed tomography to evaluate acetabular defect. Saudi patients with hip pathology requiring THR were included in the study.

Data were collected from patient's medical records, clinical examination, and preoperative x-rays. Postoperative x-ray films were reviewed at 3 months, 6 months and then yearly. Data was analyzed using the Statistical Package for Social Sciences (SPSS) program version 16.0 calculating descriptive measures including the mean, ±SD, percentage.

**Results.** Between February 2002 and December 2007, we performed 58 primary THR for a group of patients (n=54) with wide variety of different indications for their THR (summarized in **Table 1** with the highest percentage being 50% for post traumatic arthritis). The mean age at the time of total hip replacement was fifty years old (range, 18 years to 75 years). Of these, there were 23 women and 31 men. Total hip replacement was performed on the left side in 21 and in 37 patients on the right side; 4 patients had staged bilateral THR. The mean body mass index (BMI) at the time of THR was 27.91 (range, 17-40.1). The mean hemoglobin loss was 1.2 g/dl (range, 0.7-3 g/dl) based on preoperative and postoperative results. The mean time of surgery was 2 hours and 24 minutes (range, one hour and 30 minutes to 4 hours and 12 minutes). Operative reports showed the difficulty faced during surgery (**Table 2**). Difficulties included, narrow femoral canal which was found in 15 patients (10 patients were posttraumatic and 5 patients with sickle cell disease) and was treated with careful reaming, which was time consuming especially with lack of readily available developmental dysplastic hip stems from implant providers, it was often difficult to hand ream femoral canal because it was hard and sclerotic especially in patients with sickle cell disease and flexible reamer was utilized. Three patients with sickle cell disease had proximally migrated femur as a result of previous treatment by core decompression elsewhere, which was complicated by femur neck fracture, for which shortening osteotomy of the femur was performed in order to be able to reduce the hip (**Figure 1**). Furthermore, tight capsule, stiffness, and adhesion were found in 8 patients as result of posttraumatic changes and one of them had massive tissue contracture and stiffness from previous pelvic radiotherapy for her endometrial cancer. Adductor contracture release was performed in 6 patients. The greater trochanter was osteotomized in 2 patients in whom there was a significant difficulty in exposure due

to scaring. On the acetabular side, posterior acetabular bone defect were observed in 3 posttraumatic cases and were treated with structural grafting with screw fixation (**Figure 2**). Furthermore, protrusio acetabuli were found in 8 patients (4 patients with rhematiod arthritis and 4 patients were posttraumatic) in 4 of which reinforcement mesh was used with cancellous bone grafting (**Figure 3**), in the remaining 4 cancellous bone grafts was utilized with large porous coated cups. There were more than one obstacle (combined obstacles) encountered in 6 patients.

Complications included 4 proximal non-displaced

**Table 1 -** Distribution of patients by their indication.

| Indication of total hip replacement | Number of patients |
|---|---|
| Posttraumatic arthritis | 27 |
| Sickle cell disease | 9 |
| Primary osteoarthritis | 5 |
| Idiopathic avascular necrosis | 5 |
| Rheumatoid arthritis | 4 |
| Sequel of developmental dysplasia of the hip | 2 |
| Ankylosing spondylitis | 1 |
| Post electric shock avascular necrosis | 1 |

**Table 2 -** Obstacles and difficulty encountered during surgery.

| Obstacles | Number of patients |
|---|---|
| Narrow femoral canal | 15 |
| Proximally migrated femur | 3 |
| Protrusio acetabuli | 8 |
| Tightness and adhesions | 8 |
| Adductor contracture | 6 |
| Acetabular bone defects | 3 |

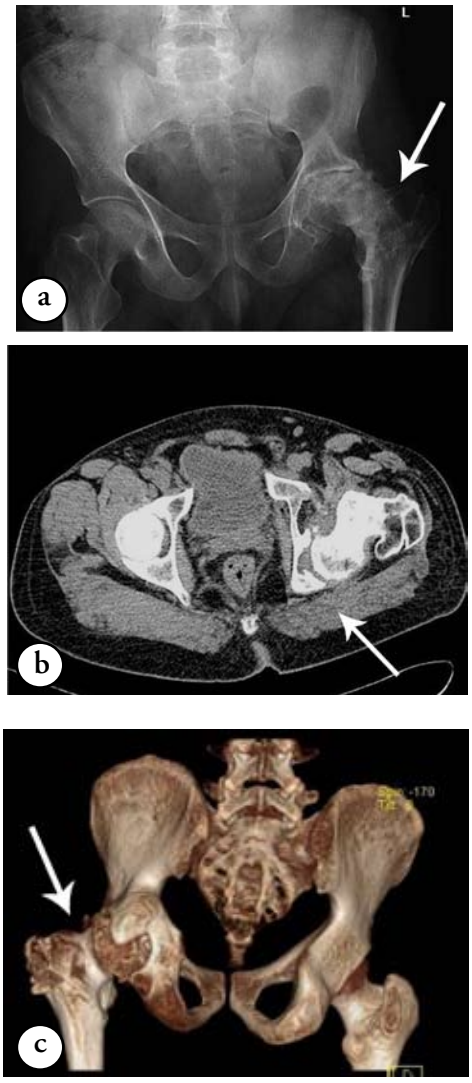


**Figure 2 -** **a**) X-ray of a case of posttraumatic arthritis (arrow) not showing the posterior acetabular defect clearly. **b**) Axial view of the computed tomography of the same patient showing posterior acetabular bone defect (arrow). **c**) Three dimensional reconstruction computed tomography showing posterior acetabular bone defect (arrow) of the same patient.

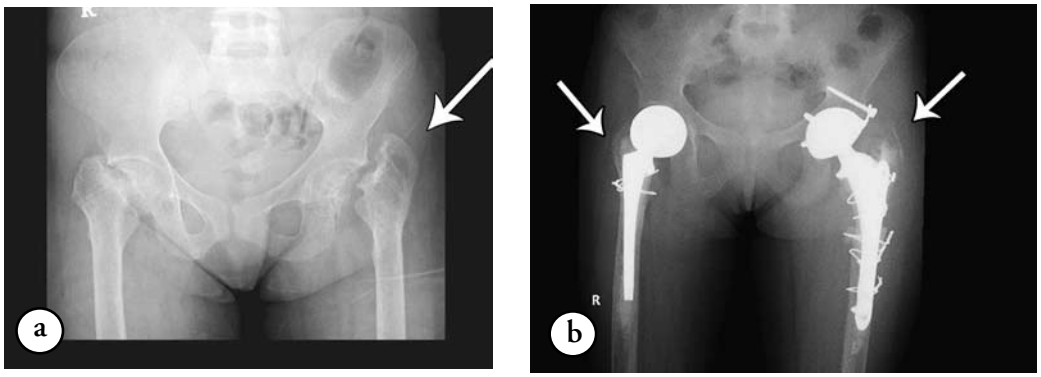


**Figure 1 -** **a**) A case of sickle cell anemia with right proximally migrated femur (arrow) as a previous result of treatment by core decompression elsewhere which was complicated by femur neck fracture. **b**) Postoperative x-ray after shortening osteotomy and fixation by locked plate and screws and cerclage wires (arrow).

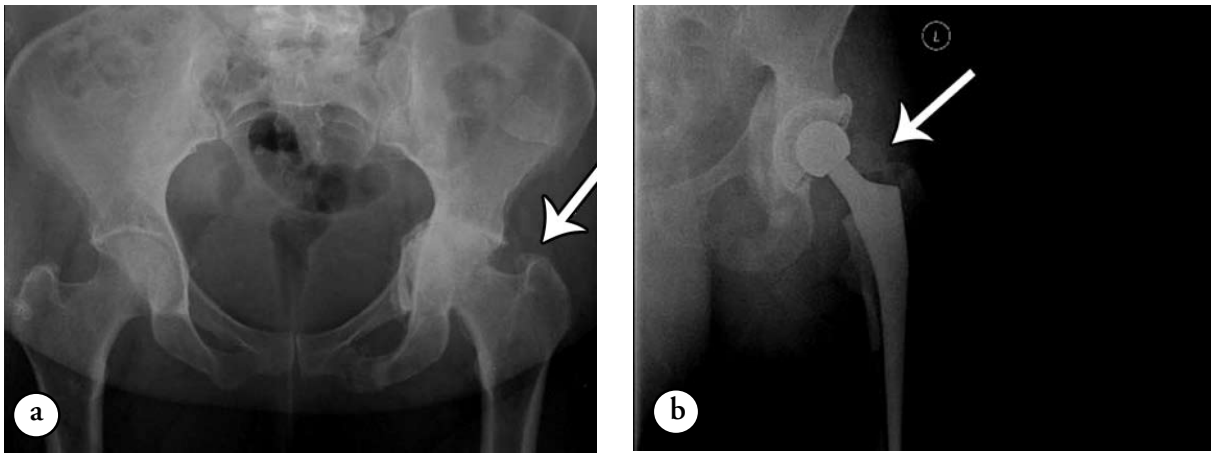


**Figure 3 -** a) A case of rheumatoid arthritis showing advance arthritic changes and protrusio acetabulum (arrow). **b**) Post-total hip replacement of the same patient with reconstruction mesh and allograft bone with cementless cup (arrow).

femoral fractures, which were treated successfully with circulage wiring, one patient needed intraoperative blood transfusion due to low starting hemoglobin and intraoperative blood loss. Moreover, one patient had deep venous thrombosis (DVT) despite prophylactic measures both mechanical and low molecular weight heparin, the patient had DVT on the eleventh postoperative day and one day later was complicated by pulmonary embolism, this patient was admitted to the intensive care unit and was therapeutically anti-coagulated initially with heparin and thereafter with coumadin. The patient was treated successfully and carried out a normal life after this acute episode. There was no positive culture or histopathology suggestive of sepsis. Co-morbidities were included in our review. Four patients had hypertension, 3 patients had diabetes, one patient had hypothyroidism and one patient had endometrial cancer, which diagnosed one year before the time of surgery. Types of hip implant used was based on patient's age, weight, bone quality, activity level, and health status. Consequently, 10 cemented femoral stem and 48 cementless femoral stem were used. Regarding the acetabular part, 40 cementless cups and 18 cemented acetabular cups were used. The mean duration of hospitalization was 9 days (range, 7-32 days); the longest duration of hospitalization was for the patient who developed pulmonary embolism. On follow-up period, all patients had no problems with activities of their daily living, and 11% had temporary pain at the incision site, which improved significantly at their final follow up. In addition, no evidence of loosening was noticed on postoperative x-ray films on acetabular and femoral side.

**Discussion.** This article aims to illustrate our experience with the intraoperative difficulty encountered in primary total hip replacement in Saudi population rather than demonstrating the outcome due to the short term follow up. Most practicing orthopedic surgeons in Saudi Arabia received their training in Europe or North America were primary hip osteoarthritis is a common pathology and most of the encountered primary total hip replacements are carried out for such a reason. In addition, in Europe and North America, hospitals are fully equipped with large variety of implants ranging from simple primary to complex revision implants. Trauma is a common entity that orthopedic surgeons face in Saudi patients as the motor vehicle accident is a quite common in developing countries in comparison to the western industrialized countries.[4] Acetabular fractures are complex, high-energy injuries with the potential for a poor outcome despite appropriate treatment.[5] Displaced acetabular fracture patient may be predisposed to symptomatic posttraumatic degenerative hip arthritis or femoral head avascular necrosis and total hip arthroplasty may eventually be necessary irrespective of the method of the initial management. Even modern fracture management using improved surgical techniques yields an incidence of posttraumatic arthritis approaching 20-30%.[6] Significant deformity of the pelvic ring can be a complicating factor, but this is rare.[7] If the post traumatic arthritis developed, total hip arthroplasty is an effective treatment for post traumatic arthritis.[7] However, total hip replacement when performed after an acetabular fracture, it is carried out to manage secondary degenerative change or, avascular necrosis of the femoral head. The overall prognosis for a patient managed with a total hip arthroplasty after an acetabular fracture is less favorable than that for one managed with an arthroplasty performed because of primary degenerative arthritis.[6,7] Osteonecrosis is a disease known to be associated with multiple factors including steroid use, chronic alcoholism, hemoglobinopathy, trauma and post electric shock.[8,9] Unfortunately, sickle

cell disease is common in Saudi Arabia,[10] Avascular necrosis develops in 3-19% of patients suffering from sickle cell disease and is frequently bilateral.[1] Chronic hemolytic anemia is associated with cortical thickening, sclerosis, and narrowing of femoral medullary canal. This condition can result in proximal femoral fracture while reaming the femoral canal or inserting femoral prosthesis.[1] Narrow femoral canal was found in 10 posttraumatic patients and encountered in only 5 patients who had sickle cell disease, which may hide some genetic involvement behind this in Saudi patients. However, further studies are needed to suggest this. Based on our experience and our review, Saudi patients have shown different pathology of their hip diseases in which most of the hips being post traumatic.

In conclusion, we advised those who like to tackle total hip replacement in Saudi patients, to perform extensive preoperative planning of their patients (computed tomography is strongly recommended) ensuring adequate femoral canal size, availability of intramedullary flexible and rigid reamers and small femoral stem (possibly developmental dysplastic hip stem), also to ensure availability of greater trochanteric fixation system for repairing osteotomized greater trochanter. From the acetabular side, ensure adequate cancellous bone chips for possible grafting in addition to be prepared to perform structural grafting if needed, and to have in their armamentarium wide variety of cemented and cementless cup sizes and roof reinforcement ring in order to tackle the difficulty suggested from our experience.

## References


1. Ilyas I, Moreau P. Simultaneous bilateral total hip arthroplasty in sickle cell disease. ***J Arthroplasty*** 2002; 17: 441-445.
2. Ilyas I, Rabbani SA. Total hip arthroplasty in chronic unreduced hip fracture-dislocation. ***J Arthroplasty*** 2009; 24: 903-908.
3. Ilyas I, Morgan DA. Massive structural allograft in revision of septic hip arthroplasty. ***Int Orthop*** 2001; 24: 319-322.
4. Bener A, Abu-Zidan FM, Bensiali AK, Al-Mulla AA, Jadaan KS. Strategy to improve road safety in developing countries. ***Saudi Med J*** 2003; 24: 603-608.
5. Bellabarba C, Berger RA, Bentley CD, Quigley LR, Jacobs JJ, Rosenberg AG, et al. Cementless acetabular reconstruction after acetabular fracture. ***J Bone Joint Surg Am*** 2001; 83-A: 868-876.
6. Ranawat A, Zelken J, Helfet D, Buly R. Total hip arthroplasty for posttraumatic arthritis after acetabular fracture. ***J Arthroplasty*** 2009; 24: 759-767.
7. Mears DC, Velyvis JH. Primary Total Hip Arthroplasty After Acetabular Fracture. ***Instr Course Lect*** 2001; 50: 335-354.
8. Aldridge JM 3rd, Urbaniak JR. Avascular necrosis of the femoral head: etiology, pathophysiology, classification, and current treatment guidelines. ***Am J Orthop (Belle Mead NJ)*** 2004; 33: 327-332.
9. Vanderstraeten L, Binns M. Osteonecrosis of the femoral head following an electrical injury to the leg. ***J Bone Joint Surg Br*** 2008; 90: 1101-1104.
10. Al-Qurashi MM, El-Mouzan MI, Al-Herbish AS, Al-Salloum AA, Al-Omar AA. The prevalence of sickle cell disease in Saudi children and adolescents. A community-based survey. ***Saudi Med J*** 2008; 29: 1480-1483.



**Related topics**

Simsek A, Cila E, Sener E, Senkoylu A, Sipahioglu S, Akdemir O, Atasever T. Fate of bulk autografts in uncemented total hip arthroplasty. Evaluation by bone scintigraphy. ***Saudi Med J*** 2006; 27: 1835-1838.

Kerimoglu S, Onder C, Aynaci O, Malkoc CH. Hip arthroplasty for ochronosis. ***Saudi Med J*** 2005; 26: 1812-1814.

Saricaoglu F, Akinci SB, Celiker V, Aypar U. The effect of acute normovolemic hemodilution and acute hypervolemic hemodilution on coagulation and allogeneic transfusion. ***Saudi Med J*** 2005; 26: 792-798.