

Direct Lateral Approach for Total Hip Arthroplasty and Its Complications in a Group of Patients

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Abstract

Background: Total hip arthroplasty (THA) aims to treat pain and to restore the joint motion and stability. The surgical approaches to perform it are different, and all approaches have disadvantages or complications. The direct lateral approach (DLA) advantages include the decrement of the dislocation possibility. **Objectives:** The objective of the study was to determine the Harris hip score (HHS) and frequency of complications by gender among a group of patients who underwent THA through DLA, and the mean age of those patients with and without complications. **Materials and Methods:** This is a cross-sectional study conducted from June 2014 to January 2021 and included 80 patients in Saint Raphael Hospital in Baghdad undergoing primary THA by DLA. We excluded patients with revision THA. Age, gender, follow-up period, complications, and HHS were recorded and entered into computer software Microsoft Excel version 2019. Mean $\pm$ standard deviation was used to express continuous variables, whereas frequency and percentage were used to express categorical variables. *t*-test and Chi-square test were used as appropriate. **Results:** There were a total of 80 patients (29 males/51 females). Mean HHS was 96.7 ± 1.5 ; mean HHS and frequency of complications did not differ significantly by gender. The percent of dislocation, fracture, and infection among patients was 3.8%, 5%, and 3.8%, respectively. The mean age did not differ significantly among patients with and without complications. **Conclusions:** Gender had no role in the complications related to DLA, and age had no role in the complications.

Keywords: Complications, direct lateral approach, total hip arthroplasty

INTRODUCTION

Adults suffering from certain diseases of the hip commonly undergo the surgical procedure “total hip arthroplasty” (THA). In this procedure, some parts of the upper femur and acetabulum are replaced with biocompatible materials. The aims of this procedure are to treat pain, to restore the joint mobility, and to achieve stability. A lot of developments occurred in the biomaterials, surgical technique, prosthesis design, and fixation techniques.^[1] The cost-effectiveness of THA has been demonstrated regarding pain reduction and improvement in function and life quality.^[2]

To perform THA, there are multiple surgical approaches. The approaches that are most commonly performed include the direct anterior approach (DAA), posterior approach (PA), and direct lateral approach (DLA).^[2] No approach yet is agreed upon as the best one.^[3] The

decision and choice of which approach to use will often be based on the surgeon's preference and local traditions.^[4] All approaches to the hip have demonstrated safety, efficacy, and advantages, but each has disadvantages or complications that can include dislocation, superficial and deep infection, prolonged wound drainage without infection, aseptic loosening or the failure of osseointegration, periprosthetic fracture, and other complications.^[5]

Smith-Peterson was the first to describe the DAA in the 1940s, and modifications were entered by Heuter in the

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1950s. Worldwide, DAA became popular in the medical field. Those who adopt this approach emphasize that it spares muscles due to its internervous intervals, restores the gait kinematics earlier, and reduces the possibility of dislocation.^[6] Some articles have shown that patients have shorter hospital stays following THA performed through an anterior approach compared with PA,^[2] and this was attributed to the sparing of muscle by this approach.^[7,8] The anterior approach requires less exposure of the femur for medullary reaming, which can create troubles regarding femoral component positioning and femoral shaft complications.^[2] The surgical incision for DAA is shown in Figure 1.^[6]

The PA to the hip was introduced in the 1950s by Moore. It is the most common surgical approach for THA performed around the world according to a recent survey. More than third of Canadian arthroplasty surgeons perform it. Its advantages include the suitable visualization of the acetabulum and femur during surgery, the abductor muscles sparing, and the extensile exposure of the acetabulum and femur as needed. One of the disadvantages of this approach is the increased rate of dislocation in comparison to the anterior and lateral approaches.^[6] The skin incision used for PA is shown in Figure 2.^[6]

The DLA to the hip was described by Hardinge in 1982.^[9] The proximal femur and acetabulum are adequately exposed in this approach. Other advantages include providing an extensile exposure to the femur as needed and lowering the possibility of dislocation as shown in some reports.^[6] The first step of this procedure is placing the patient in the lateral decubitus posture. The limb being operated is draped loosely to facilitate the dislocation of the hip and exposure of the proximal femur and acetabulum. A sterile bag is incorporated into the extremity drape, so that the surgeon can dislocate the hip and visualize the femur during preparation.^[6] The anterior half of the periosteum overlying the greater trochanter must be bisected, and the gluteus medius and minimus

muscles must be reflected. If the approach is extended proximally, the superior gluteal nerve and artery are at a risk of damage. The splitting of gluteal tendon can cause Trendelenburg gait following surgery.^[2] Figure 3 shows the skin incision used for DLA.^[6]

Different and variable studies reported different results regarding which approach is associated with less complication than the other approaches.^[7,10-12] The outcome of the different surgical approaches of THA might be affected by confounding factors such as the educational level of patient and family, patient selection, better pain control, and accelerated rehabilitation.^[10]

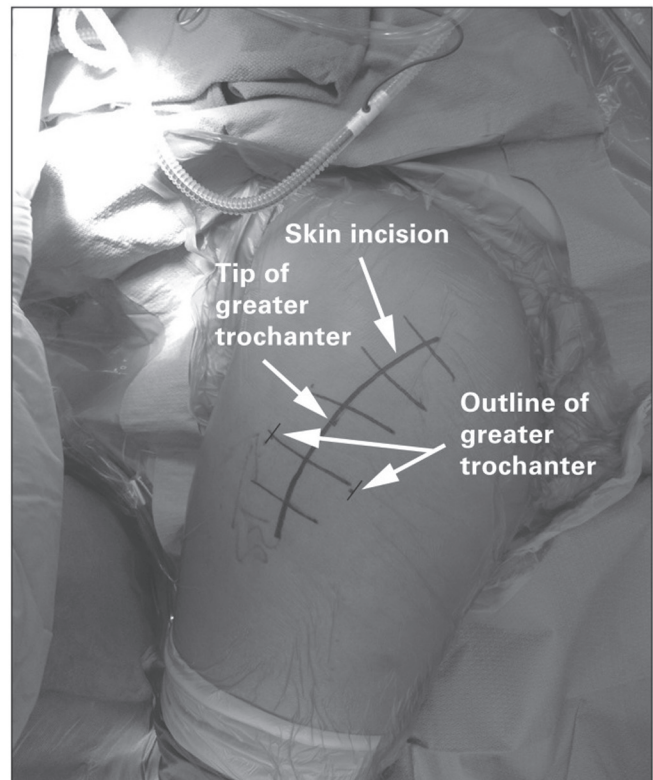


Figure 2: The skin incision used for the PA to the hip

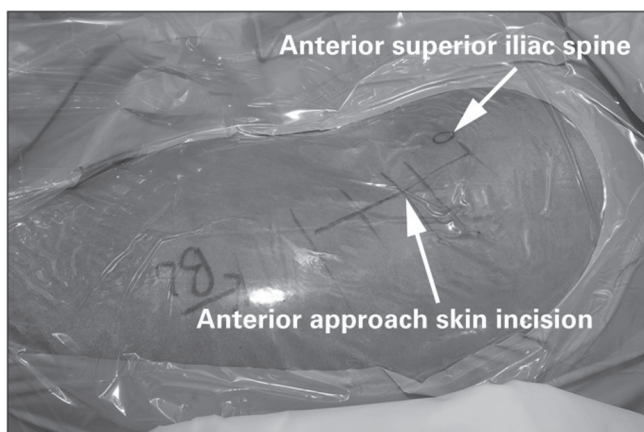


Figure 1: The skin incision used for the DAA to the hip

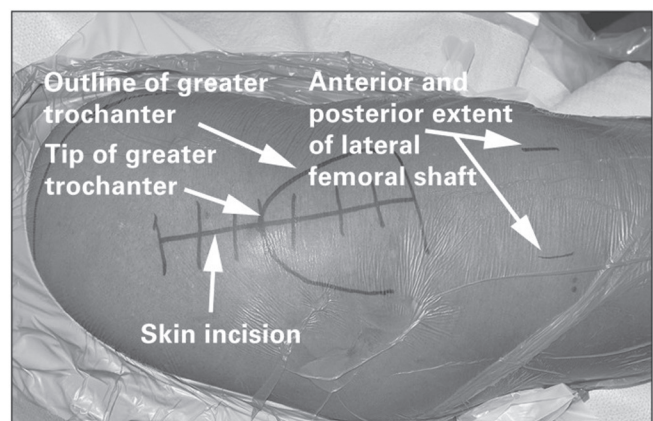


Figure 3: The skin incision used for the DLA to the hip

Table 1: Number of patients, mean $\pm$ SD of age, follow-up period, HHS, and frequency of complications in the study group

No. of patients	80	Age (years), mean $\pm$ SD	Follow-up (months), mean $\pm$ SD	HHS, mean $\pm$ SD	Complications frequency (%)
Male	29	59.7 $\pm$ 7.2	35.9 $\pm$ 19.3	96.7 $\pm$ 1.5	Yes 10 (12.5%)
Female	51				No 70 (87.5%)

There are different methods or indicators to measure the outcome of THA: one of these methods is the Harris hip score (HHS) that consists of pain (0–44) points, function (0–47) points, the range of motion (0–5) points, and the absence of deformity (0–4) points with total scores ranging from 0 to 100.^[3]

The current study aimed at determining the frequency of complications in a group of patients who underwent THA through DLA and determining the frequencies of complications by gender and comparing the means of HHS by gender and follow-up period and the mean of age by complications.

MATERIALS AND METHODS

From June 2014 to January 2021, a cross-sectional study was done. We included 80 patients who had attended Saint Raphael (Al Rahibat) private hospital in Baghdad city, Iraq, to have primary THA due to the femoral neck fracture, femoral head avascular necrosis, and developmental dysplasia of the hip. We excluded patients who have revision THA. All the patients in the study underwent THA by DLA and were followed up after surgery for the sake of diagnosis and treatment of complications if they happen. HHS was used as a measure of outcome for patients. Data about gender, follow-up period, acetabular inclination, and anteversion degrees and femoral anteversion degree, complications, and HHS were recorded and entered into a computer. Complications included dislocation; fracture (intraoperative and postoperative); and infection (superficial and deep). Statistical analysis was done by Microsoft Excel version 2019 statistical software. Continuous variables (follow-up period and HHS) were expressed as mean $\pm$ standard deviation (M $\pm$ SD), whereas categorical variables (gender and complications) were expressed as frequency and percentage (no. and %). *t*-test for the difference of means and Chi-square test were used as appropriate.

Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients' verbal and analytical approval before the sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document number 203 (including the number and the date in 12/5/2014).

Table 2: Mean $\pm$ SD of follow-up period and HHS by gender

Gender	Mean $\pm$ SD, follow-up period (months)	Mean $\pm$ SD, HHS
Male	35.6 $\pm$ 20.7	96.5 $\pm$ 1.5
Female	36 $\pm$ 18.7	96.7 $\pm$ 1.5
<i>P</i> value*	0.9 (nonsignificant)	0.6 (nonsignificant)

**t*-test

Table 3: Frequency of complications by gender

Gender	Frequency of complications		<i>P</i> value*
	Yes	No	
Male	3	26	0.7
Female	7	44	

*Chi-square test

RESULTS

There were a total of 80 patients, of which 29 were males and 51 were females. M $\pm$ SD of the age of patients was 59.7 $\pm$ 7.2 years; M $\pm$ SD of follow-up period was 35.9 $\pm$ 19.3 months; M $\pm$ SD of HHS was 96.7 $\pm$ 1.5 points; and 10 (12.5%) of patients had complications, whereas 70 (87.5%) had no complications. These results are shown in Table 1.

In male patients, acetabular inclination ranged from 30 to 40 degrees and femoral anteversion ranged from 15 to 20 degrees, whereas in females, acetabular inclination ranged from 40 to 45 degrees and femoral anteversion ranged from 10 to 15 degrees. Femoral component anteversion was 10–15 degrees for both genders.

M $\pm$ SD of follow-up period among males and females was 35.6 $\pm$ 20.7 and 36 $\pm$ 18.7 months, respectively, with no significant difference between them (*P* = 0.9). Also, M $\pm$ SD of HHS among males and females was 96.5 $\pm$ 1.5 points and 96.7 $\pm$ 1.5 points, respectively, with no significant difference between them (*P* = 0.6). These results are shown in Table 2.

Comparing the frequencies of complications among males and females yielded a *P* value of 0.7 (nonsignificant). These results are shown in Table 3.

The complications among the study group were classified into no complication; dislocation; fracture (intraoperative fracture and postoperative fracture); and infection (superficial infection and deep infection). These complications are shown in Table 4.

Table 4: Complications in the study group by gender and type of complication

Complication	No complication	Dislocation	Fracture	Infection
Male	26	0	3	0
Female	44	3	1	3
Total number and percent	70 (87.5%)	3 (3.8%)	4 (5%)	3 (3.8%)

Table 5: Mean $\pm$ SD of age of patients by complication

	Age (years), mean $\pm$ SD
Complications ($n = 10$)	61 $\pm$ 12.1
No complications ($n = 70$)	59.5 $\pm$ 6.4
P value*	0.9

* t -test

M $\pm$ SD of the age of patients with and without complications was 61 $\pm$ 12.1 years and 59.5 $\pm$ 6.4 years, respectively. There was no significant difference between them ($P = 0.9$). These results are shown in Table 5.

DISCUSSION

Our study showed that the mean HHS was 96.7, which is close to results in some other studies.^[10,13] It is thought that gender plays a role in the difference in the outcome of THA due to differences in muscle development, strength, and tone.^[14] However, our study found no relationship between mean follow-up period and gender; also, there was no relationship between mean HHS and gender. This indicates that gender had a little impact on the outcome of THA, and this point is more demonstrated by our finding that there was no relationship between gender and frequency of complications. This result is somewhat similar to the results found in other studies, which found no relationship between gender and dislocation following THA,^[14-17] but it was different from the results found by another study.^[18] These differences in the results might be attributable to difference in sample size, selection criteria, or some other factors.

The overall dislocation rate in our study was 3.8%. This rate is within the range of 0.40%–13.8% found in many other studies.^[13,19-22] The lower rate of postoperative instability might arise from multiple factors. First, there is no damage to the posterior capsule, and the anterior structures, with an exclusion of the capsule, are retained and approximated anatomically, closure creates a tight soft-tissue envelope. Furthermore, the surgeon will see the pertinent anatomical landmarks through direct downward vision; therefore, it is easy to achieve correct positioning of acetabular component, even if the patient rolls forward or backward. Other factors such as the compliance of the patient and experience of nursing and physiotherapy staff are crucial in the avoidance of dislocations.^[13] All dislocation cases in our study were in females; therefore, no comparison could be made with males.

Many factors have been associated with dislocation causation, depending on the timing of dislocation (early or late). Reports mention that about 85% of dislocations occur within 2 months following THA. Old age patients, especially those with disorders of balance and vibration sensitivity, are more susceptible to it.^[19]

The overall fracture rate in our study was 5%. This rate is within the range of 1.8%–6% found by some other studies.^[5,23] It is worth mentioning that the four fractures observed in our study included two intraoperative fractures (in male patients) and two postoperative fractures (one in male and one in female patients). Petis *et al.* suggested increased soft-tissue tension and resultant avulsion during femoral preparation as the cause of the intraoperative fractures.^[6]

The overall infection rate in our study was 3.8%. This rate is slightly higher, but close to the rate of 1.2%–2.7% found by some other studies.^[24,25] The three infection cases observed in our study included two superficial infections and one deep infection; all these three cases were in females. Because there was no infection case among males, we could not make a comparison.

Our study showed no relationship between the mean age of patients and occurrence of complications. This result is similar to the results by some other studies,^[26,27] but different from the results by some other studies,^[28,29] and this difference from our results could be due to the fact that our study did not include data about body weight or body mass index or comorbidities, which are included in other studies; therefore, this is a limitation of our study.

CONCLUSIONS

1. HHS mean was excellent at the end of follow-up of patients who underwent THA through DLA.
2. Age and gender had no role in the complications of THA through DLA.

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Conflicts of interest

There are no conflicts of interest.

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