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SHORT REVIEW OF DIRECT ANTERIOR APPROACH VS. LATERAL APPROACH IN TOTAL HIP ARTHROPLASTY - ONE MONTH AFTER SURGERY

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Abstract

Direct anterior approach is a popular approach for primary total hip arthroplasty. The lateral approach is standard procedure in our department. The aim is to compare the duration of the surgical intervention with the two approaches, the blood loss from the procedure and to evaluate the post-op X-rays of the implant as well as to compare the complications.

Methods: The surgical procedure was performed by the same surgical team with many years of experience in the application of both approaches. The study sample was 200 patients with both approaches in a period of nine months. We measured the duration of the surgical procedure from the moment the patient was brought into the operating room until he was taken out of it. Red blood cells and hemoglobin were measured preoperatively, first and second postoperative day. All patients were treated with tranexamic acid 30 minutes before incision and three hours after the closure. Postoperatively, X-ray controls were performed with a standard method, operated hip with A-P and lateral position and pelvic X-ray with both hips. The occurrence of complications was investigated in the first month. Descriptive statistics and Cox analysis were applied.

Results: The duration of the surgical procedure with the direct anterior approach is 16 minutes longer, the blood loss with the use of tranexamic acid before incision and three hours after closure is lower. Positioning the femoral stem in varus and fractures of the greater trochanter are slightly more common. Postoperative recovery is much faster in the DAA.

Conclusion: After mastering and familiarizing the surgical team with DAA, the advantages of it are rapid postoperative rehabilitation and the patient's return to normal life. The most common difficulties with positioning of the endoprosthesis and intraoperative complications are insignificant.

Key words: direct anterior approach, lateral approach, total hip arthroplasty, blood loss, tranexamic acid, postoperative X-ray, greater trochanter fracture, postoperative recovery, rehabilitation.

Introduction

Direct anterior approach (DAA) in total hip arthroplasty is established as a successful approach for primary total hip arthroplasty [1.2]. Early experience was marred by complications an associated learning curve [3-8], and after structured training surgeons are familiar with this approach. Contemporary DAA THA is also facilitated by approach-specific instrumentation.

The lateral approach (LA) is a common approach in our institution practiced by all surgeons. Its advantages and disadvantages are clearly established. Therefore, we sought to examine blood loss, X-ray implant positioning and early complications after THA in both approaches.

Materials and Methods

After institutional review board approval, our institutional total joint registry was used to identify patients who underwent primary THA with DAA and Lateral Approach in period March- December 2024. This study included 200 primary THA with DAA and LA.

Patients were included regardless of the indications for the surgical procedure, and one surgeon performed cases during the study period. All included cases were performed without extension of the hip in supine position. Intraoperative fluoroscopy is used at the discretion of the surgeon.

The patients were given spinal anesthesia by different anesthesiologists. Operative time – the duration of the intervention includes sterile preparation and isolation of the surgical field and the surgical procedure until the patient is removed from the operating table.

For this study, the patients' outcomes were analyzed at one month postoperatively. Periprosthetic joint infection (PJI) was diagnosed using standardized criteria.

The majority (97%) of patients had no history of undergoing a surgical procedure on the operatively treated extremity. In all patients were used cementless endoprosthesis (shells and stems). Indications for THA were osteoarthritis 83%, posttraumatic arthritis 6%, osteonecrosis 7% and inflammatory arthropathy 4%.

Patients were divided into two groups. Both groups had 100 patients. Patients with extremely high BMI were excluded from the DAA group due to difficult positioning of the femur for femoral canal processing and stem placement. In the first group of 100 patients, 32 were men and 68 were women. The mean BMI was 25.2, mean patient age 57.2 years. Red blood cells 4.12, hemoglobin 13.5. In the second group 43 were man and 57 women. The mean BMI was 28.7, mean patient age 67.5. Red blood cells 4.02, hemoglobin 13.7. Tranexamic acid was administered to the patients half an hour before incision and three hours after closure.

Descriptive statistics were calculated and reported as the mean and the standard deviation and frequencies and percentage.

Table 1. Demographic Comparison Between DAA and LA

Parameter	**Direct Anterior Approach (DAA)**	**Lateral Approach (LA)**
Number of patients	100	100
Male : Female ratio	32 : 68	43 : 57
BMI (range)	25.2 (18.3 - 29.0)	28.7 (23.2 - 31.7)
Mean Age (years)	57.2	67.5
Tranexamic Acid Administration	1g, 30 mins. pre-incision & 3 hrs. post-closure	1g, 30 mins. pre-incision & 3 hrs. post-closure

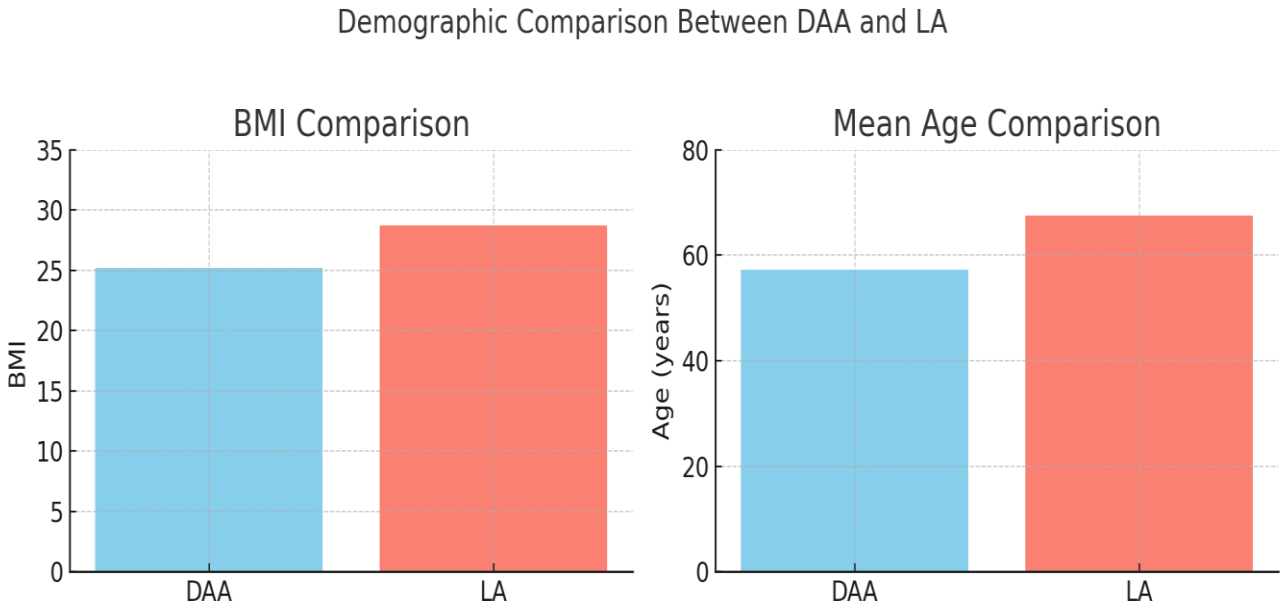
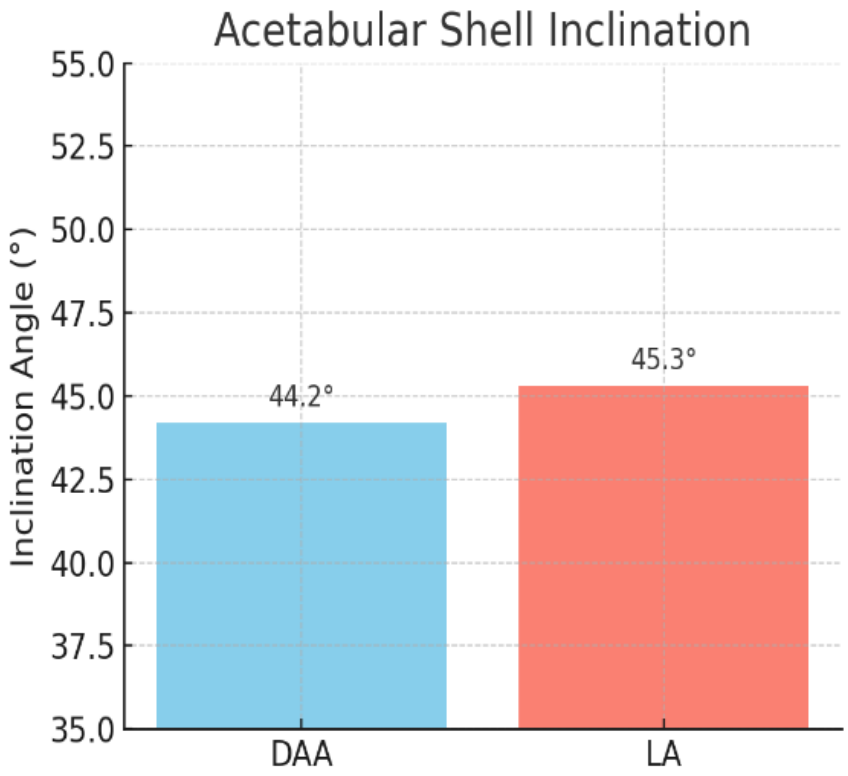


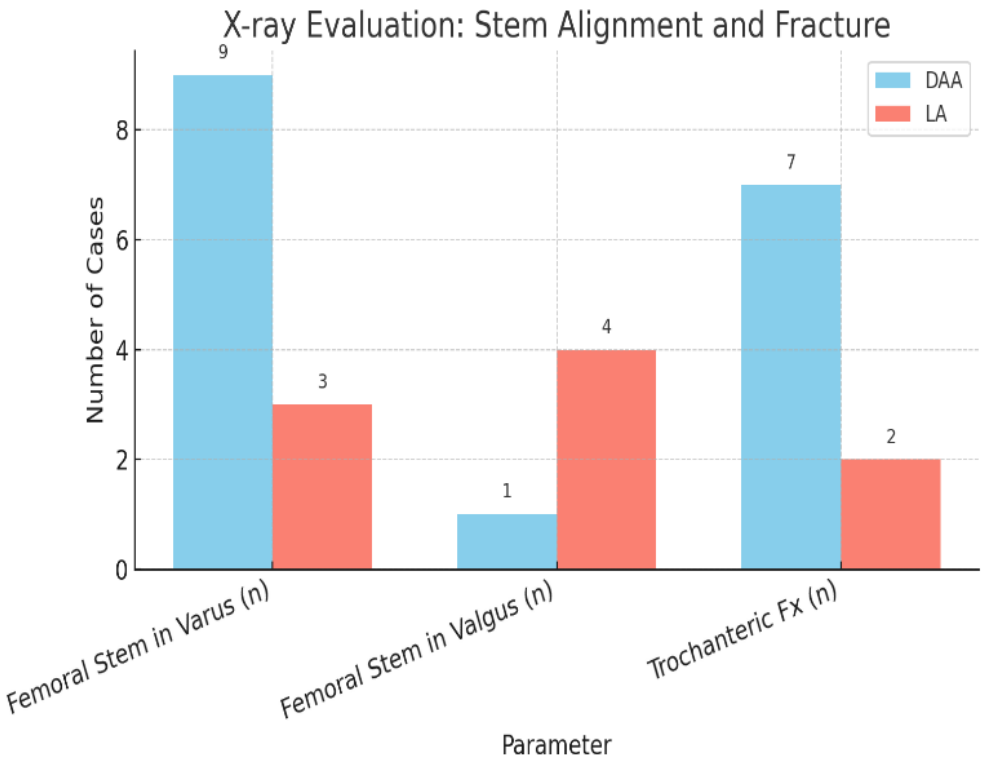
Table 2. Clinical Results Comparison Between DAA and LA

Parameter	**Direct Anterior Approach (DAA)**	**Lateral Approach (LA)**
Pre-op RBC	4.1	4.02
Pre-op HGB	13.5	13.7
1st post-op day RBC	3.9	3.8
1st post-op day HGB	12.9	12.1
2nd post-op day RBC	3.7	3.5
2nd post-op day HGB	12.7	11.7
Blood transfusion (n)	2	5
Duration of intervention	87 min	76 min

Table 3: X-ray evaluation of the prosthesis

Parameter	Direct Anterior Approach (DAA)	Lateral Approach (LA)
Acetabular shell Inclination	44.2˚ (39˚ - 50˚)	45.3˚ (37-49˚)
Femoral Stem in Varus	9	3
Femoral Stem in Valgus	1	4
Trochanteric Fxs	7	2





Results

In the DAA group, the mean BMI was 25.2, with mean patient age of 57.2 years. Red blood cells were 4.12, hemoglobin 13.5. First postoperative day RBC 3.9, hemoglobin 12.9. Second postoperative day RBC 3.7, hemoglobin 12.7. In the second group 43 were man and 57 women.

The mean BMI was 28.7 and the mean age was 67.5. Red blood cells were 4.02, hemoglobin was 13.7. First postoperative day RBC was 3.8 and the hemoglobin was 12.1. Second postoperative day RBC were 3.5 with hemoglobin values of 11.7.

Tranexamic acid was administered as discussed above. Blood transfusion was given to two patients in first group and to five patients in second group.

The duration of the whole procedure included the period from induction of spinal anesthesia meaning from positioning of the patient to closure of the surgical wound. The mean duration of the intervention with DAA was 87 minutes. The mean duration of the intervention with lateral approach was 76 minutes. Radiological measurements in DAA were as follows:

Mean acetabular shell position was 45.3°, nine stems were in a varus position with an angle of 6° and one stem in a valgus position of 4°. Trochanteric mass fracture was present in 6 patients, early periprosthetic infection in one patient.

In patients with lateral approach, mean acetabular shell position was 44.2°, while 3 stems were in a varus position with angles through the range of 0 to 5.5° and 4 stems were in a valgus position with an average angle of 4.7°.

Trochanteric mass fracture occurred in 2 patients. Three patients had early periprosthetic infection. Hip dislocation occurred on the third postoperative day in one patient with lateral approach.

Manual reduction was performed and the dislocation did not reoccur. Harris Hip Score before operation was 64 (59-67) for DAA and 58 (51-72) in LA. 1 month after operation the scores were 94 (85-97) in DAA and 81 (70-92) in LA.

Discussion

DAA is gaining in popularity[1]. The early experience with this approach was impacted by many surgeons contending with a steep learning curve during adoption [3-5]. Results after this period [8] and among surgeons with training with the approach [9,10], have been encouraging.

Also, this approach has been facilitated in contemporary practice by the development of approach-specific instrumentation more amenable to an anterior approach. In our series intraoperative periprosthetic fractures occurred in 2.5% of patients. This rate is similar to the rate of trochanteric fractures reported by Abdel et al in large cohort of THA cases performed primarily via posterior or anterolateral approaches [11]. But higher than that reported by Sershon et al [12].

Following primary THA in our series, instability occurred in 1patient. Similarly, Haynes et al [13] reported that 0.5% of their patients sustained dislocation and 0.2% required revision for instability.

They found that these rates were significantly lower than their dislocation rate using a lateral approach.

Conclusion

In conclusion, it can be said that the number of operated patients is a small sample, which compared with early results from large series by other authors is similar.

Blood loss during surgical treatment is lower in DAA but insignificantly of interest. Tranexamic acid was given in both groups before and three hours after surgery. The lower blood loss in DAA is partly due to the lower BMI in the patients in the first group.

We do not recommend surgical treatment with DAA for obese patients due to difficult positioning for implantation of the femoral component. Visibility of the acetabular cavity is better with DAA and thus allows better positioning of the acetabular shell.

When implanting the femoral component, good capsular release is required due to the possibility of fracture of the trochanteric mass as well as varus position of the femoral stem.

Joint mobility is restored more quickly with DAA and the patient uses crutches for a short period after surgery, a maximum of 10-15 days, unlike the lateral approach when crutches need to be used for 6 weeks until the gluteal muscle attachments in the trochanter area heal.

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