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TWO SURGICAL APPROACHES IN IMPLANTATION OF TOTAL HIP ENDOPROSTHESIS - A SINGLE CENTER EXPERIENCE

ДВА ХИРУШКИ ПРИСТАПИ ПРИ ИМПЛАНТАЦИЈА НА ТОТАЛНА ЕНДОПРОТЕЗА НА КОЛК-ИСКУСТВА НА ЕДЕН ЦЕНТАР

Aleksandar Trajanovski, Teodora Todorova, Aleksandar Saveski, Dalip Jahja, Antonio Gavrillovski, Andrej Gavrillovski and Maja Mojsova

University Clinic for TOARILUC (Clinic for Traumatology, Orthopedic diseases, Anesthesia, Reanimation, Intensive care and Emergency Centre), Faculty of Medicine, Ss. Cyril and Methodius University, Skopje, Republic of North Macedonia

Abstract

Introduction. Degenerative hip diseases are one of the most common musculoskeletal disorders. The large number of patients and the large number of surgeries performed annually at the University Clinic for TOARILUC, due to degenerative hip diseases, as well as the existing controversy regarding the choice of optimal approach to implantation of total hip endoprosthesis, were the motivation for conducting this study.

Aim of the study. To perform a comparative analysis of the results obtained after the application of two approaches in the implantation of total hip endoprosthesis.

Methods. This retrospective-prospective study was performed at the University Clinic for TOARILUC in Skopje from January 2018 to May 2021. A total of 60 surgically treated patients with degenerative hip disease were included in the study. The patients were divided into 2 groups based on the approach chosen for implantation of a total hip endoprosthesis, a modified Watson Jones antero-lateral approach according to group A (AA), and group B with a posterior approach (PA).

Results. The mean age of patients was 62.6 years in AA group and 71 years in PA group. Most of the patients from the two groups were retired and had normal BMI. The difference between the level of preoperative and postoperative creatinine kinase in PA group was statistically significant ($p < 0.0001$). We compared the postoperative creatinine kinase level between the two groups and found statistically significant difference ($p < 0.00001$). In most of the patients (34%) treated with the posterior approach the surgery lasted for more than 2 hours, and in those with AP approach (100%) it lasted up to 2 hours. Only one complication occurred in the group with posterior approach to the hip, and it was dislocation of the prosthesis two weeks after the surgery.

Conclusion. Patients operated with a modified antero-lateral approach according to Watson Jones had shorter and more effective rehabilitation than patients operated with posterior approach. The duration of surgery was also shorter compared to the group treated with posterior approach. Only one complication occurred during the study in the group with posterior approach, and it was dislocation of the prosthesis two weeks after the surgery.

Keywords: modified antero-lateral approach, posterior approach, Harris Hip score

Апстракт

Вовед. Дегенеративните заболувања на колкот се едни од најчестите нарушувања на мускулно-скелетниот систем. Големиот број на пациенти и големиот број на операции што се прават годишно на Универзитетската клиника за ТОАРИЛУЦ, поради дегенеративни заболувања на колкот, како и постојната полемика во врска со изборот на оптимален пристап за вградување на тотална ендопротеза на колкот, се мотив за тоа истражување.

Цел на студијата. Да се изврши компаративна анализа на резултатите добиени по примената на двата пристапа при имплантација на тотална ендопротеза на колкот.

Методи. Ова е ретроспективно-проспективно истражување извршено на Универзитетската клиника за ТОАРИЛУЦ во Скопје во период од јануари 2018 до мај 2021 година. Вкупно 60 хируршки третирани пациенти со дегенеративно заболување на колкот беа вклучени во студијата. Пациентите беа поделени во 2 групи врз основа на избраниот пристап за имплантација на тотална ендопротеза на колкот, модифицираниот антеро-латерален пристап според Watson Jones групата А и групата Б со заден пристап.

Резултати. Средната возраст беше 62,6 години во групата АП и 71 година во групата ПП. Повеќето пациенти од двете групи биле во пензија со нор-

Correspondence to: Aleksandar Trajanovski, University Clinic for TOARILUC (Clinic for Traumatology, Orthopedic diseases, Anesthesia, Reanimation, Intensive care and Emergency Centre) Skopje, R. N. Macedonia; Phone 389 78 71 09 69, E- mail: dr_trajanovski@yahoo.com

мален БМИ. Разликата помеѓу вредноста на пред-оперативната и постоперативната креатин киназа кај групата ПП е статистички значајна со $p < 0,0001$. Ние ја споредивме постоперативната вредност на креатин киназата помеѓу две групи и откривме дека разликата се смета за статистички значајна со $p < 0,00001$. Повеќето пациенти, третирани со заден пристап имале оперативно време повеќе од 2 часа, 34% од ПП и 100% од пациентите од групата АП имале оперативно време до 2 часа. Само една компликација се појави во групата со заден пристап, дислокација на протезата две недели по операцијата.

Заклучок. Пациентите оперирани со модифициран антеро-латерален пристап според Watson Jones, имаат пократка и поефикасна рехабилитација отколку пациентите оперирани со заден пристап. Времетраењето на операцијата беше исто така пократко во споредба со групата третирана со заден пристап. Само една компликација се случи за време на студијата во групата со заден пристап, а тоа беше дислокација на протезата две недели по операцијата.

Клучни зборови: модифициран антеро-страничен пристап, заден пристап, Harris Hip резултат

Introduction

Osteoarthritis (OA), also known as age-related arthritis or degenerative joint disease, is among the most often joint disorders worldwide [1]. It can involve any joint, and primarily affect the articular cartilage and surrounding soft tissues [2]. The hip joint is body's largest weight-bearing joint, secondary to the knee, and is commonly affected by OA [3]. This process presents with progressive loss of the articular cartilage, osteophytes, subchondral cysts, muscle weakness, periartricular ligamentous laxity and synovial inflammation [2]. The involvement of the hip results in reduced mobility and physical impairment that often leads to loss of independence and to increased use of health services. It has serious impact on daily activities of patients and substantial disability or dependency in stair climbing, rising from a seated position, walking or using a public transportation.

OA of the hip may be primary, if it occurs in the absence of trauma or disease but is associated with the risk factors such as female gender, age of the patients, obesity, anatomical factors, etc. On the other hand, secondary OA occurs with pre-existing abnormality of the joint such as trauma or congenital disorder of the hip, avascular necrosis, inflammatory or infectious arthritis, osteoporosis, Marfan syndrome or hemoglobinopathy [4,5]. Its presentation and progression can vary from person to person, but it is mainly presented with joint pain, locomotor restriction and stiffness; it may also manifest as muscle weakness and balance issue. The diagnosis is based on the clinical examination with serious

limitation on the range of motion and radiology findings.

OA of the hip is treated surgically by implantation of total hip endoprosthesis, for which different surgical approaches are used, and the choice of the optimal approach depends on the experience of the surgeon. Even today, there is still no general consensus among orthopedic surgeons around the world about the best approach for primary total hip arthroplasty, because both approaches (modified antero-lateral by Watson Jones and posterior) have their advantages and limitations. A review of studies by Jolles and Bogoch [6] to determine which approach is superior to the other showed that, despite numerous studies examining the effect of the surgical approach in total hip arthroplasty (THA), the quality and number of such examinations are insufficient to provide a firm conclusion as to whether one approach is superior to the other. Of the four prospective cohort studies included in this review, only one study by Barber *et al.* [7] included functional outcomes, using the Harris Hip Score and 2-year patient follow-up, involving 49 patients. The impact of the surgical approach on the rate of dislocation after primary total hip arthroplasty has also been the primary focus of a number of studies [8-12], but to date there is still no agreement as to which approach is associated with the higher dislocation rate.

The aim of our study was to perform a comparative analysis of the results obtained after the application of both approaches, modified antero-lateral Watson Jones and posterior approach, in the implantation of the total hip endoprosthesis as well as to determine the impact of the surgical approach on intraoperative complications, on the type and severity of postoperative complications. Also, it was our aim to determine the impact on the length and quality of rehabilitation.

Materials and methods

Patients and treatment

The study was conducted at the University Clinic for TOARILUC in Skopje, at the Clinic for Orthopaedic Diseases and the Clinic for Traumatology in a retrospective-prospective setting. A total of 60 surgically treated patients with degenerative hip disease were included in the study. The patients were assigned to 2 groups based on the approach chosen for implantation of a total hip endoprosthesis, a modified Watson Jones antero-lateral approach-group A, and a posterior approach-group B. Patients signed informed consent for the procedure itself, as well as for voluntary inclusion in the study, according to the principles of good clinical practice. We determined the following parameters: -clinical preoperative parameters [body mass index, laboratory (blood count, complete biochemical analysis, hemostasis with D-dimers)], -the level of creatini-

ne kinase, Harris Hip Score result and Visual Analogue Scale, (abduction, adduction, internal and external rotation of the hip), -intraoperative parameters (duration of operative intervention), -postoperative parameters (control laboratory -blood count, complete biochemical analysis, hemostasis with D-dimers), -functional results (active and passive movements in the hip) and complications (infection, endoprosthesis luxation, limb shortening, fracture). Follow-up of patients after discharge was scheduled on the 30th postoperative day, and subsequent check-ups 6 and 12 months after surgery.

Statistical analysis

All results were analyzed with the statistical program Statistics 8 for Windows, and the results obtained are presented in figures. Methods of descriptive statistics were used, such as non-parametric and parametric statistical analyses. Percentage and structure were determined for attributive series. The relationship between two samples with numerical features was determined with the Pearson correlation coefficient (p). Differences between two independent numerical samples were determined with t-test for independent samples and Mann-Whitney U test was used. Levels of probability for the realization of the null hypothesis, which were used in accordance with international standards for biomedical sciences, were 0.01 and 0.05.

Results

There were two groups of patients. The first group comprising 30 patients was treated with anterior approach (AA) and the second group of 30 patients was treated with posterior approach (PA). The mean age was 62.6 years in AA group and 71 years in PA group. Distribution of patients according to gender with female domination is presented in Figure 1.

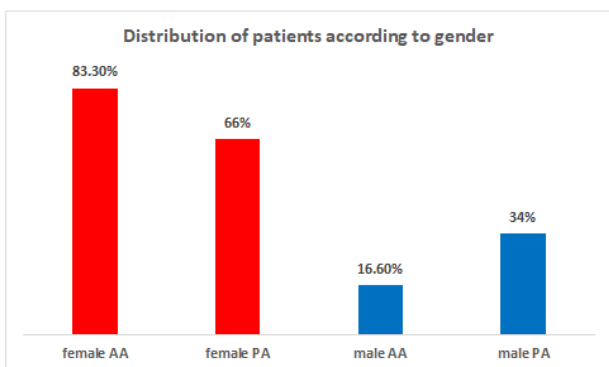


Fig. 1. Distribution of patients according to gender

Most of the patients from the two groups were retired (Figure 2).

Most of the patients who were treated with posterior and anterior approach had normal BMI (18.5-24.9) (Figure 3).

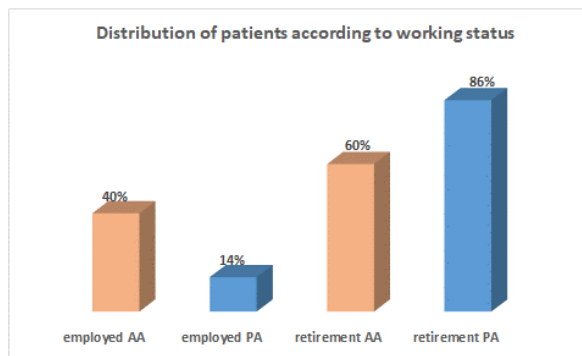


Fig. 2. Distribution of patients according to working status

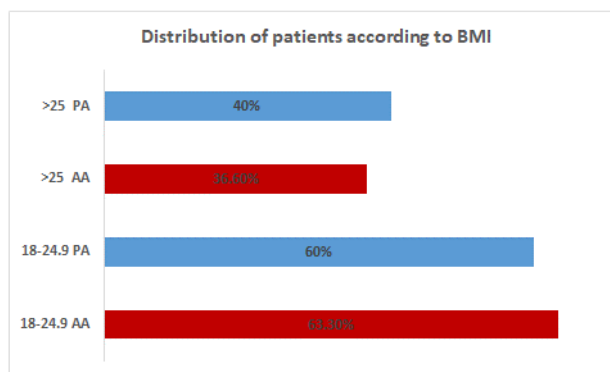


Fig. 3. Distribution of patients according to BMI

The average level of preoperative and postoperative creatine kinase is presented in Figure 4.

We used t-test to compare the value of preoperative and postoperative creatine kinase in PA group and we found an extremely statistically significant difference ($p < 0.0001$); 95% confidence interval of this difference: from -3761.98 to -2933.28. Then, we used the Mann-Whitney U test and we compared postoperative level of creatine kinase between the two groups and we found a statistically significant difference ($p < 0.00001$).

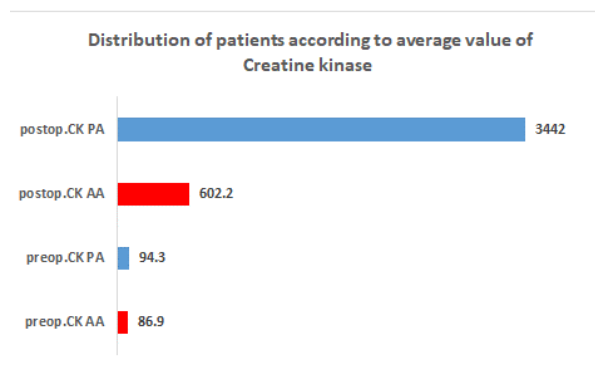


Fig. 4. Distribution of patients according to Creatine kinase

Distribution of patients according to diagnosis is presented in Figure 5.

In most of the patients (66%) treated with the posterior approach the surgery lasted for more than 2 hours,

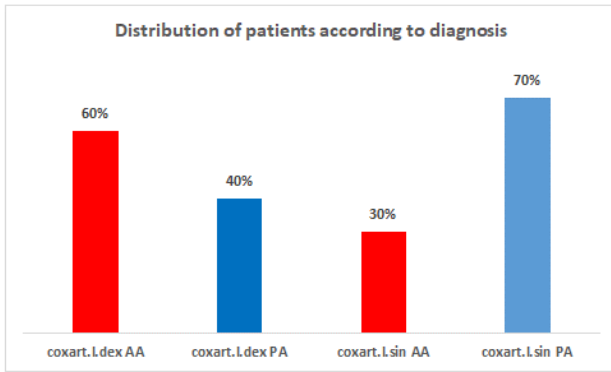


Fig. 5. Distribution of patients according to diagnosis

while 34% of patients in PA and 100% of patients in AP group had an operating time of 2 hours. Distribution of patients according to time of hospitalization is presented in Figure 6.

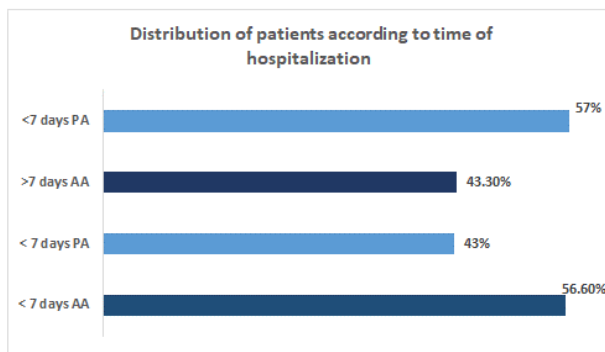


Fig. 6. Distribution of patients according to time of hospitalization

All patients (100%) from both groups had Harris hip score <70 on the first preoperative day.

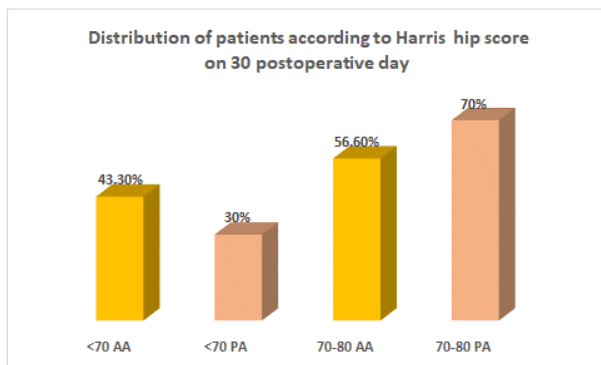


Fig. 7. Distribution of patients according to Harris hip score on 30th postoperative day

Figure 8 and Figure 9 show distributions of patients according to Harris hip score at 6 and 12 months postoperatively.

According to VAS scale preoperative patients had score 7 to 10 in AA and 8 to 10 in PA group (Figures 10 and 11).

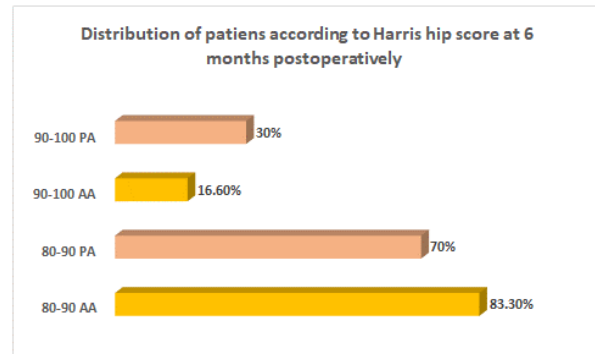


Fig. 8. Distribution of patients according to Harris hip score at 6 months postoperatively

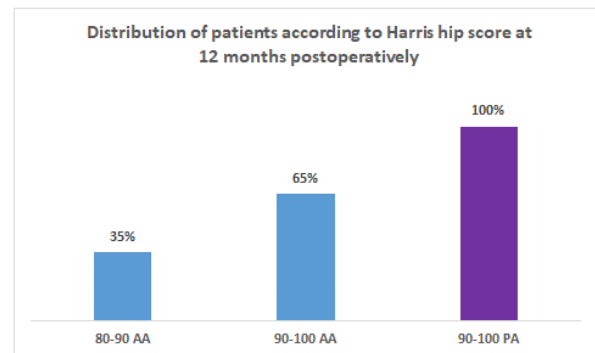


Fig. 9. Distribution of patients according to Harris hip score at 12 months postoperatively

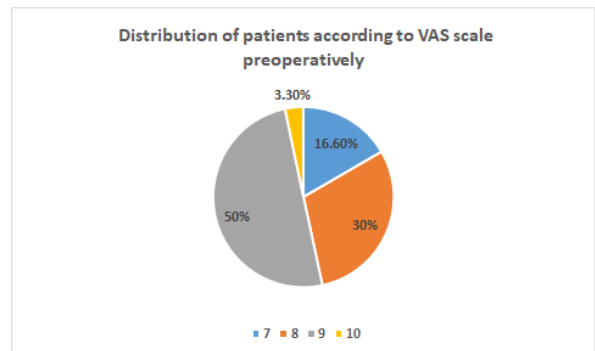


Fig. 10. Distribution of patients in AA group according to VAS scale preoperatively

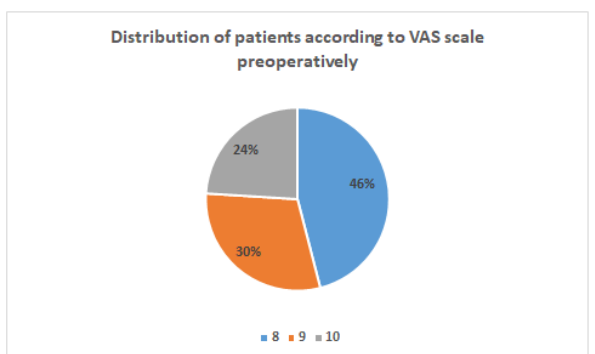


Fig. 11. Distribution of patients in PA group according to VAS scale preoperatively.

Distribution according to VAS scale on the 30th postoperative day is presented in Figures 12 and 13.

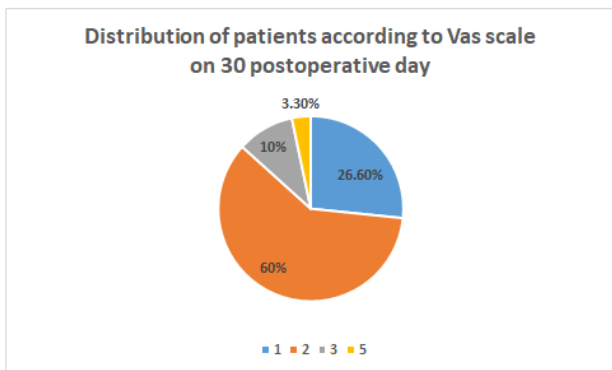


Fig. 12. Distribution of patients in AA group according to VAS scale on the 30th postoperative day

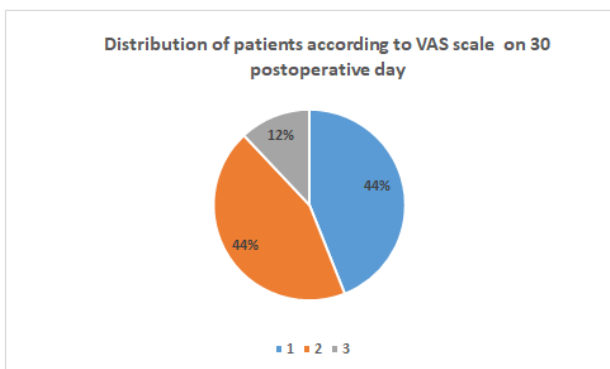


Fig. 13. Distribution of patients in PA group according to VAS scale on the 30th postoperative day

Assessment of pain according to VAS scale at 6 and 12 months postoperatively showed score 0 (no pain) in all patients from AA and PA groups.

The average operative and postoperative surgical drainage of blood was 461 ml in AA group and 680 ml in PA group. All patients (100%) received one unit of blood after surgery in PA group. In the anterior approach group 43.3% of patients received one unit of blood after surgery, and 56.6% received two units of blood after surgery (Figure 14).

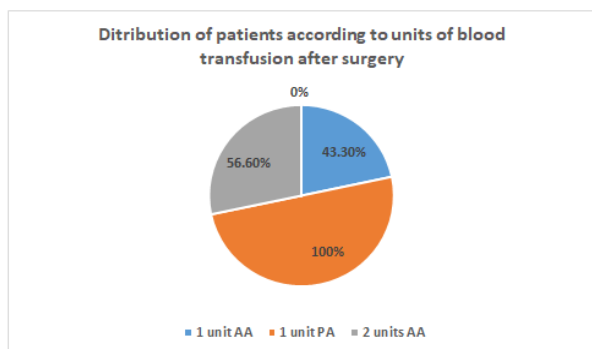


Fig. 14. Distribution of patients in AA and PA groups according to units of blood transfusion after surgery

Most of the patients underwent long rehabilitation lasting for more than 20 days (Figure 15).

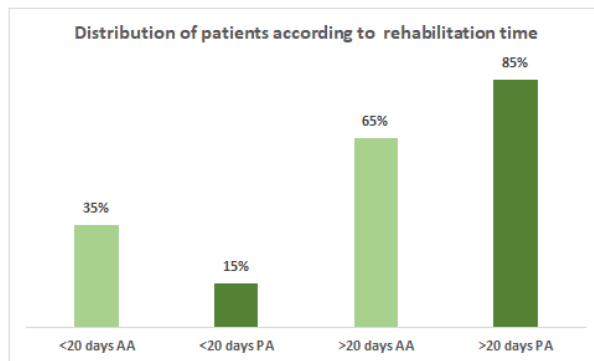


Fig. 15. Distribution of patients in AA and PA groups according to days of hospitalization

The mean value of preoperative and postoperative D-dimers in AA and PA groups is presented in Figure 16.

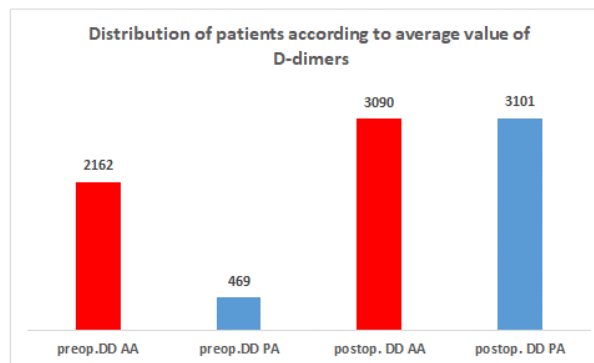


Fig. 16. Distribution of patients according to average value of D-dimers

We used t-test to determine preoperative and postoperative D-dimer levels and we found extremely statistically significant difference ($p < 0.0011$); 95% confidence interval of this difference: from -4255.17 to -1129.49. We used the Mann-Whitney U test and we compared preoperative level of D-dimers between the two groups and we found a statistically significant difference ($p < 0.01$).

Discussion

According to gender most of the patients in our study were female. Most of the patients had normal BMI 18.5-24.9. The length of the skin incision was under 10 cm in both groups. Patients operated with modified antero-lateral approach according to Watson Jones had shorter operating time compared to patients operated with posterior approach. Patients operated with posterior approach had longer hospital stay than patients operated with modified antero-lateral approach according to Watson Jones. In this study we obtained similar results as those published in the study by Wang Gang *et al.* in 2010 [17].

The approach can be declared minimally invasive if the positioning of the prosthesis is associated with sparing as many anatomical structures as possible. Sparing the periarticular muscles is generally quite important, because the separation and reinsurance of the tendons, despite good healing, involves local "biological fatigue" and leads to a longer period of rehabilitation. There is a general consensus that the length of the skin incision is not what determines the success of the surgery, but the sparing of the soft tissue and neurovascular structures. Of particular importance is the adequate positioning of the patient, which will allow the surgeon to optimally position the femoral stem and the acetabular component, which is a supination position. This is generally the preferred position for surgeons, even when navigation systems are used. Anaesthesiologists also prefer the conventional supination position, due to the possible need for urgent intubation during regional anaesthesia. In our country and in our clinic, the most commonly used approach is the modified antero-lateral approach according to Watson Jones, mainly due to the rapid rehabilitation of patients and shorter hospital stay. On the other hand, in implantation of a total hip replacement, a posterior approach can be used, for which there are several modifications. It was first described and applied in 1874 by Von Langenbeck. The modern posterior approach is closest and most reminiscent developed by Moore in 1957, and it is also known as the "Southern" or Moore approach [13-15]. Even today, there is still no general agreement among orthopaedic surgeons around the world, which is the best approach for primary total hip arthroplasty, because both approaches have their advantages and limitations. A review of studies by Jolles and Bogoch [16] regarding the most acceptable approach showed that, despite numerous studies examining the effect of the surgical approach in THA, the quality and number of such examinations are insufficient to provide a firm conclusion as to whether one approach is superior to the other.

Conclusion

In conclusion, in our patients operated on with a modified antero-lateral approach according to Watson Jones, postoperative rehabilitation was shorter and more effective than in patients operated on with a posterior approach. The duration of surgery in patients operated on with a modified antero-lateral approach was shorter than in patients operated on with a posterior approach. There was a lower rate of complications in the modified antero-lateral approach compared to the posterior; in our study only one complication was registered, and it was dislocation of the endoprosthesis, only two weeks after the surgical treatment.

Conflict of interest statement. None declared.

Reference

1. Barbour KE, Helmick CG, Boring M, Brady TJ. Vital signs: Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation-United States, 2013-2015. *MMWR Morb Mortal Wkly Rep* 2017; 66(9): 246-253. DOI: <https://doi.org/10.15585/mmwr.mm6609e1>. [PMC free article] [PubMed] [Google Scholar]
2. Hutton CW. Osteoarthritis: The cause not result of joint failure? *Ann Rheum Dis* 1989; 48(11): 958-961. DOI: <https://doi.org/10.1136/ard.48.11.958>. [PMC free article] [PubMed] [Google Scholar]
3. Zhang Y, Jordan JM. Epidemiology of osteoarthritis. *Clin Geriatr Med* 2010; 26(3): 355-369. DOI: <https://doi.org/10.1016/j.cger.2010.03.001>. Erratum in: *Clin Geriatr Med* 2013 May; 29(2):ix. DOI: <https://doi.org/10.1016/j.cger.2013.01.013>. [PMC free article] [PubMed] [Google Scholar]
4. Donahue SW. Krogh's principle for musculoskeletal physiology and pathology. *J Musculoskelet Neuronal Interact* 2018; 18(3): 284-291. [PMC free article] [PubMed]
5. Krishnan Y, Grodzinsky AJ. Cartilage diseases. *Matrix Biol* 2018; 71-72: 51-69. [PMC free article] [PubMed] [Reference list]
6. Hootman JM, Helmick CG. Projections of US prevalence of arthritis and associated activity limitations. *Arthritis Rheum* 2006; 54: 226-229. [PubMed] [Google Scholar]
7. Barber TC, Roger DJ, Goodman SB, Schurman DJ. Early outcome of total hip arthroplasty using the direct lateral vs the posterior surgical approach. *Orthopedics* 1996; 19: 873-875. [PubMed]
8. Berry DJ, von Knoch M, Schleck CD, Harmsen WS. Effect of femoral head diameter and operative approach on risk of dislocation after primary total hip arthroplasty. *J Bone Joint Surg Am* 2005; 87: 2456-2463. [PubMed]
9. Hedlundh U, Hybbinette CH, Fredin H. Influence of surgical approach on dislocations after Charnley hip arthroplasty. *J Arthroplasty* 1995; 10: 609-614. [PubMed]
10. Kwon MS, Kuskowski M, Mulhall KJ, et al. Does surgical approach affect total hip arthroplasty dislocation rates? *Clin Orthop Relat Res* 2006; 447: 34-38. [PubMed]
11. Masonis JL, Bourne RB. Surgical approach, abductor function, and total hip arthroplasty dislocation. *Clin Orthop Relat Res* 2002; 405: 46-53. [PubMed]
12. Soong M, Rubash HE, Macaulay W. Dislocation after total hip arthroplasty. *J Am Acad Orthop Surg* 2004; 12: 314-321. [PubMed]
13. Von Langenbeck B. Uber die schussverletzungen des huftgelenks. *Arch Klin Chir* 1874; 16: 263. [Google Scholar]
14. Moore AT. The self-locking metal hip prosthesis. *J Bone Joint Surg Am* 1957; 39-A: 811-827. [PubMed] [Google Scholar]
15. Chechik O, Khashan M, Lador R, et al. Surgical approach and prosthesis fixation in hip arthroplasty world wide. *Arch Orthop Trauma Surg* 2013; 133: 1595-1600. [PubMed] [Google Scholar]
16. Jolles BM, Bogoch ER. Posterior versus lateral surgical approach for total hip arthroplasty in adults with osteoarthritis. *Cochrane Database Syst Rev* 2004; 1: CD003828. [PubMed]
17. Gang W, Gui-shan G, Dan L, et al. Comparative study of anterolateral approach versus posterior approach for total hip replacement in the treatment of femoral neck fractures in elderly patients. *Chinese Journal of Traumatology* 2010; 13(4): 234-239.