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Research Article

A COMPARATIVE STUDY ON THE OUTCOMES OF MINI INCISION POSTERIOR APPROACH AND CONVENTIONAL POSTERIOR METHOD FOR TOTAL HIP ARTHROPLASTY

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Abstract:

Objective: To determine the clinical effectiveness of the mini incision posterior method in comparison with the conventional posterior approach as measured by blood loss, duration of surgery, short-term hip function and other associated complications.

Methodology: In this research work, we compared the short-term outcomes of 50 total hip arthroplasty performed through mini incision posterior method with the 42 arthroplasties conducted through conventional posterior approach. There was no important disparity in the 6 distribution, gender, and BMI of the patients of both groups.

Results: The average duration of surgery was lesser (99.0 ± 26.0 minutes versus 123.0 ± 30.0 min), and perioperative average loss of blood was also lesser (339.0 ± 210.0 versus 422.0 ± 177.0 ml) with the application of mini incision approach. There was no important disparity between the groups in average loss of blood after surgical intervention, average inclination angle, hip ratio with good inclination angle and average hip scores after 6 months of surgical intervention. We found the infection in only one female patient of Conventional-Group but there was no patient of infection in the Mini-Group. We found no dislocations or symptomatic pulmonary embolism in any patient of both groups.

Conclusion: With the application of the mini incision posterior method, there was reduction in the surgical invasion and the short-term outcomes of this approach were present as good as with the conventional posterior method for total hip arthroplasty.

Key Words: Total Hip Arthroplasty's, Mini Incision Anterior, Posterior, Disparity, Potential.

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INTRODUCTION:

There is emergence of minimal invasive approaches for THA (Total Hip Arthroplasty) in last few years and these approaches are becoming highly famous in the countries of North America [1,2]. The design of these approaches allows total hip arthroplasty to be carried through the incisions of very small size with the very less disruption of small tissues. There are 3 main approaches, comprising a mini incision anterior method, mini incision posterior method [3] and two incision method. There is expression of the concern that minimally invasive approaches might elaborate the new potential issues associated to decreased visualization at the time of surgical intervention, like implant malposition, adverse implant fixation, neurovascular damage, or compromised results for long-term [4,5,6]. Therefore, there is requirement of the sufficient scientific proof for the support of their effectiveness and safety.

There are many researches works on the THA, carried out with the utilization of the minimally invasive approaches for the patients of USA but there are very few reports available in the countries of Asian region. Very recently, Sherry gave report on the outcome of the THA with the mini incision posterior method for 14 patients in Australia [7,8,9]. The replacement of the hip with the utilization of the mini incisions approaches to be effectual for the patients of Asia having relatively small body constitutions. However, in associated literature, there is presence of only one single research work from the countries of Asia. Higuchi [10] stated the outcomes of THA with mini anterior method with a shorter incision of skin. There is lack of research works concerning about the outcomes of THA with the use of mini incision posterior method for the patients of Asia. The main objective of this research work was to find out the clinical effectiveness of the mini incision posterior method in comparison with the conventional posterior approach as calculated by duration of surgery, loss of blood, function of hip for short-term and associated complications.

MATERIAL AND METHODS:

The duration of this study was from July 2018 to June 2019, we conducted primary THA without cement for 54 hips in 52 patients. Total 50 of these hips in 48 patients operated via mini incision posterior method, entered into Mini-Group. The exclusion of four hips was carried out from this research work, 3 hips were present with complicated deformities and underwent operations via conventional posterior method and one hip was of the patients who was using the Japanese squat toilet, which needs the deep hip joint flexion and that hip was operated via direct lateral method. From June 2017 to May 2018, forty-six hips of

forty-three patients underwent THA without the cement. Of these forty-six hips, the exclusion of four hips was carried out from the group of controls. The operation of 02 hips was carried out via trans-femoral method with the utilization of femoral osteotomy and 02 hips got surgical intervention through direct lateral approach. So, the group of controls consisted the forty-two hips in thirty-nine patients who got surgery via conventional posterior method with incision of 15 to 20 centimeters (Conventional-Group). Before surgery, all the patients of groups donated autologous blood. The average volume was 815.0 ml in Mini-Group and 804.0 ml in Conventional-Group. Implantation of the components made of titanium alloy was carried out without cement in the patients of both groups.

We used the standard recommendations for the applications of these approaches. In both groups, target angles of the position of the acetabular component was 45 degree in inclination and 20 degree in anteversion. Removal of the drainage was carried out after the complete two days of surgery in the patients of both groups. Weight-bearing duration after the surgical intervention was shortened from two years. So, it was from 4 to 6 weeks in Conventional-Group and from 1 to 3 weeks in Mini-Group. We instructed the patients of both groups to walk with stick until three months after surgery but some of the patients stopped this much early.

We placed the patients in lateral decubitus position. We marked the tip of the posterior feature of great trochanter. A straight incision of skin spanning from 3 to 4 centimeters proximally and from 6 to 9 centimeters distally was made through the identified point (Figure-1).

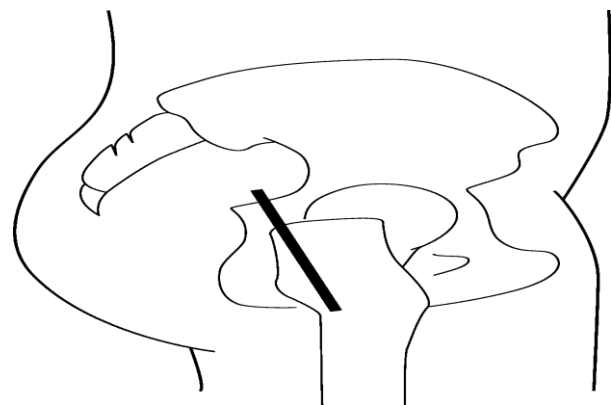


Figure 1: Skin Incision for Mini Approach

The exposure of the fascia was carried out and incised with the incision of the skin. There was split in the fibers of the gluteusmaximus muscle and rotation of the legs carried out internally. The incision of the capsule was carried out from the

acetabular edge to piriformis fossa between the gluteus minimus and piriformis tendon. After that, we incised the capsule and rotators together at the attachment to the femur. Resection of the acetabular labrum was performed. We followed the international procedure for this procedure. The repair of the capsule was much same to the method of Hedley [6]. The insertion of the drainage system carried out and closure of the wound was also carried out.

We recorded the information about all the patients regarding sex, age, height, body mass index and diagnosis. The measurement of the length of the incision was also carried out for the patients of Mini-Group at the start of the surgery. The operative data included the duration of surgery,

from incision of skin to its closure, loss of blood in the complete duration of surgery and drainage fluids. We classified the acetabular inclinations from 35-55 degrees as good; the values outside of these range were categorized as poor [10]. The average follows up period was ten months for Mini-Group and twenty months for the patients of Conventional-Group. We evaluated all the patients radiographically at sixth month after surgical intervention. The utilization of the d'Aubigné & Postel score was carried out for clinical assessment [8]. The utilization of the Mann Whitney U-test was carried out for the comparison of the continuous variables. We used the Fisher's exact test for the comparison of the categorical data between both groups. P value of less than 0.050 was significant one.

RESULTS:

There was no important difference in the patients of both groups regarding age, gender distribution diagnosis and body mass index as elaborated in Table-1.

Table 1 Patient Characteristics

	Mini group (n=50)	Conventional group (n=42)	p-value
Age ^a	62±11	59±10	0.41
Female/male	38/12	36/6	0.3
OA/AN	39/11	35/7	0.6
Body Mass Index ^a	23.2±3.4	24.0±4.3	0.48

OA: osteoarthritis, AN: avascular necrosis

a: Values expressed as mean and standard deviation

The average length of skin incision was 10.30 centimeters with a range from 9 to 13 cm in the Mini-Group. The patients of the Mini-Group had much less average duration of surgery and less average loss of blood after surgical intervention as mentioned in Table-2. We found no important difference in the loss of blood after operation. There was no need of transfusion of blood in any patients of both groups. We found no differences between the patients of both groups in angle of inclination and hips ratio with a good angle (Table-2). As concerned with the associated

complications, we found no dislocation as well as no pulmonary embolism in the patients of either group. There was incidence of infection in one female patient in the group of conventional approach who had to undergo radiation treatment for uterus carcinoma. We found no incidence of infection in the patients of Mini-Group. We performed second surgery in 2 patients: one patient from each group. The infection of the single patient was controlled by the surgical debridement with no elimination of prosthesis.

Table II: Data Comparison

	Mini Group	Conventional Group	P-Value
Operative time (minutes) ^a	99±26	123±30	0.0001
Blood loss during surgery (ml) ^a	339±210	422±177	0.01
After surgery (ml) ^a	388±176	420±181	0.3
Acetabular component inclination angle (degree) ^a	45.7±5.6	44.8±7.4	0.29
Hips in good angle (%)	92	88	0.73

^aValues expressed as mean and standard deviation.

For other female who got cable fixation for proximal femoral fracture during THA in the group of Mini-Group, the removal of the cable was carried out five months after the index surgery because of occurrence of local pain at cable connector. At six months after the surgical intervention, the sum of the Postal & Merled' Aubigné was sixteen with a range from 13 to 18 in the patients of Conventional-Group and 15.90 with a range from 11.0 to 18.0 for the patients of Mini-Group. The averages of pain score, gait score and mobility scores were 5.60, 4.90 and 5.5 for the patients of Conventional-Group and 5.60, 4.90 and 5.40 for the patients of Mini-Group. We found no important difference for the scores of individuals for the patients of both groups.

DISCUSSION:

There are many published reports about the outcomes of THA with mini incision posterior method in United States of America. Chimento & Sculco [11,12] stated the details of surgical methods of mini incision posterior method and complication rates in their first one thousand patients but the information for neither the duration of surgery nor the loss of blood was included in that research work. Lester & Helm stated the outcomes of one hundred and two replacements of hips with mini incision posterior method utilizing a 10 to 15 cm incision of skin [13]. They showed the favorable outcomes of this procedure, but this was no control group in that research work. Wenz stated the outcomes of THA by mini incision posterior method in comparison with the patients who underwent THA with direct lateral approach. In their group of study, the groups of patients of mini incision approach were present lesser average duration of surgery (124 minutes) and less loss of blood (598 milliliters) than the patients of direct lateral group [14]. They noticed no difference between the groups with respect to the associated complications after surgical interventions. That very report was much significant in describing that mini incision posterior approach reduces the duration of surgery without a rise in rates of complications. However, the patients of the control group were present with THA via direct lateral method [15,16].

Goldstein stated the findings of a research work in which there was comparison of 85 hips via mini incision posterior method with the eighty-five hips via conventional posterior method [17]. The average length of incision was thirteen 13 centimeters in the Mini-Group and thirty-six centimeter sin the Conventional-Group. There was much less loss of blood at the time of surgery in the patients of Mini-Group but there was no disparity between both groups with respect to the duration of surgery [18]. In that research work, surgeon

suggested the length of incision at the time of surgery, generally depending upon the physical constitution of the patients [19]. There was a significant disparity between the patients of their groups with regard to the body mass index; average body mass index was twenty-seven for Mini-Group and thirty-one for the patients of Conventional-Group ($P < 0.0010$). In this current research work, we found no significant disparity between the patients of groups regarding body mass index [20]. This research work displayed that there was no less loss of blood at the time of operation by the use of mini-incision method due to the difference in body mass index.

CONCLUSION:

The findings of this research work concluded that favorable short-term outcomes with the utilization of less surgical invasion can be the expectations with mini incision posterior method if trained surgeons are already acquainted with the conventional posterior method.

REFERENCES:

1. Xie, J., Zhang, H., Wang, L., Yao, X., Pan, Z., & Jiang, Q. (2017). Comparison of super capsular percutaneously assisted approach total hip versus conventional posterior approach for total hip arthroplasty: a prospective, randomized controlled trial. *Journal of orthopaedic surgery and research*, 12(1), 138.
2. Abdel, M. P., Chalmers, B. P., Trousdale, R. T., Hanssen, A. D., & Pagnano, M. W. (2017). Randomized clinical trial of 2-incision vs mini-posterior total hip arthroplasty: differences persist at 10 years. *The Journal of arthroplasty*, 32(9), 2744-2747.
3. Saad, T. A., Elbadry, A., Salem, K. H., & Kader, K. F. A. (2019). Conventional versus minimally invasive total hip replacement through the posterior approach. *Journal of Arthroscopy and Joint Surgery*.
4. Yukizawa, Y., Dorr, L. D., Ward, J. A., & Wan, Z. (2016). Posterior mini incision with primary total hip arthroplasty: a nine to ten year follow up study. *The Journal of arthroplasty*, 31(1), 168-171.
5. Tan, B. K., Khan, R. J., Haebich, S. J., Maor, D., Blake, E. L., & Breidahl, W. H. (2019). Piriformis-sparing minimally invasive versus the standard posterior approach for total hip arthroplasty: a 10-year follow-up of a randomized control trial. *The Journal of arthroplasty*, 34(2), 319-326.
6. Berger RA (2003) Total hip arthroplasty using the minimally invasive two-incision approach. *ClinOrthop* 417:232–241
7. Berry DJ, Berger RA, Callaghan JJ, Dorr LD, Duwelius PJ, Hartzband MA, Lieberman JR, Mears DC (2003) Minimally invasive total hip

- arthroplasty. Development, early results, and a critical analysis. *J Bone Joint Surg Am* 85:2235–2246
8. Chimento GF, Sculco TP (2001) Minimally invasive total hip arthroplasty. *Oper Tech Orthop* 11:270–273
 9. Goldstein WM, Branson JJ, Berland KA, Gordon AC (2003) Minimal-incision total hip arthroplasty. *J Bone Joint Surg Am* 85(Suppl 4):33–38
 10. Hedley AK, Hendren DH, Meas LP (1990) A posterior approach to the hip joint with complete posterior capsular repair. *J Arthroplasty* 5(Suppl): S57–S66
 11. Higuchi F, Gotoh M, Yamaguchi N, Suzuki R, Kunou Y, Ooishi K, Nagata K (2003) Minimally invasive uncemented total hip arthroplasty through an anterolateral approach with a shorter skin incision. *J Orthop Sci* 8:812–817
 12. Lester DK, Helm M (2001) Mini-incision posterior approach for hip arthroplasty. *Orthop Traumatol* 4:245–253
 13. Merle d'Aubigné R, Postel M (1954) Functional results of hip arthroplasty with acrylic prosthesis. *J Bone Joint Surg Am* 36:451–475
 14. Sherry E, Egan M, Warnke PH, Henderson A, Eslick GD (2003) Minimal invasive surgery for hip replacement: a new technique using the NILNAV hip system. *ANZ J Surg* 73:157–161
 15. Wenz JF, Gurkan I, Jibodh SR (2002) Mini-incision total hip arthroplasty: a comparative assessment of perioperative outcomes. *Orthopedics* 25:1031–1043.
 16. Ries, M. D. (2019). Relationship Between Functional Anatomy of the Hip and Surgical Approaches in Total Hip Arthroplasty. *Orthopedics*, 42(4), e356-e363.
 17. Malek, I. A., Royce, G., Bhatti, S. U., Whittaker, J. P., Phillips, S. P., Wilson, I. R. B., ... & Starks, I. (2016). A comparison between the direct anterior and posterior approaches for total hip arthroplasty: the role of an 'Enhanced Recovery' pathway. *The bone & joint journal*, 98(6), 754-760.
 18. Sershon, R. A., Tetreault, M. W., & Della Valle, C. J. (2017). A prospective randomized trial of mini-incision posterior and 2-incision total hip arthroplasty: minimum 5-year follow-up. *The Journal of arthroplasty*, 32(8), 2462-2465.
 19. Putananon, C., Tuchinda, H., Arirachakaran, A., Wongsak, S., Narinsorasak, T., & Kongtharvonskul, J. (2018). Comparison of direct anterior, lateral, posterior and posterior-2 approaches in total hip arthroplasty: network meta-analysis. *European Journal of Orthopaedic Surgery & Traumatology*, 28(2), 255-267.
 20. Jianbo, J., Ying, J., Xinxin, L., Lianghao, W., Baoqing, Y., & Rongguang, A. (2019). Hip hemiarthroplasty for senile femoral neck fractures: Minimally invasive SuperPath approach versus traditional posterior approach. *Injury*, 50(8), 1452-1459.