

RESEARCH ARTICLE

STUDY OF EFFICACY OF HIGH TIBIA MEDIAL OPEN WEDGE
OSTEOTOMY IN MEDIAL COMPARTMENT OSTEOARTHRITISArhab Abdulaziz Mohammed Alshabi^{1,*}, and Mugahed Ali Musaid Hussein²¹ Postgraduate Student, Faculty of Medicine and Health Sciences, University of Aden, Yemen² Dept. of Orthopedic Surgery, Faculty of Medicine and Health Sciences, University of Aden, Yemen; E-mail: Mujahid.ali.medi@aden.univ.net*Corresponding author: Arhab Abdulaziz Mohammed Alshabi; E-mail: d.a.alshabi@gmail.com; Tel: +967- 770660296

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Abstract

Knee osteoarthritis is a degenerative condition causes progressive wear in the articular cartilage and rises pressure over the medial compartment of the knee joint which will end up as a varus deformity. High tibial osteotomy is one of the surgical managements in treatment knee osteoarthritis, the goal of the treatment is to relieve medial compartment knee pain and slowdown the arthritic progression. The purpose of study to evaluate the efficacy of Medial Opening-Wedge High Tibial Osteotomy for Medial Knee Osteoarthritis. The study is a prospective descriptive clinical study was carried out between 2023 and 2023 across two designated specialized surgical centers in the Aden Governorate, Yemen Twenty consecutive active patients (comprising 23 knees) presenting with symptomatic isolated medial compartment knee osteoarthritis Kellgren-Lawrence grades II–III associated with mechanical varus deformity were enrolled, all included subjects had proven refractory to conservative management protocols for at least three to six months medial open wedge high tibia osteotomy was technically executed via a standard medial approach, the clinical and functional assessment was systematically compiled at baseline (preoperative) and at a final 2-year postoperative follow-up using the validated Arabic translation of the Knee Injury and Osteoarthritis Outcome Score. The definitive study sample consisted of 55% male and 45% female patients, with a mean age of 44.55 ± 9.6 years and a well-controlled mean Body Mass Index of 24.80 ± 1.5 kg/m², Preoperative radiographic staging classified 60% of cases as Kellgren-Lawrence grade III and 40% as grade II, Lateral distribution demonstrated a right-sided dominance in 60% of cases, followed by 25% left-sided, and 15% presenting with bilateral involvement the intraoperative distraction produced an average osteotomy wedge gap size ranging between 13 and 14 mm, Functional evaluation was done by comparing pre and postoperative scores (knee Injury and osteoarthritis outcome scoring), the final 2-year post-surgical evaluation, all five discrete functional domains evaluated via the Knee Injury and Osteoarthritis Outcome Scoring subscales exhibited profound, statistically significant improvements relative to the baseline preoperative marks ($p < 0.001$) osteotomy gaps were safely achieved in 100% of the evaluated knees (23/23) within an average healing window of 12 to 24 weeks No instances of structural construct failure, secondary loss of coronal realignment, or non-union were observed. The conclusions of study was the Medial opening-wedge high tibial osteotomy utilizing rigid plate stabilization without bone grafting constitutes a highly effective, safe, and biologically reliable joint-preserving procedure for active patients under 60 years old suffering from mild-to-moderate varus knee osteoarthritis, The procedure delivers outstanding short- to midterm functional recovery, excellent pain relief.

Keywords: Medial open wedge high tibial osteotomy; Knee injury.

Introduction:

Knee osteoarthritis is the most common form of arthritis worldwide and a leading cause of pain, disability, and impaired quality of life. Its prevalence has increased substantially due to population aging, obesity, and other risk factors such as female sex, previous knee injury, metabolic disorders, and lower limb malalignment [1][2].

the disease is characterized by progressive degeneration of articular cartilage, subchondral bone remodeling, joint space narrowing, and functional impairment. Varus deformity is frequently associated with medial compartment knee osteoarthritis and contributes to disease progression by increasing load transmission through the medial compartment in a normally aligned knee,

approximately 60% of body weight is transmitted through the medial compartment; however, varus alignment may increase this load to 80–90%, accelerating cartilage degeneration and joint deterioration. Management of knee osteoarthritis includes conservative measures such as physical therapy, weight reduction, pharmacological treatment, and intra-articular injections ,when non-operative treatment fails, surgical options may be considered, including high tibial osteotomy, Unicompartmental knee replacement, and total knee arthroplasty. [3][4]

High tibial osteotomy is a joint-preserving procedure designed to correct varus malalignment and redistribute mechanical loads from the diseased medial compartment to the healthier lateral compartment. medial opening-wedge high tibial osteotomy has gained popularity because of its technical simplicity, preservation of bone stock, avoidance of fibular osteotomy, and ability to achieve precise correction [5] the procedure involves creating a controlled medial tibial osteotomy gradually opening the wedge to correct alignment and stabilizing the osteotomy with internal fixation numerous studies have demonstrated that medial open wedge high tibia osteotomy effectively relieves pain, improves knee function and quality of life, promotes reliable bone healing, and delays the need for total knee arthroplasty in appropriately selected patients Consequently [6]

Objective:

To evaluate the outcome of Open Wedge Hight Tibia Osteotomy In treatment of medial compartment osteoarthritis, improvement of symptoms, daily function in active young patients.

Patients and Methods:

A prospective descriptive clinical study was carried out between 2023 and 2025 across two designated specialized surgical centers in the Aden Governorate, Yemen Twenty consecutive active patients (comprising 23 knees) presenting with symptomatic isolated medial compartment knee osteoarthritis (Kellgren-Lawrence grades II–III) associated with mechanical varus deformity were enrolled , All included subjects had proven refractory to structured conservative management protocols for at least three to six months medial open wedge high tibia osteotomy was technically executed via a standard medial approach, implementing step-by-step distraction to achieve full structural alignment correction . Internal stabilization was strictly accomplished using rigid plate designs (Puddu plates or TomoFix T-plates) , no bone grafts were packed into the osteotomy gaps. [7]

The clinical and functional assessment was systematically compiled at baseline (preoperative) and at a final 2-year postoperative follow-up using the validated Arabic translation of the Knee Injury and Osteoarthritis

Outcome Score [8] which independently quantifies five clinical dimensions, Pain, Symptoms, Activities of Daily Living , Sport and Recreation Function, and Knee-Related Quality of Life . Standardized full-length weight-bearing Scanograms and orthogonal radiographs were examined to monitor the degree of axial realignment, mechanical axis deviation, and the precise timeline to establish complete osseous union.

Inclusion criteria

Patients below age <60 years, body mass index <35, No ligament laxity, Unicompartmental osteoarthritis knee, Varus should be <20 degree, Grade 3 or less The Kellgren Lawrence grading of osteoarthritis knee

Exclusion criteria

The patients with bicompartamental and tricompartmental osteoarthritis knee, Restricted range of movements at knee i.e. knee flexion of less than 90 degrees or flexion contracture of more than 15 degree, Inflammatory arthritis, body mass index >35

Clinical Assessment and Physical Examination:

The primary complaint of a patient with medial compartment osteoarthritis, is pain localized to the medial joint line and will inevitably lead to a loss or reduction in function. Other common symptoms include stiffness, joint instability, reduced movement, crepitus and pain-related physiological distress, Clinical examination requires an evaluation of alignment, gait, range of movement, ligamentous stability and neurovascular status. Particular attention should be paid to asymmetric alignment and any dynamic component of gait such as a varus or hyperextension thrust. The correctability of varus deformity, the integrity of the lateral collateral ligament, the integrity of the cruciate ligaments and the presence of any fixed flexion deformity should all be determined [9]

Diagnostic Imaging and Preoperative Planning:

Detailed radiological assessment of all patients undergoing Medial open wedge high tibia osteotomy is essential to identify the extent of OA within the knee and establish the presence of any correctable deformity. Pre-operative assessment should include weight-bearing anteroposterior, lateral and skyline views. A Rosenberg view (45-degree flexion, weight-bearing posterior-anterior view) is more sensitive than weight-bearing AP radiographs at determining joint space narrowing and should be requested routinely, Radiographic evaluation-a weight bearing Scanogram of knee joint along with entire lower extremity was obtained and Hip-knee -Ankle angle was checked, many method in literature used to determine the source of deformity and the corrective angle

[10][11][12][13] figure 1. Clinically evaluation of functional outcome according the Knee Injury and Osteoarthritis Outcome Scoring(KOOS) pre and postoperative [12][14]



Fig. 1: Pre-operative planning for MOWHTO. (A) The white dashed line represents the weight-bearing axis, whereas the red circle represents the desired point where the weight-bearing axis is planned to pass post-operatively. (B) α , the correction angle, is the angle formed by the mechanical axes of femur and tibia that are aimed to be provided post-operatively. The osteotomy line (the red dashed line) is planned to be started about 4 cm distal to the medial joint line, aiming the tip of the head of fibula.

Surgical Technique:

All surgical procedures were performed under general anesthesia, with prophylactic antibiotics administered preoperatively. A tourniquet was applied to the upper thigh. The patient is supine with a tourniquet (optional). A longitudinal or oblique anteromedial incision is made just below the knee. The pes anserinus and superficial medial collateral ligament (MCL) are released or partially detached to allow opening of the osteotomy. Using fluoroscopy, a guidewire is placed from the medial tibial cortex toward the proximal tibiofibular joint, aiming about 1–2 cm below the joint line and roughly horizontal or slightly ascending toward the lateral cortex [14]. A biplanar osteotomy can be used: a transverse cut as above plus a sagittal cut (for example, a vertical cut posterior to the tibial tubercle) to increase stability and preserve the tibial tubercle [15][16][17]. The cut is carried through the medial cortex but stopped ~1 cm from the lateral cortex (creating an intact lateral hinge). The osteotomy is carefully opened using osteotomes or a spreader wedge. The opening gap is gradually increased until the planned correction is achieved by intraoperative rod method [18]. Alignment is checked intermittently on fluoroscopy by ensuring the mechanical axis passes through the target point on the tibial plateau. A locking plate (e.g. TomoFix) is applied to the medial tibia spanning the osteotomy. Locking screws secure the plate proximally and distally. The plate should be positioned to control sagittal slope (ideally slightly posterior) and avoid excessive patellar height

changes. The wound is closed in layers with a drain as needed. Final fluoroscopic images confirm the corrected alignment and fixation figure 2,3 [19]



Fig. 2: Intraoperative method under fluoroscopy guidance with a Bovie cable or radiopaque rod

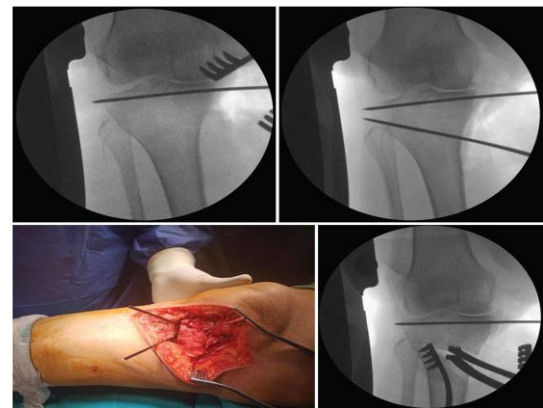


Fig. 3: (a) Insertion of protective subchondral Kirschner wires (K-wire). (b) Insertion of guide wires along the osteotomy line. (c) Intraoperative image of K-wires inserted during open-wedge high tibial osteotomy. (d) Gradual distraction of the osteotomy gap using a laminar spreader.

Postoperative Care:

Patients were closely monitored in the recovery room, with attention given to vital signs, neurological

status, and neurovascular function. Postoperative care included a period of nothing per oral for four to six hours, followed by intravenous fluids, analgesics, and deep vein thrombosis (DVT) prophylaxis. Limb elevation was maintained with a pillow. After a review of neurovascular status and postoperative

radiographs, patients were discharged with prescriptions for antibiotics, analgesics, and DVT prophylaxis. Follow-up appointments were scheduled at two weeks post-operatively for suture removal. Gradual weightbearing with crutches and isometric quadriceps exercises were initiated. Full weight-bearing and progressive quadriceps strengthening exercises were encouraged after six to eight weeks. [20][21]

Follow-Up Evaluations

Postoperative follow-up assessments were scheduled at 3, 8, 12, and 24 weeks, with suture removal occurring at three weeks. Comprehensive clinical and radiological evaluations focused on pain, swelling, tenderness, and range of motion. Radiological follow-up included weight-bearing anteroposterior and lateral views after eight weeks final clinical and Functional outcomes were evaluated 2 years postoperative.

Outcomes:

The primary outcomes assessed were the functional outcomes of Medial open wedge high tibia osteotomy according to (Knee Injury and Osteoarthritis Outcome Scoring (KOOS), Secondary objectives included the identification of potential factors associated with surgical failure, Surgical failure, was defined as conversion to unicompartmental knee arthroplasty or Total knee arthroplasty (TKA),

Statistical Analysis:

Data was processed and analyzed by using SPSS. Variables, frequencies and percentage number, were calculated. Mean and standard deviation were calculated for quantitative data. The paired-t test, Goodness of fit test for comparison variable pre-postoperative was used and $p < 0.05$ was considered statistically significant.

Ethical Consideration:

This study was approved by the committee of postgraduate studies of the Faculty of Medicine and Health Sciences, Aden University. Informed consents were obtained from the patients & administrations of enrolled hospitals in Aden-Yemen before enrolling the data into the study, after providing them detailed explanation of the objectives, methods, and benefits of the study. The information obtained were confidentially handled and used only for this research purposes. The patients have the right to agree or refuse to do this study, as well as to withdraw themselves at any time during the study.

Results:

Table 1 illustrated the age, sex, occupation, and residency of patients that treated by medial open wedge high tibia osteotomy, Males slightly predominated with (55%) and female with (45%), The mean age of patients 44.55 ± 9.6 years old.

The patients of the age group 40 – 49 represented 8(40%) of the study patients followed by the age group ≥ 50 years old with 7(35%) and the age group 20 – 39 years old with 5(25%).

Most participants were office workers 9(45%), other occupations (soldiers, housewives, etc.) were less common, Patients were mainly from Aden 9(45%).

Table 2 shows the mean body mass index was 24.80 ± 1.5 kg/m² (range 22.0–27.3). This falls in the normal-to-overweight range, with no patient in the obese category (body mass index (kg/m²) ≥ 30

Table 3 reveals the classification of osteoarthritis (OA) Severity according to Kellgren-Lawrence grade (KL) represented a 40% (8/20) of knees were grade 2, and 60% (12/20) were grade 3. No cases of grade 1 (minimal change) or grade 4 (severe OA) were included. KL grade 2 denotes mild while grade 3 indicates moderate OA.

Table 4 shows the comparisons in the clinical outcome according to the KOOS (knee osteoarthritis outcome scoring) pre-post Operation during the two years follow up. Patient-reported knee function and symptoms improved markedly after surgery. All KOOS subscale scores (Pain, Symptoms, ADL, Sports/Recreation, and Quality of Life) increased preoperative to final follow-up, and each change was highly significant ($p < 0.001$), mean KOOS Pain rose from 35.5% preoperatively to 74.4% postoperatively, Symptoms: 32.05 ± 2.01 rose to 70.60 ± 2.14 Activities of Daily Living (ADL) rose from 29.4% to 72.6%, Sports/Recreation: $24.10 \pm 1.52 \rightarrow 70.40 \pm 1.85$, ($p < .001$), Quality of Life: $26.40 \pm 1.17 \rightarrow 68.10 \pm 1.99$ ($p < 0.001$)

Table 5 shows Postoperative complications were infrequent and generally minor. Out of 20 patients, 4 (20%) had some complication, while 16 (80%) had no complications, one patient (5%) developed a superficial infection, one (5%) had a lateral hinge fracture, one (5%) sustained an intra-articular tibial fracture, and one (5%) had delayed bone union. There were no cases of deep vein thrombosis/pulmonary embolism, hardware failure, or under/overcorrection.

Discussion:

In this study of 20 patients (23 knees) with inclusive criteria that performed medial open wedge high tibia osteotomy for medial compartment osteoarthritis with varus malalignment. The analysis of personal characteristics of the patients in this study shows the predominate male 55% and female 45% with mean age 44.55 ± 9.151 similar to several studies was reported with close to the mean age < 60 years [22][23] that was directed affected the outcome of medial open wedge high tibia osteotomy [18] reported age below 56 years was a positive indicator of improved outcomes, some study like [24] reported that Patients age and the event of prior surgery did not influence the outcome.

In the current study the degree of medial compartment osteoarthritis according to KL (Kellgren and Lawrence) grade for knee osteoarthritis was grade III 60% and II 40%

grad indicated the mild to moderate knee osteoarthritis that was given better outcome in the pain relief and improvement the function according knee injury and osteoarthritis outcome scoring (KOOS), several studies and recommendations for medial open wedge high tibia osteotomy [25], [26] found statistically significant better outcomes in patient with low Grade of osteoarthritis,

In relation the Body mass index (BMI) (kg/m^2) in selected cases was within normal range 22 to 27.30 mean 24.8 ± 1.493 that was reflected the strong relation between the BMI and the outcomes and prognosis of medial open wedge high tibia osteotomy, [27] reported in criteria of patients selection in medial open wedge high tibia osteotomy for treatments medial compartment osteoarthritis the low BMI had better results than that with high BMI, [28] corroborated this result in their analysis of 95 high tibia osteotomy individuals. Individuals with a BMI larger than 10% over normal values had a pain-free time of 5 years, while those with a BMI less than 10% over normal values had a pain-free duration of 7.8 years. Since normal BMI values range from 18.5 to 24.9, we may conclude that a BMI higher than 27.4 is linked with a worse prognosis, and other studies discovered that individuals with a BMI of less than 30 had better results, [26]. In their analysis of 99 medial open wedge high tibia osteotomy, demonstrated that people with a BMI more than 30 had a tenfold increased chance of surgical failure.

The Rt knee was 60%, Lf 25% and both Knee 15% reflected the dominant knee. The type of plate fixations in the study were both Puudu and Tomofix T-plate, without bone graft with an average wedge 13-14mm, with an average healing time 12-24 weeks, rigid fixation which given the more stability even if the LH fractured [7][13]. Published study reported there is no difference between use or not use bone graft in the healing process. The factors age, sex, BMI, smoking, physical activity these combined determine the biological activity of bone healing [16]. [23], reported satisfactory results can be obtained in MOWHTO without using any bone graft, similar finding was reported in Egypt by [29] there is no observation of any plate failure at the end of third month without use any bone graft. Additionally published studies reported that there is no difference in the use or not use bone graft in open wedge high tibia osteotomy in medial compartment osteoarthritis [11][32][13].

The study demonstrated the effective for treatments of isolated medial compartment of knee with varus malalignment after open wedge high tibia osteotomy this provided pain relief, function improvement and alignment correction during the follow up period with no need for Total knee arthroplasty (TKA) this we proven by the Knee injury and osteoarthritis outcome scoring (KOOS) subscale scoring results in was highly significant in improvement $P < 0.5$, Patient-reported knee function and symptoms improved markedly after surgery. All KOOS subscale scores (Pain, Symptoms, ADL,

Sports/Recreation, and Quality of Life) increased preoperative to final follow-up, and each change was highly significant ($p < 0.0001$), mean KOOS Pain rise from 35.5% preoperatively to 74.4% postoperatively, Symptoms: 32.05 ± 2.01 rise to 70.60 ± 2.14 Activities of Daily Living (ADL) rise from 29.4% to 72.6%, Sports/Recreation: $24.10 \pm 1.52 \rightarrow 70.40 \pm 1.85$ ($p < 0.001$), Quality of Life: $26.40 \pm 1.17 \rightarrow 68.10 \pm 1.99$ ($p < 0.001$). This study shows the improvement in knee osteoarthritis outcome scoring subscale scores in almost the same as [30] in Japan in 2020 reported all KOOS subscale scores significantly improved after surgery OWHTO. Of the 123 patients, 109 (88.6%) were graded as satisfied, similar results [31] in Egypt reported prospective study on 20 consecutive patients treated by open wedge high tibia osteotomy applied by T – locked plate, between September 2016 to April 2019 there is significant improvement in the pain level after surgery when compared to before surgery. Postoperatively, 16 patients (80%) were found to have no pain, [32] also report the five subscores of KOOS increased significantly during the first year by 40–131% from preoperative values, the good results remaining throughout the 10-year follow-up for those with a surviving osteotomy, [29] from Japan 80 patients (85 knees) who underwent medial open wedge high tibia osteotomy with the TomoFix locking plate between 2009 and 2013. There were 66 women and 14 men reported KOOS improved significantly from pre- to postoperatively ($P < .0001$) post open wedge high tibia osteotomy. Factors that contribute to poorer postoperative outcomes include higher correction (> 20 mm), nonlocking plate fixation, and patient factors that include smoking, diabetes, obesity, and non-compliance with weight-bearing protocols. The impact of a lateral hinge fracture on postoperative outcome has been debated delayed union on radiographs defined as absent or incomplete radiographic union at 3 months postoperative with complete union by 6 months and define radiographic nonunion as the absence of substantial radiographic union at 6 months postoperative. However, these definitions vary. For example, one study defined radiographic delayed union as lack of progressive union at 6 months postoperative and radiographic nonunion as lack of union at 12 or more months postoperative [33]. Among our study the complications generally minor. Out of 20 patients, 4 (20%) had some complication, while 16 (80%) had no complications. Specifically one patient (5%) developed a superficial infection treated by broad spectrum antibiotics, one (5%) had a lateral hinge fracture that, one (5%) sustained an intra-articular tibial fracture, and one (5%) had delayed bone union which resolved by 6 to 8 months postoperatively. There are no thrombosis/pulmonary embolism, hardware failure, or under/overcorrection, this finding similar to published study in literature, [34] from Egypt reported the Complications occurred among 12 patients with varus deformity were treated by using medial open wedge high tibia osteotomy performed in the period

between 2020 and 2021 ,delayed union in two cases, infection in one case, lateral tibial plateau fracture in one case. Delayed union occurred in an obese smoker patient and middle-aged patient with sedentary lifestyle. They healed completely after 24 weeks without any other surgical intervention. The infection occurs in one patient not regularly clean the wound after operation and it was treated by broad spectrum antibiotics. another case while performing the osteotomy the lateral tibial plateau was fractured and this fracture was fixed with two partially threaded cancellous screws.

Conclusion:

It could be concluded that for patients with medial compartment osteoarthritis medial open wedge high tibia osteotomy is a good treatment as it restores mechanical axis, relieves pain, improves motion and thus redistribution of the load from medial compartment of the knee to lateral compartment, The results of this study affirm the efficacy of medial open wedge high tibia osteotomy in managing varus medial compartmental KOA, particularly when performed in early-stage cases involving younger patients with normal BMI. This procedure substantially improves clinical and radiological outcomes, even within resource-constrained settings. Further research is needed to investigate the long-term benefits and cost-effectiveness of medial open wedge high tibia osteotomy. Such studies could facilitate the broader adoption of this procedure as an effective treatment option for patients suffering from advance Knee osteoarthritis

Table 1: Distribution of Patients a according to Age Group, Occupation and Gender (n=20)

Variables		No	%
Sex	Male	11	55
	Female	9	45
Age (years)	< 20	0	0%
	20 – 29	2	10%
	30 – 39	3	15%
	40 – 49	8	40%
	≥ 50	7	35%
	Mean ± SD	44.55 ±9.6	
Occupation	Student	1	5.0
	Soldier	4	20.0
	Housewife	4	20.0
	Office Worker	9	45.0
	Gurd	2	10.0
Residence	Aden	9	45.0
	Lahaj	4	20.0
	Ibb	2	10.0
	Abyan	2	10.0
	Hudiadah	3	15.0

Table 2: Distribution of Patients with according mean BMI (kg/m2) n=20

BMI (kg/m2)	22 to 27.30
Mean (SD)	24.80±1.5

Table3: Distribution of Patients according classification of OA Severity according (Kellgren-Lawrence grade) n=20

Knee site	NO	%
Rt	12	60%
Lt	5	25%
Both	3	15%

Table 4: Comparisons clinical Outcome according (KOOS-subscale) Pre_ and Final Follow-up Post medial open wedge high tibia osteotomy n=20

KOOS Subscale Scores %	Preoperative mean (SD)	Final follow-up mean (SD)	P* Value
pain	35.50 ±2.53	74.35 ±2.59	<.001
symptoms	32.05 ±2.02	70.60 ±1.37	<.001
ADL	29.35 ±1.39	72.55 ±1.83	<.001
Sports/Recreations	24.10 ±1.58	70.40 ±1.84	<.001
QOL	26.40 ±1.13	68.10 ±1.99	<.001

* paired t-test

**Statistically significant (p< 0.05)

Table 5: distributions of patients with medial open wedge high tibia osteotomy according the Postoperative complication, n=20

Postoperative Complications	NO	%
infection	1	5%
fracture LH	1	5%
Intraarticular fracture	1	5%
delay union	1	5%
Thromboembolism	0	0%
Under _Over Corrections	0	0%
No Complications	16	80%

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مقالة بحثية

دراسة كفاءة قطع العظم الظنبوبي العالي الإسفيني الإنسي المفتوح في علاج الفصال العظمي الإنسي لمفصل الركبة

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المُلخَص

يُعد الفصال العظمي لمفصل الركبة حالة تنكسية تؤدي إلى تآكل تدريجي في الغضروف المفصلي، كما تسبب زيادة الضغط على الحيز الإنسي لمفصل الركبة، مما ينتهي تدريجياً بحدوث تشوه النفوس الداخلي. ويُعد قطع عظم الظنبوب العال، أحد الخيارات الجراحية المستخدمة في علاج الفصال العظمي للركبة. ويهدف هذا الإجراء إلى تخفيف الألم في الحيز الإنسي لمفصل الركبة وإبطاء تطور التغيرات التنكسية للمفصل. تهدف الدراسة تقييم فعالية قطع عظم الظنبوب العالي الإسفيني الإنسي المفتوح في علاج الفصال العظمي الإنسي للركبة المصحوب بتشوه النفوس الداخلي. أجريت دراسة سريرية وصفية مستقبليّة خلال الفترة الممتدة من عام 2023 إلى عام 2025 في مركزين جراحيين تخصصيين محددين بمحافظة عدن، الجمهورية اليمنية. شملت الدراسة عشرين مريضاً نشطاً متتاليًا (يمثلون 23 ركبة) كانوا يعانون من فصال عظمي عرضي ومغزول في الحيز الإنسي لمفصل الركبة، مصنف وفق نظام كليجرين لورانس بالدرجتين الثانية والثالثة ومرافق مع تشوه ميكانيكي من نوع النفوس الداخلي. وقد أظهرت جميع الحالات المشمولة فشل العلاج التحفظي المنظم لمدة تتراوح بين ثلاثة إلى ستة أشهر على الأقل. تم إجراء عملية قطع عظم الظنبوب العالي الإسفيني الإنسي المفتوح عبر المدخل الإنسي القياسي، مع تطبيق الإبعاد التدريجي خطوة بخطوة لتحقيق التصحيح الكامل للمحور التشريحي والميكانيكي للطرف السفلي. تم تحقيق التثبيت الداخلي بشكل حصري باستخدام صفائح تثبيت صلبة، شملت صفائح بادو أو صفائح توموفكس. ولم يتم استخدام أي طعوم عظمية ذاتية أو طعوم عظمية من متبرعين أو بدائل عظمية صناعية لملء فجوات القطع العظمي. تم إجراء التقييم السريري والوظيفي بصورة منهجية قبل العملية الجراحية وعند المتابعة النهائية بعد مرور سنتين من الجراحة باستخدام النسخة العربية المعتمدة من مقياس إصابة الركبة ونتائج الفصال العظمي، والذي يقيس بصورة مستقلة خمسة أبعاد سريرية هي: الألم، الأعراض، أنشطة الحياة اليومية، الوظيفة الرياضية والترفيهية، وجودة الحياة المرتبطة بالركبة. كما تم تقييم صور الأشعة المعيارية بما في ذلك صور الأطراف السفلية الكاملة أثناء تحميل الوزن والصور الشعاعية المتعامدة القياسية، لمراقبة درجة إعادة المحاذاة المحورية وانحراف المحور الميكانيكي، بالإضافة إلى تحديد الزمن اللازم لتحقيق الالتحام العظمي الكامل. تكونت العينة النهائية للدراسة من 55% من الذكور و45% من الإناث، بمتوسط عمر بلغ 44.55 ± 9.6 سنة، ومتوسط مؤشر كتلة جسم بلغ 24.80 ± 1.5 كجم/م²، وكان ضمن الحدود الطبيعية والمضبوطة جيدًا. أظهر التصنيف الشعاعي قبل العملية أن 60% من الحالات كانت من الدرجة الثالثة وفق تصنيف كليجرين لورانس، في حين كانت 40% من الحالات من الدرجة الثانية. أما من حيث التوزيع الجانبي للإصابة، فقد كانت الركبة اليمنى هي الأكثر تأثرًا بنسبة 60%، تلتها الركبة اليسرى بنسبة 25%، بينما أظهرت 15% من الحالات إصابة ثنائية الجانب. أدى الإبعاد الجراحي أثناء العملية إلى تحقيق فجوة قطع عظمي إسفينية تراوح متوسط حجمها بين 13 و14 ملم. تم تقييم النتائج الوظيفية من خلال مقارنة درجات مقياس إصابة الركبة قبل العملية وبعدها. وعند التقييم النهائي بعد مرور سنتين من الجراحة، أظهرت جميع المجالات الوظيفية الخمسة التي يقيسها مقياس إصابة الركبة تحسنًا كبيرًا وذا دلالة إحصائية عالية مقارنة بالقيم الأساسية قبل الجراحة ($p < 0.001$). كما تحقق الالتحام العظمي الكامل لفجوات القطع العظمي بنجاح في جميع الركب التي خضعت للتقييم (23/23؛ 100%) خلال فترة التئام تراوحت بين 12 و24 أسبوعًا. ولم تُسجل أي حالات لفشل التثبيت البنيوي، أو فقدان ثانوي للتصحيح الإكليل، أو عدم الالتحام العظمي.

الكلمات المفتاحية: قطع عظم الظنبوب العالي؛ مقياس إصابة الركبة.

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