Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies NLM ID: 101716117

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599;

(p) ISSN Print: 2348-6805

Original Research

Assessment of outcomes of Osteoarthritis patients treated with Hybrid close wedge Osteotomy

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ABSTRACT:

Background:High tibial valgus osteotomy is typically recommended for individuals with knee osteoarthritis, particularly when the damage is localized to one side of the knee joint. The present study was conducted to assess patients treated with hybrid CWHTO. **Materials & Methods:**52 patients treated with hybrid CWTHO to correct medial compartment OA of both genders were studied. The Japanese Orthopedic Association's (JOA) Lysholm score, mechanical axes (MA), femorotibial angle (FTA), posterior tibial slope, and patella height were measured using the Kellgren-Lawrence grading method. **Results:** Out of 52 patients, males were 32 and females were 20. Pre-operative and post-operative Kellgren Lawrence Grade I was seen in 40 and 36, grade II in 12 and 16 respectively. Femorotibial angle (°) was 181.2 and 170.4, mechanical axis (%) was 24.5 and 61.8, posterior tibial slope (°) was 11.4 and 10.3, Insall-Salvati index was 0.93 and 0.92, Caton-Deschamps index was 0.94 and 0.93, Lysholm score was 64.2 and 84.1, Japanese Orthopedic Association score was 72.5 and 91.5 respectively. The difference was significant (P< 0.05). **Conclusion:** After undergoing the hybrid CWHTO, cases of medial knee OA had good results. In these patients, there was no difference between the preoperative assessment and the postoperative PTS or patella height.

Keywords: tibial valgus osteotomy, knee osteoarthritis, closed-wedge HTO

Received: 17 December, 2023

Accepted: 19 January, 2024

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This article may be cited as: Kumar D, Kunder R, Verma PK, Lakhtakia PK. Assessment of outcomes of Osteoarthritis patients treated with Hybrid close wedge Osteotomy. J Adv Med Dent Scie Res 2024;12(2):8-11.

INTRODUCTION

High tibial valgus osteotomy is typically recommended for individuals with knee osteoarthritis, particularly when the damage is localized to one side of the knee joint (unicompartmental osteoarthritis) and when the patient is relatively young and physically active.¹There have been reports of several HTO forms, including lateral closed-wedge HTO (CWHTO)) and medial open-wedge HTO (OWHTO).² Medial open-wedge HTO is commonly recommended for patients with knee osteoarthritis, particularly when the damage is localized to the medial (inner) compartment of the knee joint.It may also be used to correct varus alignment of the knee, where the knee bows inward, placing excessive stress on the medial compartment.3,4Nowadays, patients with early- or middle-stage knee OA) frequently have varus deformities corrected with OWHTO, a less complex surgery.⁵ A hybrid CWHTO treatment has

recently been devised by Takeuchi et al) and their postoperative rehabilitation results have been reported.With various advantages over traditional CWHTO and OWHTO, the hybrid CWHTO method is based on the conventional CWHTO approach. In this application, the term "hybrid" refers to a combination of the medial open-wedge and lateral closed-wedge techniques made possible by a special hinge point.^{6,7}The present study was conducted to assess the outcome of osteoarthritis patients treated with hybrid CWHTO.

MATERIALS & METHODS

The present study consisted of 52 patients treated with hybrid CWTHO to correct medial compartment OA of both genders.All gave their written consent to participate in the study.Data such as name, age, gender etc. was recorded. The Japanese Orthopedic Association's (JOA) Lysholm score and knee grading system were used to evaluate clinical outcomes. Both genders' pre- and postoperative mechanical axes (MA), femorotibial angle (FTA), posterior tibial slope, and patella height were measured using the Kellgren-Lawrence grading method. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table: I Distribution of patients

Total- 52						
Gender	Male	Female				
Number	32	20				
1 0	0 1 0	1				

Table: I shows that out of 52 patients, males were 32 and females were 20.

Tab	le: II Assessment of para	meters			
	Parameters	Variables	Pre-operative	Postoperative	P value
	Kellgren Lawrence	Grade I	40	36	0.05
	Grade	Grade II	12	16	
		Grade III	0	0	
		Grade IV	0	0	
	Femorotibial angle (°)Mechanical axis (%)Posterior tibial slope (°)Insall-Salvati indexCaton-Deschamps indexLysholm scoreJapanese Orthopedic Association score		181.2	170.4	0.05
			24.5	61.8	0.01
			11.4	10.3	0.21
			0.93	0.92	0.84
			0.94	0.93	0.17
			64.2	84.1	0.02
			72.5	91.5	0.04

Table: II, graphs I, II shows that pre-operative and post-operative Kellgren Lawrence Grade I was seen in 40 and 36, grade II in 12 and 16 respectively. Femorotibial angle (°) was 181.2 and 170.4, mechanical axis (%) was 24.5 and 61.8, posterior tibial slope (°) was 11.4 and 10.3, Insall-Salvati index was 0.93 and 0.92, Caton-Deschamps index was 0.94 and 0.93, Lysholm score was 64.2 and 84.1, Japanese Orthopedic Association score was 72.5 and 91.5 respectively. The difference was significant (P < 0.05).



Graph: I Kellgren Lawrence Grade



Graph: II Assessment of parameters

DISCUSSION

Consequently, compared to OWHTO, the hybrid CWHTO approach allows for more comprehensive correction in patients with severe deformities and can be applied in situations when flexion contracture is more than 15°, which rules out OWHTO. Furthermore, when compared to OWHTO, CWHTO results in less patella lowering and less pressure rises at the patellofemoral joint.^{8,9}Oh et al¹⁰ reported that the patellofemoral OA grade progressed or worsened in 15 of 42 knees (35.7%) after OWHTO over a minimum follow-up of 5 years. Thus, hybrid CWHTO may be beneficial for treating medial OA patients with extensive deformities associated with patellofemoral OA or patella baja. The present study was conducted to assess the outcome of osteoarthritis patients treated with hybrid CWHTO.We found that out of 52 patients, males were 32 and females were 20. Saito et al¹¹ studied the short-term results in a consecutive series of patients treated with hybrid CWHTO. The FTA and MA significantly changed from 180.7° to 170.4° and from 22.0° to 60.2° , respectively. No significant differences were observed between the mean pre- and postoperative posterior tibial slope, Insall-Salvati ratio, or Caton-Deschamps index. The postoperative JOA and Lysholm scores significantly improved from 76.7 to 95.8 and from 58.8 to 90.2, respectively. We found that pre-operative and post-operative Kellgren Lawrence Grade I was seen in 40 and 36, grade II in 12 and 16 respectively. Femorotibial angle (°) was 181.2 and 170.4, mechanical axis (%) was 24.5 and 61.8, posterior tibial slope (°) was 11.4 and 10.3, Insall-Salvati index was 0.93 and 0.92, Caton-Deschamps index was 0.94 and 0.93, Lysholm score was 64.2 and 84.1, Japanese Orthopedic Association score was 72.5 and 91.5 respectively. Schallberger Aet al¹² in their study thirteen patients (24%) received a conversion to total knee arthroplasty over a median follow-up of 16.5 years; the other forty-one patients (76%, survivor group) were examined by score follow-up in addition to clinical and radiological tests. After five years, the survival rate for osteotomies was 98%, ten years was 92%, and after fifteen years was 71%. There was no discernible difference in survival or scoring outcome between an open and closed wedge high tibial osteotomy. The results showed that the Satisfaction Index was 80% (IQR 63-89; range 30-100), the Knee Injury and Osteoarthritis Outcome Score was 71 (IQR 49-82; range 9-100), the median Western Ontario and McMaster Universities Osteoarthritis index was 84 (IOR 66-96; range 9-100), and the median Visual Analogue Score (VAS) was 0 (IQR 0-1; range 0-4). The radiological evaluation, according to the Kellgren and Lawrence classification, only slightly progressed the degree of osteoarthritis. The axis went through the center of the knee in every instance, or at least through the healthy compartment.Bode et al¹³ studied sixty-two patients suffering from tibial conditioned knee joint varus deformity and medial compartment OA that underwent high tibial osteotomy using an internal plate fixator. Fifty-one patients (mean age 46.8 ± 10.2 years) were available at a mean of 60.5 (SD \pm 2.5) months (follow-up rate 82.3 %) postoperatively. Sixty-month IKDC (69.4 % SD \pm 18.6) and Lysholm (76.6 SD \pm 20.5) improved significantly when comparing with preoperative values (IKDC 44.6 SD \pm 17.8; Lysholm 52.1 SD \pm 20.8). Two of 51 subjects underwent TKA, resulting in a survival rate of 96 % among those patients followed (51 of 60; 85 %). Overall complication rate was 8.6 %. The limitation of the study is the small sample size.

CONCLUSION

Authors found that after undergoing the hybrid CWHTO, cases of medial knee OA had good results. In these patients, there was no difference between the preoperative assessment and the postoperative PTS or patella height.

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