SHAFA ORTHOPEDIC JOURNAL, Vol. 1, No.1, Feb. 2014., p. 8-10
http://soj.iums.ac.ir
Original Article

Comparison of medial and lateral approaches in distal femoral varus osteotomy to correct genu valgum

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Received: 22 Aug 2012 Revised: 3 Dec 2012 Accepted: 5 Jan 2013

Abstract

Background: Genu valgum deformity is defined as lateral displacement of lower extremity mechanical axis in knee joint. This can be corrected by medial or lateral distal femoral approach. In this study the effectiveness of distal femoral osteotomy in medial and lateral approach is evaluated by the Knee Society Score and alterations in mechanical axis before and after osteotomy.

Methods: This is a descriptive cross-sectional study on 27 patients referred to Shafa Orthopedic Hospital for corrective osteotomy by "medial close wedge" and "lateral open wedge" during 2005-2011. Data were collected from patient file, questionnaire, radiographs and physical examination.

Results: We evaluated 30 knee joints in 27 patients. Genu valgum was right-sided in 10 cases (37%), left-sided in 14 patients (52%) and bilateral in 3 cases (11%). The mean follow up was 30.7 ± 3.3 (range: 5-76) months. Patients were between 10-34 years. Osteotomy was medial in 11 and lateral in 19 cases. Postoperative tibiofemoral angle was significantly different from preoperative value. Difference in tibiofemoral angle change was not significant between medial and lateral approaches. Knee Society Score in two groups was also insignificant.

Conclusion: There was no significant difference in lower extremity mechanical axis change after genu valgum correction surgery between medial or lateral approaches.

Keywords: Genu valgum, Distal femoral osteotomy, Medial close wedge, Lateral open wedge.

Introduction

Varus or valgus deformity in lower extremity is measured as the angle between femoral and tibial mechanical axis on standing anteroposterior (AP) radiograph. Abnormal lower extremity mechanical axis is one of the major causes of osteoarthritis.

Distal femoral osteotomy for correction of genu valgum is performed in active person with more than 15 degrees valgus angle and yields excellent results. This method has two types: "medial close wedge" and "lateral open wedge" (1).

In patients with genu valgum and compared to involvement of medial knee compartment, lateral knee compartment has lower incidence. Therefore, in genu valgum correction distal femoral osteotomy has more stability than proximal tibial osteotomy (2).

In this study, medial and lateral approaches in distal femoral osteotomy are compared according to Knee Society Score (KSS). Also we evaluated mechanical axis changes in preoperative and postoperative radiographs.

Methods

Cases were selected among genu valgum patients referred to Shafa Orthopedic

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[Cite this article as: Jabalameli M, Bagherifard A, Jahansouz A, Hassanzadeh G, Mokhtari T. Comparison of medial and lateral approaches in distal femoral varus osteotomy to correct genu valgum. Shafa Orthop J. 2014.1 (1):8-10.

Hospital during 2005- 2011. All cases undergone distal femoral osteotomy by medial or lateral approach. Thirty knee joints in 27 patients were evaluated.

Inclusion criteria were having pain or cosmetic concern along with more than 12 degrees valgus deformity. We excluded patients with previous surgery and inflammatory joint disease. Blade plate was the fixation device during osteotomy. KSS score was used for evaluation of patients' postoperative status.

Tibiofemoral angle was measured with alignment view radiographs preoperative and 6 weeks, 3 months, 6 months and 1 year postoperative and then annually. Efficacy of operation on improvement of lower extremity mechanical axis was assessed in both medial and lateral approaches. Mechanical axis is the line connecting the center of femoral head and the center of ankle mortise.

According to the KSS, results were categorized into poor (score <60), fair (60-69), good (70-79) and excellent ($\geq$ 80). KSS is based on pain, knee joint range of motion, anterior-posterior stability, varus-valgus stability and alignment (3,4).

The data were analyzed using SPSS v.16, t-test, mean and standard deviation.

Results

Of 49 patients referred for surgery, 22 cases were missed during follow up and thus we included 27 patients (30 knee joints) in the study. Mean age of the patients was 19.6 +/- 4.3 (10-34) years. Eight (29.7%) cases were male and 19 (70.4%) were female. Mean follow up was 30.7+/- 3.3 (5-76) months.

In 10 cases (37%) right knee, in 14 cases (52%) left knee and in 3 patients (11%) both knee joints were involved. Medial approach was performed on 11 cases (36.7%) and lateral approach on 19 cases (63.3%). Mean preoperative tibiofemoral angle was 19.2+/- 5.6 in patients with medial approach and 16+/- 6.1 in cases with lateral approach. Mean postoperative tibiofemoral angle was 5.6+/- 1.4 in patients with medial approach and 4.2+/- 1.5 in cases with lateral approach. There was a significant difference between preoperative and postoperative values in both approaches ($p<0.0001$). Preoperative and postoperative angle changes were not significantly different in medial or lateral approach ($p> 0.05$).

Mean KSS in patients with medial and lateral approaches were 72.2 +/- 17.4 and 86.8+/-9.4 respectively which showed no significant difference ($p >0.05$). According to the KSS, postoperative clinical results in each group (lateral or medial approach), and patients' satisfaction had not significant difference. Both approaches were effective in improvement of lower extremity alignment.

Discussion

Antivalgus osteotomy is the treatment of choice for correction of genu valgum and alleviation of pain in young and middle age patients. Lateral opening wedge osteotomy is more accurate than the medial closing wedge and more often used for moderate to severe deformities. Tibial medial closing wedge is associated with earlier recovery and more often used for mild deformities (5,6).

Healy et al (7) evaluated distal femoral osteotomy in 23 patients for 4 years and reported good result for their patients.

Miniaci et al (8) found excellent and good results in 86% of their 40 cases undergone distal femoral medial closing wedge osteotomy after 5.5 years follow up.

Finkelstein et al (9) reported complete improvement in 64% of 21 patients undergone medial or lateral distal femoral osteotomy within 10 years.

Marti et al (10) reported good results in 75% of 15 cases following distal femoral medial closing wedge osteotomy.

Puddu et al (6) assessed results of operation in 21 patients for 4 to 14 years by Hospital for Special Surgery Knee Score (HSS) and International Knee Documentation Committee (IKDC) which showed good results.

Based on our study's findings and also

others' reported results (6,9,10) distal femoral osteotomy for correction of genu valgum either lateral open wedge or medial close wedge would result in acceptable results regarding to the appearance or clinical pain improvement.

Our findings were consistent with Berruto et al (4), Maquet (5), and Finkelstein et al (9) studies.

Conclusion

Both lateral and medial approaches for distal femoral corrective osteotomy yield similar outcome regarding postoperative joint function and patient's satisfaction.

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