

High Tibial Osteotomy-long term Results in Osteoarthritis of knee joint

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ABSTRACT

Aim: To evaluate the long term results of high tibial osteotomy in our population keeping in view low socio-economical status.

Place and duration of study: The study was conducted initially in orthopaedic department Mayo Hospital Lahore from 1988 to 1993 and then at AIMTH/KMSMC Orthopaedic Dept from 1997 to 2003.

Methods: Total 74 patients were selected for retrospective analysis of high-tibial osteotomy. The operation were performed initially in Mayo Hospital, Lahore (1988 to 1993) and then at AIMTH/KMS Medical College, Sialkot (1997 to 2003). All patients were evaluated clinically according to Baily knee rating scale and radiologically by measuring tibio-femoral angle. The fallow up extended 10 to 13 years with an average of 08 to 10 years. 12 patients were lost to follow up after 10 years, 08 (5.92%) patients died after 08 to 11 year of surgery due to associated medical problems. The mean age of the patients were 54 years. Range b/w 50-75 years. Results were reviewed and 45 patients (60.8%) had excellent results 20 patients (27%) good, 5(6.75%) fair, 4 patients (5.4%) poor results according to selected scale. 45 patients stated that they would like to have this surgery again because of its good results.

Conclusion: After retrospective analysis of the patient we concluded that high tibial osteotomy is a procedure of choice in carefully selected and operated patients. It gives long term pain free relief to patients before knee orthoplasty and it is considered as good standard procedure of choice in lower socio-economical patients.

Keywords: Pain, medial compartment osteoarthritis, high- tibial osteotomy.

INTRODUCTION

High tibial osteotomy has been popular treatment for medial compartment osteoarthritis of the knee joint. Richard Volkman was first to published the details of osteotomy around the knee joint in 1875. Later on different people Osgood (1913) Jones and lovelles (1929) Milch (1934) Steindler (1940) Smillie (1946) Judet et al (1954) Lange (1951) reported different kinds of oestotomies in different regions, in different patients like rickets, poliomyelitis, flexion contracture, valgus deformity or other abnormal angulations⁴⁹⁻⁵⁰. Jackson and Waugh^{44,45} (1961) were first to report and published 08 cases of high tibial osteotomy for medial compartment osteoarthritis of the knee joint. The purpose of the procedure was to realign the mechanical axes of the knee joint in order to prevent the progression of medial compartment osteoarthritis and they concluded that HTO is better and the safe procedure regarding relief of pain and retaining useful range of movement.

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Wardle (1962)⁵⁴ reported 35 patients with five years good results in patients age b/w 42 to 75 years. Instal (1964) Conventrey (1965) advocated femoral osteotomy as operation of choice with valgus knee and more than 10 degree deformity. Gariephy in 1964 introduced first time tibial osteotomy above the tibial tubercle. Later on Dawson (1965) Gunn (1966) Harris and Kostuck (1970), Levy (1971) SHea (1973) Coventry M,B. (1973) Shoji, H et al (1973) Install et Al (1974), Paul Maquet (1976) Vainiopaa, S. et All (1981) Coventry (1985) reported short term good results of high tibial osteotomy^{26,27,36,37,38,41,42,43,47-51}.

Jackson in 1990^{44,45} reported HTO with 43 good results and 68% acceptable results with 11.9 years follow up. Naglow in 1996 reported 82% long tern good results in 34 operated patients. Pauwly's showed that the previously narrowed joint space widening and regression of sclerosis and subchondlar space in patients of medial compartment disease when mechanical axis is deviated to center or lateral to the center of the joint^{4,17,18,25,30,39,46}.

The purpose of the study was to evaluate the long term results of the high tibial osteotomy keeping in view the poor socio-economical condition of our patients.

MATERIAL AND METHODS

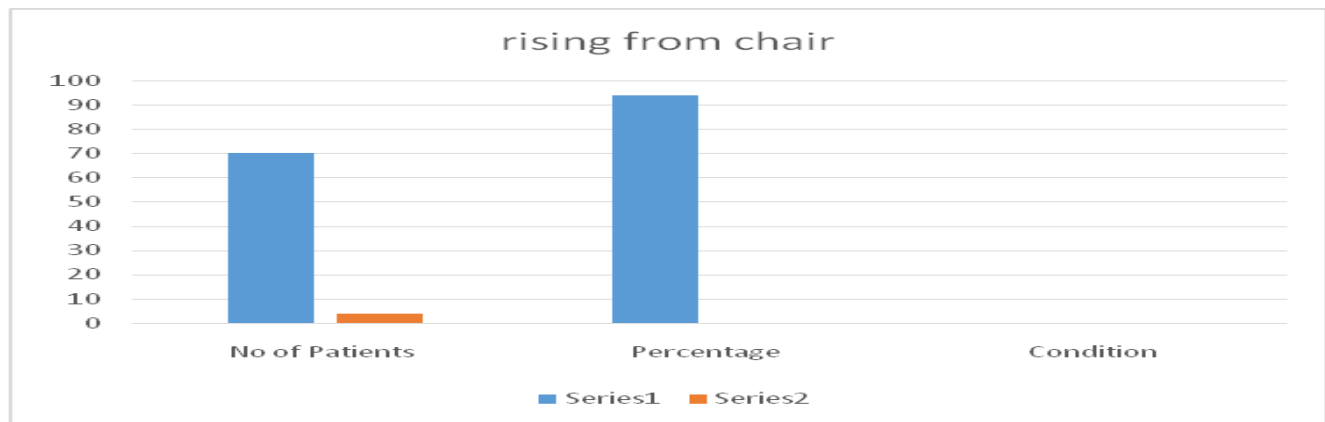
We conducted a retrospective study of 74 patients in which high tibial osteotomy was performed between 1988 to 2003 at two institutions. Only those patients were selected who have medial compartment osteoarthritis in the knee joint after failure of all conservative treatment. All patients were evaluated clinically by modified Baily knee rating scale with respect to intensity of pain, stability of joint, giving away, difficulty in walking distance, use of walking aid, rising from chair, range of movement, extension leg, and wasting of quardriceps muscles. The radiological assessment was made by measuring tibiofibular angle, radiological improvement was also assessed with respect to decrease in subcondral sclerosis, obliteration of subcondral cyst, formation of medial joint space and regeneration of articular cartilage. Laterally based closing wedge high tibial osteotomy was performed in all the patients. The size of the wedge was calculated before surgery by measuring tibio-fibular angle. Fibular oestetomy was performed at different part, head of fibula (one patient) proximal one third in 30 patients mid shaft 34 patients division of capsule of superior tibio-fibular joint in three patients and no osteotomy was performed in 7 patients. The Oestetomy site was fixed and secured by POP cast alone, POP cast and staples, stapped staples or charnely fixators in different patients.

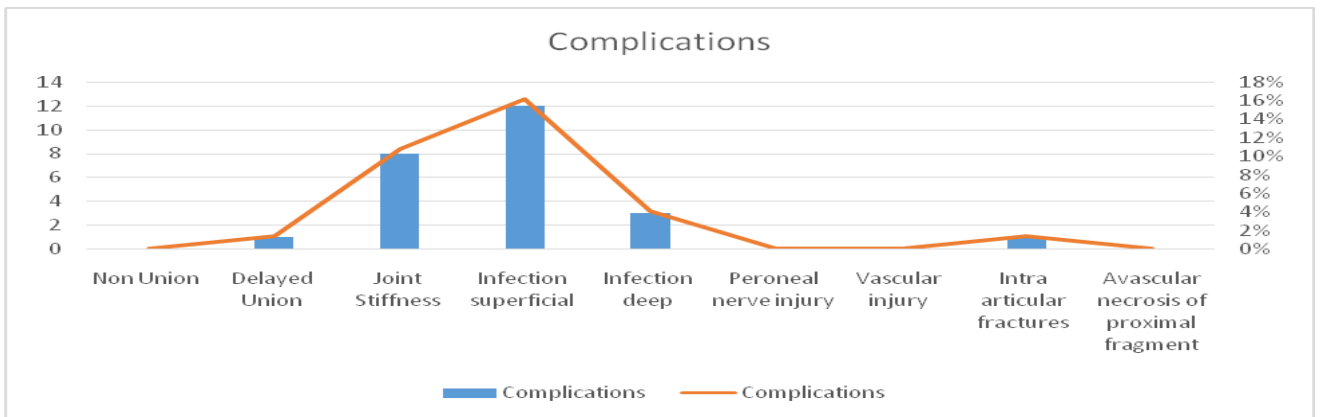
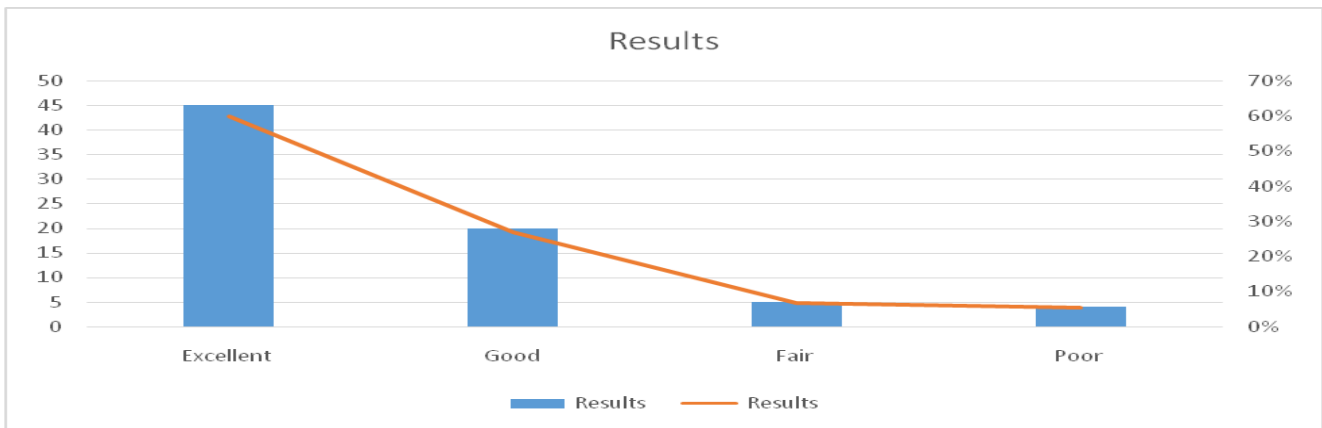
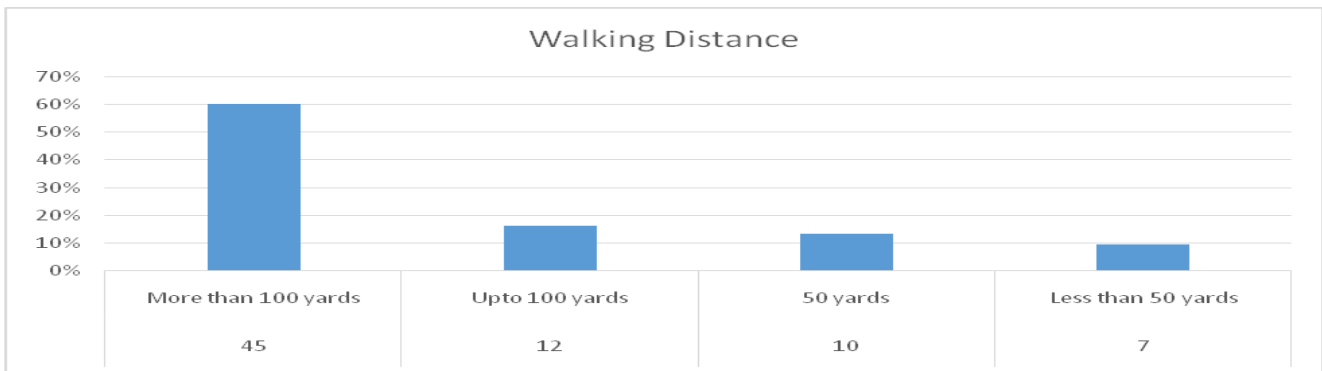
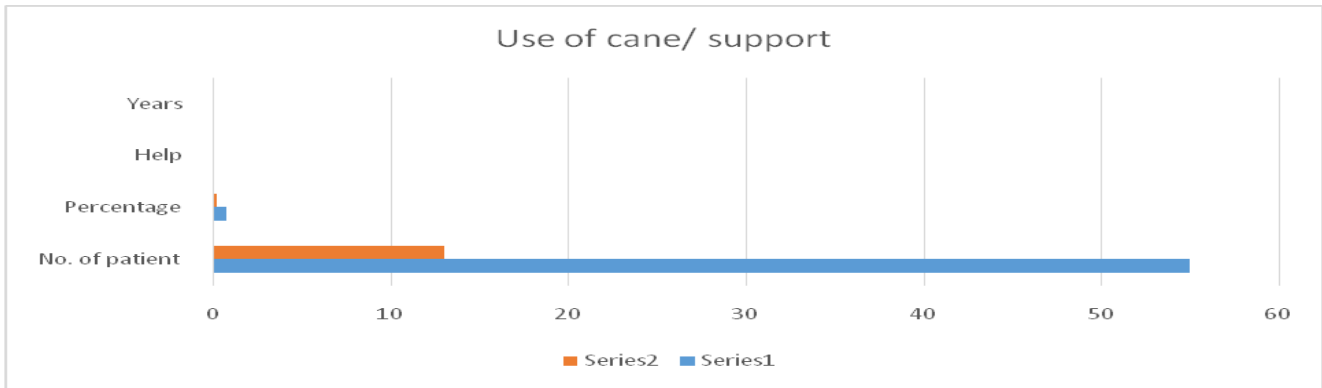
RESULTS

Seventy four patients retrospectively evaluated. The resulted were rated Excellent in 45 patients (60%) good in 20 patients (27%) fair in 05 patients (6.75%)

and poor in 04 patients (5.40%). Over all 87% patients were satisfied with the procedure. Majority of the patients having difficulty in walking even one block before surgery but after surgery 45 patients (60%) were able to walk more than 100 yards, 12 patients 16.21% upto 100 yards 10 patient (13.5%) upto 50 yards 07 patients (9.45%) walk upto 50 yards but with pain. Majority of the patient can walk independently and comfortably although they were using cane or stick before surgery but after surgery the ratio falls considerable low ($p < 0.001$). 55 patients (74.32%) were walking without support after 08 to 10 years of surgery. 13 patients (17.56%) again started using cane or stick after 09 to 10 years but this was common in old age group selected for surgery and was also probably due to deterioration of generalized health because of associated diseases. Similarly 70 patients (94%) have no difficulty in rising from chair during follow up. There was considerable improvement, 63 patients (85%) in range of movement although in some patients in which POP Cast was done to secure the osteotomy site, there was initial deterioration in range of movement but it improved in long term follow up study. Quardriceps atrophy was also improved as soon as pain settled with period of time. In 06 patients 8.10% upto 10 degree extension leg was also present.

During follow up study the complications associated with HTO like delayed union 01 patient (1.35%), non union (0%) joint stiffness in 08 patients 10.8% infection, Superficial 12 patients (16.21%), deep wound infection in 03 patients 4.05%, peronial nerve injury (0%), vascular injury (0%), intra articular fracture one patient, avascular necrosis of proximal fragment (0%) was observed.







DISCUSSION

Degenerative osteoarthritis of the knee joint is relatively common condition yet the treatment still generates lot of controversy. Corrective osteotomy of tibia have been done in tibia vara to prevent degenerative arthritis for a long time^{2,3,6,7,8,9,13,14,24,26}.

The mechanism by which osteotomy relieves the pain in OA of the knee joint is not well understood. It seems that it is most probably multifactorial. The correction of deformity and its bio mechanical effects of redistribution of the load has been highlighted by Jackson, Coventry^{8,9,10}, Waugh, Insall and more recently by Maquet et al^{8,9,10,11,15,17,27}. The bio mechanical theory of redistribution of loads does not explain the relief of the pain during post operative period and why interosseous osteotomy where deformity is not corrected relieves the pain. So there must be some other factors involves in mechanism of pain relieve. The effect of tibial osteotomy can be discussed to both clinical and bio mechanical factors. The clinical factors consist of.

1. Allowing damage cartilage to regenerate.
2. Prevention of further capsular ligament laxity
3. Decompression of vascular pressure

The bio mechanical factors includes

1. Correction of knee joint deformity in anteroposterior plain
2. Realignment of load bearing axis
3. Altering the patellofemoral mechanism which may be an important factor in relieving symptomatic pain.

Aglietti P et al have reported 79% excellent or good result with an average follow up of 6.5 years. However they reported that after 10 years the result falls to 64%. Bauer Insall et al and Rudan et al reported 60 to 70% good results after 08 to 12 years of surgery^{3,4,5,6,7,9,10,11}.

Coventry in 1973 also reported encouraging results. He proved that while changing the alignment and transferring the weight bearing stresses to healthier sites of the knee joint, the degenerative process is slowdown, arrested or ever reversed.

In our study the patient with overall post-operative correction b/w 7 to 10 degree of valgus have shown good results and we are also convinced in our study that 8 to 10 degree of valgus correction is an ideal for obtaining long-term good post-operative results of HTO as mentioned in other literatures. With over correction more than 10 degree and under correction less than 5 degree the results are not satisfactory. The complication rates are very

low in our study as compared to 11% mentioned in literature. Deep vein thrombosis, pulmonary embolism, peroneal nerve injury was not observe in our study^{11,20,21}. We also noted that there are some factors like obesity, lateral compartment osteoarthritis, poor medical conditions, relatively old patients, previous knee surgery, over correction more than 10 degree and under correction of less than 05 degree gives poor results^{4,14,15,16,21}.

The results of our study reveals that the high tibial osteotomy in osteoarthritis gives satisfactory results and excellent to good results can be achieved upto 70 to 90% in carefully selected patients, so we reached to the conclusion that laterally based High Tibial Closing wedge Osteotomy in carefully selected, relatively young patients is a procedure of choice which provides long term pain free relief in low socio-economical patients.

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