



Stiffness a Complication of Total Knee Arthroplasty and Its Management

Authors

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Introduction

Total knee replacement is a highly successful procedure with a success rate of survivorship of 10 to 15 years exceeding 90%^[1,2]. However despite advances in the surgical technique and rehabilitation post-operative stiffness continues to be relatively common complication^[3-5] Stiffness is defined as an inadequate range of motion (ROM) that results in functional limitations in activities of daily living. Although early studies reported stiffness in >50% of patients with TKA,^[6] the true incidence appears to be 8% to 12%^[3,7,8]. The incidence of complete fibrous ankylosis after TKA is about 0.1%. Biomechanical studies and gait analysis have shown that patients require 67° of knee flexion during the swing phase of gait, 83° to ascend stairs, 90° to 100° to descend stairs, 93° to rise from a standard chair, and up to 105° to rise from a low chair^[9,10]. There are no universally accepted criteria for diagnosis of stiffness, nor does consensus exist on appropriate timing of intervention. Thorough understanding of the multiple etiologies and available management options can help prevent stiffness in most patients and improve outcomes.

Aims and Objectives

The study was conducted at the Postgraduate Department of Orthopaedics; Government

Medical College, Srinagar. Aim of the study was to evaluate stiffness a complication of total knee arthroplasty, and its management.

Materials and Methods

The study was conducted at the Postgraduate Department of Orthopaedics; Government Medical College, Srinagar. After obtaining approval from Hospital Ethics Committee, a written informed consent was taken from the patients for participation in this study. The present prospective study consisted of a total of 25 cases of total knee replacement for symptomatic patients with primary osteoarthritis knee using posterior cruciate ligament substituting implant who were available for follow up. Stiffness was defined as ROM less than 90 degree. Each 8 degrees ROM was given a score of 1 upto the maximum score of 18 [HSS Scoring system]^[11]

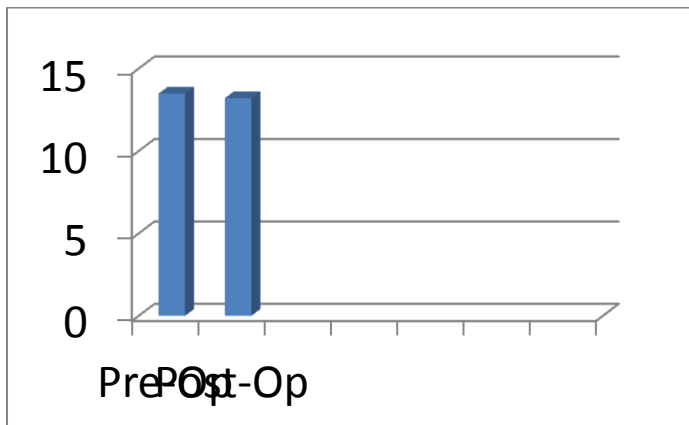
Operative Procedure

The operations were performed by a single surgeon in one hospital using a uniform surgical approach, instrumentation, technique and release sequence. A medial Para patellar approach was used through a midline skin incision. The length of the incision was identical in all cases with no attempt to perform minimally-invasive surgery. Bone cuts and soft-tissue balancing were done in

the same sequence. Wound was closed in layers over suction drain

Static quadriceps exercise & ROM of ankle/ ankle pumps were started on first post-operative day. Suction drain was removed after 24 hours Active and passive ROM of knee were started on 1st post-operative day and toe touch to partial weight bearing was allowed as per tolerance starting the 2nd post-operative day with knee brace

Observation and Results



There was no significant difference between pre and post-operative ROM however stiffness was seen in two patients which improved after manipulation under anesthesia.



Risk Factors

Preoperative risk factors include, decreased ROM^[5,12], previous surgery around knee^[13], obesity.^[14] Intraoperative^[15-18] risk factors include technical errors which lead to improper flexion-extension gap balancing, malpositioning or over sizing of components, inadequate femoral or tibial resection, excessive joint line elevation, creation of an anterior tibial slope, or incompletely resected posterior osteophytes. Postoperative risk factors include poor patient motivation and compliance, deep infection, arthrofibrosis, patellar complications, complex regional pain syndrome (CRPS), and heterotopic ossification (HO).^[19]

Management

Aggressive physical therapy may benefit in patients of persistent stiffness in first 3 months who have no infection or misaligned components Patients with late-onset knee stiffness (ie, >3 months after TKA and after adequate ROM had been achieved initially) also are less likely to benefit from physical therapy. Every effort must be taken to determine the cause of the stiffness. Patients with HO after TKA may benefit from physical therapy and manipulation. Although heterotopic bone has been associated with knee stiffness in some patients, the role and efficacy of excision of HO about the knee (unlike the hip) are unknown. Patients with limited knee motion secondary to CRPS may benefit from sympathetic blockade and physical therapy.^[19]

Treatment includes manipulation, surgical debridement or revision arthroplasty depending upon the cause. There is controversy regarding timing of manipulation, if ROM is less than 90 degree manipulation should be started as early as 10 days^[5], 2 weeks^[14] or 6 weeks^[3] Arthroscopic debridement of adhesions in combination with manipulation has been shown to substantially improve knee ROM in patients with postoperative arthrofibrosis resulting from surgical procedures other than TKA^[20-22] However, arthroscopic lysis of adhesions after TKA has not been as successful as lysis after procedures other than TKA^[23,24].

Some authors on the other hand have reported a marked increase in ROM after this procedure [25,26]. In patients with stiffness after TKA secondary to oversized, malpositioned, or loose components, revision arthroplasty is the preferred treatment.^[19]

Summary

Stiffness after knee arthroplasty is a known complication .it can occur even after adhering to meticulous surgical technique, using appropriate implant and aligning and fixing them properly.

The treatment of stiffness consists of proper pain management and close monitoring. If patients fail to achieve 90° of flexion by 4 to 6 weeks, aggressive physical therapy should be initiated. If physical therapy fails within 3 months after surgery, closed manipulation should be considered. Arthroscopic or limited open lysis of adhesions can be conducted if the knee is stiff and more than 3 months has lapsed since surgery.

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