



TO STUDY LONG TERM RESULTS OF TOTAL KNEE JOINT ARTHROPLASTY FROM HAEMOPHILIC ARTHROPATHY PATIENTS IN INDIA

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ABSTRACT

Haemophilia is a rare X-linked congenital bleeding disorder. Which is characterized by a deficiency in coagulation factors (CFs) and also divided into two types: haemophilia A and B. the aim of the study Complication and long term results of total knee joint Arthroplasty from Haemophilic Arthropathy patients. Forty two knees undergoing intensive hemophiliac-specific physical therapy after total knee arthroplasty, at an average age of 46 years, were followed to an average 50 months. For all patients, flexion contracture advanced from -10.5 stages preoperatively to -5.1 ranges at final comply with-up ($p = 0.02$). Knees with preoperative flexion less than 90 degrees were compared to knees with preoperative flexion greater than 90 degrees. Patients with preoperative flexion much less than ninety ranges experienced progressed flexion ($p = 0.02$), together with improved arc variety of motion (ROM) and reduced flexion contracture. For those patients with specific twelve-month and final follow-up data points, there was a significant gain in flexion between twelve months and final follow-up ($p = 0.02$). Hemophiliacs with the poorest flexion benefited most from focused quadriceps stretching to a more functional length, motivation for hemophiliac patients in terms of long-term improvements after total knee arthroplasty.

Keywords:- Total knee arthroplasty, Physical therapy, Hemophilia, Contracture.

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INTRODUCTION

Haemophilia is a rare X-linked congenital bleeding disorder. Which is characterized by a deficiency in coagulation factors (CFs) and also divided into two types: haemophilia A and B. HA (Hemophilic arthropathy) mainly occurs after multiple episodes of hemarthrosis. Its onset is during childhood (a) and its pathophysiology is characterized by progressive proteolytic cartilage degeneration and synovial hypertrophy, in addition to vascular damage to bones in joint regions and reduced joint space.(b) In higher stages, it can lead to joint deformity, chronic pain, and range of motion loss in the involved joint, resulting in lower

quality of life. The prevalence of haemophilia A is 1/5000, and that of haemophilia B is 1/25000. [2]

Multiple surgical interventions were applied to treat hemophiliac arthropathy in the knee, with overall knee arthroplasty (TKA) becoming a secure and successful choice for end-degree hemophiliac arthropathy. TKA is the maximum not unusual system in hemophiliacs. Unlike different sufferers undergoing TKA, hemophiliac TKA sufferers have extra challenges due to ability musculoskeletal bleeding complications of their postoperative rehabilitation. Hemophiliac patients suffer from widespread joint and soft tissue damage and chronic inflammation leads to flexion deformity. As such,

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hemophiliacs have longstanding extrinsic tightness due to quadriceps/flexion contractures.

The aim of this study was haemophilia patients who underwent total knee arthroplasty (TKA) and also to describe the clinical and surgical considerations when managing these patients. To determine the range of motion outcomes, especially after two years postoperatively, in hemophiliac patients after TKA

METHODS

A prospective, single-center, open-label, non-randomized control trial, The present study was conducted at Madha Medical college and Sri Lakshmi Narayana institute of medical sciences, Pondicherry. All patients with haemophilia who underwent TKA between January and December 2018 in our centre were reviewed. All patients had read and signed an informed consent form.

Inclusion criteria: End-stage haemophilic arthropathy of the knee with a Modified mold–Hilgartner grade of IV, complete destruction of articular cartilage, severe pain, functional impairment and no response to conservative treatment.

Excluded criteria: Patients who were unable to tolerate TKA, had previous knee surgeries, or had a recent infection in the knee.

Preoperative function and postoperative outcomes were quantitatively measured. Knee ROM data included passive flexion contracture, further flexion, and total knee arc ROM. These values were collected at the preoperative visit, as well as at approximately 12-24 months postoperatively. Knee motion gain was measured by subtracting knee arc at the preoperative time from the knee arc at 12-24 months, respectively.

Surgical Technique

These patients often have contracted and atrophied quadriceps as well as extensive intra-articular knee adhesions which compromise exposure. Care must be taken to avoid patellar tendon avulsion during exposure. A standard midline incision with median parapatellar arthrotomy is utilized. Release of intra-articular adhesions combined with tibial external rotation and a generous medial subperiosteal release diminishes tension on the patellar tendon and allows less forceful exposure minimizing the risks of fracture of the thin and osteopenic diaphysis often present in these patients.

An extensive synovectomy, posterior capsular release, and medial and lateral gutter releases is generally required. A lateral retinacular release is often useful to minimize tension on the patellar tendon during exposure and allow appropriate tracking and improved flexion postoperatively. Although a quadriceps snip is rarely

necessary, we prefer to avoid tibial tubercle osteotomies in these patients due to concern for increased bleeding and compartment syndrome. Great care must be exercised to minimize the risk of neurovascular injury. The neurovascular structures in the popliteal fossa may be adherent to the posterior capsule. Joint contracture, fibrosis of muscles from intramuscular hematomae, and synovial hypertrophy may all affect the soft tissues and resulting soft –tissue balance. Indeed, arthrofibrosis, rather than instability, is generally the main challenge with hemophiliac arthropathy.

The supra patellar adipose tissue covering the distal femur should be preserved because it is a barrier to quadriceps adhesion. In patients in whom it has been replaced by fibrous tissue, restoration of motion is especially challenging.

Bony erosion and periarticular cysts compromise bone stock, and may lead to intra-operative fracture with aggressive maneuvers. Epiphyseal hyperemia and synovial hypertrophy may cause widening of the distal femur compared to relatively narrow diaphyses. Severe patellar thinning may obviate the implantation of patellar prosthesis. Angular deformity is quite common in advanced stages of disease and tibial slope may be affected by long-standing flexion contractures. Cutting the tibia first may facilitate exposure for severe cases. At all points intra-operatively, meticulous hemostasis is essential.

The surgeon may believe antibiotic-impregnated cement, as well as the use of surgical drains. A compressive wrap is utilized in the operative dressings, and a posterior splint may be used for the first couple postoperative days to protect a fragile soft tissue envelope. A careful series of postoperative examinations is important, as nerve palsy is a theoretical concern. Mechanical deep venous thromboembolic prophylaxis is used in light of the propensity for postoperative bleeding.

Perioperative Care

A careful preoperative assessment must be performed by a hematologist, including a pre-screen for neutralizing antibodies/ factor inhibitors versus the potential recommendation for recombinant therapy. Ideally, this hematologist is familiar with the perioperative needs of the hemophiliac patient and will be available for inpatient consultation. The surgical team must also confirm that adequate factor stores are available at the inpatient pharmacy.

Appropriate anesthesia consultation, including appropriate postoperative pain management, should be carefully planned and preoperative consultation with a pain management specialist is useful. Medical co-management of concomitant diseases like HIV and Hepatitis C proves important, and patients with these diseases should be counseled on the increased risks of

postoperative infections. For maintenance of appropriate factor levels, home infusion monitoring may be needed for up to two weeks postoperatively.

Physical therapist Regimen

All patients in this study met with the hemophilia treatment center physical therapist before and after surgery. The patients received PT starting on postoperative day one. Therapy sessions were carefully coordinated with factor replacement, and each session was matched to the patient to avoid exacerbation of pain or wound condition/ hemostasis. The patients received at least one therapy session per day while hospitalized. Individualized home exercise programs were then provided upon discharge, and, in some cases, outpatient PT was initiated. Outpatient physical therapy was initially prescribed for four to six weeks postoperatively and tailored to the specific patient's needs and ROM. The patients attended regular visits with an outpatient therapist with extensive experience in managing hemophilic patients and were followed periodically with this therapist for up to two years postoperatively.

Physical therapy exercises typically included isometrics for the quadriceps, hamstrings and gluteal muscles, active and passive knee ROM exercises, and progressive resistive lower extremity exercises as the patient progressed. In addition, patients were instructed in adjuvant self-patellar mobility and scar management techniques in most cases. Functional mobility was also addressed, including the correct use of gait aids and adaptive equipment as necessary. While the therapy program used in this study has similarities to those employed in other studies, a particular difference may lie in the frequent follow-up and the focus on quadriceps stretching/extrinsic tightness undertaken by a physical therapist experienced in hemophilic arthropathy and post-surgical care.

RESULTS

The mean patient age was 39 years old (range, 21 to 59 years; standard deviation [SD] 3). The average follow up for patients was 48 months (range, 24 to 4 years; SD, 42). When analyzing ROM data for all patients collectively, there was no difference between preoperative flexion/arc (flexion minus flexion contracture) ROM and flexion/arc ROM at final follow-up. There was a significant difference between flexion contracture preoperatively and flexion contracture at final follow-up ($p = 0.02$).

Flexion contracture, on average, improved from -11.5 degrees preoperatively (range, -30 to 2 degrees; SD, 11.2) to -5.1 degrees at final follow-up (range, -26 to 0 degrees; SD, 7.1) (Table 1).

Knees were further stratified into two groups: knees with preoperative flexion less than 90 degrees (13 knees in 8 patients; mean, 73 degrees) and knees with preoperative flexion greater than 90 degrees (15 knees in 9 patients; mean, 111 degrees); there was a significant difference between the means of the preoperative flexion between these two groups ($p = 0.004$).

In those patients with preoperative flexion less than 90 degrees (mean, 73 degrees), there was a significant improvement in flexion from preoperative evaluation (range, 30 to 90 degrees; SD, 33.3) to final follow-up (mean, 88 degrees; range, 50 to 122 degrees; SD, 26.3 ; $p = 0.02$) (Table 2). presents the specific ROM values for those patients with preoperative flexion greater than 90 degrees. For those patients with specific twelve-month and final follow-up data points (10 knees in 8 patients), there was a significant gain in flexion between twelve months and final follow-up ($p = 0.02$).

In this study there were no nerve palsies and significant postoperative bleeding. There were no progressive radiolucent lines or hardware failure on postoperative radiographic assessment. There was one complication in the cohort.

Table 1: Range-of-Motion Values for Patients with Preoperative Flexion Less than 90 Degrees (n = 11 knees)

	preoperative			24 months /later postoperative		
	Extension	flexion	arc	Ext	flex	Arc
1	-30	90	60	-7	90	83
2	-25	90	65	-5	85	80
3	-10	90	80	-4	117	113
4	-10	90	80	0	122	122
5	-5	45	40	-9	50	41
6	0	80	80	0	110	110
7	-10	48	35	-10	50	40
8	-10	70	60	-8	75	67
9	0	30	30	-3	90	87
10	-10	90	80	-9	92	83
11	0	78	78	-7	90	83
Means	-10	62.5	62.5	-6.4	88.3	82.8

SD	9.7	22.2	19.5	3.7	23.6	26.9
P value	-	-	-	0.15	0.01	0.05

DISCUSSION

The knee is the most commonly affected joint in hemophiliac bleeds, and the use of TKA in hemophiliac patients has shown great promise in reducing disability. Since the first TKA was performed on a hemophiliac in 1973.⁴ For the majority of hemophiliac patients who have undergone TKA, results have been described as favorable. However, many authors have stated a high fee of early and overdue headaches, often related to infection and aseptic loosening.

Restricted ROM is likewise a common subject seen in hemophiliac TKA. This examine aimed to represent the mid-time period ROM results on this populace, and to explore whether in depth bodily remedy and stretching of the quadriceps mechanism could have an effect on late postoperative ROM effects.

The patients in present study saw a comparable improvement with both flexion contracture and further flexion ROM gains. However, despite these obvious improvements in knee function, many authors cite the complications seen with TKA surgery in the hemophiliac patient. Silva and Luck⁵ evaluated 90 TKAs in 68 patients and found that 97% of patients had good or excellent Knee Society functional scores. The average flexion arc advanced from 59 ranges to 69 ranges within the early postoperative phase, after which to seventy five tiers at the present day observe-up of two years. Flexion contracture also progressed from 18 ranges preoperatively to 9 levels inside the early.

In the case of purposeful consequences, restrictions in ROM had been the maximum limiting factor inside the Knee Society scores recorded in hemophiliac TKA patients. Increased stiffness seen in hemophiliacs has contributed to unsatisfactory profits in ROM following TKA.⁶ this stiffness tends to be the result of both intra and extra-articular contractures associated with the recurrent bleeding and subsequent fibrosis that occurs in the joints and muscles of the lower extremity.

Rehabilitation after surgery is, in fact, a key component to a patient's success. Incorporating a rigorous and appropriate physiotherapy for hemophiliac patients undergoing TKA is important to the success and gains in their ROM. However, the use of rehabilitation therapy is one of the least studied aspects of perioperative management in TKA.

Lobet et al.⁷ Found that a deficit in extension postoperatively was more likely present in knees with significant flexion contracture preoperatively. In contrast, Mockford et al.⁸ found that patients tended to migrate towards a "middle range," where those with poor

preoperative flexion gained flexion after TKA, while those with satisfactory preoperative flexion lost theirs. Similarly, other study⁷ found that patients with the stiffest knees were afforded the greatest improvements. In our study, those patients with the poorest flexion benefited the greatest from an intense postoperative rehabilitation course, with a focus quadriceps stretching performed by a therapist familiar with the hemophiliac population.

It is of vital importance that surgeons be aware of the capacity for later enhancements in ROM in longstanding extrinsic knee contracture. This data may suggest an increased threshold prior to considering a quadricepsplasty, which acutely lengthens the quadriceps at the expense of either quadriceps weakness or an extensor lag. Instead of quadricepsplasty as a first-line treatment, hemophiliac patients may rather undergo TKA alone with aggressive but appropriate postoperative rehabilitation to realize increased ROM benefits. While not directly studied here, these improvements in ROM may also occur in juvenile idiopathic arthritis or other childhood onset conditions where extrinsic muscle shortening limits ROM.

There are boundaries to the present study. This retrospective observe entails a distinctly small affected person cohort given the low numbers of hemophilic TKA versus the overall populace. Moreover, this condition and its management are usually restricted to institutions which have hemophilia remedy facilities which might be adequately prepared to offer coordinated, multidisciplinary care. While TKA in hemophiliacs is unusual in community-based practices, the PT concepts and postoperative profits in motion - and the intra-operative and postoperative distinctions from the osteoarthritic or rheumatoid population - are crucial. More large research are had to verify this initial statement in hemophiliac arthropathy, along side other conditions with extrinsic tightness, inclusive of juvenile idiopathic arthritis.

CONCLUSION

The rehabilitation after hemophiliac TKA patients is tough nowadays. Hemophiliacs can also enjoy ROM improvements with extensive stretching of the quadriceps mechanism and hamstrings to a extra functional period. Those patients with the poorest preoperative flexion less than 90 degrees realized the best gains. Importantly, this look at provides motivation for hemophiliac patients in phrases of long-term improvements after total knee arthroplasty.

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