

Evaluation of Drain Need in Total Knee Replacement SurgeryDr. Vellu¹, Dr. Pavithra²

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Abstract

Introduction: Since its introduction, total knee replacement procedures have incorporated the use of a tourniquet. However, this practice is associated with various complications, including limb ischemia, blood vessel calcification, and nerve palsy, along with increased postoperative drainage. To address the risk of hematoma formation and excessive fluid buildup in the knee joint, suction drains were traditionally inserted. Despite this precaution, the primary concern with drain usage remains an elevated risk of infection.

Materials & Methods: This study documents 100 instances of knee replacement surgery conducted without the use of tourniquets or drains. In cases of single knee replacements, blood loss averaged around 300 ml, eliminating the need for blood transfusions or drain insertion as a crepe bandage was utilized to create a tamponade effect. The absence of a tourniquet prevented any associated complications. Patients experienced excellent post-operative recovery, and the intra-operative antibiotic prophylaxis proved effective.

Results: On the first day after surgery, patients were encouraged to mobilize according to their pain tolerance. They noted reduced pain levels and enhanced functionality. Most patients described tolerable post-surgical discomfort and increased joint mobility. Additionally, all study participants recovered without complications or adverse events.

Conclusions: The use of a Romovac suction drain is not essential for total knee replacement procedures.

Keywords: Evaluation, Drain, Total Knee Replacement Surgery

Introduction

The introduction of total knee replacement surgery in the early 1970s marked a significant advancement in orthopedic procedures, with the tourniquet being routinely employed to create a bloodless surgical field and improve visibility for the surgeon [1]. Despite its benefits, the use of a tourniquet has been linked to several adverse effects, including ischemic limb injury, venous thromboembolism, calcified vessels, and nerve palsy. Additionally, patients undergoing surgeries with tourniquets often experience increased postoperative drainage and discomfort [2][3]. Severe knee arthritis is commonly treated through total knee arthroplasty (TKA), a surgical intervention designed to alleviate pain and restore joint function [4]. Although TKA has proven to be an effective procedure with favorable long-term outcomes, there remains considerable debate regarding the use of drains during the operation [5][6].

This controversy persists even with the advent of modern surgical techniques that aim to minimize blood loss, reduce complications, and promote faster recovery [7]. The use of drains in TKA is associated with potential risks, such as an increased chance of retrograde infection, greater postoperative blood loss, delayed rehabilitation, and, in some cases, accidental drain dislocation [8][9]. If a drain breaks during or after surgery, it may require wound revision for removal, posing an additional surgical burden. Although the primary purpose of drains is to prevent hematoma formation and remove excess fluid through suction at the surgical site, their use can inadvertently elevate the risk of postoperative infections [10,11].

Materials & Methods

This study documents 100 cases of total knee replacement surgeries conducted without tourniquet use. During the surgical incision and subsequent bleeding, blood vessels are sealed through cauterization, enabling the completion of the procedure without inflating a tourniquet or using a drain. A crepe bandage is applied post-dressing, creating a tamponade effect that minimizes blood accumulation and serves as an alternative to a drain. The typical blood loss for a single knee replacement is around 300 ml, with no need for blood transfusions. By eliminating tourniquet-related complications such as venous thromboembolism and fat necrosis, postoperative recovery is enhanced, and intraoperative antibiotic prophylaxis is effective.

The study data was input into Microsoft Excel and variables were coded. Analysis was conducted using SPSS software (Version 27, IBM), employing descriptive statistics. Associations between categorical variables were examined. A statistical test was used to compare treatment group outcomes and test the hypothesis, with a P value below 0.5 considered significant.

Results

This study included a total of 100 participants. On the first day after their operation, patients were encouraged to become mobile based on their individual comfort levels. Most participants experienced tolerable post-surgery pain and improved joint mobility. Additionally, all study subjects recovered successfully without any complications or adverse events.

Table 1: Age distribution among the study participants

Age	Percentage (%)
< 40 years	21
41 – 60 years	34
>60 years	45
Total	100

The age distribution of the study participants revealed that 21% were below 40 years of age, 34% were between 41 and 60 years, and 45% were above 60 years. This indicates that the majority of the participants, accounting for 79%, were over 40 years old, with the largest proportion belonging to the age group above 60 years. This trend suggests that the study population was predominantly composed of middle-aged and elderly individuals, reflecting a higher prevalence of the studied condition or surgical intervention among older adults.

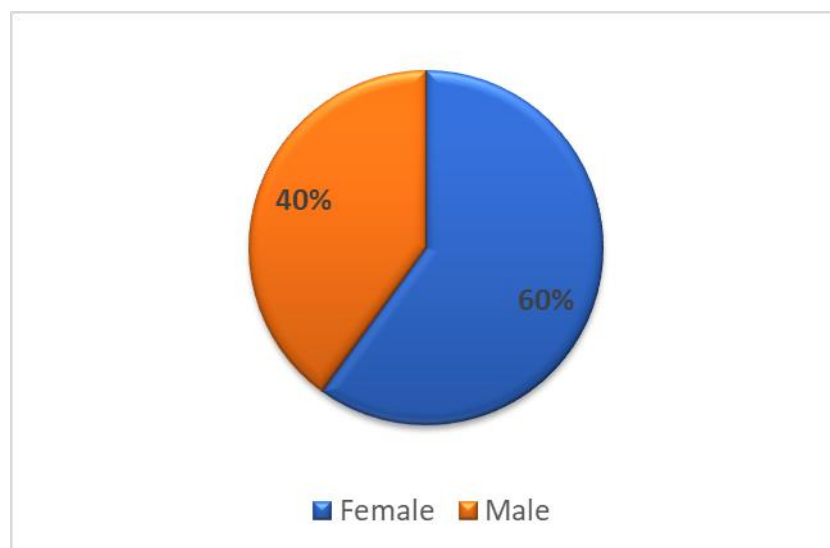


Chart 1: Gender distribution among the study participants

Among the study participants, the gender distribution was 60% female and 40% males who underwent the total knee replacement.

Table 2: Postoperative mobilization on day 1

Postoperative mobilization D1	Percentage (%)
Yes	80
No	20
Total	100

A study examining the mobility of 100 patients on the first day after surgery revealed that 80% were able to move around, while 20% remained immobile. This data suggests that a substantial proportion of the group achieved early mobilization post-operation, which is considered a favorable outcome. The ability of four-fifths of the patients to become mobile so soon after their procedure indicates a positive trend in post-surgical recovery.

Table 3: Details on Pain tolerance among the study participants

Pain tolerance	Percentage (%)
Mild pain	40
Moderate pain	45
Severe pain	15
Total	100

Of the total sample, 40 individuals (40%) experience mild pain, making this the second most common category. The majority, 45 individuals (45%), report moderate pain, indicating that half of the sample population has a moderate pain tolerance. The smallest group, consisting of 15 individuals (15%), experiences severe pain.

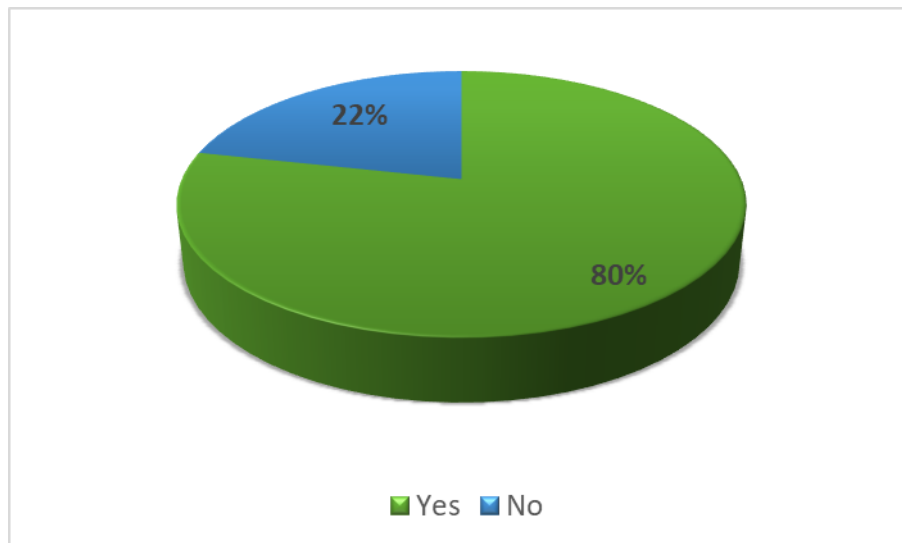


Chart 2: Details on the increased range of motion

Among the study patients, 80% patients had an increased range of motion

Table 4: Details of Complications among the study Participants

Complication	Percentage (%)
Present	0
Absent	100

The study findings indicate that complications were absent among all 100 participants. This is demonstrated by the complete lack of cases in the "Present" category for complications, with a 0% frequency and percentage. Conversely, the entire cohort of 100 individuals (100%) fell into the "Absent" category, signifying no complications whatsoever. This clear-cut distribution demonstrates a total lack of complications within this particular sample, implying that every patient in the group recovered without experiencing any negative outcomes.

Discussion

According to Jeon et al. [11], the practice of using closed suction drainage is becoming increasingly controversial among surgeons worldwide, leading to a gradual reduction in its routine application. The primary justification for drain usage has traditionally been concern over hematoma formation and subsequent infection. Surgeons historically believed that wound drainage prevented the accumulation of blood in postoperative wound compartments, thereby reducing hematoma formation. Hematomas are considered an ideal medium for bacterial proliferation due to low concentrations of opsonic proteins, which impair phagocytic activity and delay wound healing. Additionally, it has been theorized that the use of drains prevents the tamponade effect, which is essential for obliterating dead space within the surgical wound.

Various techniques have been employed to assess postoperative hematoma formation, including measurement of dressing weight, ultrasonographic evaluation of the wound, and single-photon emission computed tomography. However, none of these methods have conclusively demonstrated a significant role for drains in preventing hematoma formation. Evidence suggests that a certain degree of hematoma persists irrespective of drain usage. Consequently, there appears to be no strong

physiological or clinical rationale supporting the routine use of drains solely for hematoma prevention, as also suggested by Crevoisier et al. [9].

Postoperative infection remains a major concern following total knee arthroplasty and requires prompt management. In the present study, one patient in each group developed an early superficial infection, both of which were successfully treated with oral antibiotics. A recent meta-analysis reported infection rates of 0.5% in patients with drains and 1.2% in those without drains, findings comparable to a randomized trial that reported superficial infection rates of 2.9% in drained and 4.8% in non-drained groups. However, similar to observations by Drinkwater et al. [10] and Crevoisier et al. [9], our study did not demonstrate any statistically significant difference in superficial wound infection rates between the two groups. Notably, no cases of deep wound infection were observed in either group.

Several studies have reported a statistically significant association between the absence of drains and increased rates of persistent wound discharge and ecchymosis. In the present study, although a greater number of patients in the experimental (non-drain) group required dressing changes within the first 24 hours and exhibited ecchymosis compared to the control group, these differences were not statistically significant. One patient (1.69%) in the experimental group experienced persistent wound discharge lasting until the seventh postoperative day. Initially, the discharge was bloody and fluid in nature, likely secondary to hematoma formation, and became serous after 3–4 days. In contrast, two patients (3.2%) in the control group experienced serous discharge from the drain insertion site, persisting until the eighth and tenth postoperative days, respectively. Similar findings have been reported by Stucinskas et al. [5] and Tsumara et al. [6]. It is noteworthy that prolonged wound discharge or drainage from insertion sites contributes to increased patient discomfort, prolonged hospital stay, and higher overall treatment costs.

Conclusion

Generally, a suction drain for removal is not necessary during total knee replacement procedures.

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Conflict of Interest: Nil

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