

## **Drain Versus No Drain After Total Knee Arthroplasty: A Retrospective Comparative Study at King Abdulaziz University Hospital**

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*Abstract.* To evaluate blood loss, infection rate, use of pain medication, and length of hospital stay in patients with and without drains post total knee arthroplasty. This was a retrospective comparative study on patients who had undergone total knee arthroplasty at King Abdulaziz University Hospital, Jeddah between 2006 and 2010. Patients were divided into two groups: drainage (n = 40) and no drainage (n = 40). The hemoglobin level, hematocrit level, use of pain medication, number of blood transfusions, and length of hospital stay were recorded. The patients were assessed for infection post surgery. Data were analyzed using SPSS program. There was a significant fall in the average levels of hemoglobin and hematocrit, and an increase in the blood transfusion rates in the drainage group than in the other group. There was one case of infection in the no drainage group. All patients' were found using pain medications with no significant difference in the type of pain medication prescribed between the two groups. There was no significant difference in the average length of hospital stay between both groups. Drains increase the blood transfusion rate post total knee arthroplasty and have no effect on infection rate, pain control and length of hospital stay.

*Keywords:* Total knee arthroplasty, Drains, Blood loss, Saudi Arabia.

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## Introduction

Total knee arthroplasty is associated with considerable blood loss, which might necessitate blood transfusion postoperatively. Although the role of wound drainage is controversial, most orthopedic surgeons use drains after total knee arthroplasty without an established evidence to support their use<sup>[1]</sup>. There are reports which state that formation of hematomas and seromas are prevented by the placement of surgical drains, which provides egress for infected wounds and hence, minimizes the risk of infections, compartment syndrome and nerve compression<sup>[2]</sup>. On the other hand, some reports indicate that hematoma formation and persistent post-operative drainage increase the risk of superficial surgical site infection<sup>[3]</sup>.

In Saudi Arabia, few studies have been conducted on patients who had undergone total knee replacement<sup>[4-6]</sup>; however, none has explored the effects of drainage on clinical outcome in this group of patients. In this study, blood loss, infection rate, use of pain medication, and length of hospital stay in patients with and without drains post total knee arthroplasty were evaluated.

## Materials and Methods

This retrospective study was conducted on 80 consecutive patients who had undergone total knee arthroplasty between 2006 and 2010 at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. The study was approved by the Biomedical Ethics Research Committee of King Abdulaziz University.

All patients who had undergone total knee arthroplasty were included in this study. Exclusion criteria included patients who had undergone total knee arthroplasty due to trauma, patients who had undergone revision of total knee arthroplasty, and patients with a history of joint infection. Patients were categorized into two groups, namely those with drains and those without. Each group consisted of 40 patients who were matched for age, sex, and body mass index. Data were recorded for both groups: height, weight, hemoglobin level, hematocrit, the frequency of blood transfusions, use of pain medication, and length of stay. All patients were also assessed for signs of post operative infection.

All operations were performed by two consultants, one uses drain and the other does not. All patients were operated *via* medial parapatellar approach with tourniquet release at the end of the procedure for hemostasis and cemented posterior-cruciate-substituting prosthesis used. Compression bandages were used in all patients, and isometric exercise was commenced on the same day of surgery. Patients were mobilized on the first day post operatively.

Statistical analysis was performed using the Statistical Package for the Social Sciences, version 19 (SPSS Inc., Chicago, IL USA). Unpaired *t*-test was used to determine the difference in hemoglobin and hematocrit levels, average length of stay in hospital as well as blood transfusion rates between the two groups. Chi-square test was used to evaluate the difference in wound infection rate and pain medication use despite epidural anesthesia.

## Results

The demographic characteristics and differences between the two groups are shown in Table 1.

**Table 1. Patient demographics.**

	<b>Drain</b>	<b>No Drain</b>	<b>P-value</b>
Men : Women	14:26	6:34	0.039
Age (in years)	68.3 ± 9.5	62.88 ± 8.6	0.15
Body Mass Index (kg/m <sup>2</sup> )	33.4 ± 7.2	35.4 ± 7.1	0.61

There was a significant fall in the average levels of hemoglobin and hematocrit in the drainage group as compared with the group without drainage ( $p < 0.01$  in both cases) (Table 2). There was a significant increase in the blood transfusion rates in the drainage group as compared to the other group ( $p < 0.01$ ). Drains were removed after 24 hr in 32 patients and after 48 hr in eight patients. The average amount of fluid in the drain after removal was 300.5 cc.

**Table 2. Clinical characteristics of the patients.**

	<b>Drain</b>	<b>No Drain</b>	<b>P-value</b>
Hemoglobin difference (g/dL)	3.6 ± 1.6	1.9 ± 1.2	< 0.01
Hematocrit difference (%)	10.0 ± 6.6	5.8 ± 3.6	< 0.01
Number of units PRBCs per patient	1.6 ± 1.2	0.5 ± 0.87	< 0.01
Number of patient who had blood transfusion	27	10	< 0.01
Wound infection (n)	0	1	0.314
Use of pain medication in spite epidural anesthesia (n)	40	40	> 0.05
Length of hospital stay (days)	16.9 ± 6.3	16.4 ± 5.8 days	0.636

Abbreviations: PRBCs: Packed Red Blood Cells.

Only one patient (in the group without drainage) had a superficial wound infection, one week postoperatively; debridement was performed to this patient. However, there was no significant difference in the incidence of infection between the two groups ( $p = 0.314$ ). There was also no significant difference in the use of pain medications or type of pain medication prescribed between the two groups (Table 3).

**Table 3. Type of pain medication.**

<b>Medication Type</b>	<b>Drain</b>	<b>No Drain</b>	<b>P-value</b>
Narcotics	33 (82.5%)	38 (95.0%)	0.077
NSAID	7 (17.5%)	13 (32.5%)	0.121
Paracetamol	28 (70.0%)	30 (75.0%)	0.617

Abbreviation: NSAID: Non-steroidal Anti-inflammatory Drug.

The average length of hospital stay was  $16.9 \pm 6.3$  days in the group with drainage and  $16.4 \pm 5.8$  days in the group without drainage ( $p = 0.636$ ).

## Discussion

The rate of blood loss, infection, use of medication, and length of hospital stay in patients with and without drains post total knee arthroplasty were investigated. The authors' analysis showed that there was a significant fall in the average levels of hemoglobin and hematocrit, and an increase in the blood transfusion rates in the drainage group. In

the literature, there are controversial results regarding the effect of drains on the levels of hemoglobin and hematocrit in patients post total knee arthroplasty. While some authors found that there was no significant difference in the level of hemoglobin and hematocrit drop between patients with and without drains<sup>[7]</sup>, others reported an increase in blood transfusion rates in patients with drains<sup>[8,9]</sup>.

There is evidence that drains help in preventing the formation of hematomas, thereby decreasing the risk of infection<sup>[1,10]</sup>. However, it has also been reported that drains might act as portals of bacterial infection<sup>[11]</sup>. In a meta-analysis conducted in 2011, it was shown that the incidence of infection was 0.5% in the drainage group and 1.2% in the non drainage group, but pooled data demonstrated no significant difference<sup>[11]</sup>. The present study's findings do not permit us to make relevant comparisons as only one patient, who was in the group without drainage, had an infection.

No significant difference in the use of pain medications or their types was found. Similar observations were made by other authors who found that drains had no effect in pain control<sup>[1,10]</sup>.

The present study's finding of no significant difference in the length of hospital stay between the patients with drains and those without drains is in line with those reported from other studies<sup>[12,13]</sup>. This mainly because the length of hospital stays is related to other factors, such as patients' response to physical therapy and pain control with oral medication.

This study has some limitations as our assessment of pain was based on pain medication records, rather than pain scores that would have been a more objective method.

## **Conclusion**

Drains increase blood transfusion rate post total knee arthroplasty and have no effect on infection rate, pain control and length of hospital stay.

### *Disclosure of Benefit*

The authors do not have any conflict of interest to declare.

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# استخدام المنزح بعد عملية تغير مفصل الركبة الصناعي دراسة مقارنة بأثر رجعي

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المستخلص. استخدام المنزح بعد عملية تغير مفصل الركبة بمفصل صناعي شغلت مجالاً كبيراً للجدل بين جراحي العظام. والغالبية يستعمل المنزح على الرغم من عدم وجود براهين تدعم استعمالهم له. نحن نريد تقييم مدى تأثير المنزح على معدل فقدان الدم ومعدل الالتهابات الميكروبية وفترة المكوث في المستشفى واستخدام مسكنات الألم على الرغم من وجود تخدير للمنطقة فوق الجافية. هذه دراسة مقارنة بأثر رجعي على ثمانين مريضاً تم إجراء عملية تبديل مفصل الركبة لهم، حيث تم استعمال المنزح لأربعين منهم في حين لم يستعمل في الباقي، وتم مقارنة معدل فقدان ألم الالتهابات الميكروبية، فترة المكوث بالمستشفى واستعمال المسكنات باستعمال برنامج SPSS. تبين وجود اختلاف كبير في معدل انخفاض خضاب الدم ومكداس الدم وارتفاع معدل نقل الدم في المجموعة التي تستخدم المنزح مقارنة بالمجموعه الأخرى. لم يكن هناك اختلاف بين المجموعتين في معدل الالتهاب الميكروبي وفترة المكوث في المستشفى واستخدام المسكنات. وخلصت الدراسة إلى أن استخدام المنزح بعد عملية تغيير المفصل تزيد من معدل فقدان الدم وليس له تأثير على معدل الالتهابات أو فترة المكوث في المستشفى أو استخدام المسكنات على الرغم من وجود تخدير للمنطقة فوق الجافية.