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## Comparative study of primary total hip replacement (THR) with or without close negative suction drain

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### Abstract

Closed suction drainage after joint arthroplasty is common practice in many institutions. The theoretical advantages for the use of drains is a reduction in the occurrence of wound hematomas and infection. literature shows conflicting reports on the use of drains. This prospective, randomized study comprised 80 patients who underwent primary Total Hip Arthroplasty at Era's Lucknow Medical College between December 2016 to June 2018. 10 patients having pre-existing medical/cardiac co morbidity were excluded from the study. We observed that using drain in Total Hip replacement Arthroplasty did not show any statistically significant advantage. When all wound complications and fall in Hemoglobin were considered, we found a statistically significant difference between the two groups, suggesting that the course of healing of the wound was more uneventful in patients with non drain group.

**Keywords:** Drain, non-drain, cemented, uncemented, total hip replacement, infection

### 1. Introduction

Closed suction drainage after joint Arthroplasty is common practice in many institutions. The theoretical advantage for the use of drain is a reduction in the occurrence of wound hematoma and infection. Drains were used earliest by Hippocrates (460-377BC) to treat empyema [1, 2]. The first drain, described by Redon *et al* in 1954, were used to treat extensive wound cavities [3].

The first article describing use of closed drains for orthopedic procedures was published by Waugh and Stinchfield [4]. In a prospective controlled series they found a 1% incidence of postoperative infection in patients with a closed drain system versus a 3% infection rate in matched cases without a drain. While this result did not reach statistical significance, due to sample size, the potential to decrease wound infections with prophylactic drains was deemed encouraging. Early drains were dependent on overflow or gravity until Johann Schultes (1595-1645) took advantage of capillary action and improved the drain function by inserting wicks into the core of the drain [5].

Several authors have pointed out that routine use of CSD is controversial, and retrospective studies indicate that this practice may be unnecessary in uncomplicated cases (Hadden and McFarlane 1990, Acus *et al.* 1992) [6, 7].

Drains may also be counterproductive by preventing tamponade, resulting in greater postoperative blood loss and increased necessity for blood transfusion [8, 9]. Furthermore drains may be difficult to remove and in some cases even require additional surgery for removal, particularly if they have been incorrectly placed or sutured to surrounding tissues. Drains may also be displaced or forcibly removed by confused patients resulting in additional trauma [10]. The aim of the study is to prove and disprove the significance of surgical suction drain in primary total hip replacement arthroplasty.

### 2. Material and Methods

This prospective, randomized study comprised 70 patients who underwent a primary total hip replacement arthroplasty in Era's Lucknow Medical College between December 2016 to June 2018. Patients were divided into two groups, group 1 we use close suction drain while in group

2 no close suction drain were use. The randomization of patients was made by placing even and odd values in a computer generated table of randomized numbers. We had excluded 10 patients with pre-existing coagulopathies and those requiring anticoagulation before or after surgery due to pre-existing medical conditions and other illness like cardiac disease and other medical co-morbidity.

Intravenous prophylaxis antibiotic was routinely administered at the time of induction and at 12 hourly intervals till 24 hours. Standard posterolateral approach was used in all patients. 55 arthroplasties were cemented and 15 was hybrid in which acetabulum was Uncemented and femur component was cemented. Surgery was performed during hypotensive epidural anesthesia (mean pressure 70mm Hg) by the same surgical team.

The patients were encouraged to perform flexion- extension exercises immediately after surgery, were mobilized out of bed on the second postoperative, Weight bearing was allowed, as tolerated. The dressing was evaluated on a daily basis and the need to change or reinforce the dressing due to excessive bleeding. Removal of drain done after 24 hours. Drain removal done using sterile technique. Outpatient wound inspections after discharge were conducted at postoperative week 6 and at 3 months, unless the patient returned earlier with a postoperative complication. Post-operative 3rd day Hemoglobin level was measured to calculate fall in Hb levels.

	Drain	Non-drain	P-value
Average age (in years)	55±4.360	53±4.280	.061
Male/female	21/15	20/14	.967
Duration of surgery (in minutes)	110± 20	103±16	0.114
Fall in Hb levels (average)	1.8± 0.6	1.5± 0.3	0.012
Dressing reinforcement	3	6	.245
Hematoma	2	1	.589
Superficial wound infection	1	1	.967
Deep venous thrombosis	0	1	.967

#### 4. Discussion

The data in the literature regarding the benefits of the routine use of close suction drain after elective THA are inconclusive. This practice is deeply rooted in the orthopedic community, but it does not necessarily have a scientific basis.

Orthopedic wounds are particularly vulnerable to the development of hematomas owing to the difficulty in securing absolute hemostasis in operations involving medullary bone. In theory, a perforated plastic tube attached to low pressure suction will evacuate a developing hematoma from the operative field and promote wound healing. A hematoma is thought to impair wound healing by increasing wound tension and reducing tissue perfusion. In addition, a hematoma provides an excellent culture medium for infection, as it is low in opsonic proteins. However, in a recent prospective, randomized study, the use of a drain did not reduce the volume of the postoperative hematoma around the arthroplasty Widman *et al.* [11]

Observational studies on the use of closed suction drainage systems for wound following orthopedic procedures are conflicting, such that the use of drains has been associated with both an increased and a decreased rate of wound infection and other complications.

In this study mean age of the patients were 55±4.36 in drain group while 53± 4.28 in non drain group years which is comparable to (Magnussen *et al.*) [12], Beer *et al.* [13] and Ritter *et al.* [14] also supported that closed suction drainage does not have any positive effect on the overall outcome of patients after total joints arthroplasties operations.

#### 3. Results

In our study we compared patients who are going for primary total hip replacement. The patients were divided in two groups: patients who had close negative suction drain after surgery, patients who had not it after surgery. The selection of patients for the placement of drain was randomized. The study was done keeping the following criteria constant for all the patients in both the groups. No intraoperative complications were recorded and none of the patients died during the follow-up.

Analysis showed no significant difference in the p-value owing to all the criteria (Age, Gender ratio, Duration of Surgery), (p-value < 0.005). Analysis of our study also showed that a significant difference with respect to fall in hemoglobin level postoperatively found in drain group. The hemoglobin were measured at 3rd post operative day in both group.

The wounds were observed for infection till suture removal and upto 3 month postoperatively and no difference was found in the infection rate in both the groups. Superficial infection was found in 1 patient in each group which was managed by dressing, change and antibiotics. If all wound complications (hematoma and superficial infection) are included, we had 3 complications in patients with drain group and 2 complication in non drain group.

In our study one patient in each group develop superficial infection which were treated successfully with antibiotics and none required surgical debridement or reoperations in contrast to observation of Walmsley *et al.* [15] Analysis of our study also showed that a significant difference with respect to fall in hemoglobin level postoperatively found in drain group which is in contrast to study of Elser *et al.* [16] and Holt *et al.* [17] who reported no significantly increased blood loss in patients with drainage. Neither infection rate nor wound healing have statistically significant difference in both the group, although the study sample were very small.

#### 5. Conclusion

Using of drain in total hip replacement not showing any statistically significant advantage over not using it. When all wound complications and fall in Hemoglobin were considered, we found a statistically significant difference between the two groups, suggesting that the course of healing of the wound was more uneventful in patients with non drain group.

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