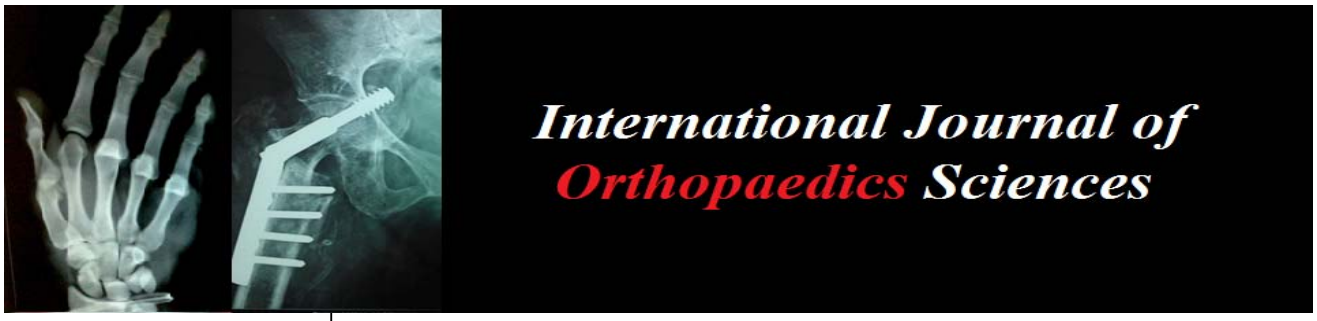


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# Comparative study of cemented hemiarthroplasty with or without close suction drain

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**Abstract**
A drain is device used to prevent collection of fluids in a cavity or closed space, but retropulsive infection can contaminated this clean surgical wound from the drain. The study was conducted between 1stApril 2013 and 31stMarch 2014, in 62 patients who underwent cemented Hemiarthroplasty of hip for fracture neck femur. 12 patients having pre-existing medical/cardiac co morbidities were excluded from the study. The randomization of patients was made by placing even and odd values in a computer-generated table of randomized numbers. We observe Post-operative 3rd day fall in Hematocrit value, Hemoglobin level and infection rate. Analysis of our study showed no significant difference with respect to fall in hemoglobin levels, MCHC levels and infection rate between the patients who had drains after the operation and the ones without drains.-Using drain in cemented Hemiarthroplasty surgeries for neck femur fracture is not showing any statistically significant advantage over not using it, although there is potential risk of retrograde migration of infection.

**Keywords:** Drain, non-drain, cemented hemiarthroplasty, HB, hematocrit

## 1. Introduction
A drain is a device used to prevent collection of fluids in a cavity or closed space this space may be anatomical or created by surgical dissection.
Drains were used earliest by Hippocrates (460-377BC) to treat empyema. Surgical drains were also used by Claudius Galen (physician in ancient Rome) to treat ascites and abscesses [1, 2].
Ambrose Pare was considered a key pioneer of surgical drainage used his cannulated lead tubes "tents" not only for drainage but wound care and debridement. He was the first to use drains for orthopedic procedures [2].
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 [3].
Bacterias can directly contaminate deep surgical sites by migrating over a drain-Cerise *et al*. [4]
Some drains can potentially infect wounds with contaminants from the air-demonstrated by Baker and Borchardt [5].
The first article describing use of closed drains for orthopedic procedures was published by Waugh and Stinchfield. 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 [6].
The use of surgical drains have a long history but indications for their use in orthopedic surgery have been less fully described Specifically, the efficacy of these drains to decrease wound complications still remains controversial.
The aim of the study is to prove and disprove the significance of surgical suction drain in Hemiarthroplasty of hip.

## 2. Material and Methods
The study was conducted between 1stApril2013 and 31stMarch2014, all 62 patients who underwent hemiarthroplasty of hip for intracapsular fracture neck femur by single surgical team

in our institution (Sri Aurobindo Institute Of Medical Sciences, and P.G. institute Indore). The patients were randomized to receive a standard closure with or without closed suction drain. The decision to use closed suction drain was made by placing even and odd values in a computer-generated table of randomized numbers. We had excluded 12 patients out of 62 which included 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. The series consisted of 28 men and 22 women with an average age of 65.3(60-74) years. Surgery was performed during hypotensive epidural anesthesia (mean pressure 80mm Hg) by the same surgical team. Intravenous prophylaxis antibiotic was routinely administered at the time of induction and at 12 hourly intervals till 48 hours. A standard posterolateral approach was used in all patients. During posterior exposure of the hip, the posterior circumflex vessels lying between the quadratus femoris and the neck were routinely identified and coagulated. In all 50 patients cemented bi-polar (hemiarthroplasty) was done and before closure, the second assistant told the operating surgeon, who was blinded to the randomization during the procedure, whether the patient should receive closed suction drain/no closed suction drain.

Among 50 operations, 25 were given closed suction drain and 25 standard closure without drainage. 1 drainage tube was brought out through the skin and placed under the fascia. The drains were removed 48hours after surgery. The patients were encouraged to perform flexion-extension exercises immediately after surgery, were mobilized out of bed on the second postoperative day, Weight bearing was allowed, as tolerated and ambulated with protection for 45 days.

### 2.1 Post-operative 3rd day Hematocrit value, Hemoglobin level, to calculate fall in levels and infection rate is observed.

During the hospital stay, persistent bleeding or serous drainage, change in hematocrit, values was recorded. Patients were followed for 3 months for wound and systemic complications. The demographic variables, preoperative hematocrit and duration of surgery were similar in patients with and without close suction drain.

## 3. Results

In our study we compared patients of fracture neck femur treated with cemented hemiarthroplasty of hip. The patients were divided in two groups: patients who had drain after surgery, patients with no drain 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.

Analysis showed no significant difference in the P-VALUE owing to all the criteria (Age, Gender ratio, Duration between Trauma and Surgery and Duration of Surgery), (P-VALUE < 0.005).

Analysis of our study showed no significant difference with respect to hemoglobin levels and MCHC levels between the patients who had drains after the operation and the ones without drains in each group.

The fall in Hb levels and fall in MCHC levels in patients in the Non -Drain group is slightly less then in patients in the Drain group but the P-value ($P < 0.005$).

The hemoglobin and MCHC levels were measured at 3rd post operation day.

The mean value of loss of HB level at 3rd post op day is (11.5 _+ 1.6 compared with 11.5 _+0.8, respectively).

No significant difference is found in Hematocrit value in both the groups.

The wounds were observed for infection till suture removal and no difference was found in the infection rate in both the groups.

Superficial infection was found in 1 patient in Drain group which was managed by dressing, debridement and re-suturing.

**Table 1**

| | Drain | Non-drain | P-value |
|---|---|---|---|
| Age (in years) | 67.35+_4.580 | 68.04+_4.238 | 0.567 |
| Gender ratio (M:F) | 14:11 | 12:13 | 0.571 |
| Duration between trauma and surgery (in days) | 3.240+_0.1979 | 3.220+_0.2483 | 0.754 |
| Duration of surgery(in minutes) | 82.12+_4.558 | 82.12+_4.096 | 1.00 |

**Table 2**

| | Drain | Non-drain | P-value |
|---|---|---|---|
| Fall in Hb levels | 1.356+_0.3123 | 1.344+_0.2567 | 0.883 |
| Fall in MCHC level | 2.24+_2.026 | 1.64+_1.221 | 0.211 |

## 4. Discussion

Numerous studies have compared whether or not closed suction drain should be used after joint arthroplasty, but not much data is available for use of closed suction drain in hemiarthroplasty.

The use of closed suction drains after major orthopedic surgeries seems a very logical and effective way of reducing the size of postoperative wound hematomas. This may reduce postoperative infection rates, improving the outcome of the operation. There are now many studies to prove that post-operatively closed suction drain does not have any major impact over hematocrit values, rate of infection, wound healing.

Browett *et al* [7] and Bryan *et al* [8] were the first to report that there is no major difference in this parameter in drain/non drain group, yet their studies were retrospective and considered meniscus operations only.

Beer *et al* [9] and Ritter *et al* [10] also supported that closed suction drainage does not have any positive effect on the overall outcome of patients after total joints arthroplasties.

Other retrospective studies confirmed that drains do not reduce morbidity after limb operations [11, 12]

On the other hand suction tubes can be a cause of infection if retrograde migration of bacteria occurs along the tube (Sørensen and Sørensen 1991, Overgaard *et al*. 1993) [13].Some previous data support the finding that suction drains increase the risk of wound infection [8, 14-17],

Whereas other data indicate there is no difference in infection rate with respect to the use of such drains, as does this study [7, 9, 10, 20]

Our study showed that fall in hemoglobin levels and mean corpuscular hemoglobin concentration did not differ in the two groups of patients, yet to maintain similar levels after the operations, the patients with drains needed more blood transfusions then did those without drains, Neither infection

rate nor wound healing have statistically significant difference in both the group, although the study sample is very small.

## 5. Conclusion

Using drain in cemented Hemiarthroplasty surgeries for neck femur fracture is not showing any statistically significant advantage over not using it, although there is potential risk of retrograde migration of infection in patients not having any medical/cardiac co-morbidities.

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