

■ *Original Article*

## A study to evaluate the role of suction drains in orthopedic surgery

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### Abstract

**Background:** There is controversy in routine use of suction drain in orthopedic surgeries. Devastating postoperative infection and years of treatment had forced on extra measures of postoperative wound care and use of drains. **Objective:** To find out the necessity of intraoperative drains in routine orthopedic surgery. **Methods:** Thirty patients were enrolled in the study. All of the patients were followed up on 2<sup>nd</sup>, 14<sup>th</sup> days and 3 monthly till one year of period. All the demographic data and preoperative investigations and intraoperative and postoperative parameters were recorded in standard proforma. Data were analysed using appropriate statistical method. **Results:** All the patients were followed up to one year period. Six patients had superficial infection on 2<sup>nd</sup> postoperative day. They were managed with antibiotics and no patient showed signs of infections on 14<sup>th</sup> postoperative day and thereafter. No patient needed postoperative reinforcement of dressing. **Conclusion:** Routine use of intraoperative drain in hip surgeries has beneficial effect of decreasing reinforcement of postoperative dressing. **Keywords:** orthopedic surgery, suction drain, BPKIHS

### Introduction

The use of closed suction drainage system after major hip surgeries is a common practice. The theoretical advantage for the use of drain is a reduction in the occurrence of wound hematoma and infection. There is insufficient evidence from randomized trials to support or refute the routine use of closed suction drainage in orthopedic surgery.<sup>1</sup>

Regarding use of drains in total joint arthroplasty it was found that there was no difference between drain and no drain group with regard to the incidence of swelling and persistent discharge.<sup>2</sup>

It was shown experimentally and clinically that bacteria migrate down a simple latex conduit drain and cause an increase in the rate of infection in postoperative wounds.<sup>3</sup>

The literature shows conflicting reports on the use of drains.<sup>4,5</sup>

Hence this study was carried out to see the advantage of closed suction drain in hip surgeries.

### Methods

The study was conducted in the department of orthopedics, B.P.Koirala institute of health sciences, Dharan, Nepal over a period of one year from January 2008 to February 2009.

Thirty adult patients undergoing surgeries for the following conditions- fracture neck of femur, trochanteric fracture, acetabulum fracture, hip dislocation were included in the study. Patients having open fractures, infection and not giving consent were excluded from the study. At the end of orthopedics surgical procedure suction drain was kept (Fig 1). Standard proforma was used to collect data regarding demographic variables, preoperative investigations, intraoperative blood loss, duration of surgery, post operative blood loss and wound infections.

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Fig. 1: Photograph showing suction drain in situ following orthopedic surgery.

The wound was inspected after 48 hours, noting amount and color of drainage. The drain was removed after 48 hours. The suture was removed after 14<sup>th</sup> day and wound was inspected at 6 weeks and 3 months and at 1 year.

The data was tabulated and analysed using standard statistical method using SPSS package.

### Results

Thirty patients were undergone surgeries using intraoperative suction drains. Most of the patients were elderly age group. Slightly more number of female (16) patients was in the study group. Left side was involved in 17 patients and 13 patients had right limb involvement. 58.8% had fractures of neck of femur, 33.3% had intertrochanteric fracture of femur and 8.3% patients had fracture of subtrochanteric region of femur.

Mean preoperative hemoglobin was  $11.54 \pm 1.26$  gm/dl. No patients were anemic before the surgery. Mean total count was  $10437 \pm 20.84$ /mm<sup>3</sup>. Mean preoperative blood sugar level was  $105.13 \pm 16.98$  gm/dl. Mean preoperative serum level was  $3.89 \pm 0.34$  g/dl.

Out of 30 patients in our study 9 patients had associated medical illness. 3(10%) had COPD, 1(3.33%) had fibrotic lung disease, 4 (13.33%) had hypertension and one (3.33%) had diabetes mellitus.

Six patients had postoperative infection on 2<sup>nd</sup> day of surgery. No patient had signs of infection at 14<sup>th</sup> post operative day and thereafter. No patients need reinforcement of dressing while drain was in situ. Other variables are shown in tabulated below.

Table showing mean values along with standard deviation of study parameters

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S.N	Variables	Mean $\pm$ S.D
1	Age(years)	$62.33 \pm 12.59$
2	Injury –surgery interval(days)	$11.2 \pm 19.96$
3	Preop Hb level(gm/dl)	$11.54 \pm 1.26$
4	Preop total count(/mm <sup>3</sup> )	$9513 \pm 20.71$
5	Post op Hb level (gm/dl)	$10.27 \pm 1.42$
6	Intraop blood loss( ml)	$329.33 \pm 118.55$
7	Perop RBS(mg/dl)	$105.13 \pm 16.98$
8	Preop s. albumin(g/dl)	$3.897 \pm 0.34$
9	Duration of surgery(min)	$94.67 \pm 8.60$
10	Post op blood transfusion(ml)	$70 \pm 142.39$
11	Post op blood loss(ml)	$335 \pm 140.30$
12	Total blood loss(ml)	$664.33 \pm 212.89$
13	Total cost of treatment(NRs)	$35766.67 \pm 2500$
14	Duration of hospital stay(days)	$10.90 \pm 8.45$

### Discussion

Orthopedic wounds are particularly vulnerable to the development of hematomas owing to the difficulty in securing absolute hemostasis in operations involving medullary bone.<sup>6</sup>

In theory, a perforated plastic tube attached to low pressure suction will evacuate a developing hematoma from the operative field and promote wound healing.<sup>4</sup> 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.<sup>7</sup>

Drain may however act as a conduit for the introduction of infection and may also enhance infection by impairing host resistance.<sup>8</sup> 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.<sup>1</sup>

In this study mean age of the patients were  $62.23 \pm 12.59$  years as compared to Magnussen et al.<sup>9</sup> Nearly 54% of our patient were female as similar to study done by Magnussen et al in which female dominance was present. Mean injury surgery interval of 11.20 days was attributed to the poor transportation facilities and lack of anesthesia and surgery time in our part of world. In our hospital patients with multiple problems had been increasing due to referral centre in the eastern part of Nepal.

Most of the patients had normal laboratory parameters. The mean duration of surgery in our patient population was  $94.67 \pm 8.60$  minutes. Mean postoperative hemoglobin level was  $10.27 \pm 1.42$  gm/dl which corresponds to study done by others.<sup>10-14</sup> In our study mean post operative blood loss was  $335 \pm 140.30$  ml in the drain and total blood loss was  $664.33 \pm 212.89$  ml. Mean post operative blood transfusion required was 70 ml which corresponds to the study done by others.<sup>1</sup> No patients in our study required reinforcement of dressing in the postoperative period which is similar to other studies.<sup>1,15</sup> The mean duration of hospital stay was  $10.90 \pm 8.54$  days which are similar to study done by Walmsay et al<sup>16</sup> and Parker et al<sup>1</sup> Cost of treatment was NRs  $35766.67 \pm 2500.80$  including all the surgical cost which was slightly higher than other routine similar orthopedic cases in our hospital.

Over one year period, drain tips were retrieved and cultured in all patients who underwent hip surgeries with the use of closed suction drainage. A total of 30 cultures were performed in 30 patients. Patients were followed for an average of 3 months after surgery to assess for postoperative wound infection. Nine patients had a positive drain tip culture, none of which were diagnosed with superficial or deep infection after a follow up of 3 months, though four (44.4%) showed initial signs of infection on 2<sup>nd</sup> post operative day. This corresponds to the study done by Weinrauch et al.<sup>17</sup>

Out of 9 patients, 5 showed Actinobacter species, 1 coagulase negative Staph aureus, one both and one E coli and Pseudomonas aeruginosa. One tip culture was found to be contaminated. Rest twenty one was sterile after 48 hours.

In our study six patients showed postoperative infection on 2<sup>nd</sup> day. All were superficial infections. On 14<sup>th</sup> postoperative day none of the patients had signs of infection and on 42<sup>nd</sup> postoperative days none of the patients had infections. There after also none of the patients showed signs of infections. Our study shows similar results as shown by Parker et al<sup>1</sup> and Walmsay et al<sup>16</sup> which showed that there was no statistically significant result between drains and none drain groups in terms of infection. In our study all patients were successfully treated with antibiotics and none required surgical debridement or reoperations in contrast to Walmsley et al.<sup>16</sup>

### Conclusion

Reinforcement of postoperative dressing requirement was lessened by using intraoperative drain. The postoperative wound infection rate was not significantly different as compared to other studies.

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