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Research Article

Are Surgical Drains Necessary in Total Hip Arthroplasty?

Sunil Sheshrao Nikose[1]*, Devashree Nikose[2], Kiran Saoji[3], Sandeep Shrivastava[4] and Shashank Jain[5]

[1]*Professor of Orthopedics and Director of Centre of Excellence for Simulation, Jawaharlal Nehru Medical College, Wardha, India*

[2]*Medical Doctor, BLS/ACLS Instructor, NKP Salve Institute of Medical Sciences, Nagpur, India*

[3]*Professor and Head, Department of Orthopedics, Jawaharlal Nehru Medical College, Wardha, India*

[4]*Director and Professor Department of Orthopedics, Jawaharlal Nehru Medical College, Wardha, India*

[5]*Senior resident , Department of Orthopedics, Jawaharlal Nehru Medical College, Wardha, India*

***Corresponding Author:** Sunil Sheshrao Nikose, Professor of Orthopedics and Director of Centre of Excellence for Simulation, Jawaharlal Nehru Medical College, Wardha, India.

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Abstract

Background: Using a drain is a routine practice to reduce hematoma formation following a total hip arthroplasty (THA). A prospective randomized study was undertaken to compare the drain and non-drain group in terms of blood transfusion need and local complications like hematoma formation.

Methods: Total 168 patient undergoing primary THA were enrolled and randomly allocated into drainage (76 patients) and non-drainage groups (92 patients).The primary outcome measures were local complication like wound hematoma formation, patient discomfort, wound complications, and need for transfusion rates and drop in hemoglobin in postoperative phase while secondary outcome measures were estimated blood loss through the drain, length of hospital stay. All patients received intraoperative tranexamic acid as per single protocol.

Results: The intra operative blood loss during THA was comparable in both groups with all surgeons using the posterolateral approach. The drain group had more patient discomfort at local site and the approximate drain amount after 48 hours was 110 ml. The drop in hemoglobin and hematocrit level was significant in the drain group and required more transfusions as compared to non-drain group. There were equal wound related complications in both groups with 2 patients each having superficial wound infection. The hospital stay was less in non-drain group (5.2 days) as compared to drain group (7.8 days). Both groups did not require enforcement dressing and there was no peri wound ecchymosis in both the group.

Conclusion: There is no evidence to support that drains are better than no- drains and the use would be dictated by surgeons' choice and personal preference.

Keywords: *Total Hip Arthroplasty (THA); Hematoma; Hemoglobin; Tranexamic Acid; Transfusion; Ecchymosis*

Introduction

Total hip arthroplasty (THA) procedures continue to grow in popularity. Due to the extensive soft tissue and bone dissection, patients undergoing THA are prone to loose between less than 500 ml to about 1500 ml of blood loss in some cases [1,2]. Consequently, hemorrhage and hematoma formation following THA is a major concern, and which would lead to anemia and necessitate blood transfusion intraoperative and postoperatively [3]. Blood transfusion is relatively difficult procedure. If there is a shortage of blood products, there may be a risk of transfusion-transmitted infections, or cultural aversion to transfusion, there has been a steady push towards reducing the necessity of blood transfusion during and following THA [4].

Suction drains were and presently used routinely after THA by most orthopedic surgeons to reduce the incidence of surgical wounds complications, like hematoma, slow internal bleeding, infections, delayed healing, and wound dehiscence, thus improving postoperative

recovery. Furthermore, the use of drainages is related to risks: indeed, they can represent a path for bacterial colonization of the deepest layers of surgical wounds, as well as foreign bodies capable of compromising the natural defenses of the organism and therefore favoring infections [5]. It is also known that this risk results influenced by the length of drain treatment: the longer the drain is kept into the wound, the more probable is a bacterial contamination [6,7].

However, the use of negative suction drain in THA is debatable question. Many studies point out towards no benefit of drain use in THA, while other authors suggested the use of surgical drainages in orthopedic surgery, even without a scientific evidence of efficacy. However, there is no universal consensus regarding the use of suction drains during surgery for THA. The present prospective randomized study was undertaken to compare the drain and non - drain group in terms of blood transfusion need and local complications like hematoma formation, postoperative blood loss in drain, patient discomfort, length of hospital stay, postoperative hemoglobin level and wound complications during and following THA.

Materials and Methods

After obtaining Institutional Ethical Committee approval and written informed consent from the patients, this prospective randomized study was conducted in Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Science (Deemed University) Sawangi, Wardha, Maharashtra, India. Total 168 patients who underwent THA due to osteoarthritis or osteonecrosis of the femoral head were enrolled in the study. Patients were divided into two groups by the surgeons' preference of use of drain and non-use of drain. In 92 patients no drain was used and in 76 patients a suction drain was placed during surgery. Patients with blood coagulation disorders, on corticosteroid treatment and concomitant medical problems such as uncontrolled hypertension, chronic obstructive pulmonary disease, heart failure, severe cardiovascular disease and history of deep vein thrombosis were excluded from the study.

Intravenous prophylaxis antibiotic was routinely administered at the time of induction and at 12 hourly intervals for next 24 hours. All patients received Tranexamic acid injection as per our protocol. Standard posterolateral approach was used in all patients and all operations were performed by one surgical team under general anesthesia. The patients were encouraged to perform mobility exercises immediately after surgery, were mobilized out of bed on the second postoperative day, and weight bearing was allowed, as tolerated. The dressing was evaluated only if required and removal of drain was done after 48 hours using sterile technique.

The primary outcome measures were local complication like wound hematoma formation, patient discomfort, wound complications, need for transfusion rates and drop in hemoglobin in postoperative phase. The secondary outcome measures were estimated blood loss through the drain, length of hospital stay. Differences in both groups were considered to be significant at $P \leq 0.05$. The amount of blood loss in intraoperative period was documented. All patients received intraoperative tranexamic acid as per the protocol.

Observations and Results

The baseline characteristics of the patients were compared which found no significant difference (> 0.05) between two groups as shown in table 1. A diagnosis of primary osteoarthritis (OA) accounted for 66% of the total study patients, and osteonecrosis of the femoral head (ONFH) (34%) was the second most common diagnosis.

Parameters	Drain (N = 76)	Non-drain (N = 92)	P value
Average age (in years)	53.45 ± 3.42	54.27 ± 2.35	0.378
Male/female	47 (61.8%)/29 (38.1%)	56(60.8%)/36(39.1%)	0.435
Diagnosis (OA: ONFH)	36:40	39:53	0.512
Body mass index (kg/m^2)	27.3 ± 1.7	28 ± 1.6	0.537
Duration of surgery (min)	112 ± 21	105 ± 18	0.230

Table 1: *Baseline characteristics of patients.*

The intra operative blood loss during the THA was comparable in both groups. The drain group had more patient discomfort at local site and the approximate drain amount after 48 hours was 110 ml. The drop in hemoglobin and hematocrit level was significant in the drain group. The drain group required more transfusions as compared to non-drain group. There were equal wound related complications in both groups with 2 patients each having superficial wound infection. There were no statistically significant difference between two groups for adverse events (p = 0.571). The hospital stay was less in non-drain group (5.2 days as compared to 7.8 days in drain group) and was statistically significant. Both groups did not require enforcement dressing and there was no peri wound ecchymosis in both the group.

Parameters		Drain (N = 76)	Non- drain (N = 92)	P value
Intra operative blood loss (ml)		282.3 ± 68.2	258.4 ± 71.1	0.339
Drainage volume after 48 hours (ml)		110 ± 123.14	00	0.000
Calculated blood loss (ml)		1008.8 ± 252.8	970.6 ± 199.1	< 0.05
Hemoglobin level (ml)	Pre-operative	11.70 ± 1.31	11.84 ± 1.42	> 0.05
	Post-operative after 48 hours	9.76 ± 1.12	10.72 ± 1.38	< 0.05
Hematocrit level		26 ± 6	29 ± 5	< 0.05
Blood transfusion patients		57 (75%)	48 (52.17%)	< 0.05
Total no. of Blood transfusion unit		55.5 ± 10.32	27 ± 11.37	< 0.05
Superficial wound infection		2 (patients)	2 (patients)	> 0.05
Hospital stay (day)		7.8 ± 1.23	5.2 ± 1.34	0.312

Table 2: *Clinical outcomes between the two groups.*

Discussion

The use of suction drains after major operations seems to be a very logical and effective way of reducing the size of postoperative wound hematomas as well as infection rate due to hematoma formation [8]. On other hand, some may argue that drains may provide an entry access point for bacteria through the suction drain itself or through its tract, persistent wound discharge with even sinus formation, and intra-articular fibrosis with subsequent poor functional outcome [9,10]. The debate over prophylactic wound drainage transcends orthopedic surgery. When the doctors are in doubt, then they need to insert a drain was countered by Halsted (1898) [11]. While many surgeons may continue the 'routine' practice of prophylactic suction wound drainage despite of proving drawbacks of its use but some randomized studies and meta-analysis have not supported the routine use of suction drainage [12,13]. The data in the literature regarding the benefits of the routine use of suction drain after elective THA are mostly inconclusive. Many studies have compared whether to use or not to use the closed suction drains in hemiarthroplasty and total joint arthroplasty [11,14].

The current study focused on the comparison of blood transfusion need and local complications like hematoma formation in THA patients who were managed with and with-out drainage. The mean age of patients was 53.45 ± 3.42 years in drain group while 54.27 ± 2.35 years in non-drain group which is comparable to Magnussen., *et al*. [15] and Kumar., *et al* [16]. The use of drain may increase total blood loss after THA. Consequently, a higher rate of blood transfusion might be expected [4,17]. Furthermore, drains may be difficult to remove and in some cases might even require additional surgery for removal, particularly if they have been incorrectly placed or sutured within the surrounding tissues. Drains may also be displaced or forcibly removed by confused patients resulting in additional trauma [16,18]. In the present study, we observed similar rates of intra operative blood loss but calculated/total blood loss was more in drain group as compared to non-drain group. Thus, drain group required more transfusions as similar to many authors reported significantly increased need for postoperative transfusions in patients treated with drains [11,19-21]. Postoperative drainage volume after 48 hours

was 110 ml which is comparable with the study done by Kim., *et al* [22]. While other authors have reported no difference in the blood volume parameters related to drainage [23, 24]. Analysis of our study also showed that a significant difference with respect to fall in hemoglobin level postoperatively after 48 hours in drain group which is in contrast to study of Elser., *et al*. [19] and Holt., *et al* [25]. As similar to Della Valle., *et al*. [26] our study found that patients receiving drain had more marked reductions in hematocrit and a longer hospital stay than those without a drain ($P < 0.05$).

A decrease in the duration of surgery is also expected when drains are not used [24]. The mean duration of surgery in drainage group was 112 ± 21 min and in non-drain group was 105 ± 18 which was 7 min shorter. This duration difference might be related to the time spent on drain insertion and/or fixation. Although the use of drains was associated with a prolonged surgical time, this small difference might not be clinically significant.

In 1961, Waugh and Stinchfield first described drainages use in orthopedic surgery and they reported that there was not any statistically significant difference between the rate of postoperative infections in patients treated with suction drainages rather than without drainages due to the lack of analyzed cases, the chance of reducing infection or other complications rate, such as hematoma or slow internal bleeding, seemed encouraging [27]. Beer., *et al*. [28] and Ritter., *et al*. [29] also supported that closed suction drainage does not have any positive effect on the overall outcome of patients after total joints arthroplasties operations. In current study, two patients in each group developed superficial wound infections which were treated successfully with local care and antibiotics and none required surgical debridement or reoperations in contrast to observation of Walmsley., *et al* [30].

Conclusion

From the results of present study it can be concluded that there is no evidence to support that drains are better than no - drains and the use would be dictated by surgeons' choice and personal preference. We believe that standardizing surgeries can produce more comparable data. Future studies could evaluate if there are differences in the clinical and biochemical results related to the use of drainage in cemented THA and in different surgical approaches. However, we recommend that suction drains should be abolished altogether in a primary uncomplicated Total Hip Arthroplasty (THA).

Conflict of Interest

None.

Source of Funding

None.

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