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ORIGINAL ARTICLE

COMPARISION OF SURGICAL SITE INFECTION IN DYNAMIC HIP SCREW SURGERY PATIENTS WITH AND WITHOUT CLOSED SUCTION DRAIN

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ABSTRACT

Background: Surgical Site Infection (SSI) is one of the common and feared complications of surgical procedures. There is still ongoing debate regarding the use of closed suction drains in reducing the incidence of surgical site infection. The objective of this study was to compare Surgical Site Infection in dynamic hip screw surgery patients with and without closed suction drain.

Materials & Methods: This was a descriptive comparative study conducted in Orthopedic and spine surgery department, Hayatabad Medical Complex, Peshawar from 24th April, 2022 to 23rd October 2022. One hundred eighty-four consecutive patients who underwent surgery for proximal femoral fractures were included in this study. The data was collected from the two groups i.e. "A" (closed suction drain) and "B" (without drain).

Results: Total of 5(2.70%) patients out of 184 developed surgical site infection, 3 patients (3.26%) in group "A" (Drain group) and 2(2.17%) in group "B" (Un drain Group).

Conclusion: There is statistically no significant difference in placement of closed suction drain and not putting drains in clean hip surgery.

KEY WORDS: Surgical site infection; Closed suction drains; Dynamic hip screw surgery.

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INTRODUCTION

Hip fractures are a frequent and significantly impair patient function.[1,2] such fractures usually need surgical treatments. Surgical site infections (SSIs) are well-defined as infections that damage the incision or deep tissue at the surgical site and manifest within 30 days following surgery.[3] The frequency of operative site infection is 2.27% in orthopedic surgery.[4] SSIs increase morbidity, death, and health-care costs[3]. Aseptic measures are required to reduce the burden of SSIs[3]. Various procedures are in place to avoid SSIs, one of which is the use of closed suction drainage.[4,5] In orthopedics, these devices have been utilized to reduce local edema, reduce the risk of hematoma or seroma development, and help in infection clearance. However, the function of postoperative surgical drains in clean, elective hip fracture surgery is not well established.[2,6]

Infection rate in different studies have different results. In one study rate of infection was 5.9% in closed suction drain and 9% in un-drained wounds.[6] In another study rate of infection was 0.4% in drained group and 0.7% in un-drained group.[7] Study performed by others authors, showed higher infection rate in drained group i.e. 0% in un-drained and 3.84% in drained patients.[8] There is no consensus in putting drain or not putting drain in different studies. This study aimed to investigate the effect of closed suction drain in reducing surgical site infection and to establish clear superiority of closed suction drain in clean orthopedic hip surgeries.

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MATERIAL AND METHODS

This was descriptive type study, conducted in the Department of Orthopedic and Spine surgery (A) PGMI Hayat Abad Medical Complex Peshawar from

24th April 2022 to 23rd October 2022. Using non-probability consecutive sampling technique, the total of 184 patients was included in the study, 92 patients in each group. All patients undergoing clean surgical orthopedic procedure of proximal femur irrespective of age and gender in the form of dynamic hip screw surgery. Exclusion criteria were: open fracture, diabetic patients, patients on steroids, smokers, Patients with active infective focus anywhere in the body.

Before starting the study, approval was taken from the hospital ethical committee. Only those patients were included in the studies that were willing to give informed written consent. Both male and female patients of any age, admitted through out-patients department (OPD) & Emergency and fulfilling the inclusion criterion were included in this study. Data was collected with the help of a Performa. After taking detail history and doing detail clinical examination & investigation like TLC, DLC, ESR & CRP to fulfill the exclusion criterion and once appropriate Patients realized that they had been split into two groups at random using a lottery system: group A patients underwent surgery with a closed suction drain while group B patients underwent surgery without a closed suction drain,. Within an hour of the anesthetic being induced, all patients got one intravenous dosage of the same broad-spectrum antibiotic, and two further intravenous doses were administered in the ward following surgery. No further antibiotic was prescribed to patients while they were discharged from hospital. They were followed till 30th post-operative day and incision site was looked for any sign of redness, discharge of pus or collection to detect SSI. Patients identified with SSIs were treated according to conventional protocols, which included pus discharge culture and sensitivity, antibiotics, and surgical therapy, such as debridement or implant removal, as indicated.

Approval for study was taken from hospital ethical committee. Patients who were willing to provide informed written consent were included in the study. IBM SPSS Version 20 software was used for collection and further manipulation of the data as and when required. Descriptive method was used to present qualitative data like sex, safety, operative procedure among others, and given in the form of frequency distribution. Mean ±SD was calculated for categorical variables like age. Chi square test was applied to compare the safety between both groups. Level of significance was chosen as 0.05. Safety was stratified among age, sex and operative procedure to see the effect modifiers. All results were presented as tables and graphs.

RESULTS

The study comprised 184 patients with a mean age of 34.44 + 10.44 years. Age and gender wise distributions are shown in Table 1. The SSI was noted on 30th post-op day and it was found out that 3.26% patients had SSI in group A while 2.17% patients had SSI in group B but it was insignificant stats-wise, p-value 1.00 in Table 4. The SSI was stratified in different age groups in whole study population and it was found that, SSI was present only in 40.01 years and above age-group in 2.70% patients, while the rest of the age groups had no infection. The difference was not sig-

Table 1: Comparison of mean age, age groups and gender between both groups (n = 92 in each group)

		Group of the Patients		P-value
		Drain Group A	No Drain Group B	
Age of the patient		36.25±10.23	34.77±10.58	0.29
Age Groups	Up to 25.00 years	16	22	0.87
		13.4	23.91	
	25.01 to 40.00 years	35	34	
		38.04	36.96	
	40.01 years & higher	41	36	
		44.56	39.13	
Gender of the patient	Male	49	40	1
		53.26	43.48	
	Female	43	52	
		46.74	56.52	
SSI present	No	89	90	1
	%	96.74	97.82	
	Yes	3	2	
	%	3.26	2.17	

Table 2: Age group and gender wise stratification of ssi in whole study population (n = 184)

			Presence of SSI		P-value
			No	Yes	
Age Groups	Up to 25.00 years	n	38	0	0.89
		%	20.65	0	
	25.01 to 40.00 years	n	69	0	
		%	37.5	0	
	40.01 years & higher	n	72	5	
		%	39.13	2.7	
Gender of the patient	Male	n	87	2	0.96
		%	47.28	1.08	
	Female	n	92	3	
		%	50	1.63	

nificant having a significance value (p-value) of 0.89. Similarly, SSI was stratified with respect to gender in whole study population. It was noted that 1.08% of male patients and 1.63% of female patients had SSI but the difference was not significant statistically having p-value of 0.96 (Table 2).

DISCUSSION

In this study, a total of 184 patients underwent proximal femoral fracture surgeries and metallic implant was placed inside the body of each patient. Patients were monitored and the impact of different closed suction drain types on SSI was investigated. Suction drains are believed to reduce the infections by lowering hematoma formation.[9] The patients were split up into two equal groups, each with ninety-two individuals. Every patient in group A underwent surgery with a closed suction drain positioned at the operative site. Patients in Group B had surgery without having a closed suction drain installed. They were monitored until the thirtieth post-operative day, during which time their wound was checked for SSI. According to the study, Group B's mean age was 45.89 years (range 5-90 years), whereas Group A's mean age was 45.41 years (range 4-90 years). There were nearly similar numbers of young and elderly individuals among the patients who presented at different phases of life. This was accounted for by trauma like RTA (road traffic accidents) in young patients as young patients are more active and prone to RTA while osteoporosis associated with old age resulted in neck of femur fractures also. The same finding was also revealed by most of the other studies as well.[10]

In this study it was found that male were more affected as compare to female. The female to male ratio was 1:2.02 in both groups while for group A it was 2.34: 1 and in group B male to female ratio was 1.75:1. In most of the studies it has been shown that males are affected more commonly than females because females live more sedentary life and less prone to accidents especially in eastern societies where females have yet to come out of traditional norms and taboos.[11]

The most frequent side effect of any surgical operation is SSI. The study found that 2.22% of both groups had an overall SSI rate. Comparable results were found in other studies where the SSI rate was 2.6%[12], 0.26-2.8%[13], and 0.72%.[14] Most orthopedic surgeons utilize closed suction drains at the surgery site, despite the lack of statistically meaningful advantages. Although there are claims of superiority of closed suction drain to control SSI but still they are considered to be costing more and its effect of prolonging hospital stay. But do the closed suction drains provide extra benefit in reducing the SSI? In this study the SSI rate in (group A) was 2.5% and 1.91% in group B with P value of 0.5. Hence it was found that the difference of SSI rate in both study populations is statistically insignificant and closed suction drain does not warrant any extra benefit in terms of infection control at surgical site.

Other studies have also shown outcomes that are comparable. Twenty patients in the drained group and twenty in the undrained group of Cobb's trial were infected. Despite the fact that Cobb and Varley's research revealed an unusually high infection rate. The Varley[15] research revealed an infection incidence of 10.2%. It was, he said, greater than he had anticipated. A total of eighteen individuals tested positive for a primary wound infection by culture. He attributes the increased rate to the fact that older patients were included in the research and that all infections that happened within six months after surgery were included in the infection rate. Cobb's other study, which also included an older group, revealed a greater infection rate. In his study, the undrained group had an infection rate of 13.2%, whereas the drained group had an infection rate of 7%. However, their investigation was unable to produce a statistical-

ly significant difference. Staph. Aureus made up the majority of the isolated organism, with contributions from E. Coli, Staph. Epidermidis, and enterococci.[16] The wound infection incidence did not significantly differ between the drained and undrained groups, according to Tjeenk's findings (p=0.36).

Orthopedic surgeons continue to utilize closed suction drains despite the lack of evidence supporting their utility. About 87% of surgeons who participated in a poll conducted by the British Orthopedic Association used drains.[17] Widman shown that the postoperative hematoma volume is not reduced by the use of two drains, one deep and one superficial.[18]

On the other hand, Kim et al. suggested using drains as they observed that patients without drains required dressing changes often, causing irritation to both the patient and the nursing staff even though a closed suction drain did not raise the risk of infection.[19] Suction drain usage is recommended by Waugh, Stinchfield, Parrini, et al. in order to avoid hematomas and thus reduce infection.[20] Alexander et al. provided additional support for suction drainage since the fluid evacuated lacked opsonic proteins, which are critical for defense.[9] Drain usage increases bacterial colonization, as demonstrated experimentally and clinically by Cerise et al. and Nora et al.[19], 96.6% of hip arthroplasties with closed suction drainage revealed positive cultures.[21] Numerous studies have demonstrated that the use of drainage increases the likelihood of infection by giving bacteria a point of entry.[22,23] Concerns about postoperative pain, transfusion requirements, and drain rehabilitation are not universally agreed upon.[24] Certain studies have reported an increase in transfusion requirements following simple joint arthroplasty; however, other investigations have not observed any differences. [25]

CONCLUSION

It was concluded from the results of this study that the difference SSI in Femoral surgeries whether closed suction drain at surgical site is placed or not, no statistically significant was noted. Since there hasn't been any evidence to support a clear winner in either scenario in terms of infection prevention effectiveness, we recommend that orthopedic surgeons reevaluate their use of drains in clinical practice.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	MSK, AK
Acquisition, Analysis or Interpretation of Data:	MSK, AK, JK, MS, MIS, AF
Manuscript Writing & Approval:	MSK, AK, JK, MS, MIS, AF

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.