

## Comparison of Suture and Staple in Closing the Wounds of Surgery of Intertrochanteric Fractures

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Received: March 16, 2014

Accepted: July 22, 2014

### ABSTRACT

**Introduction:** Staple ligation of surgical wounds is common. We compared the incidence of wound complications and patient satisfaction of the appearance of scars in Surgical wound closure using suture or staple in Intertrochanteric fractures (ITF).

**Materials and Methods:** In this randomized clinical trial, 60 patients with ITF were randomly divided into two equal groups of Suture and staple. Patients were visited on a weekly basis until the removal of staple and suture. Cases were compared with wound complications, wound closure duration, intensity of pain on seventh day based on the criterion of linear-visually.

**Results:** one patient with suture and two patients with staple had superficial infections. Duration of wound closure in staple group was significantly shorter. Pain severity on seventh day, was similar but pain at the time of removal was significantly higher in staple group. In all patients, suture or staple were removed after two weeks.

**Conclusion:** wound closure after surgical treatment of Intertrochanteric fractures with suture or metal staples have no significant influence in complications and patients satisfaction of scar appearance. According to shorter time of closure and more severe pains in removal of staples, choosing the right method can be different for patients.

**KEY WORDS:** surgical wound, suture, staple, complications, infection.

### INTRODUCTION

post surgical infections are one of the most common challenges for surgeons and health care providers. The American center of disease control reported 200 thousands post elective surgical treatments infection annually that can cost between 1 to ten million dollars for health care systems (1-3). Post surgical infections can raise duration of hospitalization to two weeks and cost of treatments to 300 percent. Appropriate wound closure is one of the necessary and important needs in reaching favorable results after surgery and decreasing postsurgical infections (4, 5). It is shown that wound collagen deposition have direct relationship with oxygenation and perfusion of wound (6). Two common methods in wound closure are suture and metal staples. Although suturing is more common, in some countries such as Iran, it is used in nearly all surgeries, but since introduction of metal staples in 1972 with tissue stapling facilities, this method for wound closure became more common in gynecology, cardiology and orthopedics. Using staple is easy and it can decrease the duration of surgery. And using metal staples has an important role in decreasing the risk of needle stick in surgeons (7,8). However despite several studies conducted, none of these two methods is not choice and data collected are conflicting. In a recent review article, it is shown that staple can decrease duration of surgery, but there was no evidence of decreasing infection and duration of hospitalization. According to these conflicts and a need for more randomized clinical trials in determining the probable differences between staple and suture, in this study we have compared the prevalence of infection, duration of hospitalization and cosmetics of wounds in patients with Intertrochanteric fractures (10).

### METHODS

In this study, 60 patients with Intertrochanteric fractures referred to Emam Hossein Hospital in 2012-2013 treated with dynamic hip screw. We have divided them into two groups according to random numbers table. Before the study, we were talked to patients about goals and methods of implementation and if they want to participate in the project a written informed consent form is needed. The primary purpose of the present study is comparing the incidence of wound complications of any surgical wound; wound infections require intravenous or oral antibiotic treatment or washing Debridement drainage after the second day after surgery and changing the wound dresses,

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Necrosis, abscesses, blisters around the site, wound dehiscence and sensitivity to the material. Other issues discussed included the term Wound closure, pain on the seventh day after surgery, pain in removing the suture or staple, time of the injury, the patient satisfaction rate of wound scar were determined bad, acceptable, good and excellent. Measuring of satisfaction was done by the appearance of the scar at the end of the second month after surgery. In Determination of the severity of pain, linear- visual measure of pain was done where zero means no pain and 12 means maximum pain imaginable, and the patient can choose a number between zero and 12. After surgery, patients were visited on the first, second, seventh and fourteenth day after surgery, and then, if necessary, every week until suture or staple was removed. The suture or staple was removed during wound healing. Data collected were analyzed by SPSS 16.0 and we used t test and chi square to compare quantitative and qualitative data respectively.

## RESULTS

There were 17 and 21 men in suture and staple groups respectively and no significant relationship was observed between them. Also, the mean age of suture and staple groups were  $51.5 \pm 11.7$  and  $49.8 \pm 13.3$  respectively, and were demographically similar. The length of incision in suture group was  $10.7 \pm 1.2$  cm and in staple group were  $11 \pm 1.6$  cm, so there was no significant relationship between them. The comparisons between two groups and their results are shown in table. We have examined patients and their wounds in different stages of the study; we observed that two patients in staple group and one patient in suture group had superficial wound infection who were treated with oral antibiotics. In our study, no other complications were seen.

As it is shown in Table 1, the duration of wound closure was significantly shorter in staple group. We also found that the pain on the seventh day after surgery was not statistically significant, but pain intensity was significantly more in removing the staple. It is noteworthy that in our study, in all patients, at the visit of the second week after surgery, the wound was healed and suture or staple was removed. We found that the two groups were similar about satisfaction with the surgical scar appearance.

Table 1. The comparison between wound complications, duration of wound closure and satisfaction of surgical scar.

Group	Suture	Staple	P value
<b>Local complications</b>	1	2	1
<b>Duration of wound closure</b>	$2.5 \pm 1$ (1.2-3.5)	$11.6 \pm 2.9$ (8-14)	<0.001
<b>Severity of pain on the seventh day after surgery</b>	$1.5 \pm 0.5$ (0-3)	$1.7 \pm 0.5$ (0-3)	0.429
<b>Severity of pain during removal</b>	$3.7 \pm 0.8$ (2-6)	$5.6 \pm 1.1$ (4-7)	<0.001
<b>Satisfaction of scar appearance</b>	Perfect	9	0.178
	Good	8	
	Acceptable	13	
	Bad	0	

## DISCUSSION

The most important finding of this study was that the surgical wound closure in patients with IFT after fixation using DHS, have no difference using suture or staple in the incidence of wound infection and other complications. We found that wound closure with staple can significantly reduce the time of surgery, but patients will experience more severe pains during the removal (11,12).

Although surgical site infection can be associated with many difficulties and disabilities and largely with costs in health care system, but there is no precise information about the incidence of this complication. Moreover the wound may have some noninfectious problems like dehiscence, and there is no precise information about these side effects. But what is clear is closing the wound properly can have a significant role in determining surgical outcomes and prevent the incidence of complications (13,14).

Using needle and suture in wound closure was the only common method for many years in closing the surgical wounds and other skin damages. In recent decades, with introducing staple to close surgical wounds, using these devices became more popular now as an important surgical wound closure with suture. Despite the many studies about staples in surgical wound closure compared with suture were done, it is unclear that whether the stapler can improve the results of surgery in preventing complications and scar appearance (15)

In choosing the proper method of closing wounds, there are various parameters, including the ease, speed, and pain, the incidence of wound complications and appearance of the Scar. As mentioned so far, despite several studies in comparing the patients with suture and staple, orthopedic studies are relatively limited. Given the important role of oxygenation in wound healing and preventing wound complications on the surgical site, Graham and colleagues compared wound oxygenation between suture and staple in knee replacement surgery and expressed that the perfusion is higher with staples. Bhatia et al. compared the results of wound closure with suture and staple after the surgery of de positron and they were reported that although staples are associated with decreasing the period of hospitalization, but its removal will be more painful (12,13). And so Bhatia et al recommended staples for long term surgeries. In this study, there was just one patient with superficial infection treated with oral antibiotics. Recently, Hemming et al, were conducted an extensive review study comparing the suture and staples. In this study, 11 systematic reviews were evaluated. Hemming et al stated that using staple is associated with decreasing the period of surgery, but despite scientific experiments, none of these methods was preferred in decreasing infection and other complications. Also Moore et al compared results of wound closure with suture and staple after resection of soft tissue tumors, and there were no difference in prevalence of complications and decreasing the hospitalization period (14).

Also Shantz et al. were conducted a randomized clinical trial in patients with orthopedics surgery, and reported that wound closure with staple is so shorter, but the prevalence of wound complications was similar between staple and suture. Researchers stated that patients have experienced more severe pains in removing the staples. Our results were consistent with these studies and we didn't observe any difference between the prevalence of wound complications. But it is said that since no material will pass through the wound, probability of infection and other complications will decrease, but now there are no scientific evidence about it. In this study, duration of wound closure with suture is more than staple, but there were more severe pains in removing the staple. Also there was no significant relationship between two groups (11).

Results of this study are in consistent with orthopedic surgeries. Wound closure after the surgeries of Intertrochanteric fractures with suture and staple have no influence in the prevalence of infection and other wound complications and patients satisfaction from the appearance of the scar. But as it is expected, duration of wound closure was shorter in using staple, but more severe pains will experienced during the removal that can be so suffering, so the choice method will depend on different patients.

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