

Randomized controlled trial comparing outcome of use of staples and nylon sutures for closure in elective orthopedic surgery

P Chaudhary, BP Shrestha, GK Khanal, R Rijal, R Maharjan
Department of Orthopaedics
B.P. Koirala Institute of Health Sciences, Dharan, Nepal

Abstract

Background: Wound complications are one of the major sources of morbidity after orthopaedic procedures and can prolong the inpatient stay or lead to re-admission. The most commonly used methods for skin closure after orthopaedic surgery are metal staples or nylon sutures. Both methods act to hold the skin edges together while healing occurs. Metal staples are said to be superior as they are regarded as quicker and easier than sutures. **Objective:** To compare outcome of use of staples and nylon sutures for wound closure in elective orthopedic surgery in term of infection rate, cosmetic appearance (Scar), time taken for skin closure. **Methods:** It is randomised controlled trial done on patients undergoing elective orthopaedic surgery at department of Orthopaedics at BPKIHS were included in the study. During procedure patients were evaluated for time taken for suture application or any complications. **Results:** A total of 60 patients (38 male and 22 female) were included in the study. Twenty two patients were between 41-55 years age group followed by fifteen patients between 25-40 yrs, twelve patients less than 25 age group and eleven patients more than 55 years. The average blood loss is 5 ml in K-wire group and 145 ml in plate group. The procedure time is 33 mins as compared to 53 mins in plate group. **Conclusion:** Metal staples are superior as they are regarded as quicker and easier than nylon sutures. But use of metal staples or clips has a greater risk of wound infection and less acceptable cosmetically than sutures. Metal staples are more expensive.

Keywords: Compartment pressure, whitesides, tibial fractures.

Address for correspondence

Dr. Pashupati Chaudhary
Additional Professor
Department of Orthopaedics
B.P. Koirala Institute of Health Sciences, Dharan
Email: chaudharypashupati@yahoo.com

Introduction

With the development of accelerated rehabilitation and the pressures placed on surgeons to reduce lengths of stay in hospital, the method of skin closure has become increasingly important in orthopaedic surgery. Wound complications are one of the major sources of morbidity after orthopaedic procedures and can prolong the inpatient stay or lead to re-admission. The objective of good wound closure is rapid skin healing and an acceptable cosmetic result while minimising the risks of complications such as wound dehiscence or infection. Such complications have a considerable impact on the recovery of the patient, causing increased morbidity, delayed discharge, increased costs, and reduced satisfaction. There is also a link between superficial wound infection and deep (prosthetic) infection.

The most commonly used methods for skin closure after orthopaedic surgery are metal staples or nylon sutures. Both methods act to hold the skin edges together while healing occurs. Metal staples are said to be superior as they are regarded as quicker and easier than sutures. Other authors have suggested that use of metal staples or clips has a greater risk of wound infection and might be less acceptable cosmetically than sutures. Metal staples might also be more expensive. There is no consensus in the literature regarding which method has good

functional outcome while closing wound in elective orthopaedic surgery. Some authors have compared the clinical outcomes of wound closure with staples and sutures after orthopaedic surgery. The optimal method of skin closure still remains unclear. . There are few literatures available and virtually no such study done in Nepal. So, we want to examine whether there is a difference in clinical outcomes with staples or sutures in orthopaedic wound closure in adult patients.

Methods

This is a Randomised Controlled Trial Study done in consecutive patients undergoing elective Orthopaedic surgery at Department of Orthopaedics at B.P.Koirala Institute of Health Sciences, Nepal from august 2010 to October 2012. The inclusion criteria was patients undergoing elective orthopaedic surgery. The exclusion criteria were open fractures, pathological fractures, co-morbid conditions, spine operation. The patients were randomized into two groups, Group A (Nylongroup) and Group B (Staplergroup) During procedure patients were evaluated for time taken for suture application or any complications. Immediate post operative complications were taken into account and post operative cosmetic appearance of wound was considered. Patients were reviewed after 2 weeks (for removal of stapler/nylon, infection, early complications).

At 6 weeks, 12 weeks and 24 weeks, the patient was evaluated for pain at incision site, postoperative scar, evidence of infection, complications.

The subjects will be enrolled after informed consent. The relevant information about demographic variables like age, sex, address, occupation; mode of injury, duration of injury, operative procedure, date of surgery and post-operative findings will be recorded in a semi-structured proforma. The proforma will be filled by the on duty residents of orthopaedics.

Ethical consideration: a. Informed written consent from subjects, b. Strict confidentiality, c. Ethical clearance from the ethical view board of BPKIHSThe data will be entered in Microsoft EXCEL 2000 and converted it into SPSS 11.5 for statistical analysis. The data obtained was analyzed with stat graphic software package version 5.0 (Statistical Graphics Corp. Inc., Rockville, MD).

Results

A total of 60 patients were included in the study. Twenty two patients were between 41-55 years age group followed by fifteen patients between 25-40 yrs, twelve patients less than 25 age group and eleven patients more than 55 years (Fig:1). Among 60 patients, 38 male and 22 female were female (Fig: 2) Trauma is commonnest cause for which elective orthopedic surgery and wound

closure was performed followed by plastic surgery procedure (Fig: 3).The average blood loss is 5 ml in K-wire group and 145 ml in plate group. The procedure time is 33 mins as compared to 53 mins in plate group (Fig 4).Hospital stay after operations is 5 days in stapler group and 2 days in nylon group (Fig: 6).

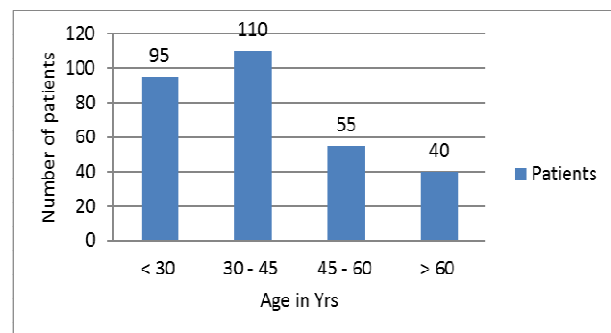


Figure 1: Age distribution in the study

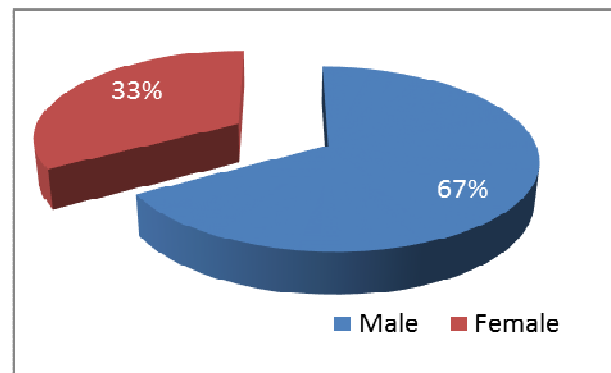


Figure 2: Distribution of sex in the study

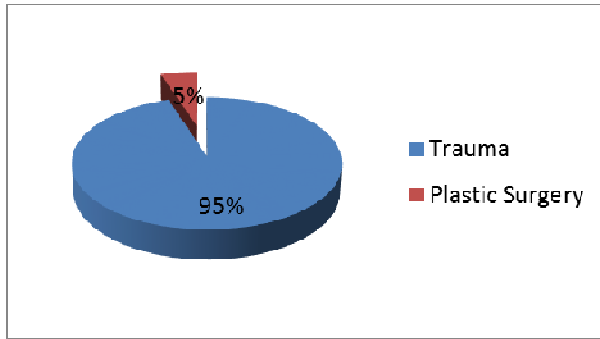


Figure 3: Distribution of mode of Injury

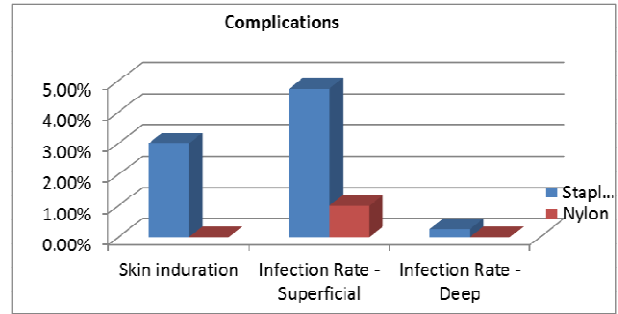


Figure 5(b): Time taken for closure of wounds

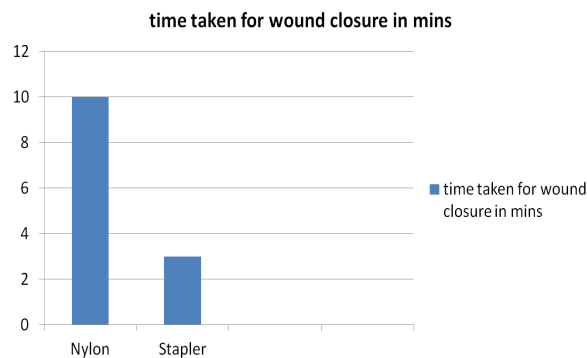


Figure 4: Time taken for closure of wounds

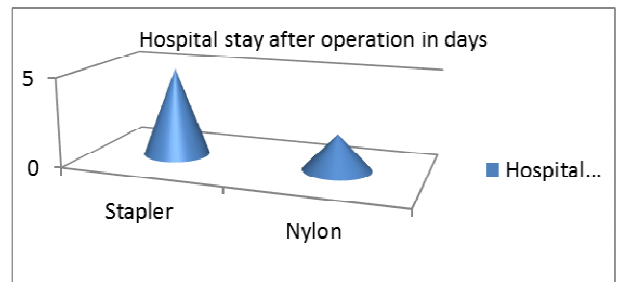


Figure 6: Hospital stay

Complications

Complications		Stapler	Nylon
Skin Induration		3%	-
Infection Rate	Superficial	4.75%	1%
	Deep	0.25%	-
Hospital stay after operation		5 days	2 days
Cosmetic		Good	Better

Figure 5(a): Time taken for closure of wounds

Discussion

The incidence of wound complications after orthopaedic surgery is not well defined. SSIs cause disability and increase treatment costs exponentially. However, the impact of non-infectious complications has not yet been well defined. The preceding pilot study aimed to determine the number of patients necessary to determine the safest wound closure material for a variety of orthopaedic procedures. The time to close wounds and pain with removal of closure material were also compared.

This study found a patient-reported wound complication rate of 18.33% (11/60). Previous studies comparing sutures and staples have demonstrated rates of infection ranging from

0.04% to 13%. The rate of confirmed Superficial SSIs in this study was 4.75% and deep infection was 0.25 %.(Fig: 5a, b)

Studies have historically relied on a clinician's interpretation of a wound complication, and have not included minor events, despite the importance of these events to the patient. Therefore, a direct comparison of our results is difficult due to the lack of a definition of a wound complication. Although this rate was somewhat higher than expected, it has been shown that the rate of non-infectious wound complications in clean orthopaedic and trauma surgery can be as high as 60% .Another prospective hip and knee arthroplasty patients found a wound complication rate of 32% (32/165) including a 9.7% (16/165) suspected infection rate.

Patel et al. also showed that over 50% (n=1437) of arthroplasty patients had persistent wound drainage on post-operative day four and further found that drainage increased hospital stay and was positively correlated with early SSI

Many surgeons cite a speed-of-closure argument when justifying their use of staples over sutures despite the myriad of papers questioning this belief .The mean difference for time of closure in this study indicates a seven minute time savings with the use of staples to close skin. If the average orthopaedic surgeon performs five procedures a day, the use of staples could

save as much as 35 minutes of operative time preventing the cancellation of surgeries.

This study showed a small, clinically relevant difference in pain upon staple removal compared to that of suture removal.

There are several limitations to the results presented here. This pilot study represents a short-term follow-up of surgical wounds with only six-week data collected. Therefore, the actual incidence of wound complications may be underestimated. Previous studies comparing the incidence of wound complications in sutured and stapled wounds have used a restricted risk period between ten days and one year with 14 days being the most common duration.

Conclusion

Metal staples are superior as they are regarded as quicker as and easier than nylon sutures. But use of metal staples or clips has a greater risk of wound infection and less acceptable cosmetically than sutures. Metal staples are more expensive.

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