DOI: https://doi.org/10.53350/pjmhs20231709122

ORIGINAL ARTICLE

Subcuticular Suturing Versus Vertical Mattress Suture Technique after Open Appendectomy

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ABSTRACT

Introduction: Mattress or simple interrupted sutures are the most often used suturing techniques, and they may result in significant scarring. For simple appendicitis, the Steri-Strips™ supported subcuticular suturing approach is advised.
Objective: To compare subcuticular suturing versus vertical mattress suture technique after open Appendicectomy.
Study Design: Randomized Controlled Trial
Setting: Department of General Surgery Lady Reading Hospital, Peshawar.
Study Duration: From August 04, 2020 to February 03, 2021.
Materials and Methods: A total of 60 patients having acute appendicitis and scheduled for appendectomy were included in the study in a consecutive manner and randomly allocated in two groups. Patients in group A were subjected wounds closure with subcuticular sutures while in group B to sound closure with vertical mattress sutures. All patients were followed to determine the postoperative pain and width of scar. Data analysis was carried out using SPSS V23 Software for Microsoft windows.
Results: The mean age of the whole sample was 32.6 + 9.2 years. The mean age in group A was 31.7 + 8.6 years while in group B it was 33.3 + 9.8 years (p 0.512). 66.7% patients in group A were males compared to 53.3% in group B (p 0.292). The mean BMI of group A was 24.2 + 2.2kg/m^2 while in group B, it was 24.9 + 2kg/m^2 (p 0.169). On follow up, the mean postoperative pain in group A was 1.7 + 0.8 compared to 2.3 + 0.9 in group B (p 0.010). The mean width of scar in group A was 1.6 + 0.6 mm compared to 2.7 + 1.0mm in group B (p < 0.001).
Conclusion: Subcuticular suture technique is superior to vertical mattress technique in terms of less postoperative pain and width of scar. However, since our study sample size was small and many effect modifiers / covariates were not addressed in our study, we cannot recommend subcuticular suture technique as routine for wound closure after appendectomy.
Keywords: Acute appendicitis; appendectomy; pain; scar; subcuticular sutures

INTRODUCTION

Currently, laparoscopic appendectomy has gained significant popularity; yet, open appendectomy remains recognized as a straightforward and economical procedure[1,2]. Suturing may be performed with absorbable and non-absorbable materials. The removal of absorbable sutures is unnecessary, hence conserving time and alleviating patient concern post-operation[3]. The predominant suturing techniques are mattress and simple interrupted sutures, which are associated with elevated rates of scar formation[4]. The subcuticular suturing approach, augmented by Steri-Strips™, is advised for uncomplicated appendicitis patients[5]. The primary purpose of using vertical mattress sutures is to provide enhanced wound eversion. It effectively eliminates dead space and enhances wound strength by integrating a substantial volume of tissue into the suture loop route[6]. The subcuticular approach, however challenging, is advantageous for sutures that need to remain for about one week while minimizing suture marks[7]. Post-operative pain and width of scar are two most important factors which influence the selection of suturing technique. A study conducted by Javadi et al. Reported significantly lower post-operative pain in subcuticular suturing group (086±081 in subcuticular suturing vs. 1.40±1.77 mm in vertical mattress sutures) at 7th post-operative day[8]. While a study by Haribabu et al. Did not find any significant difference in post-operative pain at 7th day and Wound Cosmesis. The authors concluded that botfi-subcuticular and vertical mattress sutures have similar post-operative outcomes[9].

The aim of the present study is to compare the post-operative pain and width of scar using subcuticular suturing versus vertical mattress suture technique after Open Appendicectomy. The study is designed because very few randomized trials have been conducted on comparison of these suturing techniques and have reported mixed results as reported above. The results of this study will help us to adopt a better suturing technique in future that will have lower post-operative pain and small scar size.

Received on 13-05-2023
Accepted on 23-08-2023

MATERIALS AND METHODS

Study Design: Randomized Controlled Trial
Setting: Department of General Surgery, Lady Reading Hospital, Peshawar
Duration: 06 months after synopsis approval from August 04, 2020 to February 03, 2021.
Sample size: The calculated sample size for this study was 60 patients. I will take 30 patients in each group. So a total of 60 patients were included in this study. This sample size is calculated by taking expected width of scar 1.05±0.66 mm in subcuticular suturing s. 3.62±1.77 mm in vertical mattress sutures technique[8]
Sampling Technique: Non-probability consecutive sampling
Inclusion Criteria

- Patients planned for open Appendicectomy due to acute appendicitis.
- Adult patients having age 18-60 years.
- Both male and female patients

Exclusion Criteria

- Patients already taking analgesics or steroids due to any cause was excluded.

Data collection procedure: After taking approval of synopsis, a total number of 60 patients who was referred in the department of general surgery, for open Appendicectomy fulfilling the inclusion/exclusion criteria of the study was included in this study. A written informed consent was taken from all patients before surgery and by explaining them about the objectives of the study and ensuring them the confidentially of their data.

After inclusion, data regarding baseline patient's information such as age, and gender was noted. Patient was assigned to each group by blocked randomization.
In group I patients: wound suturing was done using subcuticular suturing with an absorbable 40 monofilament Monocryl suture supported by 3 Steri-Strips™
In group II patients: Vertical mattress closure was done with 3-0 Nylon sutures. In all patients Appendicectomy was performed by consultant general surgeon having minimum 3 years post-fellowship experience. All patients were followed till 7 days after surgery. All study relevant information was noted on a pre-designed Proforma

Data analysis procedure: Data analysis was carried out using SPSS V23 Software for Microsoft windows. Mean± S.D was calculated for age, post-operative pain and width of scar. Frequency and percentages was calculated for gender. Independent sample t-test was used to compare post-operative pain and width of scar between the groups.

RESULTS

The study was conducted on 60 patients having acute appendicitis and scheduled for appendectomy. All patients were randomly allocated in two groups. 60 patients in group A were subjected to wound closure with subcuticular sutures while 60 patients in group B were subjected to vertical mattress sutures. The mean age of the whole sample was 32.6 + 9.2 years. The mean age in group A was 31.7 + 8.6 years while in group B it was 33.3 + 9.8 years (p 0.512). See table 1 for comparison of age in categories. 66.7% patients in group A were males compared to 53.3% in group B (p 0.292). See table 2 for comparison of gender between both groups. The mean BMI of group A was 24.2 + 2.2kg/m^2 while in group B, it was 24.9 + 2kg/m^2 (p 0.169). See table 3 for BMI comparison in categories. On follow up, the mean postoperative pain in group A was 1.7 + 0.8 compared to 2.3 + 0.9 in group B (p 0.010). The mean width of scar in group A was 1.6 + 0.6mm compared to 2.7 + 1.0mm in group B (p < 0.001)

Table 1: comparison of age in categories (n = 30 each)

Age group	Subcuticular sutures Frequency (%)	Vertical Mattress Frequency (%)	P value
20-30 years	12 (40%)	14 (46%)	0.046
31-40 years	12 (40%)	4 (13.3%)	
41-50 years	6 (20%)	12 (40%)	

Table 2: Comparison of Gender (n = 30 each)

Gender	Subcuticular sutures Frequency (%)	Vertical Mattress Frequency (%)	P value
Male	20 (66.7%)	16 (53.3%)	0.292
Female	10 (33.3%)	14 (46.7%)	

Table 3: Comparison of BMI (n = 30 each)

BMI	Subcuticular sutures Frequency (%)	Vertical Mattress Frequency (%)	P value
20-23	10 (33.3%)	6 (20%)	0.435
> 23-25	10 (33.3%)	10 (33.3%)	
> 25-28	10 (33.3%)	14 (46.7%)	

Table 4: Comparison of post-operative pain and scar width

Parameter	Subcuticular sutures	Vertical Mattress	P value
postoperative pain	1.7 + 0.8	2.3 + 0.9	0.010
width of scar	1.6 + 0.6mm	2.7 + 1.0mm	< 0.001

DISCUSSION

Even though laparoscopic appendectomy has grown in popularity recently, open appendectomy is still seen as a straightforward and affordable procedure[10–12]. Both absorbable and non-absorbable material types might be used for suturing. Because absorbable sutures don't need to be taken out, it saves time and lessens post-operative patient worry[13]. Dead space is eliminated with absorbable sutures because they properly attach to the subcutaneous tissue. It is also inserted into the dermis to reduce stress as the wound heals. For subcuticular wound closure, absorbable sutures are often used because they might provide more aesthetically pleasing results[14,15]. Under the right conditions, the suturing method should reduce tension, which leads to wound separation, and decrease dead space in subcutaneous tissues112, 113. After surgery, non-absorbable sutures must be removed. For long-term mechanical support, it is used as a deep suturing procedure[16,17]. There is a lack of research on wound closure methods for open appendectomy. The most often used suturing techniques are basic interrupted sutures and vertical mattress, both of which have a significant potential for scarring[18]. For uncomplicated appendicitis, the Steri-Strips™-supported subcuticular suturing approach is advised[19]. Because of their superior cosmetic results, cheaper costs, increased patient satisfaction, and decreased risk of infectious problems, absorbable intradermal sutures seem to be a preferable option than mattress suturing[20–22]. In our research, patients with simple appendicitis whose skin incision was closed with absorbable subcuticular suturing after appendectomy reported less discomfort and were more happy with the surgical site scar's breadth than the control group. Wound dehiscence and the development of subcutaneous abscesses were uncommon but did not vary substantially between the two groups. It should be mentioned that none of our subjects had any systemic disorders that could have an impact on wound healing. Among the advantages of absorbable sutures are cost savings, improved patient satisfaction, and improved cosmetic results[20–22]. In contrast to interrupted nonabsorbable suturing, absorbable subcuticular suturing has been favored and suggested as a safer and superior technique for a variety of surgical procedures, particularly in children[23,24]. In a research similar to ours, Onwuanyi et al. reported that the subcuticular approach is safe for people of all ages and provides a time and money-saving benefit[25]. According to a recent research by Tanaka et al., patients favored subcuticular suturing because it produced better cosmetic outcomes and caused less discomfort[26]. According to Foster et al., using absorbable subcuticular sutures after appendectomy increased the risk of wound infection[27]. A meta-analysis of ten randomized controlled studies by Sajid et al. showed that, in terms of surgical site infection and other operational morbidities, the use of absorbable suture for skin closure was comparable to that of non-absorbable suture. Additionally, compared to non-absorbable suture, absorbable suture resulted in a lower incidence of skin wound dehiscence rather than an increased risk[28]. Continuous subcuticular sutures may lessen dehiscence in individuals having nonobstetric surgery and superficial wounds, according to a comprehensive study by Gurusamy et al. that examined the advantages and disadvantages of continuous vs interrupted skin closure procedures[29]. Applying absorbable subcuticular suture during pediatric appendicectomies was safe, as shown by Serour et al.[24]. Similarly, Kotaluoto et al. showed that in terms of wound infections in adult patients, continuous absorbable intradermal suturing did not differ from nonabsorbable sutures. In order to reduce the risk of wound infections during complex appendectomies, they also suggested continuous absorbable suturing[30]. According to Pauniaho et al., nonabsorbable interrupted wounds did not vary in terms of their appearance or inflammatory indicators in contrast to absorbable continuous skin closure in children who had appendicectomies. Nevertheless, some infants had partial wound dehiscence upon stitch removal[23]. In individuals with simple appendicitis, closing the skin incision using subcuticular suturing after appendectomy may be safe, practical, and lead to improved cosmesis and reduced discomfort. However, the quality of the data raises questions about the result.

CONCLUSION

Subcuticular suture technique is superior to vertical mattress technique in terms of less postoperative pain and width of scar. However, since our study sample size was small and many effect modifiers / covariates were not addressed in our study, we cannot recommend subcuticular suture technique as routine for wound closure after appendectomy. In order to report the effectiveness of subcuticular suturing and control for additional variables, we advise further research with larger sample numbers and multicenter trials.

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This article may be cited as: Ali H, Shah S, Ullah T, Jabeen S, Marwan M, Habib K: Subcuticular Suturing Versus Vertical Mattress Suture Technique after Open Appendectomy. Pak J Med Health Sci. 2023;17(9): 122-124.