

# SIMPLE LIGATION VERSUS INVAGINATION OF STUMP IN OPEN APPENDICECTOMY

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## ABSTRACT

**Objective:** To compare the outcome of simple ligation versus invagination of stump in appendicitis.

**Material and Methods:** This descriptive study was conducted on 100 patients who underwent open appendicectomy at the department of surgery Hayatabad Medical complex Peshawar from December 2011 to October 2013. All patients presented with signs and symptoms of appendicitis that failed to respond to conservative management. The patients were divided in 2 groups. In group A odd numbered patients were included and even numbered patients were included in group B. Approach was through Grid iron incision. Simple ligation of stump was done in Group A and invagination of stump in Group B. The demographics, presenting complaints, severity of pain, operating surgeons, operating time and problems, postoperative pain and any other complications were recorded on a Performa specially designed for this purpose. Vicryle 2/0 was used for stump closure, and wound closure with vicryle 0 and skin with prolene 2/0 interrupted sutures. All patients were given local anaesthetic at the surgical skin wound site after conclusion of surgery. Patients were followed up to 6-8 weeks.

**Results:** The mean age was 21.3 years in a range of 13-65 years for both groups. Male patients 37 (74%) and female patients 13 (26%) in group A while in group B it was 34 (68%) and 16 (32%) respectively. Regarding complications wound infection occurred in 3 (6%) patients in group A and 6 (12%) patients in group B. Paralytic ileus was 1 (2%) in group A and 3 (6%) in group B. Post-operative pain was recorded using visual analogue scale (VAS). 3 patients in Group A (6%) and 5 patients (10%) in Group B developed moderate pain that required parenteral analgesia and extra duration of hospital stay. Mean hospital stay was 2.10 days among both groups with 1.96 days in group A & 2.06 days in group B patients.

**Conclusion:** Simple ligation in comparison with invagination of stump is simple, safer, less hazardous, less time consuming, associated with less postoperative complications, and shorter hospital stay.

**Key Words:** Appendix, Appendicular stump, Ligation, Invagination, appendicectomy.

## INTRODUCTION

Appendicectomy is one of the most frequently performed operations in surgical practice. The overall incidence of acute appendicitis is said to be around 14% percent<sup>1</sup>. Laproscopic surgery introduction is a great advancement in the field of surgery, open Appendicectomy is still a common practice<sup>2</sup>. Most of the tertiary hospitals in Pakistan and the developed countries, recommends diagnostic laparoscopy when the diagnosis of acute appendicitis is doubtful. The surgical technique may vary among surgeons and centre preference<sup>3</sup>.

Reported postoperative complications include simple wound infection to abscess formation (superficial or deep), paralytic ileus, intestinal obstruction, and rare complication of stump appendicitis, colo-cutaneous

fistula are specific postoperative complication after appendicectomy. These complication resulted in increased duration of hospital stay<sup>3,4</sup>. Stump burial after appendicectomy is a procedure frequently being performed by surgeons in the past but recently it is stated that this burial is associated with a rare complication of stump appendicitis which poses great difficulty in diagnosis and treatment<sup>4</sup>. Moreover the invagination of stump results in mass appearance during contrast studies leading to diagnostic problems<sup>5</sup>. Another complication associated with stump closure is fistula formation because of the passage of needle through the bowel lumen<sup>1,6</sup>.

Many studies suggest increased complications rate with appendicular stump invagination compared with simple ligation, stump invagination is sometime necessary when base of the appendix is inflamed<sup>5,7</sup>. The objective of this study was to compare complication rate of simple ligation versus invagination of the stump in appendicectomy<sup>1,3,8</sup>.

## MATERIAL AND METHODS

This descriptive study was conducted on 100

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patients who underwent open appendectomy at the department of surgery Hayatabad Medical Complex, Peshawar from December 2010 to October 2012. The demographics, relevant information regarding patients name, sex, age, address, clinical findings, laboratory findings, radiological findings and presenting complaints, severity of pain, operating surgeons, operating time, postoperative pain and any other complications were recorded on a Performa specially designed for this study. Random sampling was done. Odd number were included in group A in whom simple ligation of stump was done. Even numbers were put in group B in whom stumps were invaginated after ligation. All male and female patients aged 14 years or above operated for acute appendicitis via grid iron incision were included in this study. Exclusion criteria were appendicitis with abscess or mass formation, perforated appendicitis with local or generalized peritonitis, incidental appendectomy, patient with pre-existing disease such as diabetes, hypertension, chronic respiratory diseases etc. All 100 patients have grid iron incision for operation. All these patients were followed up for 6-8 weeks for any complication.

Study variables were analyzed for comparative statistics. The frequencies were determined for presenting symptoms, clinical examination, laboratory and radiological findings; mean standard deviation was calculated for age and duration of hospital stay. Results were analyzed by postoperative complications like pyrexia, wound infection, paralytic ileus, intra abdominal abscess formation, peritonitis in both groups and chi square test was used for comparison and P value of > 0.005 was considered as significant. Data analysis was done by using computer program SPSS 11 for windows.

## RESULTS

There was male predominance in both groups and majority of the patients was of younger age group, mean age 21.3 years (Table 1). Complication rate was a bit higher in group B as compare to group A, however, P value shows no significance between the two groups (>0.05). The commonest complication was wound infection occurred in 3(6%) in group A and 6(12%) in group B (Table 2). The mean hospital stay was 2.06 days (ranged 1-5 days). Mean hospital stay was 2.06 days (range 1-5 days) it was not statistically significant as P value was >0.05. mean time spend on stump invagination was 4.6 minutes (rage 3-10 minutes).

## DISCUSSION

Appendectomy is a common surgical procedure and a surgical trainee starts its surgery from appendectomy. It was previously routine to bury the appendicular stump after appendectomy by taking a "Z" suture in a sero-muscular extra mucosal pattern. However recent studies suggest that taking the suture is sometimes associated with complication such as

**Table 1: Gender Distribution**

Sex	Group A	Group B
Male	37 (74%)	34 (68%)
Female	13 (26%)	16 (32%)

**Table 2: Post operative complications**

Complications	Group A	Group B
Surgical site infection	3 (6%)	6 (12%)
Post operative fever	7 (14%)	12 (24%)
Ileus	1 (2%)	3 (6%)
Post operative pain	3 (6%)	5 (10%)

P value = >0.05

fistula formation and wound infection and the reason is by passing the needle through the bowel luman while burying the stump<sup>4,6</sup>. It was thought previously that burial of stump prevents exposure of the infected base of the appendix to the peritoneal cavity as well as guarding against bowel leakage should the stump ligature slips<sup>9,10</sup>.

Our study shows a male predominance in the overall prevalence of acute appendicitis in both groups and majority of the patients was of younger age group with a mean age of 21.3 years is comparable to other studies<sup>2,7,8,11</sup>.

Wound infection is most common post operative complication associated with appendectomy. In this study wound infection noticed in group A was 3 (6%) and in group B 6 (12%). The reason of higher infection rate in group B can be attributed to stump burial with possible contamination of the needle going through the bowel lumen while taking the purse string suture around the base of the appendix<sup>12</sup>. This is comparable to other studies in which wound infection was 5%<sup>11</sup>, 7%<sup>8</sup> and 7.5%<sup>9</sup>. The wound infections were superficial and treated by opening the wound, draining the pus and sending it for culture and sensitivity. The patients were started with appropriate antibiotic for up to 7 days according to culture and sensitivity<sup>5,12</sup>.

Similarly 7 (14%) patients developed fever post-operatively in group A while 12 (24%) in group B which also shows better results in case of simple ligation as compared to stump closure and may be because of greater tissue handling and longer duration of surgery leading to chest infection etc<sup>12</sup>.

Hospital stay reflects the mortality, morbidity and cost of a disease or a procedure. It is one of the most important variable on which the outcome of a study highly depends upon. In our study the mean hospital stay was 2.10 days range 1-5 days in all 100 cases. This was comparable with the studies done by Chaudhary IA et al<sup>5</sup>. Hospital stay in group A was 1.96 days while in group B it was 2.06 days. Statistically there was no

difference between two groups on the basis of stay in hospital<sup>5</sup>.

In this study paralytic ileus was noted in 1 (2%) patient in group A and 3 (6%) in group B for more than 24 hours and all the patients recovered with conservative treatment.

Operating time (mean 32 min) in group A and operating time (38 min) in Group B was recorded although wound infection, post operative pyrexia, increase length of hospital stay and paralytic ileus were commonly observed in both groups, all these were statistically insignificant as compared with other studies<sup>5,12</sup>. The most important observation was the extra time that was spent on stump invagination (mean 5 min).

In majority of patients (91%) oral paracetamol and diclofenic sodium were enough to achieve pain control, and analgesia was not required beyond 3-5 days. 3 patients in Group A (6%) and 5 patients (10%) in Group B developed moderate pain that required parenteral analgesia and extra duration of hospital stay.

## CONCLUSION

Invagination of stump is adviseable when base of the appendix is perforated and to achieve adequate closure of the stump.

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