

SIMPLE LIGATION VERSUS LIGATION AND BURIAL OF STUMP IN APPENDICECTOMY IN PATIENTS WITH CLINICAL DIAGNOSIS OF ACUTE APPENDICITIS

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ABSTRACT

Objective: To compare the post operative complications in appendisectomized patients with and without burial of stump following appendicectomy in patients with clinical diagnosis of acute appendicitis.

Material and Methods: This comparative study was conducted from 27th October 2006 to 5th June 2007. One hundred cases who underwent appendicectomy for uncomplicated acute appendicitis were divided into two groups. In group 1 simple ligation and in group 2 burial of the appendiceal stump following appendicectomy was done. Each group consisted of 50 cases. Post-operative follow-up was done for two months for any complication in all cases.

Results: The mean age was 24.2+8.031 years in group 1 and 23.7+8.672 years in group 2. In this study wound infection was 6% in patients undergoing burial of stump following appendicectomy and 4% in simple ligation ($p > 0.05$). Mean hospital stay was 2.42 days in those with stump burial following appendicectomy while in simple ligation it was 2.06 days ($p > 0.05$). There was one case of paralytic ileus in Group 2 (2%) while in group 1 there was none ($p > 0.05$). In group 2, 30% of patients suffered from fever while in simple ligation it was 20% (p value > 0.05). Extra time was spent on burial of stump following appendicectomy with mean 3.6 minutes.

Conclusion: Simple ligation of the stump is easy and less time consuming. There is no significant difference in frequency of wound infection and shorter hospital stay in simple ligation and ligation and burial of stump after appendicectomy.

Key Words: Appendicectomy, Stump Burial, Simple Ligation.

INTRODUCTION

Acute appendicitis is one of the most common surgical procedures performed worldwide. The incidence of acute appendicitis is 1.4 cases/1000 in general population, in males it is 1.5/1000 and in females it is 1.9/1000.¹⁻³ Although minimal invasive surgery is a great advancement in surgical field, open appendicectomy is still in common practice.⁴

The technique of appendicectomy may vary from surgeon to surgeon or from

center to center, starting from skin incision to the ligation and burial of appendicectomy stump and so on. The technique of inversion of stump is by purse string or Z-suture that causes extra time to be spent and it may also cause contamination due to the passage of needle through the lumen of the cecum inadvertently. Whether to bury or not to bury the appendiceal stump depends on the preference of the surgeon and in laparoscopic appendicectomy the stump is even simply coagulated.⁵

DEMOGRAPHIC AND POST OPERATIVE DATA

Characteristic	Group-1 (Simple ligation)	Group-2 (Stump inversion)	P value
Sex			
Male	35 (70%)	32 (64%)	0.403
Female	15 (30%)	18 (36%)	
M:F	2.1:1	1.7:1	
Age			
Mean	24.2	23.78	0.765
Age(S.D)	yrs(8.031)	yrs(8.672)	
Range	14-70 yrs	14-45 yrs	
Hospital			
Mean stay	2.06 days	2.4 days	13.590
Range	1-5 days	1-5 days	
Time spend On stump			
Invagination			
Mean Time	0	3.6 min	
Range	0	1.2- 5.6 min	

Table 1

There are different types of post operative complication that occur after appendicectomy e.g. wound infection, abscess formation, paralytic ileus, intestinal obstruction, length of hospital stay and some rare complications like cutaneous fistula and stump appendicitis⁶⁻¹⁰. Stump burial may complicate and pose difficulty to treat the appendiceal appendicitis that is a rare complication of appendicectomy which occurs due to incomplete resection of stump^{4,6}.

Complications occur in both simple ligation and in burial of stump. Most of the studies favor simple ligation^{4,11-13}. Stump invagination causes deformity in the cecal wall that appears like a tumor during contrast study and colonoscopy¹². Stump appendicitis is an acute inflammation of the residual appendix and rare complication after appendectomy¹⁴.

Whether simple ligation of the appendix or stump burial into the cecum can reduce the risk of stump appendicitis remains controversial. Rao et al¹⁵ showed that all the cases reported in the literature underwent simple ligation of the appendix

without burial of the stump, suggesting that simple ligation with failure to amputate the appendix close to its origin from the cecum is a prerequisite for developing stump appendicitis. Mangi and Berger¹⁶ reviewed 2185 cases of appendectomy and found that there was no correlation between simple ligation or stump burial and stump appendicitis.

Although the evidence suggests increased complications with appendiceal stump burial compared with simple ligation, burial of the stump is unavoidable in some appendicectomies. It may for example be necessary in order to achieve adequate closure if the base of appendix is perforated¹⁷.

The aim of our study was to evaluate the outcome of burial as compared to simple ligation during appendicectomy in patients diagnosed with acute appendicitis with keen regards to postoperative complications.

MATERIAL AND METHODS

This comparative study was conducted in Surgical B unit Post

POSTOPERATIVE COMPLICATIONS IN SIMPLE LIGATION AND STUMP INVERSION

Postoperative Complications		Group 1 {Simple ligation} (n=50)	Group 2 {Stump inversion} (n=50)	p value
Wound infection	Yes	2 (4%)	3 (6%)	0.211
	No	48 (96%)	47 (94%)	
Paralytic ileus	Yes	0 (0%)	1 (2%)	1.010
	No	50 (100%)	49 (98%)	
Postoperative pyrexia	Yes	10 (20%)	15 (30%)	1.333
	No	40 (80%)	35 (70%)	

Table 2

Graduate Medical Institute Lady Reading Hospital Peshawar from 27th October 2006 to 5th June 2007 including two months follow-up in all cases.

One hundred cases of appendicitis were divided into two equal groups by simple randomization. Group 1 included simple ligation of the stump and Group 2 included stump closure with invagination.

All patients aged 14 years or above were included in the study. Exclusion criteria was incidental appendicectomy, appendicectomy done through incision made in area other than right iliac fossa i.e. midline, Para median, appendicitis with abscess formation that was not localized, appendicitis with generalized peritonitis, appendicular mass formation, those cases in which stump could not be buried due to inflamed cecal wall.

A total of 100 cases that fulfilled the required criteria were included in the study. After formal consent patients were further assessed through detailed history, physical examination and investigations e.g. total leucocytes count, urine complete examination and ultrasound in some cases especially in females. Other relevant data e.g. date of operation, date of discharge and operative findings were recorded on a proforma.

Postoperative hospital stay, wound infection, pyrexia, paralytic ileus, intra-abdominal abscess formation and

peritonitis and any other rare complication i.e. fecal fistula, portal pyaemia were noted accordingly. Follow-up was done for two months in all patients which started after patients had been discharged from the ward. First follow-up after discharge was done at 8th to 10th post operative day at which stitches were removed; complete history, clinical examination and relevant investigations if needed were done. Further follow-up was done for two months.

The data collected on the pre-structured Proforma was analyzed used SPSS^R Version 10.0 for windows (SPSS Inc, Chicago, IL). Chi square test was used to see association between different variables in two groups (post op hospital stay, post op pyrexia, wound infection, paralytic ileus, intra-abdominal abscess formation and peritonitis) and a P value of <0.05 was considered significant.

RESULTS

The demographic characteristics between each group were compared (table 1). There was a dominance of male in both groups. In group-1 there were 35 male and 15 females, male to female ratio was 2.3:1, while in group-2 there were 32 male and 18 female, male to female ratio were 1.7:1. The mean age for group-1 was 24.2 years (range 14-70 years+8.031). The majority of patients in both groups were of younger age.

Sixty-three percent of patients were between age 14 to 28 years. The frequency of acute appendicitis was highest between 14-30 years of age comprising 84% of patients. Post-operatively two patients (4%) in group-1 developed wound infection while in group-2 three patients (6%) developed wound infection (Table 2). P-value was >0.05 that is statistically not significant.

Paralytic ileus developed only in one patient (2%) in group-2 that was for more than 24 hours while in group-1 there was none and was not statistically significant as P-value was >0.05 . Postoperative pyrexia developed in 10 patients (20%) in group-1 while in group-2 it was 15 (30%) patients P-value was >0.05 again it was not significant statistically. Mean hospital stay was 2.06 days (range 1-5 days) in group-1 while in group-2 it was 2.4 days (range 1-5 days) it was not statistically significant as P-value was >0.05 . There was no mortality in both groups. The mean time spend on stump invagination was 4.6 minutes (range 3-10 minutes). All complications developed during the stay in hospital and no significant complications were seen during follow up for two months and there was no mortality in this study.

DISCUSSION

Appendicectomy is the most commonly performed emergency abdominal surgery¹⁸. Traditionally after appendicectomy the stump is buried in the cecal wall by a purse string suture or a Z suture. It is a seromuscular suture encircling the appendix base. The reasons given for this invagination of stump are safety against slipping of ligature from the stump or blow out of appendix stump, less chances of peritonitis from spillage of pathogens from remaining the stump, less incidence of post operative wound infection, better healing of gut by formation of granulation tissue and collagen from the serosal layer of

caecum¹⁹. It is also an extra closure should the ligature on the base of appendix fail.

Those who do not favour a purse string suture argue that there is no evidence that the infected mucosa is harmful if left exposed and that purse-string merely traps any infection to form an intramural cecal abscess^{20,21}. However, there are reports of more residual abscesses over the wall of caecum due to invagination of stump, besides the deformation (filling defect) may lead to the suspicion of a neoplasm²².

Demographically males were more in number (67% versus 33%). The male to female ratio was 2:1 similar to values from a study by Chaudry et al²³. In most studies it has been shown that males are more frequently affected than females²⁴⁻²⁶. The mean age was 23.7 years (range 14-70 years). Most of the patients belonged to the younger age group. The most common age group for acute appendicitis was 2nd and 3rd decade of life similar to other studies²⁴⁻²⁷.

Demographically there was no difference in the two groups in this study. The mean age for group-1 was 24.4 years while group-2 was 23.3 years⁴. Wound infection is the most common complication after appendicectomy, which was 5 percent in our study and was the most common complication. This is comparable with other studies where a similar value was observed^{18,28} which were comparisons between open and laparoscopic appendicectomies.

Wound infection was high 13.5% in open appendicectomy in a study done by Vettoretto et al and 10.6% by Bhopal et al^{29,25}. It was 4% in group-1 and 6% in group-2. All the infections were treated by leaving the wound open and draining pus with antibiotic cover for 5-7 days according to culture and sensitivity. Although the infection rate was high in group-2 in our study but this was not

statistically significant similar to results of a study by Chaudry et al²³. There was no case of postoperative intraperitoneal collection in both groups.

Post operative pyrexia developed in 25% of patients collectively in both groups that was comparable with other studies³⁰. It was more common in group-2 and could be due to excessive tissue handling during stump inversion which could lead to pyrexia and inflammation. Hospital stay is one of the most important variables on which the outcomes of the study highly depended. It reflected the mortality, morbidity and cost of a disease or a procedure. In our study the mean hospital stay was 2.24 days (range 1-5days) in all 100 cases. This was comparable to studies done by Khanna S et al⁵ while a study done by Ghelase f et al³¹ and Yau KK³² comparing open and laparoscopic appendicectomy. Hospital stay in group-1 was 2.06 days while in group-2 it was 2.4 days. Same results were found in other studies. Statistically there were no differences between both groups on the basis of length of stay at the hospital. Another observation in the study was the mean time spent on stump invagination which was 4.6 minutes. In some cases it was difficult to invaginate due to fixed and improper exposure of the cecum. This makes simple ligation superior to invagination.

Neither mortality nor intra-abdominal abscess was recorded in our study. In literature mortality has been reported 0.7%²⁶ and 1.8%³³ while intra-abdominal abscess has been reported 2.5% and 2.3% (in open appendicectomy).

No cases of small bowel obstruction or incisional hernia were found during two months of follow-up. In literature small bowel obstruction after appendicectomy has been reported 1.2%-1.3% in two large series of studies by Tingstedt B et al³⁴ and Anderson RE³⁵

while a study in Saudi Arabia by K hairy et al reported only 1%⁸. Incisional hernia was reported in only 0.4% in the same study by Tingstedt B et al.³⁴ as these two complications are rare and needs prolong follow up and a large sample we could not find these complications in our study.

In the whole series only one patient that was in group-2 developed paralytic ileus in this study (2%). It was for more than 24 hours and was treated conservatively. It may due to excessive tissue handling because it was difficult to invaginate the stump.

The most important observation was the extra time that was spend on the stump invagination. In some cases invagination of the stump is unavoidable and it may for example be necessary in order to achieve adequate closure if the base of appendix is perforated.

CONCLUSION

We concluded from the study that there were no advantages of invagination the stump of appendix over simple ligation and in some cases it was difficult and hazardous. Simple ligation is easy and less time consuming. There is no significant difference in frequency of wound infection and shorter hospital stay in simple ligation and ligation & burial of stump after appendicectomy.

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