

Comparison the Frequency of Wound Infection in Simple Ligation of Appendicular Stump versus Stump Invagination after Appendectomy

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ABSTRACT

Acute appendicitis is the most common abdominal emergency surgical disease. It is suggested that between 6.7% and 8.6% of the people of the Western world submit appendicitis at some point in their lives. The study results will show that which of the procedure has low rate of infection as there is diversity and conflict of data in existing literature.

Objectives: To compare wound infection in simple ligation of appendicular stump versus stump invagination after appendectomy.

Subjects and Methods: It was a Randomized controlled trial study conducted in the admitted patients of acute appendicitis in the Department of Surgery, Khyber Teaching Hospital, Peshawar from 1st January, 2017 to 31st December, 2019. Total of 500 patients were enrolled in the study and they were randomly allocated Group A or Group B by a draw equally. Both the groups were kept under observation in the hospital for 10 days and data were collected before discharged.

Results: A total of 500 patients of acute appendicitis were observed, which were divided in two equal groups. Overall Male to female ratio was 1.19:1. The overall average of the patients was 33.01 years +9.30SD. Wound infection wise distribution shows that Group A patients have less wound infection 5.6% than Group B patients (7.2%) patients with insignificant group p -value=0.292.

Conclusion: It is an equivalent technique as the benefits gained through improved quality of life were offset by the effect of wound infection. We commend that the choice of the procedure be based on surgeon or patient preference.

Keywords: ligation, stump invagination, appendicular stump, acute appendicitis, wound infection

INTRODUCTION

Acute appendicitis is the most common abdominal emergency surgical disease. It is suggested that between 6.7% and 8.6% of the people of the Western world submit appendicitis at some point in their lives. Although thousands of appendectomies are performed annually worldwide, the treatment of appendicular stump has not been uniform.¹ Appendectomy remains the standard treatment of acute appendicitis, which is performed by both open and laparoscopic approaches. Man has the lifetime risk of appendectomy of 12% vs 25% for women, making it the most commonly performed operation in the world.² Despite the increased use of the laparoscopic approach, open appendectomy is an operation still performed on a large scale worldwide. Two main approaches exist for the stump closure, the simple ligation and the stump invagination.³ Different studies had been conducted to compare the postoperative complications after stump ligation alone and stump ligation with invagination in appendectomy. Some studies report that patients under going appendectomy with stump ligation offer shorter hospital stay as compared to those undergoing appendectomy with ligation and burial of the stump.^{4,5} While others conclude that simple ligation of the appendicular stump during appendectomy is safe, simple and shortens operating time.^{2,6} The authors who recommend burial of the stump consider appendiceal

stump as a contaminated structure and its presence in the abdominal cavity increases the risk of infection and the invagination of the stump aim to provide an extra safety measure for the prevention of postoperative complications. There is reported incidence of infection in stump ligation group is 6.67% patients⁵ and 13.33% in stump invagination group.⁶ A meta-analysis reported the incidence of infection to be 2.3%-18.2% in the Stumpligation group and 4.0%-22.5% in the Stump invagination group.⁷

The rationale of my study is based upon that which of the procedure has low rate of infection as there is diversity and conflict of data in existing literature. The results of this study will be shared with local surgeons to start multi-centric randomized controlled trials on this commonly performed procedure.

MATERIALS AND METHODS

This Randomized Control Trial was carried out at Surgery department, Khyber Teaching Hospital, Peshawar from 1st January 2017 to 31st December, 2019. Total Duration was 2 years. A total of 500 patients of acute appendicitis were observed, which were divided in two equal groups, 250 in each group. Patients in Group A were managed by simple ligation and another Group B; patients were going through stump invagination. On probability consecutive sampling technique was used. All the patients presenting with acute appendicitis with age range 18 years to 50 years of

bothgender were included .while Patients with Appendicular Abscess, Appendicular Massand uncontrolled diabetes were excluded from this study.

Eligibility for this study were given to all patients diagnosed with acute appendicitis and undergoing appendicectomy. Acute appendicitis diagnosis was made using the Updated Alvarado Scoring System (MASS). A full history and extensive physical examination plus relevant investigations were performed in order to make a provisional diagnosis. Both patients received a total White Blood Cell Counting (WBC). The patients with erroneous presentation have been subjected to abdominal ultrasound. The sample of 500 was divided by lottery method into two categories. Group A(control) of 250 patients performing basic binding. Group B (case) comprises 250 patients who have been stumped by stumps. The entire activities were conducted by advisors, senior registrars or senior residents. For two days, the same quality commercial brand was provided to every patient I/V ceftriaxone, metronidazol without conflict of interest. Just 8 hours on the first day was allocated to Analgesics. Any signs of infection and serosanguinous discharge that were considered as infection were verified on the seventh postoperative day. Presence on the 10th day of any symptoms of inflammation or discharge.

Data were collected using structured questionnaire and analyzedusing SPSS computer software version 15.0. Frequency andpercentage were calculated for qualitative variable like gender and wound infection for group (A and B). Mean and standard deviationwas calculated for numeric variable like age. Wound infection wasstratified among age and gender to see the effect modification usingchi square test that was applied to compare both groups (A and B),

keeping the p value <0.05 that was considered as significant value. All the results were presented as tables and charts.

RESULTS

Gender wise distribution shows that 139(55.6%) were male and111(44.4%) were female in Group A with male to female ratio was1.25:1, while Group B contains 133(53.2%) were male and117(46.8%) were female with male to female ratio was 1.14:1.Overall Male to female ratio was 1.19:1. Gender distribution among both the groups was insignificant with p-value=0.327

Average age was 32.5 years+ 9.41SD in Group A While Group B have average age of33.51 years +9.19 SD. The age distribution among the group was also insignificant with p-value0.372. Postoperative wound infection in both the groups shows that Group A have wound infection in 14(5.6%) patients and 236(94.4%)patients have no wound infection while Group B shows wound infection in 18(7.2%) patients and 232(92.8%) patients were free of postoperative wound infection which shows that wound infection was insignificant in both the group with p-value=0.292. (Table 3). Age wise distribution in both the groups shows that wound infection was greater in older age group and decreases with the decrease of age. The patients having less than or equal to 20 years of age have shown wound infection in 4% in Group A while 3.3%in Group B. We can see that wound infection in both the group when stratified among the age, it shows insignificant. (Table 4)

Table 1: Age Wise Distribution In Both The Groups

		Group		Total	p-value
		A	B		
Age (in years)	<= 20.00	25 10.0%	30 12.0%	55 11.0%	0.372
	21.00 - 30.00	89 35.6%	71 28.4%	160 32.0%	
	31.00 - 40.00	84 33.6%	90 36.0%	174 34.8%	
	41.00+	52 20.8%	59 23.6%	111 22.2%	

Table 2: Wound Infection Wise Distribution In Both The Groups

		Group		Total	p-value
		A	B		
Wound		14	18	32	0.292
Infection		5.6%	7.2%	6.4%	

Table 3: Gender Wise Distribution Of Wound Infection In Both The Groups

Gender	Group		p-value
	A Wound Infection	B Wound Infection	
Male	3 2.2%	128 96.2%	0.3371
Female	11 9.9%	104 88.9%	0.4690

Table 4: Age Wise Distribution of Wound Infection in Both The Groups

		Group				p-value
		A		B		
		Wound Infection		Wound Infection		
		Yes	No	Yes	No	
Age (in years)	<= 20.00	1	24	1	29	0.7071
		4.0%	96.0%	3.3%	96.7%	
	21.00 - 30.00	5	84	5	66	0.4793
		5.6%	94.4%	7.0%	93.0%	
	31.00 - 40.00	2	82	4	86	0.3743
		2.4%	97.6%	4.4%	95.6%	
	41.00+	6	46	8	51	0.4885
		11.5%	88.5%	13.6%	86.4%	

DISCUSSION

The most frequent surgical emergencies are acute appendicitis in the second and third decades of life. ⁷⁻⁸ During appendectomy, some surgeons simply bind the appendix stump alone and others tend to use stitches to invaginate the stump. The objective of this analysis was to assess the twomthing of the stump. The causes of the stump's invagination are protection against the slippage of the stump from the body, fewer chances that bacteria from the residual stump are spilling out and less incidence of postoperative wound infection. ^{8,9} The first mentioned of Stump appendicitis was Rose in 1945 and the interval of re-inflammation of any residual appendiceal tissue following an appendectomy is defined. ^{10,11} The true occurrence and precise causes of stump appendicitis are reported to be understood in documentation, as diagnosis difficulties are not apparent. ¹²

There is an extremely broad spectrum of literature on the human appendix. The extraordinary length of Samaha et al. in 2011 is 55 cm, a single case of amegaloappendix.¹³Invagination of the stump during appendectomy was typically performed by several surgeons of many centres, but there were no data to support its usefulness from randomized clinical trials. ¹⁴

The reasons for this invagination of appendicular stump safety against slipping ligature off the stump, reduced probability of peritonitis caused by spilling the pathogens out of the stump, reduced incidence of post-operational wound infections, improved cure of the intestines due to formation of granulicious tissues and collagen from the serosal layer of caecum.¹⁴⁻¹⁶Data apparently revealed that the patients in whom the stump wasligated and invaginated are more prone to get superficial surgical siteinfection (4/250 patients), but no statistical significance was revealedowing maybe to the small sample size of the study. Bull et al. showed the wound infection rate to be 18% without prophylactic use ofantibiotics. ¹⁹

Many health care providers thought that the wound infection rate could have been reduced by the use of prophylacticantibiotics, particularly metronidazole in cases of appendicitis.^{19,20}some reports^{21,22} claimed benefits while others²³ showed nodemonstrable beneficial effects. In a similar prospective series²⁴where no antibiotic was given, the incidence of wound infection was18.4 per cent and in contrast to 8.6 per cent in another identicalprospective series where a similar combination of antibiotics was given. The findings in this study as well as others^{24,27} suggest that

either simple ligation or stump invagination does not affect the rate of wound infection.

CONCLUSION

The study showed that direct binding to trans fastening of the stump is safe and simple. It does not deform the cave wall, as it may be mistaken for a cave-mass during invagination or serve as the point of reference for ileocecalintussusception. For treatment of appendicular stump, both procedures are equally safe and so simple binding can be recommended because they are much easier to do.

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