

# Comparison of Surgical Site Infection in Complicated Appendicitis: Primary Versus Delayed Closure

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## ABSTRACT

**Objective** To compare the rate of surgical wound infection following primary closure (PC) versus delayed primary closure (DPC) in cases of complicated appendicitis (CA) in adult patients.

**Study design** Experimental study.

**Place & Duration of study** Department of General Surgery Ward 26, Jinnah Postgraduate Medical Centre Karachi, from January 2016 to June 2016.

**Methodology** Sixty patients of acute complicated appendicitis between age 15 to 39 year of age were included in this study. These patients were randomly allocated into Group A (primary closure group) and Group B (delayed primary closure group) after informed and written consent. Postoperatively patients were followed till 3<sup>rd</sup> postoperative day and after discharge in outpatient department on weekly basis. Final outcome, the wound infection, was measured at the end of one month.

**Results** The mean age of the study subjects was 27.35±6.85 year. No significant difference was observed between group A and B (43.3% and 23.3% - p=0.10) in terms of wound infection.

**Conclusion** There was no difference in outcome in terms of wound infection following primary closure and delayed primary closure in patients who underwent appendectomy for complicated appendicitis.

**Key words** Appendectomy, Appendicitis, Primary surgical wound closure, Delayed primary wound closure.

## INTRODUCTION:

One of the important causes of abdominal pain leading to surgical intervention is acute appendicitis and appendectomy is by far the commonest surgical procedure done through emergency admissions worldwide.<sup>1,2</sup> About 400,000 patients undergo appendectomy per year in Pakistan.<sup>3</sup> Despite routine use of prophylactic antibiotics against aerobic and anaerobic organisms prescribed postoperatively wound infection remained important causes of morbidity after appendectomy.<sup>4-6</sup> Wound infection leads to significant morbidity and healthcare related

cost burden because of increased hospital stay, nursing care costs, drug treatment and dressings.<sup>5</sup>

The approach to closure (PC and DPC) has been thought to play a role in influencing postoperative surgical site infection. Although DPC has been shown to be superior to PC in dirty midline abdominal approach, in case of incision in complicated appendicitis, PC and DPC both are advocated.<sup>7</sup>

Traditionally wounds in complicated appendicitis were closed by DPC approach to diminish the probability of wound infection.<sup>8,9</sup> Many studies conducted later reported low rates of wound infection using PC, suggesting that this management may be safely used, however, there is still no consensus among surgical community for the optimum technique of wound closure and still there are contradictory reports about their usefulness.

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A study concluded that DPC is optimal management strategy for complicated appendicitis wounds. It showed a huge difference in rate of wound infection in PC versus DPC, though there were many concerns regarding study design. Two national studies have shown contradictory results. In one, there was significant difference in terms of wound infection rate between PC and DPC groups and other showed no significant difference.<sup>2,10</sup> These studies were weak in methodology, lacking inclusion and exclusion criteria and the surgical expertise available for closure of wound. Additionally wound infection was interpreted as presence of heavy purulent discharge at incision site, with or without bacterial growth. This subjective assessment created a non-uniform conclusion analysis. Despite all these objections the disparity in rate of infection between two groups was distinct. In many centers primary wound closure is still practiced. This study was conducted with the objective to compare the rate of wound infection between wounds closed by PC versus DPC.

**METHODOLOGY:**

This was a randomized controlled trial conducted in surgical unit III Ward 26, Jinnah Postgraduate Medical Centre Karachi, from January 2016 to June 2016. Patients with complex appendicitis (perforated, gangrenous, pus formation) between the ages of 15 year to 39 year, were enrolled in this study. There were total of 60 patients included in the study. Thirty-six patients were male and 24 female. Patients was selected from emergency room after informed and written consent were operated for acute appendicitis. All patients with diabetes mellitus, on steroids or immunosuppressant therapy, non-complicated appendicitis (only acutely inflamed appendix), peroperative alternate diagnosis and BMI >40, were excluded from the study. Approval of the study was obtained from IRB.

Patients were randomized into Group A (primary closure group) and Group B (delayed primary closure group) by using sealed envelope method.

After IV hydration and antibiotics use, surgery performed by year 4 resident. All patients were followed in the ward daily till 3<sup>rd</sup> postoperative day and after that in OPD on weekly basis. Wound infection was measured as per operational definition at the end of one month. Wound infection was considered as positive if there was presence of purulent or pus discharge from wound, pain (VAS >4 after day 3), localized swelling, redness, tenderness, and warmth on touch, up till 30 days of post intervention.

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The data collected was analyzed through SPSS version 19.0. Chi-square test was applied to compare the wound infection in both the groups and p <0.05 was taken as significant.

**RESULTS:**

Sixty diagnosed patients of complicated appendicitis were enrolled in this study. Age of patients ranged from 15 to 39 year with mean age of 27.35±6.85 year. There were 37 (61.7%) male and 23 (38.3%) female patients. Male to female ratio in group A was 1.7:1 and in group B 1.5:1

In this study, rate of surgical wound infection was 33.3% (20/60). No remarkable difference was noted between the two groups, A and B (43.3% versus 23.3%; p=0.100) as shown in table-I. Stratification with respect to age groups and gender yield no noticeable variation for rate of surgical wound infection between the two groups.

**DISCUSSION:**

Appendectomy remains the most frequent surgical procedure performed in emergency department all over the world.<sup>11,12</sup> Surgical site infection (SSI) is the commonest complication following appendectomy.<sup>13</sup> It is observed more in complicated appendicitis (gangrenous, and perforated

Wound Infection	Group A n=30	Group B n=30	p-value*
Yes	13 (43.3%)	7 (23.3%)	0.10
NO	17 (56.7%)	23 (76.7%)	

\*p-value computed by Chi-square test =2.70

appendicitis).<sup>14</sup> Many surgeons considered open wound management as standard, especially for perforated appendicitis.<sup>15</sup> In recent cost-conscious health care delivery system, there has been a trend towards primary closure of appendectomy wounds. Prolonged admission, readmission and increase use of antibiotics and nursing care are all among the factors contributing to economic burden on health care system.<sup>16,17</sup>

Multiple factors including patient related, surgical technique, environment and treatment contribute to postoperative SSIs.<sup>18,19</sup> Approach to incision and its management is a leading cause behind most of the SSIs.<sup>18</sup> Wound contamination is responsible for majority of SSIs.<sup>20</sup> In this study patients allocated into Group A and Group B randomly. Overall rate of surgical wound infection was 33.3%. Results were not different in both the groups. The results did not show any significant difference in SSI rates between the two groups. The results are also comparable to a study in which a wound infection rate of 24% was observed when the incision was closed primarily in perforated appendicitis.<sup>4</sup>

#### CONCLUSION:

There was no statistically significant difference in outcome in terms of wound infection following primary closure or delayed primary closure in patients with complicated appendicitis.

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