

# COMPARATIVE STUDY OF WOUND HEALING IN PRIMARY VERSUS DELAYED PRIMARY CLOSURE IN CONTAMINATED ABDOMINAL SURGERY

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## ABSTRACT

**Objective:** The purpose of this study to compare the two surgical techniques, primary and delayed primary closure in terms of post-operative wound complication in contaminated cases.

**Study Design:** Case control comparative study.

**Setting & Duration:** This study was carried out in Jinnah Postgraduate Medical Centre, Karachi from June 1999 to May 2001.

**Methodology:** This study includes 66 patients, 33 in each group having different pathological conditions above 12 years and below 65 years of age. Different methods of closure e.g. primary and delayed primary closure were applied to reduce wound complications. All patients admitted through emergency and received antibiotics. Regular dressing was done in case of delayed primary closure. Following results were planned at 1, 3 and 6 months.

**Results:** Frequency of wound infection in primary closure was 60% while 33% in delayed primary closure group. Frequency of wound dehiscence was 12% in primary while 6% delayed primary group similarly incisional hernia was found 10% and 6.2% respectively.

**Conclusion:** Delayed primary closure in laparotomy wound seems to be effective method of wound closure in laparotomy wound regarding less wound healing complications in emergency.

**KEY WORDS:** Contaminated Abdominal Surgery, Wound Infection, Delayed Primary Closure

## INTRODUCTION

Peritonitis remains the one of the surgical emergencies ever since. It should be deal properly and promptly otherwise wound related complications like wound infection, wound dehiscence, incisional hernia greatly increases the morbidity and mortality of surgical patients. The history of surgery is as old as mankind and wound infection has been a part of it ever since wounds are caused by accidents, warfare and surgical operation.<sup>1</sup>

Wound healing is inherent property of an organism to preserve with internal environment by maintaining and restoring the composition of its tissue.<sup>2</sup>

In case of abdominal surgery if the peritoneal cavity is grossly contaminated wound sepsis is inevitable.<sup>3</sup> Wound closure techniques are one of the factors responsible for poor or good outcome of surgical operations in contaminated emergency cases. In practice contaminated wound are closed by primary skin closure (usual abdominal closure) or by delayed primary closure.

Delayed primary closure was developed 200 years ago and it corresponds to the closure of skin and sub cutaneous tissue few days later. After operation on appearance of granulation tissue usually on 5th to 6th day. Rationale behind it lies on normal biological events of healing. If the wound is open for few days. The combination of events occurs that will greatly decrease the incidence of infection and also there is less chance of bacterial colonization.

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**METHODOLOGY**

This study was conducted in sixty six patients in Surgical Unit II, Department of Surgery, Jinnah Postgraduate Medical Centre, Karachi from June 1999 to May 2001. The patients were divided in two groups (33 in each group) on alternate basis. In each group different pathological entities like perforated appendicitis, duodenal and illeal perforations patient were include and consisted of 11 patients of each entity.

In order to prevent wound infection and processing wound healing smoothly different methods of closure e.g. primary and delayed primary closure were used. In group A primary skin closure technique was used while in group B the delayed primary closure was done. All cases were admitted through emergency. The incisions employed were either midline or grid-iron (later sometime converted to Rutherford Morrison Incision). Wounds were either contaminated or dirty and emergency laparotomy was performed. Antibiotics were given in all cases.

After facial closure wound were washed with normal saline. In those cases which were left for delayed primary closure, skin and sub cutaneous tissue were left unsutured and post-operatively wound first examined after 24 hours and than daily dressing with a thin layer of normal saline soaked gauze up to the appearance of granulation tissue (healing of the wound). The two superficial layers were closed on average of 5th post-operative day when granulation tissue appeared somewhat completely. Cultures were taken in both groups and given proper antibiotics according to the culture and sensitivity reports.

Wound infection was suspected if there were swelling, redness and the presence of pus, while wound dehiscence was suspected if there is pinkish serosanguinous discharge from the wound. Follow up visit of both groups were planned at 1, 3 and 6 months from the date of operation to monitor any evidence of incisional hernia.

***Inclusion Criteria***

Patients above 12 years of age of both sexes were included in this study all cases performed in emergency bases and include contaminated peritoneal cavity. Only patients with peritonitis having perforated hollow viscous like duodenal perforation, illial perforation and perforated appendix. All patients receiving I. V antibiotics included in this study.

***Exclusion Criteria***

Patients having known risk factors influencing wound healing (Anemia, Jaundice, Diabetes Mellitus, and

Steroid Therapy etc) were not included in the study. Similarly patient who died postoperatively and who did not come for follow up visits were also excluded from the study. Patients who did not received antibiotics also excluded from studies. Patients with history of traumatic injuries were also not included in this study. Patients over 65 and below 12 years of age were also excluded from the study.

**RESULTS**

This study initially included 74 patients, 38 in group A and 36 in group B but after discharge 5 patients did not come for regular follow up, hence were excluded from the study 2 from group B and 3 from group A . A total of 3 patients died post-operatively 2 from group A and 1 from group B therefore these patients were not included in study do finally a total number of 66 patients were included 33 in each group. The frequency according to the different diagnostic entities in Table I.

The frequency of wound infection in group A was 80% in perforated appendicitis, 70% in duodenal perforation and 60% in illeal perforation while in group B the incidence of would infection was 30% in perforate appendicitis, 31% in duodenal perforation and 50% in illeal perforation. The frequency of wound dehiscence was 10% in perforated appendix, 15.39% in duodenal perforation and 10% in illeal perforation in group A while in group B it was 0%, 7.69% and 10% respectively. The prevalence of incisional hernia was 10% in perforated appendix, 7.69% in duodenal perforation and 20% in illeal perforation in group A while it was 0%, 7.69% and 10% in group B respectively. 12% as a whole in group A while 9% as a whole in group B, likewise incisional hernial incidence was same as wound dehiscence in both groups.

That there is no clear-cut difference on the basis of sex in terms of wound complications in two groups. Finally the statistical test applied to show the significant value (p-value). The difference between the two groups is statistically significant with p-value (0.02) in terms of wound infection. The other complications like wound dehiscence; incisional hernia found to be statistically insignificant between the two groups.

**DISCUSSION**

Smooth and uneventful healing in peritonitis has a prime importance because most often wounds are dirty or contaminated in these cases. Wound infection remains a prime cause of wound failure in most of the cases. It is also associated with some other complications like wound dehiscence and incisional hernia etc. In this

current study it appeared that incidence of delayed wound healing e.g. complications in primary wound closure was over all 67% and in delayed primary closure 37% over all shows statically significant result with p-value less than 0.05.

Results of this study are comparable to some international and local studies. Cohen<sup>4</sup> concluded that infection rate 12% in delayed primary closure while 48% in primary closure group. Similarly Smilanch<sup>5</sup> showed infection rate 27% in primary while 3% in delayed primary closure group. In Bender<sup>6</sup> study infections in delayed primary closure group was 2.8% only. In another study done by Bradford<sup>7</sup> noted wound infection only in 2 patients in delayed primary closure group. Similarly study done by Urssir<sup>8</sup> showed 30.2% prevalence of infection rate in delayed primary closure while only 2.1% in primary skin closure group. Unlike this study in which 60% infection rate was found in primary while 33% in delayed primary closure group with over all growth of 49%. This study is also in contrast to the findings of 10-20% infection rate reported in various studies like Woods<sup>9</sup>, Kumzawa<sup>10</sup> and Cruis<sup>11</sup> previously.

Among the local studies Sajid<sup>12</sup> study shows infection rate of 55.17% in primary skin closure while only 15.38% in delayed primary skin closure group. In another study done by Iqbal<sup>13</sup> also noted the incidence of (66.66%) in primary skin closure group as compared to the delayed primary closure (26.66%). These findings are very much consistent with current findings showing reduce incidence of wound infection in delayed primary group. Regarding wound dehiscence Mohammad Iqbal noted the incidence of 6.66% in primary skin closure while 0% in delayed primary closure while in this study 12% in primary closure while 6% in delayed primary closure group. In another study done by Saqib<sup>14</sup> wound dehiscence was found in about 13% of typhoid perforations. Waqar<sup>15</sup> study shows wound dehiscence in 5.9% of cases of peritonitis.

Incisional Hernia remains a serious problem after laparotomy. In Sittu<sup>16</sup> study rate of incisional hernia was 1% while in this study it was 10% in primary 6.2% in delayed primary closure. In a study by Mingoli<sup>17</sup> incisional hernia was higher in Emergency than elective surgery.

## CONCLUSION

Delayed primary closure is a better approach in abdominal closure in contaminated abdominal surgery in emergency setting. It has continuously showing better results over primary skin closure in terms of post-operative complications like wound infection, wound dehiscence, incisional hernia and stitch abscess.

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