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Post-operative complications after mass closure of abdomen - a study of 150 patients: a case study

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ABSTRACT
The objective of the study is to study post-operative complications after one layer closure of abdomen. This is a retrospective study in the Department of General Surgery, Shadan Institute of Medical Sciences and Research Centre, Hyderabad, from December 2010 to December 2013. Patients above the age of 10 years, of both the sexes requiring laparotomy in emergency or elective were studied and followed. In this study of 150 cases of laparotomy with upper and lower midline and subcostal incisions were closed with mass closure technique using no 1 prolene and no 1 vicryl. Continuous suturing was done to close linea alba and muscles. The post-operative complications like burst abdomen, incisional hernia, wound infection, wound dehiscence, pain abdomen, re-exploration, keloid formation, hypertrophied scar, stitch granuloma, fecal fistula were studied. Mass closure of the abdomen with non-absorbable suture material seems to be a better technique because the wound can be closed rapidly, conveniently, and if required re-exploration becomes easier, and the post-operative complications are minimum compared to the multilayered closure of abdomen compared with standard studies.

Keywords: Mass closure, Single layer closure, Post-operative complications.

1. INTRODUCTION
Exploration and re-exploration of the abdomen is a common occurrence in surgical practice. While performing laparotomy, the surgeon should keep in mind that the incision chosen should have good accessibility, extensibility,
security and an acceptable scar with minimum post-operative complications. Factors other than mechanical ones like obesity, recurrent surgery, infected wound, uraemia, renal failure, sepsis, jaundice should alert the surgeon to be meticulous (Stanley et al. 1951). The standard practice of closure of laparotomy wounds was a multi-layered closure with chromic catgut has compelled the surgeon to go for non-absorbable sutures. The incidence of dehiscence rapidly decreased from 1941, Jones et al. used mass closure with figure of 8 with stainless steel wire stitches. A single layer closure of abdominal wound with non-absorbable suture was advised by John H. Shephard (John H Shephard, 1983). Over the years, the method of mass closure with non-absorbable suture material has gained popularity because of minimum discomfort, good patient compliance and the low rate of complications. Mass closure permits easy closure of abdominal wound even in the presence of distension. It is safer in debilitated patients, since the tissues will not hold any suture unless one takes the advantage of bulk (Sharma et al. 1986).

2. MATERIAL AND METHODS
The present study was conducted in the Department of General Surgery, Shadan Institute of Medical Sciences and Research Centre, Hyderabad, between December 2010 to December 2013. A total of 150 patients above the age group of 10 years, of both the sexes requiring laparotomy in emergency or electively were studied including gynaecological cases. The aim of the study was to know the incidence of immediate and late post operative complications of mass closure of abdomen like the incidence of incisional hernia, wound infection, fecal fistula hypertrophied scar, stitch granuloma, keloid, intestinal obstruction, pain abdomen or death.

3. TECHNIQUE
In all the cases, abdominal wound was closed in one layer (mass closure) with no 1 prolene and no 1 vicryl. In all the cases, sutures were continuous and every third suture was locked and in those cases where prolene was used, the first and the last knots were buried. The bites were taken at a distance of 2–2.5cms from the wound margin and a distance of about 1–1.5cms in between the sutures was maintained. The sutures were kept just firm. The peritoneum was closed along with linea alba. No separate sutures were taken. The length of the suture to the wound length was maintained in a proportion of 2:1 to 3:1 (kendall et al. 1991). The types of incisions in the study were upper, lower midline and right subcostal incision. The transverse and para-medial incisions were excluded from the study. Sutures were removed on 10th to 12th post operative day and the patients were followed up for a varying period, twice monthly basis for the first 3 months and 2 monthly basis thereafter for a maximum period of 2 years. The patients were evaluated for immediate and late post-operative complications.

4. RESULT AND ANALYSIS
No of cases- 150 (Table 1 to 4)
Laparotomy- midline incision for emergency and elective- 77
Cholecystectomy- right subcostal incision- 72
Gynaecological emergencies (ectopic) - lower midline incision- 1
Percentage of complications: (22%)
Incisional hernia- 6.6%
Wound infection with gaping followed by secondary suturing- 10%
Hypertrophied scar- 3.3%
Keloid- 2%
Burst abdomen- Nil
Re-exploration- Nil
Stitch granuloma- Nil
Fecal fistula – Nil

Patients died- 1 (53 year old lady with intestinal obstruction and an old case of incisional hernia. Laparotomy was done, multiple resections and anastomoses were done in the small bowel and a segment of about 60 cms of intestine was resected. Patient was alright up to 10th post operative day and suddenly she developed chest pain and died because of massive myocardial infarction).

5. DISCUSSION
In a study of 150 cases of laparotomy with 78 midline and 72 right subcostal incisions. Patients were observed and followed up from December 2010 to December 2013 for a maximum period of 3 yrs at shadan institute of medical sciences and research centre. In our study of mass closure of abdominal wound with non absorbable and delayed absorbable suture material, we have observed this technique was easier and fast with short duration of anaesthesia.
Table 1  
Incisional Hernia (10 patients)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Patient Name</th>
<th>Risk Factors</th>
<th>Age/sex</th>
<th>Date of surgery</th>
<th>Disease</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chithi Babu</td>
<td>Anaemia</td>
<td>26/M</td>
<td>10-04-2010</td>
<td>haemorrhagic pancreatitis</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>2</td>
<td>Shankariyah</td>
<td>Malignancy Jaundice COPD</td>
<td>75/M</td>
<td>25-05-2010</td>
<td>Obstructive Jaundice(Ca pancreas)</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>3</td>
<td>Fareed</td>
<td>Peritonitis</td>
<td>20/M</td>
<td>08-02-2012</td>
<td>Intestinal obstruction</td>
<td>Choledochojejunostomy</td>
</tr>
<tr>
<td>4</td>
<td>Mumtaz Begum</td>
<td>Obesity Multiple Adhesions</td>
<td>40/F</td>
<td>10-02-2012</td>
<td>Recurrent Incisional Hernia</td>
<td>Hernial repair</td>
</tr>
<tr>
<td>5</td>
<td>Laxman</td>
<td>Anaemia</td>
<td>58/M</td>
<td>26-11-2012</td>
<td>Chronic Pancreatits</td>
<td>Laparotomy (cytostagastrostomy)</td>
</tr>
<tr>
<td>6</td>
<td>Srinivas</td>
<td>Septicemia</td>
<td>65/M</td>
<td>21-04-2013</td>
<td>Acute appendicitis with peritonitis</td>
<td>Laparotomy + colonic resection</td>
</tr>
<tr>
<td>7</td>
<td>Chandrashekar</td>
<td>Malnutrition and Anaemia</td>
<td>42/M</td>
<td>15-05-2013</td>
<td>Hiatus hernia</td>
<td>Fundoplication + Gastrojejunostomy</td>
</tr>
<tr>
<td>8</td>
<td>M.D. Khan</td>
<td>Peritonitis</td>
<td>56/M</td>
<td>06-07-2013</td>
<td>Perforation with peritonitis</td>
<td>Exploratory Laparotomy</td>
</tr>
<tr>
<td>9</td>
<td>Anil</td>
<td>Fever with cough</td>
<td>14/M</td>
<td>19-09-2013</td>
<td>Intestinal obstruction (sub umbilical mass)</td>
<td>Exploratory Laparotomy</td>
</tr>
<tr>
<td>10</td>
<td>Yousuf</td>
<td>Fecal peritonitis</td>
<td>25/M</td>
<td>25-10-2013</td>
<td>Appendicitis with perforation and fecal peritonitis</td>
<td>Laparotomy</td>
</tr>
</tbody>
</table>

Table 2  
Wound Infection (15 patients)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Patient Name</th>
<th>Risk Factors</th>
<th>Age/sex</th>
<th>Date of surgery</th>
<th>Disease</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anjamma</td>
<td>Peritonitis</td>
<td>45/F</td>
<td>22-06-2011</td>
<td>Peritonitis</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>2</td>
<td>Abida Begum</td>
<td>Anaemia</td>
<td>45/F</td>
<td>27-08-2011</td>
<td>Transverse colonic mass</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>3</td>
<td>Abdul Khader</td>
<td>Malnutrition and Anaemia</td>
<td>35/M</td>
<td>07-11-2011</td>
<td>Bilious gastritis + hiatus hernia</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>4</td>
<td>Bheemla</td>
<td>Peritonitis</td>
<td>65/M</td>
<td>15-11-2011</td>
<td>Subacute intestinal obstruction</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>5</td>
<td>Md. Sultan</td>
<td>Chemical peritonitis Jaundice</td>
<td>30/M</td>
<td>27-12-2011</td>
<td>Duodenal Perforation + Subacute intestinal obstruction</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>6</td>
<td>Tasleem Begum</td>
<td>Anaemia</td>
<td>25/F</td>
<td>11-01-2012</td>
<td>Adenoma of right lobe of liver</td>
<td>Laparotomy (exploration and liver resection)</td>
</tr>
<tr>
<td>7</td>
<td>Fareed</td>
<td>Jaundice Pancreatitis</td>
<td>20/M</td>
<td>08-02-2012</td>
<td>Intestinal obstruction</td>
<td>Choledochojejunostomy</td>
</tr>
<tr>
<td>8</td>
<td>Chandramma</td>
<td>Anaemia</td>
<td>70/F</td>
<td>05-06-2012</td>
<td>Cholecystitis</td>
<td>Cholecystectomy</td>
</tr>
<tr>
<td>9</td>
<td>Swathi</td>
<td>Anaemia</td>
<td>38/F</td>
<td>23-06-2012</td>
<td>Intestinal obstruction</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>10</td>
<td>Sk. Azeem</td>
<td>COPD Anaemia</td>
<td>70/M</td>
<td>31-01-2013</td>
<td>Perforated appendix</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>11</td>
<td>Chandrashekar</td>
<td>Anaemia</td>
<td>42/M</td>
<td>15-05-2013</td>
<td>Hiatus hernia</td>
<td>Gastrojejunostomy + fundoplication</td>
</tr>
<tr>
<td>12</td>
<td>Venkatiah</td>
<td>Infected wound</td>
<td>40/M</td>
<td>11-06-2013</td>
<td>Stab injury</td>
<td>Exploratory laparotomy</td>
</tr>
<tr>
<td>13</td>
<td>Anil</td>
<td>Umbilical discharge</td>
<td>14/M</td>
<td>19-09-2013</td>
<td>Intestinal obstruction (Sub umbilical mass)</td>
<td>Exploratory Laparotomy</td>
</tr>
<tr>
<td>14</td>
<td>Yousuf</td>
<td>Peritonitis</td>
<td>25/M</td>
<td>25-10-2013</td>
<td>Appendicitis with fecal peritonitis</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>15</td>
<td>Affan khan</td>
<td>Chronic malaria</td>
<td>16/M</td>
<td>04-11-2013</td>
<td>Splenomegaly</td>
<td>Splenectomy</td>
</tr>
</tbody>
</table>
and operating time with decreased incidence of complications even in emergency and elective cases (Pollock, 1979; Ellis, 1965 & 1985; Herman et al. 1974; Donaldson Hal, 1982; Jenkins, 1976).

In our study of 150 cases we had incidence of 6.6 (10 patients) percent of incisional hernia of total cases. Surgical wound infection with gaping of the skin was seen in 10 (15 patients) percent of the cases. Hypertrophied scar and keloids were seen in 3.3 percent and 2 percent respectively. One patient died of myocardial infarction on 10th post op day. No cases of burst abdomen were observed in our study. Other complications of surgery like fecal fistula, stitch granuloma and reexploration were not noted.

6. CONCLUSION
Mass closure of abdominal incision with non absorbable (prolene) and delayed absorbable (vicryl) suture material;
1. Abdominal wall can be closed easily and rapidly as the peritoneum is not closed separately, even when the contents are under tension. Closure is very secure even in debilitated and cachexic patients.
2. Mass closure gives a better acceptable scar with minimum complications and also saves the time, lessens duration of anaesthesia especially in severely ill patients.
3. If second laparotomy is necessary shortly after the first one, wound can be rapidly opened.
4. It is associated with a lower incidence of wound infection, burst abdomen and incisional hernia, than with layered closure of abdomen.
5. In mass closure of a deep bite of tissues is taken which provides more cushioning effect and hence, less strangulation of tissues.
6. Mass closure is a better technique in better age group.
7. Mass closure then holds the promise for a safe technique of closure and minimal complications, its gaining wider acceptance and is definitely a better technique.

REFERENCES
8. Pollock AV. wound breakdown results from failure of technique. British Journal of Medicine, 1979, 72, 889