ORIGINAL ARTICLE

Use of the "bogota bag" for closure of open abdominal wound after exploratory laparotomy — our experience at Mayo Hospital Lahore

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Abstract

Objective: To assess the efficacy of Bogota bag for closure of open abdominal wounds after laparotomy where the primary closure cannot be achieved and other closure techniques are not available.

Methods: The descriptive study was conducted at Mayo Hospital, Lahore, Pakistan, from September 2011 to February2015, and comprised patients who underwent laparotomy and peritoneal cavities and who could not be closed primarily because of various reasons like traumatic loss and oedematous gut. They were managed with Bogota bag for abdominal closure. SPSS 18 was used for statistical analysis.

Results: Of the 55 patients, 37(67.27%) were male and 18(32.73%) were female. There was traumatic loss in 34(61.8%), oedematous gut and omentum in 15(27.27%) and gangrenous abdominal wall in 6(10.9%) patients. Bogota bag was applied in all (100%) of them. In 19(34.55%) patients, delayed primary closure was possible, so the Bogota was used temporarily. In 36(65.45%) cases managed with Bogota bag, healing occurred by granulation tissue or skin grafting/flaps were applied and these patients developed hernia. Five (9.09%) patients developed small bowel fistula which was managed conservatively. No patient developed complication due to exposure or abdominal compartment. There were 7(12.8%) postoperative deaths due to the disease process and were unrelated to the closure technique.

Conclusion: Bogota bag was an effective means of closure of open abdominal wound and prevented the complications due to open abdominal wounds or closure under tension.

Keywords: Open abdominal wound, Bogota bag, Closure technique, Complications. (JPMA 66: 980; 2016)

Introduction

Exploratory laparotomy is done for various reasons with closure of the wound being the primary aim after completion of the procedure. Sometimes this closure is either not possible at all or can be achieved by closure under tension. This open abdominal wound can be due to traumatic loss of abdominal wall and oedematous intestine and omentum due to peritonitis. This leads to gaping and open abdominal wound. Damage control surgery is one of the reasons for leaving an abdomen open initially.[1] The abdominal wall defect can be due to leaving an abdominal incision open at the completion of surgery or by re-opening the abdomen for the reason of abdominal compartment syndrome.[2] Open abdomen exposes the viscera and leads to fluid, electrolyte and temperature loss, which can be reduced with temporary abdominal closure techniques until the abdomen can be closed secondarily, or graft/flap coverage provided.[3]

The open abdomen presents numerous management challenges for the surgeons, particularly in patients with traumatic injuries and those with intra-abdominal sepsis.[4]

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The problems associated with open wounds are prolapse and evisceration, injuries to the viscera, fluid and electrolytes and temperature loss etc. On the other hand if closure is under tension, it can lead to abdominal compartment syndrome, i.e. respiratory and cardiovascular problems, more pain, wound dehiscence and hernia. The complications can be prevented or minimised by understanding of the pathophysiology, prevention of abdominal sepsis and tissue loss, facilitation of re-explorations (if required), control of the inflammatory response and proper surgical technique.[4]

There are various closure techniques in open abdomen like only skin closure, Bogota bag, mesh closure, vacuum-assisted closure, component separation fascial closure and local flaps, Wittmann patch, Zipper closure, human amniotic membrane, artificial bur and dynamic retention sutures.[5] Of these techniques, the Bogota bag, first used in Columbia, is in practice for more than 20 years. The advantages of the Bogota bag include easy preparation from urology bag/blood transfusion bag, low cost, non-adherence to the exposed tissues, prevention of evisceration, ease of application, and wide availability.[6,7] Bogota bag can easily be applied by any surgeon at the end of procedure. This is useful for preventing the complications and saving the life of patients when other

options are not available. We are unaware of any study exploring the indications, use and complications of the Bogota bag in Pakistan. Therefore, we explored the utility of this technique in our setup for closure of open abdominal wounds among patients presenting at a tertiary care centre.

Patients and Methods

The descriptive case series was conducted in East and South surgical units of Mayo Hospital, Lahore, Pakistan, from September 2011 to February 2015, and comprised patients of either gender in whom laparotomy had to be performed and their peritoneal cavities could not be closed primarily because of various reasons. They were managed with Bogota bag as abdominal wound closure technique. Patients upto 12 years were excluded as they are managed in paediatric surgery section. Non-probability purposive sampling technique was used. The patients included had presented directly to the surgical emergency or had been referred by other hospitals. They were having abdominal wall defect due to traumatic loss or peritonitis and abdominal wall sepsis/necrosis. Clinical assessment was made and relevant investigations were done. After making diagnosis, initial resuscitation and management, these patients were shifted to the operation theatre. In all the cases, exploratory laparotomy was done and the primary problem was dealt with and the abdomen was left open either to prevent abdominal compartment syndrome or due to inadequate tissue to approximate the defect. Blood transfusion bag was used as Bogota bag. The Bogota bag was sutured to the surgical wound margins using interrupted stitches. Depending upon the condition, the patients were managed postoperatively as per routine. Later, in some patients, after the distension and oedema had settled and patients were stable haemodynamically, abdominal closure was done. In the remaining patients there was healing by secondary intention or they were managed by local flaps or skin graft after the development of granulation. All these patients were observed for evisceration and prolapse, intestinal fistula, wound infection, compartment syndrome, burst abdomen and hernia. Data was analysed using SPSS 18.

Results

Of the 55 patients, 37(67.27%) were male and 18(32.73%) were female (Table-1). Exploratory laparotomy was done for abdominal trauma in 38(69%), for peritonitis in 10(18%) and for maliganancy in 7(12.7%) patients (Table-2).There was traumatic loss in 34(61.8%), oedematous gut and omentum in 15(27.27%) and gangrenous abdominal wall in 6(10.9%) patients (Table-3). Bogota bag was

Table-1: Gender distribution.

Sr. No.	Gender	No	Percentage
1.	Male	37	67.27%
2.	Female	18	32.73%
	Total	55	100

Table-2: Indications for laparotomy.

Sr. No.	Gender	No	Percentage
1.	Trauma	38	69%
2.	Peritonitis	10	18.2%
3.	Malignancy	7	12.8%

Table-3: Reasons for being unable to close laparotomy wound.

Sr. No.	Gender	No	Percentage
1.	Traumatic loss of abdominal wall	34	61.8%
2.	Inflammatory oedema of gut and omentum	15	27.27%
3.	Gangrenous abdominal wall	6	10.9%

Table-4: Outcome of Bogota bag (in terms of complications).

Sr. No.	Gender	No	Percentage
1.	Fistula	5	8.47%
2.	Hernia	36	61.02%
3.	Wound infection	4	6.77%
4.	Re-application of Bogota	6	10.17%
5.	Mortality	7	11.87%
6.	Evisceration	1	1.69%
7.	Visceral Injury	Nil	00
8.	Abdominal Compartment	Nil	00
9.	Burst abdomen	Nil	00
10.	Temperature and fluid/Electrolyte problems	Nil	00

Figure: A patient with Bogota bag after laparotomy for peritonitis.

applied in all (100%) of them. In 19(34.55%) patients, delayed primary closure was possible, so the Bogota was used temporarily. In 36(65.45%) cases managed with Bogota bag, healing occurred by granulation tissue or skin grafting/flaps were applied and these patients developed hernia (Table-4). Five (9.09%) patients developed small bowel fistula which was managed conservatively. No patient developed complication due to exposure or abdominal compartment. There were 7(12.8%) postoperative deaths due to the disease process and were unrelated to the closure technique. The hospital stay ranged from 23 to 58 days.

Discussion

There is no substitute for the abdominal wall regarding laparotomy wound closure. It allows the natural healing to go on and prevents all the problems of exposure and closure under tension. In case of open/gaping abdominal wound, either due to traumatic loss or intra-abdominal sepsis, the issue of primary abdominal closure always remains. Sometimes this may not be possible at all or may result in abdominal compartment syndrome if done under tension.[8] The available techniques for these wounds closure include only skin closure, Bogota bag, mesh closure, vacuum-assisted closure, component separation fascial closure and local flaps, Wittmann patch, Zipper closure, human amniotic membrane, dynamic retention sutures.[5] These techniques aim at preventing the abdominal contents from the problems due to exposure and abdominal compartment. Bogota bags are used for abdominal closure of open laparotomy wound or for release of abdominal compartment syndrome (Figure). After placement of the Bogota bag, serial operative closures may be required to return abdominal contents to their original location before definitive closure.[9] The Bogota bag technique is a reliable method for closure of open abdominal wounds. The Bogota bag can be made from a sterilised 3-litre urology bag or blood transfusion bag that is cut into an oval shape and sutured to the skin. The advantages of the Bogota bag include low cost, availability, smooth and non-adherent inner surface, ease of application in the operating room, and change/reapplication later on.[6,10] Local flaps can be used for closure and have lower rates of hernia when reinforced with a mesh compared to Bogota.[7,11]

Various studies have been conducted on the management options of midline defect in abdominal wound dehiscence. One study concluded that the Bogota bag is a useful technique and is the preferred closure system to prevent or treat abdominal compartment syndrome. The high mortality rates described are due to the underlying diseases leading to open abdominal closure and not directly to the Bogota bag technique itself.[12] Similarly, one study explained that early temporary closure of the abdominal wall using Bogota bag in patients with abdominal sepsis and planned re-explorations is simple, safe, inexpensive, and effective. This temporary abdominal cover provides good exposure of abdominal content between re-explorations and may prevent fistula formation.[13]

A study on separation of anatomical components techniques for the reconstruction of midline abdominal defect showed that the operation is an effective method for autogenous reconstruction of massive midline abdominal wall defects. It can be used either as a primary mode of defect closure or to treat the complications of trauma, surgery or various diseases.[14] Both of these can be opted for if the abdominal wall defect is small because of the limitations of local available tissue, needs expertise and have few limitations, while Bogota bag does not have these problems and can be used by the operating surgeon.

In our study, the problems due to exposure and evisceration, burst abdomen and abdominal compartment syndrome did not occur in any patient. A study on 12 patients with Bogota bag showed that no patient developed abdominal compartment, fistulae or abscess formation.[12] In our study, some of the patients had development of small gut fistulae due to disease process and all of these settled with conservative management by parenteral nutrition. Wound infection occurred in 7.27% of cases and no patient had intra-abdominal abscess formation which is similar to their results. Their survival rate was 41.6%,[12] while in our study it was 87.2%.The most common complication (65.45%) was ventral hernia. This was due to larger defects and though difficult it could be managed by mesh herioplasty later. Important is that the life of patient and serious complications of exposure and closure under tension could be prevented. A study has shown 67% hernia rate after mesh closure of abdominal wall defect.[15] These results are comparable to our study. Moreover, 7.1% of their patients developed fistulae, while in our patients it was 9.1%.

Conclusion

Bogota bag is an effective and useful means of closure of open abdominal wound to prevent the complications due to exposure of visceras i.e. evisceration, injury, loss of fluids and temperature and complications secondary to wound closure under tension.

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Conflict of Interest: No.

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