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General Surgery

MODIFIED TECHNIQUE OF BOGOTA BAG APPLICATION IN DIFFICULT ABDOMINAL CLOSURE

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ABSTRACT Early temporary closure of the abdominal wall using Bogota Bag in patients with abdominal sepsis and planned re-exploration is simple, safe, inexpensive and effective. This temporary abdominal cover provides good exposure of abdominal content between re-exploration and may prevent fistula formation. The development and subsequent repair of large hernias constitute one of the difficult post-operative problems.

Use of Bogota Bag is very helpful, particularly in peripheral hospitals in India where enough facilities are not available. These bags can be used and patients can be referred to higher centers, thus saving the life.

In our study, we observed the utility and efficacy of this technique in our setup for closure of open abdominal wounds and concluded that Bogota Bag is a useful technique and is the preferred closure system to prevent or treat abdominal compartment syndrome.

KEYWORDS : Open abdominal wound, Bogata bag

INTRODUCTION

Post laparotomy abdominal wound dehiscence, difficult or impossible abdominal closure in primary laparotomy sometimes becomes a difficult situation to a surgeon. This open abdominal wound could be due to traumatic loss of abdominal wall & edematous intestine and omentum due to peritonitis. This leads to gaping of abdominal wound. Damage control surgery is one of the reasons for leaving an abdomen open initially. Abdominal wall defect can be due to leaving an abdominal incision open at the completion of surgery or by re-opening the abdomen for abdominal compartment syndrome.

The problems associated with open wounds are prolapse and evisceration, injuries to the viscera, fluids & electrolytes and temperature loss etc. If closure is under tension, it can lead to abdominal compartment syndrome.

Various methods of surgical repair have been described including mesh repair, vacuum pack, placing tension sutures, closing only the skin and Bogota bag repair.[1] Of these techniques, Bogota Bags is found to be most safe, easy, simple, inexpensive and effective. It was first used by Oswaldo Borraez as a resident in Bogota, Colombia.[2]

Bogota Bag is generally a sterile plastic urobag that is sewn to the skin or fascia of the anterior abdominal wall.[2] Temporary abdominal closure techniques are used to postpone definite closure until predisposing factors causing pathological elevation of intra-abdominal pressure are resolved. It acts as a hermetic barrier that avoids evisceration and loss of fluids; it reduces intra-abdominal pressure to restore systemic perfusion. Another advantage of Bogota Bag is that the abdominal contents can be visually inspected, which is particularly useful in cases of ischemic bowel.[2]

OBJECTIVE

To assess the efficacy of Bogota Bag for temporary closure of abdominal wound after laparotomy.

REVIEW OF LITERATURE

N. Sukumar et al on their case report on Bogota bag usage concluded that open abdominal technique and use of damage-control staged laparotomy, with application of Bogota bag offers relatively safe and acceptable means of managing abdominal wound dehiscence.[1]

Brox- Jimenez et al used Bogota Bag temporarily for closure of abdomen in 12 pts., no complications occurred in relation to placement or withdrawal of Bogota Bag. There were no fistulas or no intra-abdominal abscess. Mean hospital stay recorded was 46 days.[3]

Boris Krishtein, Ariel Shapira and others used Bogota Bag Technique for abdominal closure primarily in the management of injuries. Abdominal closure using Bogota Bag was viewed retrospectively in 152 patients with secondary peritonitis of which 79 patients had complications of abdominal trauma and 2 were cases of mesenteric events. Bogota Bag was kept in situ for 1-19 days. 9 patients had intestinal fistula, 76% of patients were saved using Bogota Bag.[4]

Qian Huang, Jieshon Li, Wan-Yee Lau in their study concluded that of various techniques, use of Bogota Bag may be particularly useful for surgeons who encounter severe abdominal trauma in small rural hospitals, where lifesaving interventions such as control of bleeding needs to be preferred immediately and rapidly before patients are transferred to higher center for definitive treatment.[5]

Carlosa Manterola et al in their study concluded that, open abdomen with Bogota Bag is associated with a high rate of hospital morbidity and delayed complications. On evaluating a prospective series of 86 patients who underwent re-laparotomy, found that with the most frequent indication of contained laparotomy(CL) being intra-abdominal sepsis(60%), the primary fascial closure rate was 39% and in-hospital mortality rate was 12%. 60% of patients develop ventral hernia within a follow up of 48 months.[6]

A study by Yar Muhammed, Khalid Masood Gondal, and Umar Ahmed Khan concluded that Bogota Bag was effective means of closure of open abdominal wound and prevented the complications due to open abdominal wound or closure under tension. Of the 55 patients, there was traumatic loss in 34, edematous gut and omentum in 15 and gangrenous abdominal wall in 6 patients. In 19 patients, delayed primary closure was possible. In 36 patients, healing occurred by granulation tissue or skin grafting/flaps were applied and these patients developed hernia. 5 patients developed small bowel fistula. No patient developed complications due to exposure or abdominal compartment. There were 7 post-operative deaths due to the disease process and were unrelated to the closure techniques.[7]

MATERIAL AND METHOD

Bogota Bag is a simple plastic bag (urinary irrigation bag), which is easily available, placed and transfixed over the abdominal defect, then sutured to the wound edge or fascial edge.

This is a retrospective study and we studied 19 cases of wound dehiscence admitted in our hospital of Teerthanker Mahaveer University, Uttar Pradesh between January 2015 to July 2016 and were managed with Bogota Bag for abdominal closure.

Of these 19 patients- In 2 cases Bogota Bag was applied in primary closure, where one was very obese and other was very emaciated and hypoproteinemic. Laparotomy was done in these patients but closure was not possible. In rest 17 cases, Bogota Bag was used for secondary closure.

In both groups, Bogota Bag remained in situ for 7-14 days. When the general conditions improved and after the resolution of infection secondary repair was done.

In 9 cases resolution of abdominal sepsis permitted secondary closure within 10 days, in 3 cases on the 12th day and in rest it was delayed up to 14 days.

2 patients developed faecal fistula on the 7th and 9th day of Bogota Bag application. The site and cause of fistula was adhesion of small bowel loop with the margin of the wound.

MODIFIED TECHNIQUE

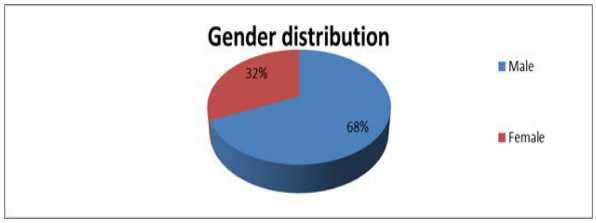
We modified the application of bag in 6 patients to avoid complication like adhesion of intestinal loops and fistula formation at the margins. We expanded and spread the plastic sheath about 4-5 cm beyond the skin margin. Fixation of the bag was similar to the other group. Our observation was, that no adhesions and fistula formation was there in these patients and we could avoid these complications.

RESULTS

Of the 19 patients 13 (68%) were male and 6 (32%) were female.

Table 1- Gender Distribution

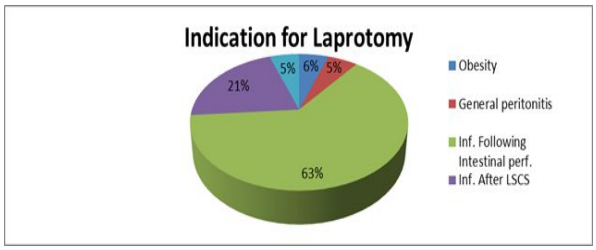
S. No.	Gender	No. of patients	Percentage
1	Male	13	68%
2	Female	6	32%
	Total	19	100%



- **Cause of Exploratory Laparotomy in these patients was -**

Table 2- Indications for Laparotomy

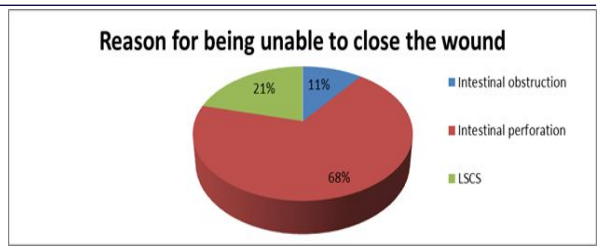
S. No.	Indication	No. of patients	Percentage
1	Obesity	1	5%
2	General	1	5%
3	Infection following intestinal perforation	12	63%
4	Infection after LSCS	4	22%
5	Ca. Ascending colon	1	5%



1. Reasons for being unable to close Laparotomy wound in these patients.

Table 3- Reason for being unable to close Laparotomy wound

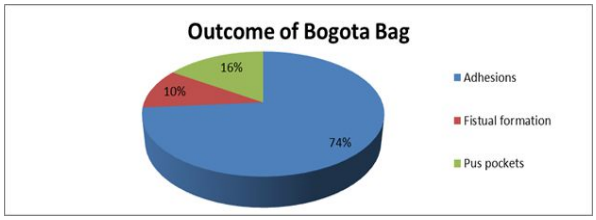
S.No.	Reason	No. of patients	Percentage
1	Intestinal obstruction	2	11%
2	Intestinal perforation	13	67%
3	LSCS	4	22%



- **Outcome of Bogota Bag-**

Table 4- Observation of outcome of Bogota Bag

S. No.	Complication	No. of patients	Percentage
1	Adhesions	14	72%
2	Fistula formation	2	11%
3	Pus pockets	3	17%



DISCUSSION

Various available techniques for wound closure includes only skin closure, Bogota Bag, mesh closure, vacuum associated closure, component separation facial closure and local flaps, Wittmann patch, zipper closure, human amniotic membrane, dynamic retention sutures, KCI VAC or ABThera dressings.[2]Evan Roden, Benninger and others describe the use of Bogota Bag as a new modified temporary abdominal closure.[8]

Mesh repair has been reported to have higher complication rates of up to 80% with about 23% incidence of enteric fistula . Using absorbable mesh and interposing omentum between bowel and mesh lessens this complication.[1]Vacuum pack dressing is gaining popularity due to ease of dressing and success rates. A sterile sponge dressing is placed over the defect and covered with vacuum bag and then continuous suture is applied. These wounds can be grafted with superficial skin graft or may be allowed to close by secondary intentions.[1]The above technique will definitely lead to incisional hernia that can be repaired much later. However, the major problems with this technique are dense adhesions of intestine to wound edges and abdominal wall which leads to difficult and delayed primary repair and iatrogenic fistula.[1]Use of Bogota Bag prevents musculo aponeurotic necrosis and allows free expansion of abdominal viscera, thus preventing abdominal compartment syndrome. It allows direct visualization of intestines beneath the bag.[1]This temporary method of Dressing facilitates planned re-opening for definitive closure.

We modified the application of bag in 6 patients to avoid complications by expanding the plastic sheath beyond the margin, about 2" inside the incision margin. In our observation there was no bowel loop adhesions and fistula formation. On attempting to mobilize bowel from the wound margins lead to injuries in our 2 cases, thus a larger size of bag was used beyond the wound margins. Hence, we could prevent this complication in all 6 cases by using this modified technique. Similar attempts were made by Paran et al.[9] they also reported that to solve problem of lateral retraction of the wound edge, they applied intravenous tubes as sutures through all layers of abdominal wall and tightened it gradually over days at bed side, as edema subsided. Thus by approximating the wound edge slowly they were able to achieve primary fascial closure.

There were no fistulas or no intra- abdominal abscess and mean hospital stay recorded was 46 days in Brox- Jimenez et al[3] study while in our study in 72% of patients adhesion formation and in 11% fistula formation and in 17% pus formation was seen. Similarly in a study of Boris Krishtein, Ariel Shapira[5] 09 patients had fistula formation.

CONCLUSION

Open abdominal technique and use of damage-control staged laparotomy, application of Bogota bag offers a relatively safe and

acceptable means of managing abdominal wound dehiscence. Mobilization of intestines from adhesions can result in enteric fistulation and hence should be avoided. Bogota Bag helps to prevent adhesions. Proper surgical technique is of utmost importance in preventing this dreaded complication of laparotomy, which prolongs hospital stay and requires intensive measures to manage.[1]

In our experience, Bogota Bag is a useful technique and is the preferred closure system to prevent or treat abdominal compartment syndrome. Particularly useful in peripheral centers of India where enough facilities are not available.

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