Bogota Bag- A Novel Experience at Saidu Teaching Hospital Swat

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ABSTRACT

Background: Laparotomies done for various conditions in which primary closure may leads to complications.
Objective: To assess the efficacy of bogota bag for temporary abdominal closure in laparotomies.
Material & Methods: This descriptive study was conducted at Saidu Teaching Hospital/Saidu Medical College Swat, Pakistan, from April 2016 to September 2018. Our study population included all patients who had laparotomies for various indications including abdominal sepsis, abdominal visceral edema and trauma during the said period. These patients had temporary abdominal closure done with bogota bag. The data was analysed by SPSS 18.
Results: In our study population of 17 patients, 11 were males and 06 were females. The indications for laparotomy included abdominal trauma in 2 patients, acute abdomen resulting in sepsis and edema of abdominal contents in 12 patients and mesenteric ischemia in 3 patients . Complications developed in patients managed with bogota bag were wound infection in 5 patients, bogota bag reapplication in 2 patients, ventral herniation in 2 patients, enteroatmospheric fistula in 1 patient and 1 patient died because of the sepsis and multi organ failure. Delayed primary closure (DPC) was done in 15 patients and healing by secondary intention occured in 2 patients.
Conclusion: In conclusion bogota bag application for laparotomy wound closure was a novel technique in our institute, it reduces mortality and burst abdomen. It is easy to learn technique with cost effectiveness and better tolerability profile. We recommend its use in laparotomies done for various indications where primary closure may lead to Abdomen compartment syndrome, burst abdomen many other complications and even mortality.
Keywords: *Bogota bag, laparotomy, temporary abdominal closure, delayed primary closure, abdominal sepsis.*

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INTRODUCTION

At times surgeons come across certain conditions in which they are unable to close the abdomen after laparotomy. These conditions include edematous abdominal viscera, abdominal sepsis, abdominal wall loss and a need for directed relook laparotomy. All these conditions result in increased abdominal pressure upon abdominal closure which leads to increases in morbidity and mortality. Intra-abdominal hypertension (IAH) and Abdominal Compartment Syndrome (ACS) have high prevalence in intensive care unit patients and causes significant deaths. Mortality is 26.1% for grade III while it is 100% for grade IV abdominal compartment syndrome.[1] To reduce the complications and mortality of Abdominal Compartment Syndrome (ACS) and Intra-abdominal hypertension (IAH), laparostomy is done temporarily. Laparostomy wound is covered by different ways including bogota bag, wittmann patch, vacuum assisted closure, the abthera device and synthetic or biologic mesh. In our setup the easiest method to cover the abdominal viscera after laparostomy is a plastic silo (Bogota bag) which is cost effective, easily available and which preserves the intact fascia when sutured to the skin edges[2]

After the initial temporary management, the laparostomy wound is either closed by delayed primary closure or left to heal by secondary intention. Mesh, components separation, and autologous tissue transfer are definite procedures in practice to decrease the complications associated with open abdomen on immediate and long term basis.[3]

Laparostomy is successfully employed in trauma cases either for wall loss or for a directed relook. Temporary abdominal closure is done either by bogota bag or by opsite sandwich vac pack. Both these techniques significantly reduce mortality.[4]

In some hospitals worldwide there is less experience in managing patients with open abdomen and temporary closure of abdomen. But now there is increasing trend to apply the principles of open abdominal wound management for prophylactically countering the harmful effects of abdominal compartmental syndrome.[5]

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Despite limited studies, open abdomen may be an important option in the surgeon's armamentarium for the treatment of severe peritonitis.

Quality studies are required to assess the efficacy of laparostomy in treatment of abdominal sepsis[6]

Although bogota bag is in surgical practice for more than 20 years but there is no such study on this topic in our population, we conducted prospective study to get experience with this novel technique in our institute.

In our resource poor setup we utilized the opportunity to use bogota bag due to its proclaimed benefits and share our experience of bogota bag application in laprastomies.

MATERIALAND METHODS

We conducted descriptive case series study in the Department of Surgery Saidu Group of Teaching Hospitals / Saidu Medical College Swat from April 2016 to September 2018. We applied bogota bag to various patients for different indications in both genders.

These patients were initially received in A&E department. They were resuscitated and then undergone laparotomy. After dealing the primary pathology the patient were subjected to laparostomy and urine bag (size 2 liter) was used as bogota bag for covering of abdominal contents. The bag was sutured to wound margins with Prolene 2/0.

Patients were kept postoperatively in high dependency unit and general surgical ward.

In most of the patients abdomen after relook lapratomy and haemodynamic stability bogota bag was removed and lararostomy was closed by delayed primary closure.

In the remaining patients abdomen was still unable to be closed by delayed primary closure. In these patients bagota bag was left in situ and wound was allowed to heal by granualation tissue and fibrosis by secondry intention.

Patients aged 14 to 60 years of both gender were included in the study.

Patient age below 14 and above 60 years were excluded from study. Similarly patients suffering from diabetes mellitus, malignancy and immune compromised states were also excluded.

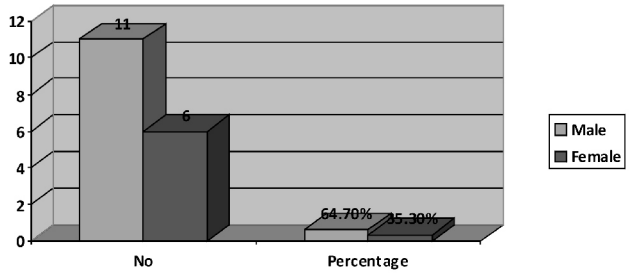
Patients outcomes were measured in terms of length of stay at hospital, enteroatmospheric fistula, visceral injury, wound infection,incisional hernia and mortality.

The data was analysed by using SPSS 18.
All the results are shown by tables.

RESULTS

In our study the total number of patients were 17. 11 male patients and 6 female patients were included in our study. (Graph-1)

Graph-1: Gender Wise Distribution



Indication for laparotomy in (2) 11.76% patients were trauma including blunt abdomen trauma in 1 patient and fire arm injury in 1 patient. Acute abdomen was indication for 12 patients (70.58%).

3 patients (17.64%) were having acute mesenteric ischemia. (Table-1)

Table-1: Laparotomies Distribution

Sr. No.	Disease	No	Percentage
1.	Trauma	02	11.76%
2.	Acute abdomen	12	70.58%
3.	Mesenteric Ischemia	03	17.64%

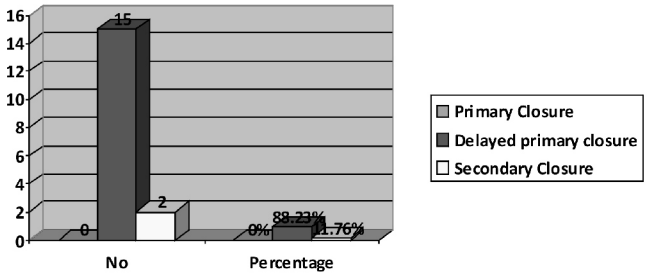
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Among the 12 patients of acute abdomen ,6 patients (50%) were having enteric perforation, 3 patients (25%) were having perforated appendix while 3 (25%) patients were of intestinal tuberculosis perforation. (table-2)

Complications in our study included wound infection in 5 patients(29.41%), bogota bag re application in 2 patients (11.76%) ,incisional hernia in 2 patients (11.76%), fistulation in 1 patient(5,88%),mortality in 1 patient (5.88%).None of our patients develop burst abdomen 00%. (Table-3)

Delayed primary closure done on 7th post-operative day was possible in 15 patients (88.23%). While secondary closure by granulation and fibrosis occurred in 2 patients (11.76%). (Graph 2)

Graph 2 : Method of Closure



DISCUSSION

After laparotomy abdominal wall closure is mandatory to prevent all those complications resulting from open abdomen. At times abdominal wall closure is not possible so the surgeon opt for laparostomy. After leaving the abdomen open, closure of the fascial defect is done as early as clinically feasible, but without precipitating Abdomen Compartment Syndrome. Historically, techniques such as packing, mesh, and vacuum-assisted closure have been developed to assist temporary abdominal closure, and techniques such as components separation, mesh-mediated traction, bridging fascial defect with permanent synthetic mesh, or biologic mesh have also been attempted to achieve early primary fascial closure, either alone or in combined use.[7] Bogota bag is an effective and useful means of closure for open abdominal wound to prevent the complications due to exposure of viscera i.e. evisceration, injury, loss of fluids and temperature and complications secondary to wound closure under tension. [8]

Table 2: Causes of Acute Abdomen

Sr. No.	Causes of Acute Abdomen	No	Percentage
1.	Enteric Perforation	6	50%
2.	Perforated Appendix	3	25%
3.	Intestinal Tuberculosis	3	25%

Table 3: Bogota Bag Complications

SR. NO.	COMPLICATIONS	NO	PERCENTAGE
1.	Wound Infection	05	29.41%
2.	Bogota re-application	02	11.76%
3.	Incisional Hernia	02	11.76%
4.	Enteroatmospheric fistula	1	5.88%
5.	Mortality	1	5.88%
6.	Evisceration/burst abdomen	0	00%
7.	Visceral Injury	0	00%
8.	Hypothermia	0	00%

In 1984 in Columbia applying a 3-L urologic irrigation bag to the fascia or skin was first used in the management of laparostomy.It was introduced to the western world by Feliciano and Mattox after their observation of Boraize using bogota bag for the management of laparostomy. The technique was named 'the Bogota bag' .Initially 41% mortality was reported but gradually it declined due to continuous monitoring of intra abdominal pressur, better understanding of pathophysiology and acquisition of experience in management of bogota bag.[9]

Open abdomen in traumatic and non-traumatic patients is effective in facing the deranged physiology of severe injuries or critical illness when no other perceived options exist. Its use remains very controversial and is a matter of great debate, as it is a non-anatomic situation with potential severe side effects and increased resource utilization. Moreover, the lack of definitive data demands carefully tailoring its use to each single patient, taking care to not overuse it. Abdominal closure attempt should be done as soon as the patient can physiologically tolerate it. All possible precautions should be implemented to minimize complications. Results improve proportionate to the clinicians' team's experience with the intricacies of open abdomen management[10]

The primary aim in managing laparostomy patients is to achieve primary fascial closure as soon as possible without causing recurrent abdominal compartment syndrome or other complications associated with premature closure. If the infection source has been controlled and even if a relaparotomy might be needed in the near future, every effort should be made to achieve primary fascial closure during the initial hospitalization period and avoid the significant morbidity associated with leaving the abdomen open for delayed reconstruction. Gradual fascial closure, often mesh-assisted, seems currently to be the best available technique, but other possibilities, such as the components separation technique at an early stage or fascial closure with a mesh prosthesis can be considered when there is no infection and enough skin to cover the prosthesis. However, if primary fascial closure is not possible, an early decision to resort to the planned hernia strategy is a good option.[11]

In our study population we did delayed primary closure in 15 patients on 7th post operative day.

In our study population 2 had incisional hernia due to secondary closure . this shows that if patient is in good physiological reserve then delayed primary closure is best option. This shows that our study is in conformity with the study cited above by Ari K Leppaniemi.

There was 5.88% mortality in our study though patients had severe abdominal sepsis due to enteric and tuberculous perforation.Our mortality rate is very low as compared to the study done by Muresan, Mircea et al which show the overall mortality in 66 patients with ACS was 27.3%.[12]

A study has shown 67% hernia rate after mesh closure of abdominal wall defect our study has shown incisional hernia developement in 11.76% patients which is very less than study done by Mayberry JC,Burgess EA et al which shows 67% hernia rate after mesh closure of abdominal wall defect [13.]

In our study there was development of enteroatmospheric fistula in 5.88% patients while Wound infection occurred in 29.41% of cases but non patient developed intra-abdominal abscess formation which is near to the results by Brox-Jiménez A, Ruiz-Luque[14] et al.

CONCLUSION

We conclude that bogota bag is a good alternative in case we opt for laparostomy. It is easily available and cost effective and having a better tolerability profile. It prevents the complications of abdominal compartmental syndrome and burst abdomen which ultimatly results in decreased mortality rate.

Conflict of Interest: No.
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