ORIGINAL ARTICLE

The effectiveness of Bogota bag application in patients with advanced severe peritonitis

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Abstract:

Objective: To evaluate the Bogota bag's efficacy in closing abdominal wounds that are open and have severe peritonitis following laparotomies but cannot be closed well using primary closure and in the absence of alternative closure methods.

Material and Methods: Following approval from the hospital's ethical committee, a randomized control study involving 100 patients was carried out at the Khyber Medical Hospital in Peshawar, Pakistan. Participants had undergone a decompressive laparotomy due to severe peritonitis, and closure was accomplished either using a Bogota bag or an abdominal layer closure in the reverse sequence. Variables were gathered in a Excel sheet along with the pertinent patient data that was retrieved from the medical records in the hospital. Statistics were examined using SPSS 25.

Results: This study was conducted on 100 patients divided in two groups. In terms of gender distribution, group A contained 33(66%) male patients, while group B contained 31(62%) male patients. Group A also contained 17(34%) female patients, while group B contained 19(38%) female patients. In comparison to group A [8.84±3.64 days], the mean hospital stay in group B [6.40±3.24 days] was considerably shorter (p = 0.001). The mortality and complication (infection and fistula formation) rates in group B were significantly lower than group A.

Conclusion: The use of a Bogota bag to close an open abdominal wound proved successful in avoiding complications associated with open wounds or the ones that were closed under tension.

Keywords: Bagota bag, open abdominal wound, advance severe peritonitis, closure technique

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Introduction:

The main stay of treatment for patients with severe secondary peritonitis is source control, which frequently necessitates one or more procedures. Primary fascial closure may not be advised in these cases. Repeatedly closing the fascia could result in necrosis and fascial loss if several laparotomies are required. Additionally, in order to close the fascia due to visceral edoema, considerable tension may be required, which raises the risk of abdominal compartment syndrome, fascial dehiscence, and wound infection. The latter issue may impede renal, hemodynamic, cardiac, and respiratory functioning. As a result, these individuals need a temporary abdominal closure method.[2]

Numerous methods, including the use of prosthetic mesh, zippers, sliding fasteners, towel clip skin closure,[2] and negative pressure wound therapy, have been documented for temporary coverage of the exposed viscera. It is a simple and cost-effective procedure to temporarily close the abdominal wall with a Bogota bag in these patients, and the bag's transparency allows for an assessment of the intra-abdominal space. In our arrangement, a urine collection bag-also known as a Bogota bag-was utilised to prevent the evisceration of organs and fluid loss. It also allows for the visual inspection of the abdomen

Table 1: Demographics

Demographics		Group A	Group B
Age		39.76±18.721	40.44±18.489
Gender	Male	33 (66%)	31 (62%)
	Female	17 (34%)	19 (38%)
Indication for surgery	Anastomotic leakage	13 (26.0%)	10 (20.0%)
	Duodenal perforation	10 (20.0%)	12 (24.0%)
	Post lap, peritonitis	15 (30.0%)	18 (36.0%)
	Ileal perforation	12 (24.0%)	10 (20.0%)

Table 2: Comparison of hospital stay between both groups

	Groups	N	Mean	Std. Deviation	P value
Hospital stay (Days)	Group A	50	8.84	3.644	0.001
	Group B	50	6.40	3.245	

contents, which is frequently helpful and affordable and readily available.

When primary closure cannot be carried out and there are no alternative available closure methods, we intend to evaluate the Bogota bag's efficiency for closing open abdominal wounds in the event of severe peritonitis following laparotomy.

Material and Methods:
With approval from the institution's research committee and ethical board, this randomized control study was carried out at the Khyber Medical Hospital in Peshawar, Pakistan, in March 2020 till October 2022. Through non-probability sequential sampling, information on 100 patients from diverse age groups and both gender was acquired. In the study, patients who underwent decompressive laparotomy, had Bogota bags placed, were admitted for a variety of surgical abdominal problems, and were later found to have severe peritonitis or to be at high risk of acquiring it during surgery. Patients who underwent surgery ranged in age from 16 to 87, and their informed consent was taken into consideration. Patients with incomplete arrival, operation, post-operative recovery, or daily progress report data in their records were omitted.

The discharge information and charts of these patients, which were acquired from the record department, were used to identify patients who underwent Bogota Bag placement throughout the study period.

The patients were divided into two groups, A and B, and group A was compared with group B, which includes patients who underwent Bogota bag application via non absorbable polypropylene 1 suture.

Group A was compared with group B that include patients who underwent standard procedure of closure of all the abdominal layers in reverse order. Absorbable suture polyglycolic acid 1 suture was used to close the linea alba and non-absorbable polypropylene 2/0 suture was used to close the skin. Variables such as peritonitis-causing factors, rationale for employing a Bogota bag, and morbidities and mortality connected to or unconnected with the use of a Bogota bag were studied. Data was analyzed using IBM SPSS 25. Numerical variables are presented as Mean and standard deviation. For categorical data frequencies and percentages were used. Numerical outcomes were assessed between both groups using independent samples T test keeping P value < 0.05 while categorical outcome was assessed using Chi Square test keeping p value at <0.05.

Results:
This study was conducted on 100 patients divided in two groups. Group A patients went through abdominal closure technique while group B patients had Bogota application technique. The mean age in group A was 39.76±18.72 years while the mean age in group B was 40.44±18.48 years. Regarding gender distribution there were 33(66%) male patients in group A while 31(62%) male patients in group B, there were 17(34%) female patients in group A while there were 19(38%) female patients in group B as shown in table no.1.

In comparison to group A, the mean hospital stay in group B was considerably shorter. The mean hospital stay in group B was 6.40±3.24 days while in group A the mean hospital stay was 8.84±3.64 days (P = 0.001) as shown in table no.2.

Table 3: Comparison of mortality between both groups

		Mortality			
		Yes	No	Total	P value
Groups	Group A	11	39	50	0.02
		22%	78%	100%	
	Group B	3	47	50	
		6%	94%	100%	
		14	86	100	
Total		14%	86%	100%	

Table 4: Comparison of complications between both groups

		Complications				
		Infection	Fistula	No complications	Total	P value
Groups	Group A	17	15	18	50	0.004
		34%	30%	36%	100%	
	Group B	6	10	34	50	
		12%	20%	68%	100%	
Total		23	25	52	100	
		23%	25%	52%	100%	

Regarding the comparison between mortality between both groups we found that the mortality rate in group B was significantly lower than group A, the mortality rate in group B was 3(6%) while 11(22%) in group B (P = 0.02) as shown in table no.3.

Complications were significantly lower in group B as compared to group A, in group A 18(36%) patients had no complications while 34(68%) patients in group B had no complications. Infection was seen in 17(34%) patients in group A while 6(12%) in group B and fistula was developed in 15(30%) patients in group A while 10(20%) patients in group B as shown in table no.4.

Discussion:

The peritoneum, the lining of the abdominal cavity, can get inflamed which a serious medical condition and is known as peritonitis. If not properly addressed, it can result in serious complications from a number of causes, including infection, trauma, or surgery. Surgery is frequently required in severe cases of peritonitis to remove the affected tissue and stop the illness from spreading.[7]

There is no documentation of a technique that has been demonstrated to be superior, despite the fact that numerous authors have documented various open abdomen/temporary abdominal closure techniques. Post-laparotomy, main anterior abdominal wall incisional wound fascial closure is carried out in the majority of surgical clinical situations.[8] Different surgical clinical situations may require an open abdomen, such as for damage control surgery or to prevent abdominal compartment syndrome. Other examples are the visceral peritoneal cavity size disparity in organ transplant procedures, severe trauma, infected pancreatic necrosis, necrotizing infection of the anterior abdominal wall tissues, and ischemic viscera with second opinion planned surgery.[9] Despite being used in a variety of surgical clinical settings, no conclusive information regarding the epidemiology and results of the open abdomen technique is currently available. However, it should be noted that when it comes to laparotomy incisional wound closure, the anterior abdomen wall fascia and skin cannot be replaced.[10]

Since a primary abdominal fascia closure that is too forceful could put too much tension on the fascia, prosthetic materials are employed to temporarily seal the abdominal wall in these challenging situations. There is not a proven perfect prosthesis for interim abdominal closure, though. Different authors have employed a variety of materials, including polyglycolic acid mesh (Dexon) and absorbable woven polyglactin mesh, for temporary abdominal closure. However, Bogotà bag has recently become the material of choice for surgeons.[11]

We conducted our study on 100 patients presenting with severe peritonitis. The patients were divided equally in two groups, group A patients underwent standard procedure of closure of all the abdominal layers in reverse order and group B patients had Bogota bag application using non absorbable polypropylene 1 suture. The mean age in group A was 39.76±18.72 years and in group B 40.44±18.48 years. In both groups majority of the patients were male as compared to female patients.

We compared hospital stay, mortality and complications between both groups and found significant difference between both groups. The patients which underwent Bogota bag application showed significantly shorter hospital stay, mortality and complications ($P < 0.05$). A study conducted by Cordoba DA et al, in a cohort study showed that patients treated with Bogota bag had significantly shorter hospital as compared to another technique for abdominal closure called vacuum assisted closure, they also reported lower complication rates and mortality rate.[12] According to Villafuerte et al., 40% of the articles that were analyzed and showed the efficiency of the Bogota Bag, which allowed for primary closure to be done following a laparotomy, did not report complications.[13]

Conclusion:
From our study we conclude that Bogota bag application is an effective technique for patients with severe peritonitis in terms of hospital stay, mortality and complications as compared to other abdominal closure technique.

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Role and contribution of authors:
Javeria Bibi, concept, study design, data collection and manuscript writing.

Muhammad Naeem Khattak, Supervision and guidance

Qavi Ullah, did statistical analysis

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