

Araştırma

TEMPORARY ABDOMINAL CLOSURE WITH BOGOTA BAG IS A SAFE PROCEDURE

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SUMMARY

Background: Because of the intra-abdominal sepsis or increased intra-abdominal pressure, abdomen should be closed temporary. Temporary abdominal closure is also planned when the bowel viability is questionable or re-exploration is required. Abdomen closure with Bogota bag is an easy technique that allows for easy access.

Material and Method: We presented 15 patients with abdominal closure with Bogota bag, sterile 3L irrigation bag. It was sutured with running no.1 polypropylene through the subcutaneous tissue. Re-exploration was performed every 24-72 hours under general anesthesia. The abdomen was irrigated and the surgical procedure was performed and covered with a new Bogota bag. Abdomen was permanently closed when abdominal sepsis was resolved and/or absence of viability questionable bowel segment.

Results: Bogota bag had changed one to nine times for every patient. The mean hospital stay length was 22 days. Regrettably, 6 of 15 (40%) patients died during hospitalization due to sepsis or co-morbid disease. The abdomen was closed with skin layer alone in surviving patients. We did not find any adherences between bag and visceral surfaces. None of the patients had developed a new fistula and also the intra-abdominal infec-

tion had not aggravated. It permits bringing the edges of the wound to make final closure easier. Conclusion: Ideally technique for temporary abdominal closure should protect and avoid damaging abdominal viscera, prevent contamination, minimize the risk of evisceration. Bogota bag is safe, simple, cheap and effective procedure. It can be easily performed and offer a simple access to abdominal cavity.

Key words: Temporary abdominal closure, Bogota bag, abdominal compartment

BOGOTA BAG İLE BATIN DUVARININ GEÇİCİ OLARAK KAPATILMASI GÜVENLİ BİR YÖNTEM DİR

ÖZET

Amaç: Batın içi yaygın enfeksiyonlarda veya artmış batın içi basınç durumunda batın duvarının geçici olarak kapatılması gerekebilir. Barsakların canlılığının şüpheli olduğu durumlarda veya batın içinin tekrar gözden geçirilmesi gerektiği durumlarda da batının geçici olarak kapatılması planlanabilir. Batının Bogota bag ile kapatılması, batın içine kolayca ulaşılmasını sağlayan bir teknik olarak görünmektedir.

Materyal ve Metod: Batın duvarı Bogota bag ile kapatılan 15 hasta retrospektif olarak incelendi.

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Bogota bag olarak 3L' lik steril irrigasyon sıvısı torbası kullanıldı. Bogota bag subkutan dokuya 1 numara polipropilen ile kotüne olarak tespit edildi. Batın içi genel anestezi altında 24 ila 72 saat aralıklarla tekrar değerlendirildi. Batın içi yıkandı, gerekli olan cerrahi işlemler uygulandı ve batın duvarı yeni bir Bogota bag ile tekrar kapatıldı. Batın duvarı batın içi enfeksiyon düzeldiğinde ve/veya barsakların canlılığında şüphe kalmayınca kalıcı olarak kapatıldı.

Bulgular: Bogota bag her hasta için bir ila dokuz kes değiştirildi. Ortalama hastanede yatış zamanı 22 gündür. Üzücü olarak 15 hastanın 6' sı (%40) hastanede yatarken sepsisten veya diğer ek hastalıklardan dolayı öldü. Hastaların hiçbirinde Bogota bag ve batın içi organlar arasında yapışıklık görülmedi. Hastaların hiçbirisi yeni fistül geliştirmede ve batın içi enfeksiyonda artma görülmedi. Bogota bag yara dudaklarının birbirine yakın durmasını sağlayarak batının kalıcı olarak kapatılmasında kolaylık sağladı. Sonuç: Batının geçici olarak kapatılmasında ideal yöntem batın içi organları korumalı ve zarar vermemeli, kontaminasyonu engellemeli, eviserasyon riskini azaltmalıdır. Bogota bag ile batın duvarının geçici olarak kapatılması güvenli, basit, ucuz ve etkili bir yöntemdir. Batın içine kolayca ulaşmamızı sağlar.

Anahtar Sözcükler: Batının geçici olarak kapatılması, Bogota bag, Abdominal kompartman sendromu

INTRODUCTION

During laparotomy, some conditions may force the surgeon to leave the abdomen open. Temporary abdominal closure (TAC) technique is justified for any patients when bowel viability is questionable, re-exploration is planned in one to three days and intra-abdominal bleeding requires damage control surgery. The increased intra-abdominal pressure in patients with abdominal compartment syndrome (ACS) often requires TAC. When we use any TAC procedure, it is necessary to prevent intra-abdominal contamination, to save the intra-abdominal organs and also fluid loss, to minimize the risk of increasing intra-abdominal

pressure. TAC procedures has increased in the last decade with understanding of its functions, advantages and disadvantages^{1,2}. Unfortunately, it continues to be associated with very high morbidity and mortality, and different techniques has been developed to protect the intra-abdominal organs, but it can not be standardized for all situations.

Many techniques for TAC are described in literature^{3,4,5,6,7}. Bogota bag is one of them and its use was described by Mattox in severe abdominal sepsis³. The abdomen is closed with a sterile IV bag to drain the intra-abdominal infection and also observe the intra-abdominal organs. It is changed in every 48 to 72 hours. When intra-abdominal sepsis subsides, ischemic diseases or visceral edema resolved, the abdomen closed permanently with mesh/fascia or only with skin layer. In this study, we presented the patients who had temporary abdominal closure with Bogota bag procedure and their results.

MATERIAL AND METHOD

In this study, we evaluated our experiences with Bogota bag technique as the TAC in between 01 January 2000 and 31 December 2008, retrospectively. The sterile 3L irrigation bag was used. The sterile bag was cut as 1 to 2cm larger than the size of the laparotomy and sewn with running no.1 polypropylene sutures through the subcutaneous tissue of the abdominal wall. If needed two bags were used to close wider openings. After 24-72 hours, the bag was taken and the intra-abdominal organs and cavities inspected. The abdomen was irrigated with saline. Necessitated procedures had done, the abdomen was recovered with a new bag. The plastic bags were removed and the abdominal wall was closed when there was no more evidence of intra-abdominal sepsis and also absence of necrosis. The patient properties and laboratory results and also their relation to mortality were evaluated. Results compared with unpaired t test on computer program.

RESULTS

TAC with Bogota Bag was used for 15 patients. Patients were selected because of intra-abdominal sepsis, increased intra-abdominal pressure, ischemic mesenteric vascular diseases and so planned to undergo re-exploration. Median age of patients were 54 (20-85) and 13 of them male and 2 female. The initial pathologies and interventions are given on the table [Table 1].

We needed to use Bogota bag in patients due to peritonitis in 3 of patients after intra-abdominal surgery due to malignancies, 2 patients after trauma, 2 patients after the abdominal aortic procedures, one patient due to strangulated and perforated femoral hernia, one patient after iliac artery repair due to iatrogenic injury during angiography, one with primary unknown peritonitis, one patient due to intra-abdominal abscess, and in two patients with ischemic vascular diseases to observe intra-abdominal organs. In another two patients due to increased intra-abdominal pressure because of ileus. During operation, small bowel fistulas recognized in 5 patients, anastomosis failure in 3 of them, intra-abdominal abscesses in 3, colonic perforation in 2, and severe intestinal edema in 2 patients. Increased intra-abdominal pressure and edematous intestine accompanied most of the pathologies.

Bogota bag had been changed one to nine times for every patient. Six of patients died due to sepsis before permanent abdominal closure and one patient due to co-morbid diseases after permanent abdominal closure. Remaining patients have survived with a permanent only skin closure. No patient needed a skin graft or mesh. None of the patients had developed a new fistula or their intra-abdominal infections be aggravated during the use of Bogota bag technique. Demographic properties of living and died patient and their laboratory results, transfusion of blood and blood products are presented on the table [Table 2]. Bilirubinemia and leucocytosis are significantly high in died patients, (p=0.03, p=0.01, respectively).

Table 1: The properties and pathologies of the patients

Age	Sex	Primary Pathology	Cause of Bogota bag	Number of Bogota bag use	Mortality
1. 74	Male	Ileus and acute abdomen	Leakage from ileum, Dirty abdomen	2	Yes
2. 20	Male	Intra-abdominal abscess	Severe distention Dirty abdomen	3	Yes
3. 69	Male	After coronary angiography and iliac artery repair Acute abdomen	Anastomosis failure Dirty abdomen	2	Yes
4. 41	Male	After trauma, with colostomy Acute abdomen	Leakage from Jejunum	9	No
5. 62	Female	After ovarian cancer surgery Acute abdomen	Leakage from jejunum Dirty abdomen	3	No
6. 72	Male	Acute abdomen Intra-abdominal abscess	Perforation of colon due to colonic malignancy Dirty abdomen	2	No
7. 40	Female	Incarcerated femoral hernia Acute abdomen	Leakage from jejunum Dirty abdomen	1	No
8. 55	Male	Acute abdomen after repair of incisional hernia	Leakage from ileum Dirty abdomen	5	No
9. 62	Male	Acute abdomen	Ischemic vascular disease of the intestine and Leakage from jejunum	1	Yes
6. 72	Male	Acute abdomen Intra-abdominal abscess	Perforation of colon due to colonic malignancy Dirty abdomen	2	No
7. 40	Female	Incarcerated femoral hernia Acute abdomen	Leakage from jejunum Dirty abdomen	1	No
8. 55	Male	Acute abdomen after repair of incisional hernia	Leakage from ileum Dirty abdomen	5	No
9. 62	Male	Acute abdomen	Ischemic vascular disease of the intestine and Leakage from jejunum	1	Yes
10. 70	Male	Distension at the end of an aortic surgery	Severe edema of intestine	1	No
11. 64	Male	Acute abdomen after an aortic surgery	Iatrogenic injury to duodenum Dirty abdomen	5	Yes
12. 57	Male	Intra-abdominal abscess	Colonic perforation Dirty abdomen	3	Yes
13. 70	Male	Mesenteric ischemia	Ileum perforation and necrosis	2	No
14. 32	Male	Penetrating abdominal trauma	Multiple colonic perforation Dirty abdomen	6	No
15. 22	Male	Mechanic intestinal obstruction	Necrotized small intestine, Severe edema of intestine	2	No

Discussion

When re-laparotomy is required for treatment of intra-abdominal pathology or abdominal wall couldn't be approximated, there is not a standard procedure for TAC. Although in the development in the diagnostic and treatment modalities, TAC is one of the life-saving procedures in these patients^{2,6}.

ACS is the increased intra-abdominal pressure above 20 mmHg and also accompanied with organ failure¹. Leaving the fascial layers open will decrease the intra-abdominal pressure. Some times in damage control surgery to decrease the water loss and to tampon the intra-abdominal bleeding, forcefully closure of the abdomen recommended. But Offner et al compared the only skin closure or Bogota bag and reported that forcefully closure of abdomen led to 11 times increase in the intra-abdominal pressure. The surgical decompression of the abdomen remains the treatment of abdominal compartment syndrome, is followed by one of the TAC technique in order to prevent intra-abdominal hypertension and end organ damage⁷. The surgical decompression of abdomen remain the treatment of ACS, is followed by one of the TAC technique in order to prevent intra-abdominal hypertension and end organ damage. In our series, Bogota bag is used to decrease the intra-abdominal pressure which had evolved from severe visceral edema that also prevents fasciae closure.

Vacuum-assisted closure (VAC) is another TAC procedure. It is a perforated plastic sheet cover the viscera and sponge is placed between the fascial edges. The wound is covered by an air-tight seal, is connect to a suction pump. VAC is associated with highest fascial closure rate^{2,9}. Miller et al reported that the vacuum assisted closure let the closure of fascial within one month and comparing with the only skin closure it has the same complication rate of fistula and abscess formation, but on the other hand it has the 9% of incisional hernia comparing to skin closure that has 100% ventral hernia¹⁰. But vacuum assisted wound closure seems to be much more complex and expensive procedure².

Closure of the abdomen temporary with a prosthetic material is an alternative procedure to vacuum assisted and Bogota bag. Schachtrupp et al reported that the prosthetic material make more easy of drainage of infectious material, observing the underlying organs like Bogota bag¹¹. It has advantages of protecting fascial lines from retraction so make secondary closure easier. It also provides mobilization of patient. On the other hand it has the disadvantages of un-absorbable prosthetic material that lead to enteric fistulas.

Bogota bag is a transparent material and also impermeable to fluid. It is a soft material so cannot cause irritation to peritoneal surface of intestine. The transparency of sheath facilitates to observe intra-abdominal organs, early recognition of intra-abdominal infection and hemorrhage. It leads to development of the fibrous sheath over the omentum and also intestinal surface. Bogota bag is safe and preferred closure system to prevent ACS. No complications occurred in relation to placement of Bogota bag in our patients. None of our patients had a new growth of any fistulas, a new abscesses or aggravated intra-abdominal infection due to this technique. Comparing the other alternatives, it is very cheap and safe procedure.

In all techniques, after patients improved, intra-abdominal infections subsided and intra-abdominal pressure is decreased, the abdomen should be closed. Howdieshell et al recommended for the timing of closure of the abdomen permanently at fifth day of operation and advice closure even with only a skin layer if the fascial closure impossible¹². But visceral edema, continuing bleeding, sepsis, renal failure, intra-abdominal or retro-peritoneal abscesses, ileus, poor granulation tissue development, risk of general anesthesia may not allow early permanent closure. Many alternatives are also present to close abdomen for permanent closure. We used the only skin because the fascial layer was retracted.

Mortality was high in our patients. A review in literature, patients with TAC showed mortality rates up to 30%². Six of the 15 (40%) patients died

during hospitalization due to sepsis or co-morbid disease. Renal and liver functions of all patients were abnormal but more prominent in death patients. Especially, the leucocytosis and bilirubinaemia were prominent and also statistically high in died patients.

In conclusion, many options are available for management of the abdomen that can not be closed or that should not be closed. Ideally technique should protect and avoid damaging viscera, prevent contamination, minimize the risk of evisceration. TAC with Bogota bag is safe, simple, cheap and effective procedure, it can be easily performed and offer a simple access to abdominal cavity.

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Temporary Abdominal Closure With Bogota Bag is a Safe Procedure