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An Approach to Perianastomotic Pouches due to Anastomotic Leakage After Rectal Resection

Rektum Rezeksiyon Sonrası Gelişen Anastomoz Kaçaklarına Bağlı Peri-anastomotik Poşlara Yaklaşım

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ABSTRACT

Objective: Conservative treatment of perianastomotic pouch due to low anastomosis in rectal surgery is possible in patients without generalized peritonitis. This report describes the treatment of this complication using Endo-SPONGE® and transrectal endoscopic lavage.

Methods: Sixteen patients with abscess resulting from anastomotic leakage after rectal resections were retrospectively reviewed; nine of them were treated with transrectal endoscopic lavage and the other seven patients were treated with endoscopic vacuum therapy.

Results: During the initial operation, 13 patients underwent loop ileostomy. In three patients, diverting stoma was created after anastomotic leakage was observed. The mean volume of the abscess cavity was 82.6 cc (24.7-128) for those treated with EndoVAC (vacuum-assisted closure) and 33.3 cc (10.5-61.1) for those treated with endoscopic lavage. The number of sponges exchanged was 13.8 (5-25), and the time required for pouch closure was 74.3 days (20-136) for negative aspiration therapy and 66.1 days (30-210) for transrectal endoscopic lavage. As a late anastomotic complication, we recorded stricture in only one of seven patients (14.2%) treated with Endo-SPONGE®. Four of nine patients (44.4%) that underwent endoscopic lavage developed strictures, which needed reoperative procedures.

Conclusion: According to our experience, the sponge placement and negative pressure aspiration can be helpful in the treatment of anastomotic leakage after low anterior resections for rectal cancer. The results of time until cavity closure are not inferior to those of the conventional treatment, and a functional advantage over the conventional approach was observed. Patients with Endo-SPONGE® placement had less stricture and defecation problems.

Keywords: Anastomotic leakage, vacuum-assisted closure, colorectal surgery, endoscopically transrectal lavage, endo sponge

ÖZ

Amaç: Rektal cerrahide aşağı anastomozlardan dolayı oluşan peri-anastomotik poşların konservatif tedavisi, hastalarda generalize peritonit bulguları olmadığı durumlarda mümkündür. Çalışmamızda bu tür komplikasyonların Endo-SPONGE® ve transrektal endoskopik yıkama ile tedavisini tanımlamaktadır.

Yöntemler: Rektal rezeksiyon sonrası anastomoz kaçağından abse gelişen 16 hasta retrospektif olarak incelendi, bunlardan 9'u endoskopik transrektal yıkama ve diğer 7 hastada endoskopik vakum yöntemi ile tedavi edildi.

Bulgular: On üç hastaya ilk ameliyat esnasında loop ileostomi uygulandı, 3 hastaya ise anastomoz kaçağı gözlendikten sonra saptırıcı stoma yapıldı. Ortalama abse kavitesi hacmi EndoVAC (vakum yardımlı kapama) ile tedavi edilen grupta 82,6 82,6 cc (24,7-128) ve endoskopik yıkama grubunda ise 33,3 (10,5-61,1) cc idi. Değiştirilen sponge (sünger) sayısı 13,8 (5-25) ve poşun kapanması için gereken süre negatif aspirasyon grubu için ortalama 74,3 (20-136) gün ve transrektal endoskopik yıkama grubunda da 66,1 (30-210) gün idi. Geç anastomoz komplikasyonu olarak, Endo-SPONGE® ile tedavi edilen 7 hastadan yalnızca birinde (%14,2) darlık kaydedilirken konservatif endoskopik yıkama grubundaki 9 hastadan 4'ünde (%44,4) reoperasyona gerek gösteren darlık gelişmiştir.

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J Acad Res Med 2021;11(1):102-106

Sonuç: Deneyimlerimize göre sponge yerleştirilmesi ve negatif basınçlı aspirasyon, rektal kanser için yapılan aşağı anterior rezeksiyon sonrası anastomoz kaçağı tedavisinde yararlı olabilir. Kavitenin kapanma süresi sonuçları konvansyonel tedaviye göre kötü değildir, fonksiyonel avantaj konvansyonel tedaviye üstün larak izlendi. Endo-SPONGE® yerleştirilen hastalar daha az darlık ve defekasyon problemine sahiptir.

Anahtar kelimeler: Anastomoz kaçağı, vakum yardımlı kapama, kolorektal cerrahi, endoskopik transrektal yıkama, endo sponge

INTRODUCTION

Leakage of low colorectal anastomosis continues to be the most important complication of colon surgery as it can lead to generalized peritonitis, sepsis and multiple-organ failure (1-3). Treatments range from conservative measures, such as broad antibiotics and diverting ostomy, to endoscopical abscess drainage, daily transrectal pouch lavage, or Hartmann's procedure and abdominoperineal resection as a final option (1-5).

Recently, perianastomotic pouches without peritoneal irritation are treated by endoluminally placed Endo-SPONGE®. This method provides continuous drainage of the perianastomotic abscess, control of infections, reduction of the size of the abscess cavity, increased blood flow and stimulation of granulation tissue (6-8). The drawback of this method is as follows: Endo-SPONGE® (B-Braun Medical®, Braun Melsungen AG, Germany) is the only product in the market, and it has high costs as it is used every two to four days until the abscess regresses. This study described our experience with handmade Endo-SPONGE® treatment and compared this modality with the traditional procedure, transanal endoscopic lavage.

METHODS

This retrospective study was approved by the Ethical Committee of Kafkas University (approval number: 279, approval date: 04.11.2020). All subjects had given a written informed consent before the endoscopic procedures. From 2014 to 2019, all patients with clinical features of anastomotic leakage after rectal resections were evaluated. Nine patients were treated by the conservative approach (daily endoscopic transanal debridement and lavage), and seven patients were treated by transanal Endo-SPONGE®. Endo-SPONGE® and transanal endoscopic lavage were started in patients without peritoneal irritation and persistent severe sepsis and after an evaluation of the perianastomotic abscess cavity by a computerized tomography of the lower abdomen.

For patients who cannot be treated with endoscopic vacuum-assisted closure (Endo-SPONGE®), the pouch was irrigated every one to two days and endoscopic debridement was performed if needed. In patients who underwent endoscopic vacuum-assisted closure, a "handmade" polyurethane sponge (Figure 1a, b) was inserted transanally by hand or through the anastomotic defect by endoscopy after irrigation and debridement of the perirectal abscess cavity. This procedure was performed after a light sedation with midazolam (2.5-5 mg IV) (Figure 2). The polyurethane sponge dressing was made from an open-cell polyurethane sponge used for large open wounds, appropriate for the size of the abscess cavity and connected to an evacuation tube (nasogastric tube CH 12). The end of the tube was connected to an intermittent vacuum drainage system (KCI Acelity, San Antonio, Texas, USA). Pressure levels were kept between -70 mmHg and -90 mmHg, and the sponge was replaced every three days to prevent the growth of granulation tissue inside it. Patients were discharged when their vital signs improved. Endo-SPONGE® was stopped when the cavity shrank, and stoma resulting from ileostomy was closed when the cavity was resolved. Traditionally, before it was known that Endo-SPONGE® is connected to negative aspiration, transanal endoscopic exploration, lavage and debridement of the perianastomotic pouch, this procedure was repeated daily or every other day.

Due to the small sample size, we could not make any "statistical analysis" in this study.



Figure 1a. Original Endo-SPONGE® (Braun Medical®, Braun Melsungen AG, Germany)

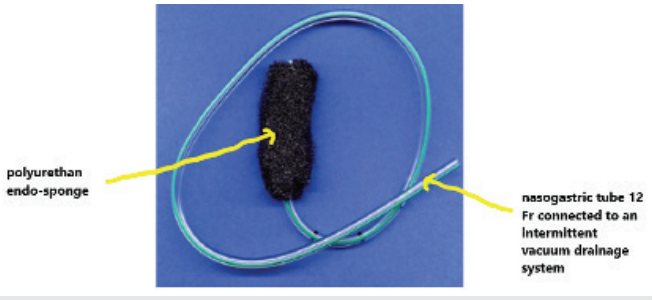


Figure 1b. "Handmade" Endo-SPONGE® from polyurethane sponge

J Acad Res Med 2021;11(1):102-106

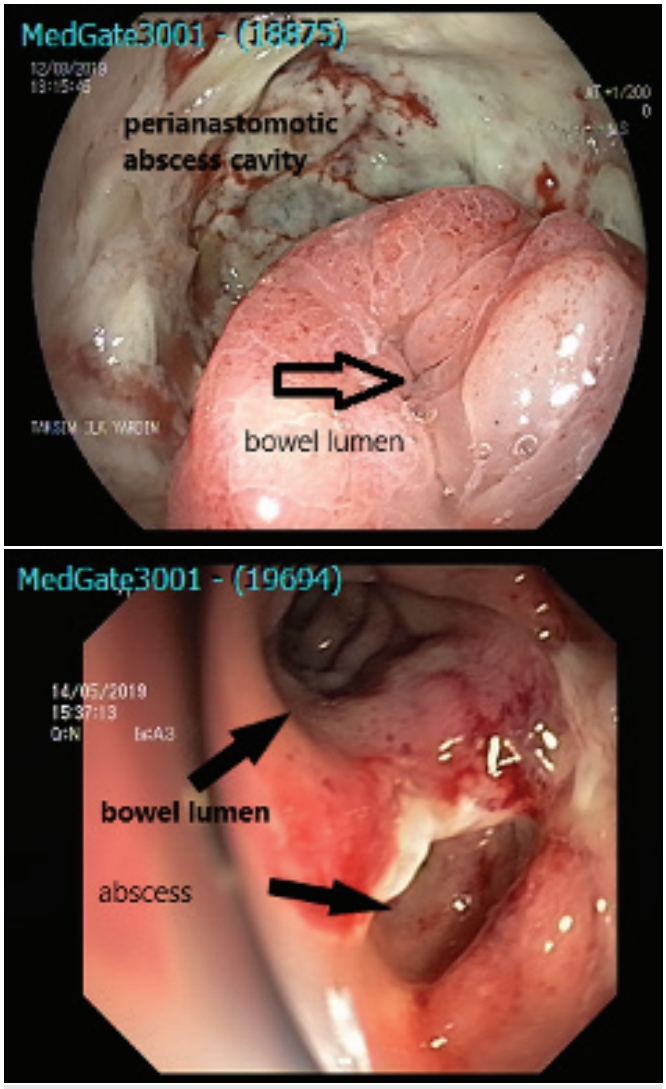


Figure 2. Taken from the archive of Dr. Doğan Gönüllü

RESULTS

Between 2014 and 2019, 16 patients (12 males and 4 females) with anastomotic leakage after low anterior resection for rectal cancer (double stapler) were treated with transanal endoscopic lavage (n=9) or Endo-SPONGE® (endoscopic vacuum therapy) (n=7) Figure 3. The median age was 61.4 years (46-73 years). Thirteen patients received chemoradiotherapy preoperatively, and three patients with rectum malignant tumour underwent an operation directly. During the initial operation on 13 patients, loop ileostomy was performed. In three patients, the diverting stoma was created after anastomotic leakage was observed. Anastomotic leakage was diagnosed at a mean of 6.6 (range: 3-24) days; a mean of 7.1 (3-10) days for the endoscopic lavage group; 8.3 (4-24) days for the group treated with Endo-SPONGE®. Endo-SPONGE® was stopped in one patient at post-operative 48th day with nearly complete anastomotic disruption, and a terminal colostomy was performed. The results of the use of Endo-SPONGE® and transanal lavage are shown in Table 1.

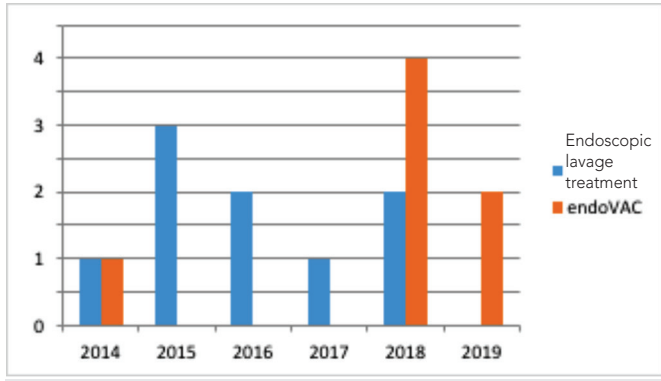


Figure 3. The distribution of anastomotic leakage treated conservatively per year

Table 1. Variables studied

Variable	Endo-SPONGE® treatment	Endoscopic lavage treatment
Volume of the abscess cavity (cc)* (CT, MRI)	82.6 (24.7-128)	33.3 (10.5-61.1)
Dimensions of initial abscess cavities (mm)*	53.3x30.1x100.6	35.9x29.3x56.4
Time until closure of pouches*	74.3 (20-136) days	66.1 (30-210) days
No. of sponges changed*	13.8 (5-25)	
Diverting stoma closure*	146 (105-195) days	86.4 (60-145) days
Definitive stoma	2	1
Outcome	1 stricture	4 strictures
	(endoscopic dilatation)	2 defecation problems**

*Values are median (range), **Inability to evacuate the bowel completely, faecal urgency
CT: computed tomography, MRI: magnetic resonance imaging

DISCUSSION

Anastomotic leaks after low anterior resection operations for rectal cancer continue to be a feared complication. It prolongs the duration of the illness, and sometimes recovery happens with fibrosis of the anastomotic line and perianastomotic tissue. This leads to stenosis, perturbation of defecation and permanent stoma (1,2,9).

Relaparotomy and lavage and stoma creation can effectively decrease the mortality in post-operative leakage by reducing the generalized peritonitis and sepsis. Alternative treatment options have been introduced through developing endoscopic interventions (9-11). Transanal endoscopic debridement and lavage, negative pressure drainage application and fibrin sealant application have been used in limited case series. Until today, there are no studies about the treatment desired to be used in anastomosis leakage (5,9,12).

J Acad Res Med 2021;11(1):102-106

In the last decade, the application of endoscopic negative pressure (Endo-SPONGE®, Braun Aesculap, Germany), which is a minimally invasive procedure for low colorectal anastomotic leakage, has been shown to be an effective way for reducing pelvic sepsis (4,5,12). After endoscopic debridement and lavage, the application of Endo-SPONGE® connected to a negative aspiration device allows a continuous drainage and cleaning of presacral septic pouch by increasing tissue perfusion and formation of granulation tissue that will close the cavity in a short time (13).

Despite the limited number of patients, we investigated the effects of Endo-SPONGE® treatments and compared the outcomes with endoscopic drainage and lavage treatment.

Chopra et al. (12) compared the results of repeated endoscopic debridement combined with stent, endoluminal vacuum device and endoscopic fibrin injection. They mentioned that vacuum-assisted therapy seems to be suitable for leaks with large perirectal abscess. The median size of the initial abscess was 53.3x30.1x100.6 mm for the Endo-SPONGE® group and 35.9x29.3x56.4 mm for the repeated endoscopic lavage group. These values are superior to the size reported in the literature. Weidenhagen et al. (14) reported that the mean length of the cavity at the beginning of the treatment was 7.4±5.1 (2-20) cm. von Berstorff et al. (15) reported that, in a series of 26 patients, the initial size of cavities ranged from 2x2 cm^2 4 cm^2 to 10x12 cm^2/120 cm^2. They reported that patients who underwent radiochemotherapy previously had significantly larger cavities than those who did not undergo neoadjuvant therapy. In a systematic review by Shalaby et al. (16), the median size of the defect was 6 (4.7-34.9) cm.

The timing of Endo-SPONGE® can influence the success of the procedure. Weidenhagen et al. (14) reported a high success rate when negative aspiration was initiated within six weeks postoperatively. A similar rate was reported by van Koperen et al. (17), where success rate was 75% if Endo-SPONGE® was started within six weeks and 38% if patients underwent endoscopic negative pressure therapy. In our study, the anastomotic leakages were diagnosed after a median of 8.3 (4-24) days, and negative pressure therapy with Endo-SPONGE® was started after one or two days. The sponge was changed every two to four days, and the median number of sponges used was 15.1 (range: 5-25). A review reported that sponges were changed every two to three days in nine studies and every three to four days in eight studies. The median number of sponges used was 7 (range: 3.4-13) (16).

In our study, the closure of the abscess cavity is achieved in 13 patients (81.2%). Two patients underwent Hartman's procedure after applying Endo-SPONGE® three to four times because of the progressive dehiscence and complete disruption of the anastomosis. One patient developed chronic presacral sinus despite a transrectal lavage for 27 days. The stoma of this patient closed four months after the operation, because of incomplete closure of the presacral sinus. The mean time of cavity closure for patients treated with Endo-SPONGE® was 74.3 (20-136) days and for the patients treated with only transanal lavage was 66.1 (30-210) days. Nagell and Holte (8) investigated the cavity closure times of five patients treated with negative pressure aspiration and 10 patients treated with the conventional ways. The mean time of EndoVAC group was 96.3 (43-195) days and that of the control group was 336 (52-1,464) days. There have been insufficient data to determine whether Endo-SPONGE® or endorectal lavage or observation is the best treatment. However, we believe the transanal lavage might be preferable, according to the different sizes of the cavities treated: 53.3x30.1x100.6 mm vs. 35.9x29.3x56x4 mm.

Glitsch et al. (18) reported an efficient treatment with transanal vacuum rectal drainage in 94.1% of their patients. They concluded that the cavity closure time depended on the cavity size, distance of anastomosis to the anal verge and patient's age. In a systematic study (16), variables that were significantly associated with failure were reported as preoperative radiotherapy and presence or absence of a protective stoma. In our study, all patients treated with Endo-SPONGE® had a protective ileostomy in addition to the first operation, and the other three stomas were done after the formation of anastomosis leakage. All patients who were treated with Endo-SPONGE® underwent preoperative long-term radiochemotherapy. Only three patients treated with endoscopic lavage underwent an operation directly. We did not observe any significant difference in terms of the size of the perirectal abscess between patients treated with neoadjuvant radiotherapy and those who did not receive neoadjuvant therapy.

Some authors have reported recurrence of fistula or abscess pouch. A multicentre study by Stefan et al. (19) reported that 25% of patients who were treated successfully developed recurrent abscesses.

The recovery of bowel continuity after successful eradication of the abscess cavity was achieved after a median time of 146 (105-195) days for patients treated with Endo-SPONGE® and 86.4 (60-145) days for patients treated with endoscopic lavage. Two patients in the Endo-SPONGE® group had a definitive ileostomy, and one patient in the conventionally treated group had a definitive ostomy. Weidenhagen et al. (14) reported that stoma reversal was possible in 22 of their 25 patients (88%) after an average of 169 days. During their follow-up, 10 patients (35%) had stenosis treated successfully by balloon dilatation. Srinivasamurthy et al. (20) reported a 62.5% recovery rate.

As a late anastomotic complication, we recorded only one stricture (1/7, 14.2%) resolved by endoscopic dilatation in patients treated with Endo-SPONGE®. Four patients who had endoscopic lavage developed strictures, which needed reoperative procedures (4/9, 44.4%). Two patients in this group developed defecation problems such as an inability to evacuate the bowel completely and faecal urgency. During follow-up of the 11 patients treated with Endo-SPONGE®, Mussetto et al. (21) observed that two patients had anastomotic stricture. One of them was treated with endoscopic dilatation and the other was treated with placement of a covered stent that was removed after five weeks.

J Acad Res Med 2021;11(1):102-106

Study Limitations

This study had some limitations. The rarity of anastomotic leakage makes the randomization difficult. The study was of a retrospective nature and included selected patients in the period of 2018-2019. Patients with larger cavities were treated predominantly with Endo-SPONGE® placements. In addition, the small number of patients in each group makes statistical validation difficult. To sum it up, more multicentre studies are needed to continue this preliminary design by increasing the number of these patients.

CONCLUSION

According to our experience, the sponge placement and negative pressure aspiration can be helpful in the treatment of anastomotic leakage after low anterior resections for rectal cancer. The results of time until cavity closure are not inferior to those of the conventional treatment, and a functional advantage over the conventional approach was observed. Patients with Endo-SPONGE® placement had less stricture and defecation problems.

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