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Endo-sponge therapy for management of anastomotic leakages after colorectal surgery: A case series and review of literature

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ABSTRACT

Background: Endo-sponge treatment is a novel approach to manage selected patients with anastomotic leakage following colorectal surgery. However, the available data are still scanty.
Aims: To evaluate the efficacy and safety of the endo-sponge therapy in a large series, and to perform a review of the current evidence concerning such a treatment.
Methods: Consecutive patients diagnosed with partial colonic anastomotic leakage managed with endo-sponge placement were enrolled. The endo-sponge system was changed every 48–72 h as outpatient, until to cavity closure. Literature review was performed for pooled-data analysis.
Results: Twenty-five patients were enrolled, including 13 (52%) with diverting ileostomy. Following endo-sponge applications (median sessions: 9, range: 1–39; median treatment duration: 4 weeks, range: 1–32), a complete healing was achieved in 22 (88%) patients. Three (12%) patients developed a major complication (1 uretheric fistula, 1 ileal fistula, and 1 pararectal abscess), all successfully treated by surgery. Ileostomy closure was achieved in 11 (84.6%) patients. No mortality related to the procedure was observed. Overall, 174 patients treated with endo-sponge were reported in literature. By considering data of the larger 7 studies, a complete healing of presacral cavity was achieved in 131 (94.3%) out of 149 patients.
Conclusions: Our relatively large series of patients confirmed the efficacy, tolerability, and an acceptably low complication rate of endo-sponge therapy for colorectal anastomosis leakage treatment.

1. Introduction

Anastomotic leakage is a serious complication following colorectal surgery, and it is associated with early and long-term morbidity and mortality, with a rate ranging from 6% to 22% [1,2]. Anastomotic leakage following low anterior rectal resection occurs in up to 24% [2–4]. Patients with distal rectal anastomosis and those receiving neo-adjuvant radiotherapy or chemotherapy are at higher leak risk [5–7], with the need of a permanent stoma rate reaching 62% of cases [8]. Treatment of rectal cancer depends on cancer localization. Indeed, a partial mesorectal excision with a colorectal anastomosis is generally performed for proximal tumours, whilst a total mesorectal excision (TME) with a very distal colorectal or even colo-anal anastomosis is needed for mid and distal tumours [8]. In the restorative proctocolectomy for either ulcerative colitis or familial polyposis, the TME technique is generally applied followed by an ileo-anal pouch procedure. Following these surgical approaches, a large presacral cavity remains being not completely filled by the neorectum or the pouch. In the presence of an anastomotic leak, mucus and fluid accumulate in this cavity because of an insufficient drainage. While a small cavity may heal spontaneously, a larger cavity could become a chronic presacral sinus, which prevents the closure of temporary ileostomy. Indeed, when stoma closure is attempted in the presence of a persistent sinus, the function of the neorectum or pouch is often compromised [9,10]. Moreover, cancer development may occur in the chronic para-anastomotic sinus [11]. Available treatments for this presacral abscess cavity and subsequent sinus range from conservative approach, such as nasogastric suction, broad-spectrum antibiotic therapy and parenteral nutrition, to different surgical options [12,13]. The latter include resection of the failed anastomosis with or without a repeat anastomosis, laparotomy and

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transabdominal drainage with proximal defunctioning or instillation of agents, such as fibrin glue, aiming to occlude the cavity [14]. A minimally invasive alternative to these surgical strategies is to use endo-sponge therapy aiming to reduce the size of the sinus cavity, to limit pelvic sepsis, and to reduce the risk of a permanent stoma [15]. We reported a case series of patients with rectal anastomotic leakage managed with such an endoscopic approach. In addition, a systematic review of literature was performed.

2. Materials and methods

2.1. Patients

Consecutive patients presenting with anastomotic leakage following colorectal surgery, with or without protective stoma, who were managed with endo-sponge placement in a single centre (Istituto Clinico Humanitas, Milan) were included. After surgery, when an anastomotic leakage was suspected due to faecal discharge from wound or drain, fever, pelvic abscess, local peritonitis, discharge of pus per anus, a CT scan was performed to confirm diagnosis. Only patients with clinical signs and symptoms suggesting an inflammatory complication confined in the pelvis were included, whilst those with signs of a generalized peritonitis were excluded. In addition, patients with a complete anastomotic dehiscence were not enrolled. All patients received broad-spectrum antibiotics. In patients with protective stoma, parenteral nutrition was given when adequate oral food intake was not possible. In patients without a stoma, total parenteral nutrition was given with only clear fluids orally. At the first appearance of granulation tissue in the sinus cavity at endoscopy, oral diet was reintroduced.

2.2. Endoscopic procedures

We used a flexible standard gastroscope (GIF-100 Video Gastroscope; Olympus Corp., Tokyo, Japan) of 9.8-mm diameter, and a suction/operative channel of 2.8 mm, to determine the extension of anastomotic leakage and the degree of the dehiscence of the anastomotic circumference. The presence of the abscess cavity was assessed. We first proceeded to aspirate the enteric and purulent content, and then performed rinsing with sterile saline solution mixed with iodine solution, for a more radical clearance. After the length and size of the abscess cavity were clearly estimated, the size of the endo-sponge (an open-pored polyurethane sponge) was cut accordingly and was installed transanally. In detail, following endoscope introduction into the deepest point of the cavity, an over-the-scope plastic tube of 12 mm was advanced into the deepest point of the cavity. After withdrawal of the endoscope, the endo-sponge was inserted through the lubricated tube by using a pushing probe. This probe has a specific mark that indicates when the tip of the sponge has reached the end of the overtube, i.e. touches the surface of the cavity. At this time we retracted the overtube, hence releasing the sponge in the correct position. When the sponge was reduced in size to fit the volume of the cavity, the length of the pusher was recalculated accordingly. When the cavity was too large for one sponge, multiple sponges were placed. Thereafter, the sponge was connected to a low vacuum suction bottle (B-braun Redyrob Trans Plus® preloaded bottle with variable vacuum), creating a constant negative vacuum pressure of 150 mmHg. The correct positioning of the sponge was checked with the endoscope at the end of procedure. Because the anastomotic leak and the corresponding cavity has a high bacterial load, sterility of the procedure was not mandatory. The sponge dressing is provided sterile, but we used no sterile gloves and instruments for trimming and placing the sponge. The sponge system was changed every 48–72 h. The initial endoscopic placement was done in the left lateral position under deep sedation with propofol. The changing of the sponge system was usually done in conscious sedation with 5 mg midazolam i.v. The removal was facilitated by initial instillation of 10 ml NaCl 0.9% or more to dissolve the granulation tissue from the pores of the sponge, so favouring a painless extraction. The size of the sponge introduced was progressively reduced according to the decrease in the cavity size. The treatment was repeated until healing was achieved, that is when the cavity was less than 1 cm in diameter, and abandoned before complete healing only when a complication developed. After a few sponge exchanges most patients were discharged, and managed as outpatients. These patients returned to the hospital two times a week until abscess resolution. Informed consent was obtained from each patient before starting the endo-sponge therapy.

2.3. Literature search

Literature search were performed by using PubMed, with the only limitation of articles in English language published through July 2014. The following exploded medical subject heading terms were used: ‘anastomotic leakage and vacuum’, ‘anastomotic leakage and endosponge’, and ‘endosponge’. Boolean operators (NOT, AND, OR) also were further used in succession to narrow and widen the search. Only those studies concerning endo-sponge therapy for colorectal anastomotic leakages were considered. Titles and abstracts were reviewed, full articles of all relevant studies were retrieved, and manual searches of reference lists from identified relevant articles were also performed to identify any additional studies that might have been missed. When more than one publication from the same investigator or group was available, only the most updated version, including the entire sample size, was considered for this pooled-data analysis.

3. Results

3.1. Our series

Between September 2008 and October 2013, 40 (13.4%) out of 296 patients were diagnosed with an anastomotic leakage following colorectal surgery. Of them, 25 (Males: 18; Mean age: 67 years, range 37–89) patients were managed with endo-sponge placement in our centre, whilst the remaining patients were treated in different manner according to the size and location of the leakage as well as the patient condition. Of the 25 enrolled patients, 17 underwent open and 8 a laparoscopic approach. In detail, 19 patients underwent anterior rectal resection (18 rectal cancer; 1 rectal endometriotic nodule), 5 patients underwent left colectomy (4 left-sided colon cancer; 1 acute diverticulitis), whilst 1patient underwent proctocolectomy for severe ulcerative colitis.

Overall, 18 (82%) out of 22 patients who underwent colorectal resection for malignant disease received a preoperative radiochemotherapy (8 cases) or only chemotherapy (10 cases). A diverting ileostomy was performed in 13 (52%) patients. The anastomotic leakage extension ranged from near 70 to 270 degrees of the whole anastomotic circumference. The median dimension of the cavity, as assessed by endoscopic measurements or by CT-scan (3 cases), was of 56 mm (range 15–100 mm). The anastomotic leak was detected after a median of 17 days (range 0–102 days) after the surgical intervention. The endo-sponge treatment was applied after a median of 16 days (range 0–53 days) from anastomotic leakage detection. A median of one (range 1–3) sponges were used in the first session, and the median number of applications per patient was 9 (1–39 applications), for a duration of 4 weeks (range 1–32). One patient who developed an ileal fistula received only 1 endo-sponge treatment before undergoing surgical re-intervention. All