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## **CLOSURE OF ANASTOMOTIC FISTULA AFTER RECURRENT COLON CANCER AND PERITONEAL CARCINOMATOSIS USING ELASTIC BALLOON OBTURATION - CASE REPORT**

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### **ABSTRACT:**

*ANASTOMOTIC FISTULA IS A FREQUENT COMPLICATION THAT CAUSES MORTALITY AND VARIOUS MORBIDITIES, WITH AN INCIDENCE VARYING BETWEEN 6% AND 22%. THIS ARTICLE DESCRIBES A CASE REPORT OF A 51-YEAR-OLD WOMAN HOSPITALIZED FOR ASCENDANT COLON NEOPLASM FOR WHICH A RIGHT HEMICOLECTOMY WAS PERFORMED. AFTER 6 MONTHS SHE PRESENTED IN THE EMERGENCY SERVICE WITH INTESTINAL OCCLUSION AND PERFORMED SURGICAL INTERVENTION, WHICH DISCOVERED METASTASES AT THE LEVEL OF THE OLD ANASTOMOSIS AND PERITONEUM. ENLARGED ENTERECTOMY IS PERFORMED WITH ILEO-COLIC ANASTOMOSIS. IN THE 7-TH DAY OF THE SURGERY, THE PATIENT PRESENTS TO THE POSTOPERATIVE WOUND, INTESTINAL CONTENT AND IS DIAGNOSED WITH POSTOPERATIVE ANASTOMOTIC FISTULA. THE PATIENT IS TREATED USING THE ELASTIC BALLOON OBTURATION TECHNIQUE, WITH THE CLOSURE OF THE FISTULA AFTER 13 DAYS OF TREATMENT, CHANGING THE BALLOON MOUNTING 6 TIMES IN TOTAL, WITH A HOSPITALIZATION PERIOD OF 24 DAYS FROM ADMISSION TO DISCHARGE FROM THE HOSPITAL. ELASTIC BALLOON OBTURATION IS AN EFFICIENT METHOD OF CLOSING THE FISTULA, IN OUR CASE SUCCESSFULLY CLOSING ANASTOMOTIC FISTULA AFTER AN ANASTOMOSIS PERFORMED FOR A NEOPLASIA RECURRENCE WITH CARCINOMATOSIS*

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**KEYWORDS:** ANASTOMOTIC, FISTULA, OBTURATION, BALOON, CANCER, COLORECTAL, NLR

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## INTRODUCTION

Anastomotic fistula is one of the most common reported complications of colorectal surgery, being an important prognostic and predictive factor for early morbidity and mortality and tumor recurrence. The common risk factors are age, male sex, smoking, alcohol consumption, NSAIDs, diseases coronary heart disease, obesity, emergency surgery, difficult anastomosis and vascular compromise<sup>7</sup>. The incidence is between 6% in high volume centers up to almost 22%<sup>8</sup>. This variability is attributed to different types of resection and the level of anastomosis, so low anastomoses are reported as increased risk factors in anastomotic fistulas<sup>9</sup>. Some aspects of anastomotic fistula prevention include aseptic technique with gentle and careful dissection, stress-free anastomosis, precise suture placement, and adequate bowel blood flow<sup>10</sup>.

Chlorectal cancer surgeries performed in an emergency are associated with higher morbidity and mortality rates than in elective surgery<sup>11</sup>. Many studies confirm that emergency colorectal resection is inadequate with poor oncological results<sup>12</sup>.

Depending on the severity of the fistula, it is divided into three grades A, B, and C, respectively. Grades A and B may be administered non-surgical antibiotics and drainage, however, grade C usually requires reoperation and can lead to 3 or more complications, including mortality<sup>13</sup>.

Prevention of anastomotic leakage is very important, and precocity and management optimization decrease the consequences and can increase survival<sup>14</sup>.

## CASE REPORT

The case reported is a 51-year-old woman, with BMI 23.1, with hypertension, non-smoker, hospitalized (pre-planned, non-emergency) for ascending colon cancer diagnosed colonoscopically (adenocarcinoma G2), for which right hemicolectomy with ileotransverso-anastomosis LL, with favorable postoperative evolution, with a total number of 16 days of hospitalization.

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<sup>7</sup> C.Y. Kang, W.J. Halabi, O.O. Chaudhry, et al (2013) Risk factors for anastomotic leakage after anterior resection for rectal cancer. *JAMA Surg* 148 65–71; A. Vallance, S. Wexner, M. Berho, R. Cahill, M. Coleman, N. Haboubi, et al (2017) A collaborative review of the current concepts and challenges of anastomotic leaks in colorectal surgery. *Colorectal Dis.: Off. J. Assoc. Coloproctol. G. B. Ireland* 19 (1) O1–o12

<sup>8</sup> Freek Daams, Misha Luyer, Johan F. Lange (2013) Colorectal anastomotic leakage. Aspects of prevention, detection and treatment. *World J. Gastroenterol* 19 (April (15)) 2293–2297

<sup>9</sup> P. Matthiessen, O. Hallbook, M. Andersson, J. Rutegard, R. Sjobahl (2004) Risk factors for anastomotic leakage after anterior resection of the rectum. *Colorectal Dis* 6 pp. 462–469

<sup>10</sup> Kulaylat M, Dayton M. (2012) Surgical complications. In: Townsend C ed. *Sabiston Textbook of Surgery*. nineteenth ed. Philadelphia PA: Elsevier Saunders 281e327

<sup>11</sup> L. Lepre, A. Mero, G. Cancrini, B. Frezza, L. Venturini, S.M. Tierno, F. Tomassini, G. Costa (2009) Emergency colonic surgery: analysis of risk factors predicting morbidity and mortality. *Chir. Ital.* 61 (5) 565–571; O.H. Sjo, S. Larsen, O.C. Lunde, A. Nesbakken (2009) Short term outcome after emergency and elective surgery for colon cancer. *Colorectal Dis.* 11 733–9

<sup>12</sup> C.S. McArdle, D.J. Hole (2004) Emergency presentation of colorectal cancer is associated with poor 5-year survival. *Br. J. Surg.* 91 605–609; J. Kim, R. Mittal, V. Konvalian, J. King, M.J. Stamos, R.R. Kumas (2007) Outcome analysis of patients undergoing colorectal resection for emergent and elective indications. *Am. Surg.* 73 (10) 991

<sup>13</sup> B. Gessler, O. Eriksson, E. Angenete, Diagnosis (2017) Treatment, and consequences of anastomotic leakage in colorectal surgery, *Int. J. Colorectal Dis.* 32 (4) 549–556

<sup>14</sup> Dumitru Rădulescu, Cârțu Dan, Eugen Georgescu, Ion Georgescu, Valeriu Șurlin, Daniela Marinescu (2020) Anastomotic leakage and fistula after gastric and esophageal cancer surgery - a literature review. *Journal of Surgery* 16(1): 13-22

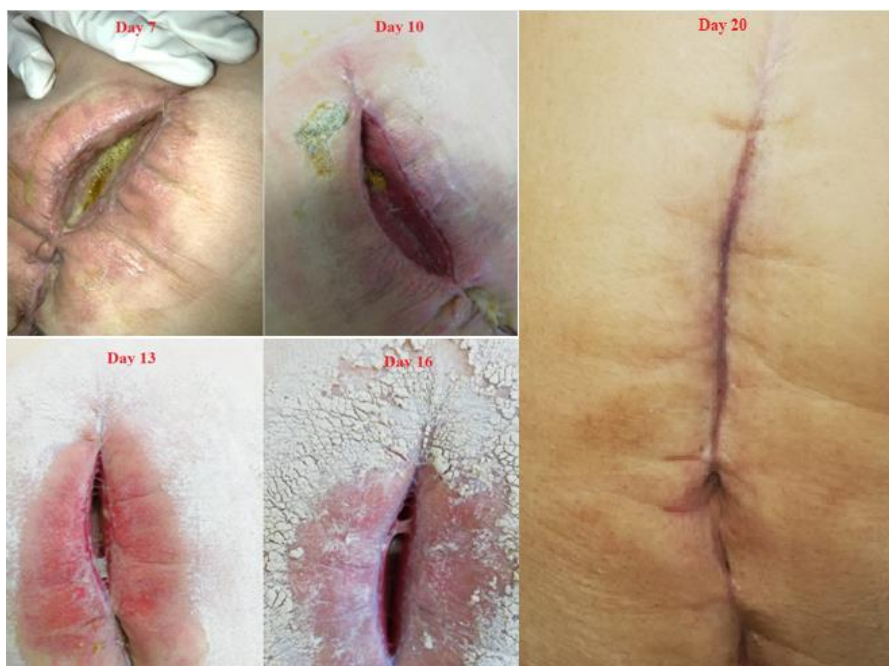
After 6 months, he presents to the emergency service with the cessation of intestinal transit for feces and gases, nausea, vomiting with intestinal contents, symptoms that appeared 48 hours ago, which intensifies in evolution; it performs CT without a contrast agent due to elevated creatinine levels. Imaging results in conjunction with clinical data confirm the diagnosis of intestinal obstruction.

Hydroelectrolytic balancing treatment is performed, after which emergency surgery is performed where metastases were found in the peritoneum with the ileum and the old anastomosis, which is why an enlarged enterectomy with ileocolic anastomosis L-L is decided and performed.

The initial postoperative evolution is favorable, with the appearance on the 7th day after the surgery of nausea, vomiting, blood pressure decrease, followed shortly by the appearance at the level of the wound of a secretion with intestinal contents, with remission of other symptoms.

The established fistula had an initial drainage of 400ml/day, and after its constitution, the treatment with elastic balloon with adjustable pressure was applied as a treatment, a technique used in the I Surgery Clinic from Craiova County Emergency Clinical Hospital for almost 3 decades, which underwent small changes during obtaining improved results in the treatment of fistula.

The balloon mounting was performed 6 times until the complete closure of the defect that occurred on the 20th day after surgery (Figure 1). The entire period of hospitalization was 24 days.



*Figure 1 - the evolution of the anastomotic fistula in time after the application of the method of obturation with elastic balloon*

### ***ELASTIC BALLOON OBTURATION TECHNIQUE – UPDATE***

The procedure closes the fistula by applying a pneumatic elastic balloon with adjustable pressure at the external orifice of the fistula; the balloon should extend beyond the edges of the fistula, dehiscent wound, or evisceration by 5-10 cm<sup>15</sup> (Figure 1).



Figure 1 – Placing the balloon on the projection area of the fistulous orifice that must extend at least 5-10 cm beyond the edges of the wound

### ***INDICATIONS OF THE METHOD***

The method is indicated in *anastomotic fistulas exposed in evisceration* and for those exposed to the surface without parietal trajectory or with very short trajectory, fistulas for which it is not suitable for other methods of conservative treatment. It is also useful in closing *gastrostomies or cecostomies*, thus avoiding reintervention, which in the vast majority of situations is not without complications. It is recommended to apply this method only in fistulas in which the intestinal transit is free and there are no acute peritoneal complications. It is necessary to use this method in fistulas that are not exposed by evisceration, with the mandatory condition of the existence of a constituted fistulous trajectory, isolated from the rest of the peritoneal cavity.

### ***WOUND PREPARATION***

A mechanical-chemical toilet is performed with debridement and removal of all beetles, with the removal of retentive sac bottoms (Figure 2A). The skin protects against the irritating action of the secretions externalized by the fistula using protective ointments in a thick layer, after which sterile compresses are applied, which also ensures the stability of the balloon on the wound (Figure 2B).

<sup>15</sup> I.Georgescu, R. Nemeş (1996) Obturation with an elastic balloon-the authors' procedure for the conservative treatment of external postoperative digestive fistulae. *Chirurgia* 45(4), 207-212



*Figura 2 A – mechanical-chemical toilet with debridement and removal of all beetles; B – application of thick protective layers on the skin and sterile compresses to ensure the stability of the balloon*

Applying sterile compresses to the wound and protective creams on the skin around the wound.

#### ***BALLOON FIXING AND MAINTENANCE***

After positioning the balloon, apply a circular sheet with a protective role to allow the fixing and holding of the balloon followed by a circular bandage with 15-20 cm gauze strips secured with adhesive tape or elastic band (Figure 3A).

The circular bandage should be tight enough to ensure the tightness of the balloon at the edges of the wound and to prevent the spread of fistulous contents but at the same time light enough not to be an extrinsic obstacle to intestinal transit and not to hinder the patient's breathing (Figure 3B ).



*Figura 3 A – Positioning the balloon according to the location of the fistulous orifice B - Fixing and holding the elastic balloon using a circular bandage*

If the assembly is well done, it is repeated at intervals of at least 4-5 days to allow the formation of stimulated granulation tissue and the reaction of "foreign body" to compresses soaked in disinfectants and healing substances.

<b>ADVANTAGES OF THE METHOD</b>	<b>INCIDENTS AND ACCIDENTS</b>
In the fistulas exposed in the evisceration and in the ones without trajectory, the elastic balloon plays the role of a "pack" that completes the lack of parietal substance, restoring the continuity of the digestive tract;	Method without major accidents and incidents;
In fistulas with a trajectory, the occlusion occurs by sliding the tissues due to the pressure exerted on the abdominal wall, realizing the obturation of the entire fistulous trajectory, not only of the external orifice;	Balloon displacement and loss of assembly tightness;
The method suppresses digestive losses by contributing to the recovery of the general condition, the disappearance of the septic syndrome, the healing of skin lesions;	Breaking the balloon by hyperpressure or as a result of the corrosive action of digestive juices on the balloon causing us to interpose a plastic foil between the balloon and the dressing;
It allows the resumption of the normal diet of the patient and the maintenance of an efficient intestinal transit;	Closure of the visceral lumen by objective hyperpressure by the appearance of a subocclusive syndrome (food intolerance, vomiting, abdominal pain, stopping intestinal transit), accident solved by restoring the assembly or partial decompression of the balloon.
The constant pressure at the level of the fistulous trajectory contributes to the spontaneous closure of the fistula without the possibility of the appearance of retentive secondary trajectories;	
It allows the immediate mobilization of the patient	
It is a method of conservative treatment of evisceration;	
The closure or chronicity of the fistula is obtained, with the creation of general local and biological anatomical conditions that allow a late reintervention to solve the fistula with minimal risks;	
The method is simple, economical and can be applied in any surgical service because it does not require special equipment.	
The duration of treatment is variable depending on the anatomo-clinical form - sometimes it is possible to close the fistula in 10-14 days other times the method is applied 2-3 months until the evisceration heals	

## DISCUSSIONS

The management of anastomotic fistulas should aim at the complete deviation of the fistula content<sup>16</sup> to collect the effluent, to protect the surrounding skin, and to stimulate the formation of granulation tissue, but with the maintenance of the fistulous orifice using different drainage procedures. Balloon closure plays the role of a "pack" that completes the lack of parietal substance, thus restoring the continuity of the digestive tract, reaching the

<sup>16</sup> Di Saverio S, Tarasconi A, Inaba K, et al. (2015) Open abdomen with concomitant enteroatmospheric fistula: attempt to rationalize the approach to a surgical nightmare and proposal of a clinical algorithm. J Am Coll Surg 220(3):e23–e33

closure of the entire fistulous tract, not only the external orifice, closing by sliding tissues due to pressure on the abdominal wall.

Unlike the negative pressure vacuum method which is expensive and has a risk of trauma and enlargement of the fistula<sup>17</sup>, the elastic balloon closure method is devoid of these complications, rarely showing mild side effects of too high restraint which can be adjusted immediately and can be applied in any surgical service because it does not require special equipment.

Peritoneal carcinomatosis has an increased morbidity of up to 30% when surgical treatment is applied, essentially corresponding to gastrointestinal suture dehiscences, intestinal perforations and fistulas, intrabdominal collections or abscesses and postoperative bleeding, 10% of patients requiring reintervention or several times<sup>18</sup>. In our case, the patient had a recurrence in the peritoneum with the ileum and the old anastomosis, which is why an enlarged enterectomy with ileocolic anastomosis LL is decided and performed, with a favorable initial evolution followed by the appearance of the anastomotic fistula on the 7th day after surgery.

Systemic inflammatory response can be measured by using the NLR (Neutrophil to lymphocyte ratio) surrogate as a cheap and widely available marker to predict the survival of cancer patients<sup>19</sup>. Several studies have shown that NLR values between 3 and 5 in colorectal cancer patients have been associated with poorer postoperative outcomes, burdened by numerous complications<sup>20</sup>. In our case the patient had at admission NLR=5,4 which showed that the patient had a pre-existing inflammatory status, thus presenting an increased risk of complications after colorectal surgery, in our case of anastomotic fistula.

Anastomotic fistula results in a complex wound with persistent inflammation of the granular tissue or surrounding skin due to persistent soiling and chemical irritants in the intestinal contents, local infection, sepsis, electrolyte imbalance and nutritional depletion<sup>21</sup>. Spontaneous closure of the fistula is unlikely in these patients, but using the elastic balloon technique we can control the discharge of intestinal contents and protect the wound and skin nearby, the patient can resume normal nutrition thus solving the biggest challenges in managing fistula patients.

The effluent characteristics of a fistula were evaluated and classified into low volume (<200ml / day, moderate (200-500ml / day) or high volume (> 500ml / day)<sup>22</sup>. In our case the maximum flow was 400ml / day, fitting in the fistula with moderate flow, with indication of

<sup>17</sup> Gunn LA, Follmar KE, Wong MS, Lettieri SC, Levin LS, Erdmann D (2006) Management of enterocutaneous fistulas using negative-pressure dressings. *Ann Plast Surg.* 57(6):621–625

<sup>18</sup> Losa F, Barrios P, Salazar R, Torres-Melero J, Benavides M, Massuti T, et al. (2014) Cytoreductive surgery and intraperitoneal chemotherapy for treatment of peritoneal carcinomatosis from colorectal origin. *Clin Transl Oncol.* 16:128–40

<sup>19</sup> Guthrie, G.J., Charles, K.A., Roxburgh, C.S., Horgan, P.G., McMillan, D.C., Clarke, S.J. (2013) The systemic inflammation-based neutrophil-lymphocyte ratio: experience in patients with cancer *Crit Rev Oncol Hematol* 88 218–230

<sup>20</sup> Malietzis, G., Giacometti, M., Askari, A., Nachiappan, S., Kennedy, R.H., Faiz, O.D. et al (2014) A preoperative neutrophil to lymphocyte ratio of 3 predicts disease-free survival after curative elective colorectal cancer surgery *Ann Surg* 260 287-292

<sup>21</sup> D'Hondt M, Devriendt D, Van Rooy F, et al. (2011) Treatment of small-bowel fistulae in the open abdomen with topical negative-pressure therapy. *Am J Surg* 202(2):e20–e24

<sup>22</sup> Bobkiewicz A, Walczak D, Smoliński S, et al (2017) Management of enteroatmospheric fistula with negative pressure wound therapy in open abdomen treatment: a multicentre observational study. *Int Wound J* 14(1):255–264



drainage, but without expected favorable results, given the peritoneal carcinomatosis and the clinical status of the patient.

The closure of the fistula took place within 13 days of its formation, despite the pre-existing peritoneal carcinomatosis and the fact that it was a fistula with medium flow (max 400ml / 24h).

Although the anastomotic fistula is associated with high morbidity and mortality leading to prolonged hospitalization and higher treatment costs with an increased risk of reoperation<sup>23</sup>, the balloon closure method proves its efficiency in terms of rapid patient recovery in just 13 days from the establishment of the fistula, as well as the reduced costs of hospitalization and treatment.

### **CONCLUSIONS**

Elastic balloon obturation is an effective method of closing the fistula, completely eliminating the loss of digestive secretions and their consequences, completely eliminating the loss of digestive secretions and their consequences, with perfect isolation of the fistula and removal of losses preventing irritation and ulceration. local and general consequences;

By making an elastic suspension of the abdomen, the method allows the mobilization of the patient and the resumption of nutrition in a natural way, regardless of the type of fistula, favoring the resumption of intestinal transit.

The positive pressure in the fistulous tract corroborated with the much lower pressure in the digestive lumen produces the absorption of fluids in the fistulous tract achieving better conditions for fistula healing, in our case managing to close an anastomotic fistula after an anastomosis performed after a recurrence of colorectal cancer with carcinoma and with an increased value of the systemic inflammation marker (NLR).

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<sup>23</sup> Cadeddu F, Salis F, Lisi G (2015) Complex anal fistula remains a challenge for colorectal surgeon. *Int J Colorectal Dis* 30: 595-603

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