

Total Resection of the Mesorectum with Laparoscopic Endo-Anal Pull-Through in the Treatment of Distal Rectal Cancer

Ressecção Total do Mesorreto com Abaixamento Endo-Anal Videolaparoscópico no Tratamento do Câncer do Reto Distal

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ABSTRACT

Objectives: To describe the technique of endo-anal pull-through of the rectum performed by a laparoscopic approach in a patient with adenocarcinoma of the distal rectum. We also present and discuss the various techniques of colon pull-through proposed to date. **Discussion:** Colo-anal anastomosis remains a challenge with implications for sphincter function. Many variations of the technique have been described and can be used provided they consider the clinical characteristics of the patient, the patient's personal choice, and the experience of the surgeon. Laparoscopy can be employed in pull through surgeries of the colon without the need for stoma or auxiliary incisions.

Key words: Laparoscopy. Rectal Neoplasms. Endo-anal pull-through.

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INTRODUCTION

Advances in the treatment of rectal cancer have enabled the reconstruction of bowel transit, even with the most distal tumors, without compromising survival. Laparoscopic surgery has evolved so that surgical trauma is minimal and recuperation faster and less painful. There is less risk of herniations or the formation of adhesions, beyond the aesthetic and immunologic benefits.

Ultra-low anastomosis performed with staplers, colonic pull-through and intersphincter resections are technical options in sphincter preservation that are reducing the need for perineal amputation and permanent colostomy.¹ More precise data and longer follow-up, however, are still needed to evaluate the impact of these procedures in terms of the rates of local recurrence and measures of sphincter function.

The low colo-anal anastomosis has several drawbacks. The occurrence of incontinence is

common and socially limiting. There is a greater technical difficulty and critical irrigation of the pulled-through colon. Fistulas occur in up to 20% of cases, and late complications include stenosis. These complications can lead to new surgeries, permanent or temporary colostomy, and increase the chance of cancer recurrence.² Stomata are typically considered temporary, and thus imply additional reversal surgery that is not without risks or complications. Additional hospitalizations for stenosis or anastomotic fistula are common. The impossibility of closing temporary stoma can reach 22% of cases.³ Technical innovations, such as the colonic pouch, have contributed to reducing complications and sequelae.^{4,5,6}

CASE DESCRIPTION

EMCJ, male, age 64, a native and resident of Curitiba, Paraná was treated for distal rectal adenocarcinoma first diagnosed two years ago. There

was no family history of cancer or polyps. He denied smoking and drinking. His past medical history included type II diabetes, hyperlipidemia and hypertension. He had undergone myocardial revascularization surgery and prostatectomy for benign prostatic hyperplasia; both surgeries were uneventful.

The patient was initially managed by another physician who recommended radiation and chemotherapy. The lesion was then staged as uT1N0M0 and the patient underwent local resection followed by adjuvant chemotherapy. Fourteen months later, follow-up tests revealed a new lesion in the distal rectum associated with an elevated carcinoembryonic antigen (CEA) level. Colonoscopy revealed a new elevated sessile lesion in the scar of the previous local resection which was biopsied. Several small polyps were also identified in the left colon and were resected endoscopically. The anatomic pathology confirmed the lesion of the rectum as moderately differentiated adenocarcinoma and described the polyps as tubular adenomas without high-grade dysplasia. One metastatic lesion was diagnosed in the upper lobe of the left lung and another in the liver.

The patient underwent a PET-CT, which revealed hypermetabolism in the left posterolateral wall of the lower rectum and anal canal, a liver metastasis in segment VIII, and a lung metastasis in the superior segment of the left upper lobe. After administration of a new chemotherapy regimen, there was complete regression of hepatic lesion, but the left apical pulmonary nodule persisted.

In our care, the patient was staged again using endorectal ultrasonography and MRI as yT3N0M1. On examination, the patient was in good general condition, had a ruddy complexion and was well hydrated. The abdomen was flat, soft and non-tender. There were no palpable masses. Visual inspection of the anal canal was normal; on digital rectal examination, however, a hard fixed posterior lesion, located approximately 3.5 cm from the anal margin was palpable.

Surgical Procedure

The patient was placed in Lloyd-Davies position under general anesthesia. Four trocars were placed: right flank, right iliac fossa, left flank, and the optic in the umbilical position. We ligated the inferior mesenteric artery and vein at their origins and dissected the splenic flexure. This was followed by

dissection of the rectum respecting the planes and sections of the Total Mesorectal Excision (TME). For this case of a male patient, with a long and narrow pelvis, a Pfannenstiel incision was necessary, so we could advance the TME to the level of elevators in all of the quadrants.

In the perineal approach we injected adrenaline solution (at a concentration of 1:200,000) into the submucosa of the distal rectum and anal canal. We dissected the submucosa in its entire circumference and sectioned the distal rectum 2 cm below the tumoral margin, aiming to preserve most of the sphincter muscles, without violating the oncologic limits.

The rectum and colon were then pulled and exteriorized transanally (Figure 1). The sigmoid colon was sectioned and attached to the anal canal with separate nonabsorbable sutures. A compressive dressing was applied to the exteriorized colonic stump.

The patient had an uneventful postoperative course despite the development of small areas and foci of necrosis in the colonic stump. The necrotic areas were debrided every other day or as needed. The patient evolved without abdominal complaints and had several pasty evacuations per day until the 30th postoperative day, when we performed the amputation of the colonic stump suturing the colon to the anal canal, with separate absorbable sutures. On the same occasion, the patient also underwent resection of the pulmonary nodule by open thoracotomy.

The patient had a favorable postoperative course. The patient reported pasty stools with an incontinence score of 15 using the **Cleveland Clinic Florida fecal incontinence score** system. The



Figure 1 - Exteriorized colonic stump.

patient uses garment liners as a precaution, but reports fecal incontinence only at night.

DISCUSSION

There are several procedures that can be used to treat cancer of the medial and distal rectum. It is up to the surgeon to choose that which is best suited to the case in question. It is therefore important that the surgeon know the different techniques available so that the treatment of each case can be individualized.

Several surgeons contributed to making the ultra-low colo-anal anastomosis feasible and safe. In the late nineteenth century, Maunsell developed a colon pull-through operation with inversion of the rectum, resulting in a delayed colorectal anastomosis. In 1902 Weir modified the Maunsell operation, using an abdominal approach. The colonic stump remains exteriorized for 12 days (on average), to then be resected and reintroduced into the pelvic cavity. The technique of rectosigmoidectomy with delayed anastomosis was modified by Turnbull (Cleveland Clinic) and by Cutait (São Paulo University) in 1961.^{7,8} It is used for treatment of both rectal cancer and acquired megacolon. After mobilization of the entire colon and rectum by an abdominal approach, the rectum is everted and sectioned 3-4 cm from the pectineal line.

The pull-through is then accomplished by telescoping the colorectal segment which is attached to the edge of the sectioned rectum. After 2 to 3 weeks the stump is amputated close to the anus and the colonic mucosa is sutured to the rectum. Recent results of 67 patients who underwent the Turnbull-Cutait pull-through, report the occurrence of fistulas in 7% and failure of the surgery in 25% (16% stenosis and prolapse in 7%).⁹

In 1932, Babcock proposed the transanal pull-through and the Parks proposed the primary colo-anal anastomosis. In 1999 Baulieux described delayed colorectal anastomosis performed one week after the primary procedure.² In 1940, Correa Netto¹⁰ was the first Brazilian to perform the pull-through operation after intersphincter perineal amputation of the rectum. The technique was used for the treatment of acquired megacolon.

In 1948 Swenson and Bill¹¹ proposed the abdominoperineal rectosigmoidectomy with removal of the colon distended by eversion and section of the

rectum through a perineal approach, followed by telescoping of the colon. The anastomosis was performed through a perineal approach 2 or 3 cm from the pectineal line, followed by introduction of the colonic stump in the pelvic cavity.

In 1959 Mandache used the endoanal pull-through of the colon when a cuff of rectal mucosa extending 3 to 4 cm above the pectineal line was resected and the colon pulled-through inside this rectum devoid of mucosa, which allows adhesion of the muscle of rectum to the serosa of the pulled-through colon. The colonic stump remains exteriorized for 18 days.¹² This technique was used by several authors.

In Brazil, this technique was performed by Mendonca, Simonsen, and Raia in cases of megacolon and by Habr-Gama for rectal cancer.¹³⁻¹⁶ Similarly Vasconcelos in 1961 performed an abdominoperineal rectosigmoidectomy through an abdominal approach, removing the rectal mucosa up to the anal canal and pulling the colon down into the rectum.¹⁷ A similar technique was described by Soave in 1963.¹⁸

In 1956 Duhamel¹⁹ introduced the retro-rectal pull-through surgery, which preserves the rectum. The operation entails the detachment of the retro-rectal space to the level of the levator muscles of the anus, sectioning and closing the rectum at the level of the peritoneal reflection, and preparing the vascular arcade of the segment of the colon to be pulled through. Using a perineal approach, a posterior submucosal detachment is performed, respecting the sphincter apparatus to the level of the puborectal ligament of the elevator muscle of the anus. Then an opening is made in the muscular wall of the rectum at this level, thus reaching the pre-sacral space through which the colon is pulled through. Altmeier and Martin (1962), Grob (1960), and Haddad (1968) proposed modifications to Duhamel's original technique.^{20, 21, 22}

These are surgical techniques that were described 80 years ago, but seem to have been forgotten. They do not pose oncologic risks, do not require a protective ileostomy, and can avoid the mini-incisions typical of laparoscopic surgery.

For the patient in question, we opted for the endoanal pull-through of the colon. This technique was described by Mandache and used by Habr-Gama.^{12, 16} The postoperative course was uneventful. The endo-anal pull-through of the colon does not require

a protective colostomy or ileostomy, because a perineal colostomy is performed. Important oncologic details such as the ligation of the inferior mesenteric artery at its origin and total mesorectal excision must be respected. The release of the splenic flexure is critical, as is the certainty of preserving a marginal arcade to assure an adequate vascularization of the segment of the colon pulled through. These are important details that impose additional technical difficulty when the operation is performed laparoscopically.

The most feared complication is necrosis of the pulled-through segment of the colon which can progress to infection of the pelvic cavity, with abscess and fistula formation. Any suggestion of such necrosis requires urgent revision of the pull-through. With a viable pulled through colon the anastomotic dehiscence rate is very low. Adhesion occurs between the serosa of the pulled-through colon and the muscle of the rectum.

The adhesion scar between the serosa of the pulled-through colon and the muscle of the rectum should be complete around the entire circumference and firm. The cutting and suturing is performed 2 to 3 cm from the anal verge.

Delaying the colo-anal anastomosis is primarily a way of avoiding the risks associated with the high rates of fistula and stenosis after primary suture, complications that frequently result in permanent colostomy. Technical advances and progress in pre-and postoperative care have decreased the incidence of complications, but the low colo-anal anastomosis continues to have disappointing statistics. In the 1960s the incidence of anastomotic leaks after a rectosigmoidectomy was as high as 42%. This rate has declined to up to 20% in recent publications.² To avoid severe septic complications most surgeons prefer to perform a protective ileostomy.

New techniques and materials have emerged, but most are still undergoing clinical evaluation. Anastomoses using compressive, biodegradable, or magnetic (magnooanastomosis) rings or clips; doxycycline-coated sutures; staple-line reinforcement by banding or using an electric welding anastomosis system have been described.^{5, 23}

Fecal incontinence is also more common in patients who undergo resection with rectal

anastomoses below 6 cm from the anal margin, occurring in up to 60% of these patients.²⁴ Inverted double stapling can lower the risk of incontinence caused by excessive dilation during placement of instruments with possible damage to autonomic nerves. Resection of the transitional zone, hemorrhoids, or part of the internal sphincter, as well as pre-operative radiation therapy, all can contribute to the incontinence frequently observed post-operatively. The risk of incontinence (also present in cases of primary colo-anal anastomosis) is frequently reported as temporary, especially in the first year after surgery.²⁵ By the 60th postoperative day the patient, using 2-4 mg of loperamide daily, reported having one bowel movement a day. Although the fecal incontinence he reports is exclusively nocturnal, he chose to use a garment liner as extra protection during the day.

We elected an anastomosis technique by second intention approximately 30 days after excision of the mesorectum. The delayed anastomosis performed on the 6th postoperative day reported anastomotic fistulae occurring in only 3% of cases.² Facy e cols. operated 17 patients with anastomosis performed on the 5th postoperative day. They described one case of ischemia of the pulled-through colon, two deep pelvic abscesses, and one fistula connecting the colo-anal anastomosis and the vagina.²⁶

Our publication aims to demonstrate the laparoscopic application of the endo-rectal pull-through. The delayed colo-anal anastomosis is safer, since, practically speaking, there is no risk of fistula. There is also no need for protective colostomy or ileostomy. It is an alternative to perineal amputation of the distal rectum, as long as it does not increase the risk of cancer recurrence. And there is still the possibility of removing the tumor through an anal approach, completing the procedure without incisions other than the usual trocar punctures.

Preserving the oncologic principles, the laparoscopic endo-anal pull-through is technically feasible and a reasonable option, especially in patients at risk for anastomotic complications or who refuse a protective stoma.

RESUMO

Objetivos: Descrevemos a técnica do abaixamento endo-anal do reto realizado por acesso laparoscópico em um paciente portador de adenocarcinoma do reto distal. Também apresentamos e discutimos as várias técnicas de abaixamento do cólon propostas até o momento. **Discussão:** A anastomose colo-anal permanece um desafio com implicações na função esfíncteriana. Muitas variações técnicas foram descritas e podem ser utilizadas desde que respeitem critérios considerando as características clínicas do paciente, opção pessoal do paciente e a experiência do cirurgião. A videocirurgia pode ser empregada também nas cirurgias de abaixamento do cólon, sem a necessidade de ostomia ou de incisões auxiliares.

Palavras chave: Laparoscopia. Neoplasia retal. Abaixamento endo-anal.

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