



The pull-through procedure: a new role for an old operation

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In the last 20 years major evolution has occurred in the treatment of low rectal cancer. Surgical treatment of low rectal cancer has evolved from abdominoperineal resection to proctectomy with total mesorectal excision (TME) and coloanal anastomosis (CAA). Currently, with advances in rectal anastomosis techniques, sphincter saving operations have become the standard for upper and middle rectal cancers. In case of very low rectal carcinomas, two major techniques have been used: an anterior resection with coloanal anastomosis (CAA) or an abdominoperineal resection (APR) with permanent colostomy and perineal reconstruction. Today we know that, in selected patients, a CAA does not compromise oncological outcome. (1)

Introduction of neoadjuvant chemo radiotherapy increased the rate of CAA for rectal cancer. (2-4) The main drawback of CAA is the risk of leakage which is reported to occur in 2.9%- 20% of cases. (5,6)

Patients undergoing CAA may have many adverse effects in bowel function, the presence of a low anastomosis results in incontinence, urgency or evacuation difficulties in up to 50% of the patients. (8,9)

For this reason many different methods of reconstruction have been evaluated to improve bowel function as a colonic j-pouch or a coloplasty or an end to side anastomosis. Colonic j pouch has been shown to be better than a straight anastomosis in the first 2 years postoperatively. (9,10)

Pelvic irradiation also has been reported to increase complications associated with CAA resulting in stricture (17%), abscess (4%), fistula (3%), bowel obstruction (6%) and fecal incontinence (8%). (8,9)

After radiotherapy a coloanal anastomosis has a failure rate of 24% with the need of permanent diversion stoma. (11)

In order to reduce the incidence and mortality of anastomotic leakage a prophylactic covering stoma is mandatory. (12) However also a prophylactic stoma can result in minor or major complications in 10% of the cases. (13, 14)

For these reasons we decided to use an old surgical technique avoiding the diverting stoma: the abdominoperineal pull-through (PT) resection with delayed coloanal anastomosis.

The pull-through (PT) technique for rectosigmoid cancer was first described in 1932 by Babcock. (15) In 1950 Swenson (16) described an abdominoperineal pull-through resection with immediate colorectal anastomosis used for benign and malignant lesions of the rectosigmoid area and rectum. Due to a high incidence of anastomotic leakage and pelvic infection a delayed anastomosis was used by Turnbull (17,18) for rectal cancer as well as in children with Hirschsprung's disease. In Brasil Cutait used the delayed anastomosis technique in patients with Chagasic megacolon. Nowadays, with the advent of stapling devices the trans-anal Kight-Griffen anastomosis is the first choice for sigmoid and rectal cancer. (19)

Pull through is reserved for patients with intra operative breakdown of the anastomosis or with complex pelvic problems such in salvage procedures.

We propose the pull-through technique with delayed anastomosis as an alternative to coloanal anastomosis with prophylactic stoma in patients with ultralow rectal cancer needing a CAA as a standard procedure in order to reduce the complication rate of the latter procedure.

Patients Selection

Inclusion criteria for the pull-through technique are malignant low rectal cancer without

sphincter involvement requiring an ultra-low anastomosis.

Exclusion criteria are fecal incontinence (any grade) and anal sphincter dysfunction before surgery and cancer sphincter involvement.

A patient database is prospectively set up. Preoperative assessment include digital rectal examination and multidisciplinary evaluation in oncological patients that include endorectal ultrasonography, pelvis MRI and total body CT scan. Also Wexner continence score (20) is recorded for any patient. Patients affected by T4 rectal cancer, cancer involving sphincter muscle or advanced disease are excluded.

All patients are classified by American Society of Anesthesiology score (ASA score). Post operative complications (complications occurred within 30 days from surgery), post operative mortality (exitus within 30 days from surgery) and technical failure (patients who required a definitive stoma) are recorded.

The criteria for laparoscopic or robotic access is no local advanced tumor and no general contraindications

Operative Procedure

All patients receive antibiotic prophylaxis with metronidazole and cefalosporine 30 minutes before surgery.

Surgical procedure is performed in Lloyd-Davies position with an abdominoperineal approach. General anesthesia is performed in all patients. Abdominal phase begins with colonic dissection, division of inferior mesenteric vessels and complete take down of colonic splenic flexure. Total Mesorectal Excision with rectal dissection down to the pelvic floor is performed in all patients. Perineal phase begin positioning an anal retractor (Lone Starr®) to perform a circumferential mucosectomy at the level of dentate line, then the rectum is dissected up to the level of the abdominal resection. Rectum and sigmoid are pulled through the anal canal. After an abdominal control to be sure of a "floppy" colon positioning, a 10 centimeter's long colonic segment is left outside the anal canal. Colonic wall is fixed with 4 stitches at the dental line. A pelvic drain is inserted through the abdomen.



The colon resection and coloanal anastomosis are performed between fifth and tenth postoperative day.

With patient in lithotomic position in general or spinal anesthesia an anal retractor is positioned. Then after the resection of the pull-through segment a manual coloanal anastomosis is performed. Between the two surgical procedure colonic segment is daily detected to check on any colonic necrosis.



We do not perform any prophylactic stoma in this surgical procedure.

Clinical examination, CEA level and chest and abdomen CT scans and Wexner continence score every 6 months in the first two years and once a year until the fifth year are performed as a standard follow up.

Discussion

Turnbull and Cutait in their studies reported a comparison between delayed and immediate anastomosis that showed less serious complications in delayed group. (17, 21) Pull through (PT) procedure with delayed coloanal anastomosis seems to have lower complication rates compared with direct coloanal anastomosis. (22) Surveys about PT procedure describe fistula rates ranging from 0 to 7 % and pelvic abscess rates from 2 to 7%. (22) There are not prospective studies but the Cleveland Clinic Foundations published a retrospective study with 100 cases of delayed coloanal anastomosis with good oncologic

results, a post operative mortality rate of 3% and a morbidity rate of 36%. (22) The median Wexner score was 10 in the first postoperative year but improve to 7.8 after the second year. (22)

Remzi et al. in 2009 published another retrospective study comparing CAA and PT procedure and demonstrating that long term functional outcomes are comparable. (23) Incidence of anastomotic leakage and pelvic sepsis was higher after CAA. (17, 21, 23) Bowel function evaluated with Wexner Score and quality of life evaluated with SF36 were comparable into two groups. (23)

Conclusions

In conclusion the potential advantage of a PT technique are the following:

1. There is no need for a diverting stoma with no complications related to the closure of ileostomy
2. There seems to be far less anastomotic complications as compared with CAA (mainly leakage and subsequent stenosis). This, in turn, may translate in better functional results for function is strictly related to early morbidity.
3. When using laparoscopic or robotic technique the PT procedure will lead to the so called "no scar surgery" (specimen extraction through the anus and no need of ileostomy). This may be important for selected patients (young ladies, fashion models, etc).

4. The procedure may be considered a first choice for patients scheduled to receive a CAA but at high risk for complications.
5. Finally in case of intra operative coloanal anastomosis break down the PT procedure may allow good salvage surgery.



Why a Pullthrough?

- ❑ No diverting stoma
- ❑ < anastomosis complications compared with CAA (with related better functional results?)
- ❑ "No scar" surgery (if laparoscopic or robotic)
- ❑ First option in patients at high risk for complications
- ❑ Salvage surgery in previous coloanal break-down

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