



Case Report

Double barreled wet colostomy. Case report and description of the surgical technique

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ABSTRACT

Pelvic exenteration has showed to be beneficial therapeutically and palliatively in locally advanced colorectal cancer. Reconstruction of urinary transit posterior to a cystectomy has always been challenging with many associated complications. We present a 58-year-old male with locally advanced rectal cancer in which a pelvic exenteration and a double-barreled wet colostomy (DBWC) was created for urinary reconstitution. We present the surgical technique of DBWC. DBWC is a good alternative to other urinary reconstructions because fecal and urinary derivation occurs in only one stoma, the stoma output is easier to manage, and fewer complications are seen compared to other urinary reconstructions. Long-term surveillance is mandatory in patients with a DBWC because there is an increased risk of neoplasm in the reservoir.

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Colostomia úmida em dupla-boca. Relato de caso e descrição da técnica cirúrgica

RESUMO

A exenteração pélvica mostrou-se benéfica, tanto terapêutica quanto paliativamente, em casos de câncer colorretal localmente avançado. A reconstrução do trânsito urinário após uma cistectomia sempre foi desafiadora, com muitas complicações associadas. Os autores apresentam o caso de um homem de 58 anos de idade com câncer retal localmente avançado, submetido a uma exenteração pélvica e uma colostomia úmida em dupla-boca (CUDB) para reconstituição urinária. Os autores apresentam a técnica cirúrgica da CUDB, uma boa alternativa para outras reconstruções urinárias, já que a derivação fecal e urinária ocorre em

Palavras-chave:

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apenas um estoma, a saída do estoma é mais fácil de gerenciar e o método apresenta menos complicações em comparação com outras reconstruções urinárias. A vigilância a longo prazo é obrigatória em pacientes com CUDB, pois há um risco aumentado de neoplasia no reservatório.

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Introduction

Up to 37% of new colorectal cancer cases are diagnosed with locally advanced disease with invasion of surrounding structures. Pelvic exenteration was described since the 1940s as a procedure for treating and palliating gynecologic cancer.^{1,2} Advances in perioperative management and in surgical technique allow performing more radical procedures in pelvic surgery.

Historically, pelvic exenteration has a 50% morbidity and 10% mortality.³ Multi-visceral resection in colorectal cancer has shown to increase overall survival and it might be useful as a curative or as a palliative alternative.^{3,4}

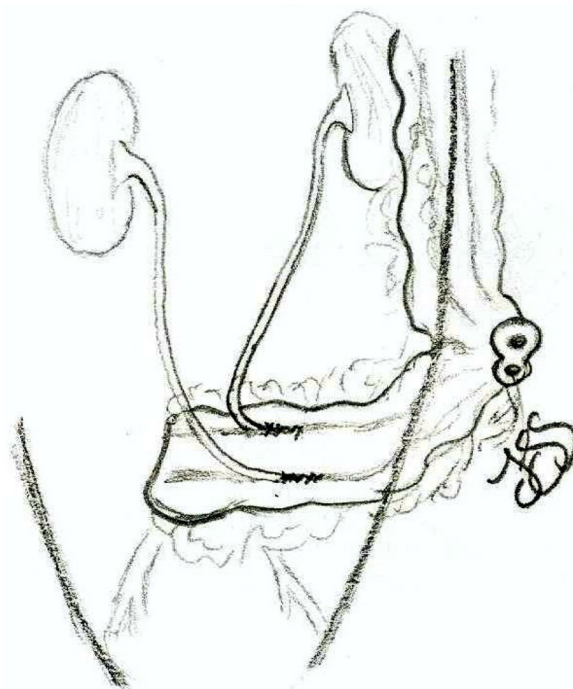
One of the most common difficulties surgeons have to deal with in pelvic exenterations is the reconstruction of the urinary transit after a cystectomy.

Clinical case

58-year-old male referred to our hospital for surgical treatment. As important medical past history, he had systemic hypertension with medical treatment. He was diagnosed with a locally advanced rectal adenocarcinoma, metastatic to the liver. He had a tumor in the mid-rectum that involved the prostate and the vesical trigone with associated periprostatic abscesses. Before being referred to our hospital, he had a loop sigmoid colostomy as a fecal derivation mechanism for treating the pelvic abscesses. He was staged as cT4N2M1 and started chemotherapy (capecitabine and oxaliplatin) and radiotherapy (up to 50.4 Gy). In the 10th week of neoadjuvant therapy, we did a pelvic exenteration and reconstructed the urinary transit with a double-barreled wet colostomy (DBWC). He had a surgical wound infection (pelvic wound) that was treated with negative pressure therapy with good response. He went home after three weeks. The pathological report staged the disease as ypT3N0M1. 10 months later, the patient has had no urinary or stoma complications. In his last imaging study, two metastatic pulmonary lesions appeared, and he decided to be treated with palliative care.

Surgical technique

Mechanical bowel preparation a day before surgery is done. Once the pelvic dissection is started, we try to maintain the most length of both ureters always respecting an oncological resection (R0). Sigmoid colon and descendent colon are completely liberated, and the splenic flexure is taken down. The left ureter is dissected from the retroperitoneal tissue up to the



Picture 1 – Colonic segment that will be used as urinary reservoir.

suspensory ligament of Treitz. The right ureter is dissected in the same way. It is important to maintain the periureteral fat intact to avoid ureteral ischemia or stenosis.

To prepare the colonic segment that will be used as a reservoir, a 15–20 cm distal segment is chosen, and a mesenteric window is created through which a tutor is passed. This place will be the stoma at the end of the procedure (Picture 1). A taenia is incised approximately four cm in a longitudinal fashion until submucosa is exposed. The submucosal plane is dissected in both sides (Fig. 1). The right ureter is cut tangentially making its circumferential diameter of 1 cm. In a retrograde fashion, a catheter is introduced in the ureter. Afterwards, a 1 cm incision in the colon through the mucosa is done, the catheter is introduced into the reservoir and through the colotomy, and the distal part of the catheter is retrieved. An end to side ureter-colonic anastomosis is created using simple stitches of polydioxanone 4–0. Stitches include mucosa and submucosa from the colon and total tissue from the ureter (Fig. 2).

Once the anastomosis is finished, as an anti-reflux mechanism, the ureter is tunneled in the submucosa space created in the colonic taenia. We used monofilament 4–0



Fig. 1 – Dissection of colonic taenia.

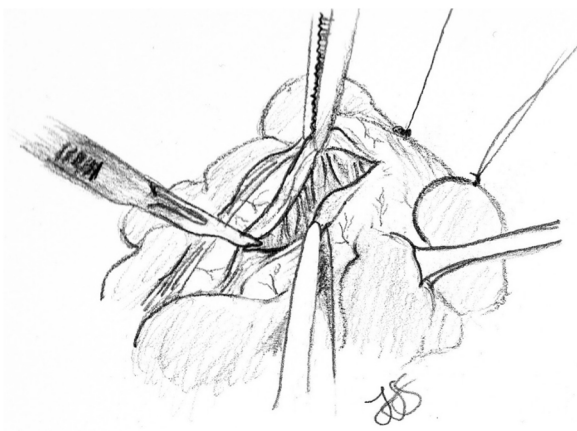


Fig. 2 – Ureter-colonic anastomosis.

for this step (Leadbetter technique). Finally, the left ureter is approximated below the mesocolon and the anastomosis is fashioned in the same way as done with the right ureter. (Fig. 3).

The abdominal wall is incised and the colon, with the tutor, and both exteriorized catheters are pulled through the incision. The reservoir is fixed with simple sutures to the retroperitoneum to avoid tension in the ureter-colonic anastomoses. A drainage is fixed towards the reservoir and another is placed in the pelvis. Once the laparotomy incision is closed, we create the stoma, everting the proximal end as most as we can, this way excluding the distal end (Fig. 4).

We usually start enteral nutrition on the first post-operative day. We do a urography in the seventh post-operative day and after that take out the drainage. The ureteral catheters are maintained in their position for three more weeks.

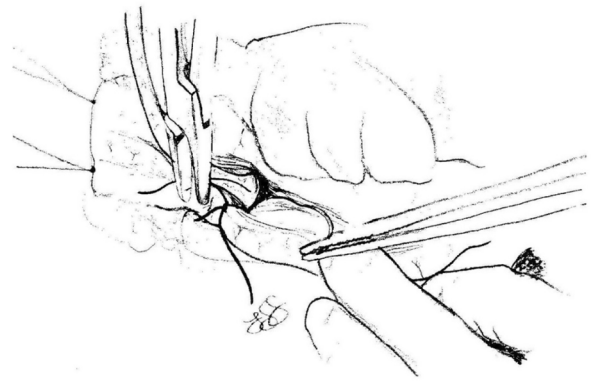


Fig. 3 – Ureter being tunneled in taenia's muscular layer.

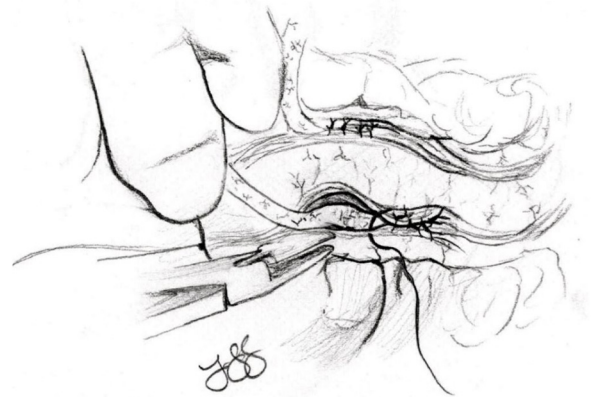


Fig. 4 – Finished double-barreled wet colostomy.

Discussion

In 1948, Alexander Brunschwig described pelvic exenteration in advanced cervical cancer with radical hysterectomy and cystectomy.^{2,3} Appleby in 1950 described eight cases with rectal cancer who had a posterior pelvic exenteration.¹ Brunschwig reported the first cases of a ureter-colonic anastomosis after a pelvic exenteration in 1948.⁵ In the 1950s, Appleby also described a ureter-colonic anastomosis. Brintall and Folcks described a ureter-colonic anastomosis joining the right ureter to the cecum and the left ureter to the descending colon.⁴ These procedures had many complications including septic urinary infections and difficult management of the stoma since the output is in a completely fecal liquid state.

In 1940, Bricker described the use of an ileal conduit to replace the bladder.⁶ This new procedure was quickly adopted as the standard of care in the reconstitution of the urinary transit posterior to a radical cystectomy.

Patients that are candidates for pelvic exenteration usually have many co-morbidities: malnutrition, current steroid therapy, chemotherapy, radiotherapy, and many others. All of these risk factors and a radical procedure with its own morbidity (pelvic exenteration) have all by itself many complications. If we also add a Bricker ileal conduit plus a fecal stoma then the patients must manage two stomas. Stomas have a negative psychological effect on patients and this, and reducing morbidity, has led surgeons to look for new alternatives.⁷ In 1989,

Carter redesigns the surgical technique of a wet colostomy. He described the DBWC in a patient who had a sigmoid loop colostomy with a colo-vesical fistula secondary to radiotherapy. The patient did not want to have a second stoma.⁸

The wet colostomy first described by Brunschwig had many metabolic and infectious complications associated with a stoma very difficult to manage (liquid output). The DBWC modified by Carter in 1989, separates the fecal material from the urinary output, therefore there are less urinary septic complications, and stoma management is easier because instead of having a liquid fecal production the patient has a continuous urinary production and a semi-formed fecal production. In addition, since it is only one stoma, patients accept this procedure more than surgeries involving the creation of more stomas.⁹

DBWC is used in pelvic exenteration for gynecologic, urologic or colorectal cancer.^{2,3,8-14} Large groups have demonstrated the safety of this surgery and are even extending the age limit, doing surgery on octogenarian patients.^{2,9-14}

Several complications have been associated to urinary diversion. In the early post-operative period, septic complications from pelvic abscesses or fistulas are reported frequently.^{7,15} Ureter-colonic complications might present in the early (fistula) or late (stenosis) post-operative period. Calculi might form in the urinary reservoir. Perineal wound infection, post-operative ileus, vascular access infection, among other complications have been reported in this type of procedure.^{2,3,9,12-14} Metabolic acidosis is another possible complication in patients with a urinary reservoir.^{7,9,16}

Perioperative mortality for this type of surgery is reported from 0% to 11.56%.^{2,3,9-15} Intestinal Urinary reservoirs have been associated with an increased risk of cancer at the ureter-colonic anastomosis.^{16,17} A long-term surveillance is mandatory. This risk might be increased up to 500-700 times that in the general population. Up to 40% of patients with a ureter-sigmoid anastomosis will develop polyps. The mechanism might be associated with nitrosamines produced by bacteria present in the reservoir.^{16,17}

Lopes de Queiroz using the QLQ-C30 survey, analyzed quality of life in 5 patients with DBWC and reported a high level of functional results and better global health status.¹⁸

Conclusion

Pelvic exenteration with DBWC to reconstruct urinary transit is a safe procedure and is well tolerated by patients. A prospective, randomized, comparative study between urinary reservoirs and the DBWC would give significant information with regards quality of life. Due to the risk of neoplasm in the reservoir, a long-term vigilance is mandatory.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

- Lopez MJ, Spratt JS. Exenterative pelvic surgery. *J Surg Oncol*. 1999;72(2):102-14.
- Guimaraes GC, Ferreira FO, Rossi BM, Aguiar S Jr, Zequi SC, Bacheaga W, et al. Double-Barreled wet colostomy is a safe option for simultaneous urinary and fecal diversion. Analysis of 56 procedures from a single institution. *J Surg Oncol*. 2006;93:206-11.
- Gannon CJ, Zager JS, Chang GJ, Feig BW, Wood CG, Skibber JM, et al. Pelvic exenteration affords safe and durable treatment for locally advanced rectal carcinoma. *Ann Surg Oncol*. 2007;14(6):1870-7.
- Lopez-Cano M, Mañas MJ, Hermosilla E, Espín E. Multivisceral resection for colon cancer: analysis of prognostic factors. *Dig Surg*. 2010;27(3):238-45.
- Brunschwig A. Complete excision of pelvic viscera for advanced carcinoma: one stage abdominal operation with end colostomy and bilateral ureteral implantation into colon above de colostomy. *Cancer*. 1948;1:177.
- Bricker E. Bladder substitution after pelvic evisceration. *Surg Clin North Am*. 1950;30:1511-21.
- Farnham SB, Cookson MS. Surgical complications of urinary diversion. *World J Urol*. 2004;22:157-67.
- Carter MF, Dalton DP, Garnett JE. Simultaneous diversion of the urinary and fecal streams utilizing a single abdominal stoma: the double-barreled wet colostomy. *J Urol*. 1989;141(5):1189-91.
- Carter MF, Dalton DP, Garnett JE. The double-barreled wet colostomy: long-term experience with the Hirst 11 patients. *J Urol*. 1994;152 Pt 2:2312-5.
- Takada H, Yoshioka K, Boku T, Yoshida R, Nakagawa K, Matsuda T, et al. Double-barreled wet colostomy. A simple method of urinary diversion for patients undergoing pelvic exenteration. *Dis Colon Rectum*. 1995;38(12):1325-6.
- Osorio Gullón A, de Oca J, López Costera MA, Virgili J, Ramos E, del Rion C, et al. Double-barreled wet colostomy: a safe and simple method after pelvic exenteration. *Int J Colorect Dis*. 1997;12:37-41.
- Sukumar S, Sivanandam E, Sanjay Bhat H, Mathew G, Sudheer OV, Dhar P. Revisiting the double-barreled wet colostomy for simultaneous urinary and fecal diversion—an Indian experience. *Indian J Gastroenterol*. 2010;29(6):240-3.
- Golda T, Biondo S, Kreisler E, Frago R, Fraccalvieri D, Millan M. Follow-up of double-barreled wet colostomy after pelvic exenteration at a single institution. *Dis Colon Rectum*. 2010;53(5):822-9.
- Kecmanovic DM, Pavlov MJ, Ceranic MS, Masulovic DM, Popov IP, Micev MT. Double-barreled wet colostomy: urinary and fecal diversion. *J Urol*. 2008;180(1):201-4, discussion 204-205.
- Blanco Díez A, Rosado EF, Castelo LA, Rodríguez-Losada JS, Chantada Abal V, Novás Castro S, et al. Colostomía húmeda en doble barra: análisis de una derivación. *Actas Urol Esp*. 2003;27(8):611-7.
- Mundy A. Metabolic complications of urinary diversion. *The Lancet*. 1999;353:1813-4.
- Malone MJ, Izes JK, Hurley LJ. Carcinogenesis. The fate of intestinal segments used in urinary reconstruction. *Urol Clin North Am*. 1997;24(4):723-8.
- Lopes de Queiroz F, Barbosa-Silva T, Pyramo Costa LM, Werneck Cortes BJ, Figueiredo JA, Guerra F, et al. Double-barreled wet colostomy with simultaneous urinary and faecal diversion: results in 9 patients and review of the literature. *Colorectal Dis*. 2006;8:353-9.