

Double-barrelled wet colostomy formation after pelvic exenteration for locally advanced or recurrent rectal cancer.

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Abstract

40 For locally advanced rectal cancer, locally recurrent rectal cancer (or any other advanced pelvic cancer) it may be necessary to perform a total pelvic exenteration. In such cases urinary tract reconstruction is usually achieved with the creation of an ileal conduit with a urinary stoma on the right side of the patient's abdomen, and an end colostomy is brought out separately on the left. The potential morbidity from a second stoma, may be avoided by the use of a double-barrelled wet colostomy (DBWC), as a 45 single stoma. Another advantage is the possibility to use a VRAM flap for perineal reconstruction. In this technical note we present our early experience in 10 cases and a video of DBWC formation in a male patient.

Introduction

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Locally advanced rectal cancer can be treated with curative intent by pelvic exenteration, first described by Brunschwig in 1948 [1, 2]. Pelvic exenteration is associated with high morbidity, with a median reported complication and mortality rate of 57% and 2.2% respectively [3]. Another consequence of complete pelvic exenteration

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is the necessity for both urinary and faecal diversion. This is usually accomplished by formation of an end colostomy and separate urinary diversion, which can be performed in a number of ways [4], but the formation of an ileal conduit, first described by Bricker *et al.* in the 1950's [5, 6], is the most commonly used method.

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Diversion of urine and faeces via a double-barrelled wet colostomy (DBWC) was first described in 1989 by Carter *et al.* [7] and is reported as a safe solution for simultaneous diversion [8]. It should be noted that mixing of urine and faeces only occurs externally in the appliance bag, which seems to reduce the risk of urinary sepsis and of colonic dysplasia, previously reported for uretero-sigmoidostomies in which urine and faeces mixed freely, although the long-term follow-up of DBWC is still in small numbers [9]. In

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addition, a distinct advantage of a single left-sided stoma, is the ability to harvest a generous right vertical rectus abdominis muscle (VRAM) flap for filling of the pelvis and repair of the perineal defect.

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We present our experience in 10 patients and a surgical video on the formation of a DBWC for simultaneous urinary and faecal diversion following complete pelvic exenteration.

Operative technique (video)

In the video we present a 31 year old male patient, diagnosed with a locally advanced low rectal cancer. The tumour was invading the prostate and the patient was treated with neoadjuvant chemoradiotherapy (Fig. 1). The patient had an otherwise unremarkable past medical history. He received full oral bowel preparation pre-operatively. Prior to surgery, the plastic surgeon marks the outline of the planned right myocutaneous flap, in this case a VRAM flap. A stoma site has been marked by a stomatherapist. Intravenous broad-spectrum antibiotics have been given at induction of anaesthesia.

A midline incision is made to the right of the umbilicus to preserve umbilical perforating vessels. The left hemicolon is mobilized (full splenic flexure mobilization is usually needed, unless a long sigmoid colon allows enough length to form a tensionfree DBWC without flexure mobilization) and the colon is transected, leaving 10-15cm of colon distal to the planned stoma site to become the urinary reservoir and conduit of the double-barrelled wet colostomy. Both ureters are mobilized. The rectum is mobilized posteriorly and laterally in the mesorectal (TME) plane. The ureters are ligated and transected at the level of the lower promontory to leave ample length for the formation of anastomoses to the colonic conduit later, but to prevent the use of radiated ureter for an anastomosis as most patients will have undergone pelvic radiation prior to surgery. The urinary bladder is mobilised and devascularised, and the urethra is divided below the prostate following ligation of the dorsal vein (Santorini's) complex. Finally, the anus and rectum are mobilised from below as an extrasphincteric dissection, dividing the pelvic floor wide in order to meet up with the abdominal dissection posteriorly and laterally, and the specimen is dislocated. The dissection continues anterior to the prostate and the whole specimen is then retrieved via the perineum.

The DBWC (Fig. 2 and 3) is formed by separately anastomosing the ureters into the colonic conduit close to the transected end, which itself is oversewn with 3-0 Maxon (Covidien, Dublin, Ireland). The decision on ureter length should take into account the ultimate position of the conduit in the pelvis, thereby ensuring that kinking of lengthy ureters, or tension on short ureters, is avoided. The ureters are cut obliquely and a longitudinal colotomy is performed to the equivalent length, following which a stay suture (Polysorb 3-0; Covidien, Dublin, Ireland) is placed at the heel of the anastomosis. The uretero-sigmoidostomy anastomoses proceed with interrupted monofilament

absorbable sutures (Maxon 4-0; Covidien, Dublin, Ireland). A size 8 infant feeding tube
110 (Bard® Ltd, Crawley, UK) is passed into the ureter and secured by transfixion through
the ureteric wall with a rapidly dissolving suture. The distal end of the tube is then
placed into the colonic conduit and the anastomosis is completed.

Following completion of the ureterocolic anastomoses, a trephine is made in the
115 abdominal wall at the marked site and the colon is brought through the abdomen using a
Jaques catheter (Teleflex Medical, Co. Westmeath, Ireland), facilitating the safe
placement of a bridge under the loop colostomy. The urinary conduit is then seen to sit
comfortably in the pelvis without tension. The stoma is opened transversely and the
120 infant feeding tubes are retrieved, flushed to ensure patency, and placed into a sterile
glove for the remainder of the operation. The urinary conduit is then filled with saline to
check for integrity of the conduit and the uretero-colic anastomoses and additional
sutures placed as necessary. The stoma is matured with rapidly dissolving sutures.

The right VRAM flap is harvested on the deep inferior epigastric vessels and advanced to
125 the perineum via the pelvis, ensuring a bulky and well-perfused closure of the defect
[10], in an attempt to reduce perineal surgical site morbidity, a frequently-reported
consequence of pelvic exenterations, especially following radiotherapy [11]. Low
suction drains are placed in the pelvis. To close the abdominal defect at the site of the
VRAM flap harvest we prefer a polypropylene mesh (Ethicon, Somerville, NJ, USA), the
130 fascia otherwise in the midline being reconstituted with continuous 1-Maxon . Quilting
sutures are placed to reduce dead space and the subcutaneous layer and skin are re-
approximated in layers over suction drains.

Case series

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To date we have reconstructed the fecal and urinary flow through a double-barrelled stoma in 10 patients (8 males). In nine cases a colostomy was formed, in one case a double-barrelled ileostomy, due to a previous proctocolectomy for Familial Adenomatous Polyposis Coli (on background of ulcerative colitis). Information on the 10 patients is in Table 1.

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Indication for operation was a primary locally advanced rectal cancer in 6 cases. Two patients presented with a recurrence of previously resected rectal carcinoma. One patient had a locally invasive sarcoma of the prostate. This patient underwent a Hartmann's procedure with a anterior exenteration, without perineal reconstruction.

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The last patient had a locally advanced squamous cell carcinoma of the anus.

Complications related to the double-barrelled wet stoma were frequent. Five patients developed a urinary tract infection, all successfully treated with antibiotics. Two patients developed an infection of the VRAM flap, which could be treated conservatively with antibiotics in one case, but required operative incision and drainage in the other. One patient developed a pelvic abscess which was drained through the pelvic stump (the patient who underwent the Hartmann's procedure). One patient, who underwent a sacrectomy at level S2-S3 developed neuropathic pain and sensible loss of the right foot.

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Long term complications mainly consist of recurrent urinary tract infections. Six patients have required either multiple or continuous antibiotic treatment for urosepsis. One patient developed neuropathic pain of the left leg, which is of unknown cause.

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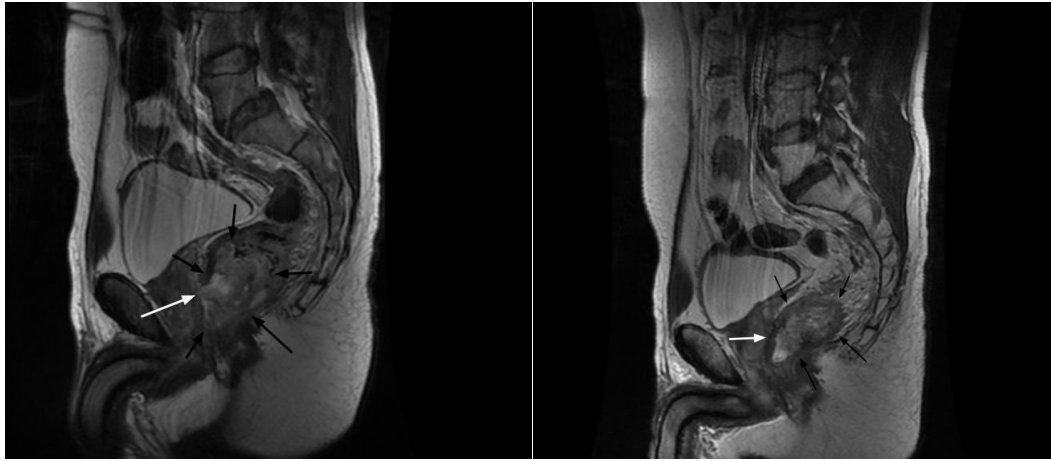
Discussion

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Pelvic exenteration necessitates diversion of urine and faeces, traditionally achieved by an end colostomy with separate formation of an ileal conduit. We recommend the construction of a double-barrelled “wet” colostomy (DBWC), which is a technically straightforward way of diverting urine and faeces simultaneously through a single
165 stoma, but without mixing, and avoiding the additional morbidity sometimes associated with an ileal conduit as a second stoma [12, 13]. The DBWC method also facilitates the harvesting and use of a VRAM myocutaneous flap for filling of the pelvis and closure of the perineal defect. A recent review of 205 cases shows an acceptable DBWC related complication-rate (11%). Urinary tract infection was seen in 5 patients. Hydronephrosis
170 in 3. Three patients developed a necrosis of the colonic conduit due to torsion [11].

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Long term follow up of ureterosigmoidstomies has shown an increased risk of tumour formation (2.6%; median latency period 29 yrs) compared with ileal conduits (0.02%)[14]. These cases were all found in classic (non-DBWC) ureterosigmoidstomies. The rate of tumour development in colonic conduits is
175 significantly lower [15]. So far, no cases of development of cancer in a DBWC have been reported [9], but as the latency period for development of tumours in ureterosigmoidstomies is long, we believe regular endoscopic follow-up of a DBWC is needed.



A.

B.

Fig 1. A. Preoperative MRI scan of pelvis showing a low rectal cancer (black arrows) invading the prostate (white arrow). B. After neoadjuvant chemoradiation there has been downsizing with fibrosis, but the rectum and prostate remain radiologically inseparable.

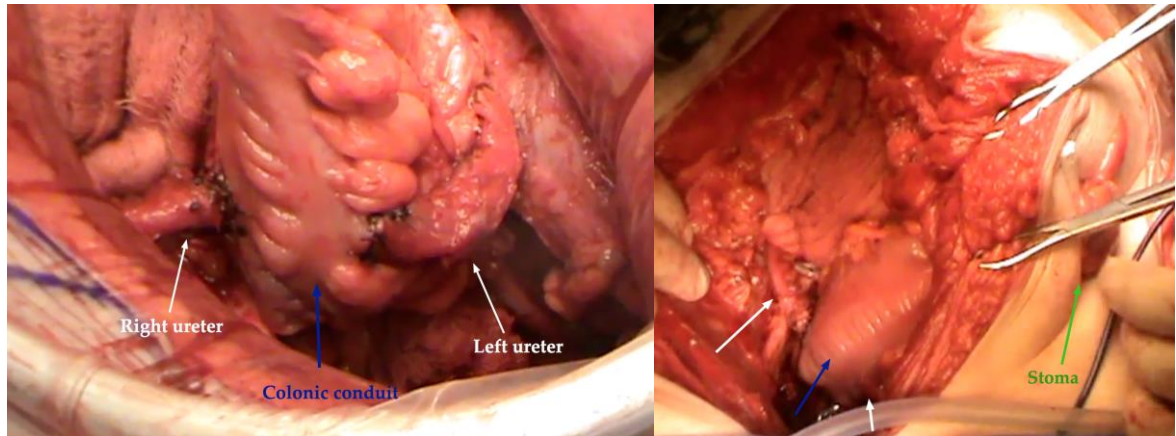
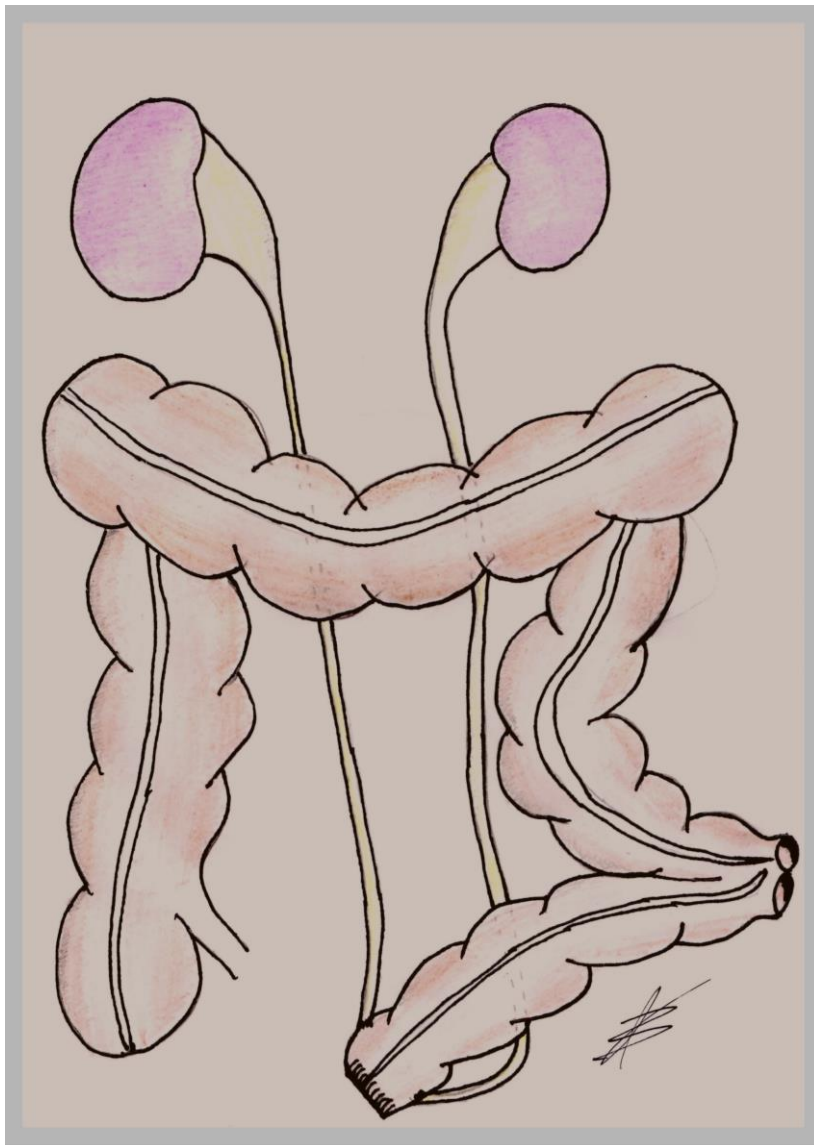


Fig 2. Peroperative pictures of **ureterosigmoidostomy** with the colonic conduit (blue arrow) and bilateral ureters anastomosed (white arrows) and stoma (green arrow).

Fig 3. Drawing of the double-barrelled wet colostomy



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