Revisiting the double-barreled wet colostomy for simultaneous urinary and fecal diversion—an Indian experience

Sudhir Sukumar · E. Sivanandam · H. Sanjay Bhat · Georgie Mathew · O. V. Sudheer · Puneet Dhar

Abstract Pelvic exenteration in advanced malignancies is usually a curative procedure aimed at improving quality of life. We analyzed the perioperative data and outcomes in 12 patients who underwent simultaneous urinary and fecal diversion with a double-barreled wet colostomy after total pelvic exenteration. Eight males and four females aged between 25 and 73 years underwent the procedure with mean operative duration of 350 min and mean postoperative stay of 15 days. Three patients developed early complications while four developed late complications. During follow up ranging from 6 to 64 months, four patients died of disease progression while four died of unrelated causes. One lady was lost to follow up, the remaining had a mean survival of 32.9 months. None had deterioration in renal function or peristomal dermatitis and all were well accustomed to managing one stoma. Our results show that double-barreled wet colostomy is technically simple and reduces surgical morbidity while providing satisfactory outcomes and patient comfort.

Keywords Colostomy · Pelvic exenteration · Urinary diversion

Introduction

Total pelvic exenteration for advanced pelvic malignancies involves removal of the bladder, prostate and rectum besides the uterus, ovaries and vaginal walls in females.

These patients subsequently require urinary and fecal diversions; this is usually achieved with an ileal conduit in the right iliac fossa and a separate colostomy in the left iliac fossa [1]. These two stomas result in the inherent difficulties of managing both collection devices besides being expensive and cosmetically depressing.

A standard wet colostomy [2] refers to an end colostomy with a bilateral ureterosigmoidostomy proximal to the stoma. Though this avoids separate stomas for urine and feces, it has largely been abandoned due to complications like foetid watery diarrhea, ascending pyelonephritis and electrolyte imbalances [3].

Carter et al. [4] first described the double-barreled wet colostomy (DBWC) for patients with radiation damage to the pelvis after radiotherapy for gynecologic malignancy. Since then, other series [5, 6] have confirmed the cosmetic, economic and medical benefits of the DBWC for simultaneous urinary and fecal diversion.

We analyzed our experience with this simple method of simultaneous fecal and urinary diversion through a single stoma.

Patients

During the period from August 2001 to May 2008, twelve patients underwent pelvic exenteration and DBWC for various indications. In all cases, the exenteration was first completed by one surgical team and then, the combined
diversion was performed by a second team. The medical records of the patients were reviewed retrospectively to analyze the demographics, indications, technique, morbidity and functional results.

The surgical technique involves a standard pelvic exenteration followed by mobilization of the left colon beyond the splenic flexure. Sufficient length of colon is made available to perform a well everted loop colostomy at a previously marked site. The distal segment of the colon (beyond the stoma) is closed approximately 15 cm from the stoma at the level of the sacral promontory (Figs. 1, 2). Both ureters are divided below the level of iliac vessels and mobilized towards the colostomy avoiding angulation. Bilateral separate splinted ureterocolonic reimplantations by the Leadbetter technique were then performed along the taenia of the distal segment (Fig. 2) and the splints were later brought out through the stoma to lie in the stoma bag. The loop stoma was performed with care in such a way as to have a ridge of posterior wall intact and elevated with a glass rod.

Ureterograms and pouchograms were performed after 2 weeks and prior to stent removal. All patients were routinely advised low dose antibiotic prophylaxis with oral co-trimoxazole (80 mg trimethoprim + 400 mg sulfamethoxazole once daily for a month) and alkalisation with oral sodium bicarbonate (600 mg thrice daily to continue long-term). Patients were trained to routinely evacuate bowel or to regulate bowel movements with enemas and also to wash the urinary conduit when necessary. Follow up protocol included 3 monthly serum electrolyte estimations and ultrasonograms of upper tracts besides yearly computerised tomogram scans of the abdomen and pelvis.

Results

The twelve patients (8 males) had a mean age of 53.9 years (25–73 years) (Table 1). The primary diseases were rectal carcinoma (6), cervical carcinoma (4), prostatic hemangiopericytoma (1) and pelvic soft tissue sarcoma (1). The indications for pelvic exenteration included locally advanced disease at presentation (10), local recurrence of cancer (1) and major complications of surgery or radiotherapy (1). None had a pre-existing stoma and both fecal and urinary diversions were performed as a primary procedure in all. For the entire surgical procedure, the mean operative duration was 350 min (range 240–540) and the mean estimated blood loss was 1500 mL (range 1000–2300). Mean postoperative hospital stay was 15 days (range 10–35 days).

In the immediate postoperative period, one patient developed a urinary leak from the ureterointestinal anastomotic site; it was successfully managed with placement of percutaneous nephrostomy tubes. Two developed wound dehiscence that required re-suturing in the same admission. There were no deaths in the first 90 days.

One was lost to follow up after a period of 6 months during which time she was doing well. Overall follow up duration ranged from 6 to 64 months (mean: 31.8 months). Three patients died due to progression of disease while one died from sepsis following a delayed enterocutaneous fistula resulting from local recurrence. Four others died due to unrelated causes. The mean overall survival was 32.9 months.

Three patients developed delayed complications that required readmissions – one developed a unilateral renal abscess with a contralateral staghorn calculus that required aspiration of the abscess followed later by elective percutaneous nephrolithotomy for the renal calculus. Another patient developed pyelonephritis that settled with cefoperazone therapy for 2 weeks. A third patient required a diverting ileostomy for delayed enterocutaneous fistula that developed after 4 years. No intervention was done for one patient with a small parastomal hernia. None of the patients had any irreversible deterioration of renal functions, biochemical imbalances or peristomal dermatitis during the available follow up duration.

The patients on follow up were also regularly reviewed by a stoma therapist. All patients had only one stoma appliance (Coloplast/Alterna or Ostomates India) that was connected to a urinary collection device. The collection bag was emptied 3–4 times a day in addition to the routine bowel movements. The appliance was replaced every 4–5 weeks and all patients were satisfied with the functional results.
Discussion

Exenteration for pelvic malignancies is usually performed with a curative intent but it may be palliative in certain cases. Options for urinary diversion after a pelvic exenteration include constructing a separate ileal or colon conduit, a continent catheterisable stoma or an orthotopic neo-bladder [7]. These require adequate mobilization of bowel loops, which may not always be feasible due to the primary malignancy or damage from previous radiation. Besides, fecal diversion requires another colostomy. The double-barreled wet colostomy is technically easier, requires less mobilization of small bowel, avoids an entero-enterostomy and thus reduces the operative duration and surgical morbidity [8].

Usually, the single stoma has a continuous outflow of urine with an intermittent outflow of semiformed feces. A single stoma for both urine and feces is more convenient for the patient with respect to daily management of collection bags. The single stoma also considerably reduces the expenditure on collection devices. Besides, it improves the cosmetic appearance and quality of life, especially in those patients who have aggressive malignancies and a relatively shorter survival [3]. DBWC has also been performed without a pelvic exenteration for patients with unresectable tumors that need simultaneous fecal and urinary diversion [8] as well as for neurogenic bladders with fecal and urinary incontinence [6].

The anti-reflux technique has been shown to improve the safety of ureteric reimplantation. With urine draining into a reservoir distal to the stoma, the chance of fecal contact with urine and consequent ascending pyelonephritis is greatly reduced [3]. Further, it has been documented that even patients with positive urine cultures from the reservoir did not always show clinical symptoms or signs of urinary infection [9]. However, two patients in our series developed upper tract infections that were successfully managed with conservative measures.

Table 1  Follow up data of twelve patients

<table>
<thead>
<tr>
<th>Age/Sex</th>
<th>Primary cancer</th>
<th>Follow up duration (months)</th>
<th>Follow up status</th>
<th>Cause of death</th>
<th>Complications (early/late)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>56/F</td>
<td>Cervix</td>
<td>28</td>
<td>Dead</td>
<td>Systemic disease</td>
<td>Pyelonephritis (late)</td>
<td>Conservative</td>
</tr>
<tr>
<td>59/F</td>
<td>Cervix</td>
<td>24</td>
<td>Dead</td>
<td>IHD</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>49/F</td>
<td>Cervix</td>
<td>6</td>
<td>Lost</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>49/M</td>
<td>Rectum</td>
<td>14</td>
<td>Dead</td>
<td>Systemic disease</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>61/F</td>
<td>Cervix</td>
<td>24</td>
<td>Dead</td>
<td>Systemic disease</td>
<td>Wound dehiscence (early)</td>
<td>Re-suturing</td>
</tr>
<tr>
<td>62/M</td>
<td>Rectum</td>
<td>28</td>
<td>Dead</td>
<td>Unrelated</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>45/M</td>
<td>Pelvic</td>
<td>41</td>
<td>Dead</td>
<td>IHD</td>
<td>Parastomal hernia (late)</td>
<td>Observation</td>
</tr>
<tr>
<td>73/M</td>
<td>Rectum</td>
<td>57</td>
<td>Dead</td>
<td>Sepsis</td>
<td>Enterocutaneous fistula (late)</td>
<td>Diverting ileostomy</td>
</tr>
<tr>
<td>62/M</td>
<td>Prostate</td>
<td>47</td>
<td>Dead</td>
<td>IHD</td>
<td>Urinary leak (early)</td>
<td>Conservative</td>
</tr>
<tr>
<td>38/M</td>
<td>Rectum</td>
<td>64</td>
<td>Alive</td>
<td>–</td>
<td>Renal abscess</td>
<td>Open drainage</td>
</tr>
<tr>
<td>68/M</td>
<td>Rectum</td>
<td>36</td>
<td>Alive</td>
<td>–</td>
<td>Renal stone (late)</td>
<td>PCNL</td>
</tr>
<tr>
<td>25/M</td>
<td>Rectum</td>
<td>12</td>
<td>Alive</td>
<td>–</td>
<td>Wound dehiscence (early)</td>
<td>Conservative</td>
</tr>
</tbody>
</table>

IHD Ischemic heart disease; PCNL Percutaneous nephrolithotomy
With adequate stoma care and regular change of collection appliances, peristomal dermatitis and other local skin complications can be avoided as was possible in our patients.

By avoiding small bowel anastomosis and using large bowel distant from previous surgery and pelvic irradiation, the technique of DBWC is thought to reduce the risk of fistula and stenosis [3]. In our series, one early urinary leak from the ureterointestinal anastomosis recovered with temporary nephrostomy diversion. One enterocutaneous fistula that occurred as a late complication was due to cancer recurrence.

The risk of carcinogenesis at the ureterointestinal anastomotic site is higher in diversions where there is contact between urine, feces, urothelium and colonic epithelium [10]. Hence, it has been suggested that the lack of continuous contact between urine and feces in the double-barreled wet colostomy may help in reducing this complication [5].

A short distal reservoir that expels its contents by mass colon contraction is thought to reduce urinary stasis and consequent infections or electrolyte imbalances [4, 5]. All patients in the present series have maintained satisfactory renal functions during the follow up period. Intravenous urograms performed at various intervals have revealed normal upper tract anatomy and function in all except one with the renal calculus.

Other authors have even suggested later revision of the diversion to a continent urinary reservoir in patients who show good response and healing [3].

**Conclusions**

Our initial experience with the DBWC has shown it to be a simple and safe method of combining urinary and fecal diversion with low morbidity and definitely better cosmesis and economy.

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**References**