

# Use of Inflated Foley Catheters to Prevent Early Empty Pelvis Complications Following Pelvic Exenteration

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**Abstract.** *For most patients with bulky pelvic tumors, pelvic exenteration remains the only curative option. Although initially reported as a palliative procedure, nowadays it is rather performed with curative intent. Once the resectional phase is ended, a large defect will remain at the level of the pelvic diaphragm, predisposing to severe complications which are generically included under the name of empty pelvis syndrome. It has been widely demonstrated that this type of complication is associated with severe mortality, even if the patient is free of any pelvic recurrence. We present the case of a 56-year-old patient submitted to total pelvic exenteration for locally invasive previously chemo-irradiated cervical cancer who presented six months after surgery with a severe enteroperineal fistula. We decided to reoperate on the patient; intraoperatively we found recurrence on both pelvic walls and an enteroperineal fistula caused by tumoral invasion. We performed an intestinal resection with enteroenteral anastomosis. In order to isolate the intestinal loops from the unresectable pelvic recurrence, in the pelvis we placed three Foley catheters inflated with 60 ml of saline each, in order to hold the intestinal loops away from the pelvic wall. The postoperative course was uneventful. The urinary catheters were removed after six weeks.*

Although screening tests have been largely introduced worldwide, there are still many patients diagnosed with an advanced stage of gynecological disease when local invasion has already developed (1, 2). In all these cases,

neoadjuvant chemo-irradiation is performed in order to diminish the local invasion and to transform the patient into a candidate for a less extended resection. However, there are cases in which local invasion persists after neoadjuvant treatment and in which pelvic exenteration is needed. Since Brunschwig reported it for the first time in 1948, this surgical procedure has become the golden-standard for patients with locally invasive pelvic malignancies (3). Although the resectional phase has remained practically unchanged, the reconstructive phase has undergone multiple improvements in order to improve the patient quality of life. However, there are still cases in which a reconstruction is not possible at the time of resection; in all such cases, a poorer quality of life is expected due to the fact that the patient becomes a permanent carrier of urinary and digestive ostomies. Another important problem which develops in these cases is the development of a large, poorly-vascularized space which predisposes to a high number of complications and which is generically called empty-pelvis syndrome (4-6). One of the most important problems associated with the presence of empty pelvis syndrome is visceral herniation of the small bowel in a pre-irradiated, hypoxic or denuded pelvic floor, which will lead, in time, to enteroperineal fistula (7). The percentage of patients developing this kind of complication is estimated at 15% and almost half of the cases will die because of this complication, although most of them are tumor-free (8). For such cases, reoperation is required in order to treat a debilitating, non-tumoral complication.

## Case Report

A 56-year-old patient had initially been referred for surgery for pelvic pain, vaginal bleeding, constipation and dysuria. At that time, local examination revealed the presence of a bulky cervical tumor invading both the posterior wall of the urinary bladder and the anterior rectal wall, while the biopsy confirmed the presence of a poorly differentiated squamous cell cervical carcinoma. The patient was addressed to the Oncology Service

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where she was submitted to chemoradiation consisting of cisplatin and external-beam radiation therapy. One month after ending the neoadjuvant treatment, she was submitted to surgery; unfortunately, local invasion of the urinary bladder and of the rectum were still present, hence total pelvic exenteration with pelvic and para-aortic lymph node dissection was performed. Due to the association of a large necrotized and abscessed tumor, with the recent history of neoadjuvant irradiation, no reconstructive procedure was performed at that time; the two ureters were exteriorized in right terminal urostomy, while the left colon was exteriorized in left terminal colostomy. The early postoperative course was uneventful, the patient being discharged on the tenth postoperative day. The histopathological studies confirmed the presence of a poorly differentiated squamous cell carcinoma, with positive pelvic and para-aortic lymph nodes. Moreover four pelvic lymph nodes and two para-aortic lymph nodes presented capsular invasion.

Postoperatively, the patient was submitted to adjuvant chemotherapy and irradiation but she developed severe enteritis so the adjuvant treatment was stopped during the third month postoperatively. Six months later, the patient self-referred to us for severe pelvic pain associated with massive pelvic purulent and enteral discharge via the perineal wound. The imaging study confirmed the presence of a pelvic recurrence associated with an enteroperineal fistula and the patient was consequently re-submitted to surgery. Intraoperatively, a pelvic recurrence was found, with enteral invasion. The recurrent tumor had developed on the lateral pelvic walls and invaded the enteral loops, which also herniated in the denuded, hypoxic space which had remained after the initial resection. In the meantime, an important solution for continuity between the small bowel and the perineal surface was found. Cytoreductive surgery was performed, the tumor being partially removed *en bloc* with the invaded enteral loops and the loop fistularised to the perineal surface, while the continuity of the digestive tract was re-established by a side-to-side enteroenteral anastomosis (Figures 1 and 2). Although complete resection was not possible due to the presence of a massive bony invasion, a cytoreductive surgical procedure was successfully performed.

An omental pedicle was mobilized and laid in the pelvic cavity in order to bring well-vascularized tissue with high fibroblastic properties to this hypoxic space; we introduced three Foley catheters through the perineal wound and inflated the balloons with 60 ml of saline each in order to maintain the small bowel loops as far away as possible from the contaminated pelvic cavity (Figure 3). The urinary catheters were extracted iteratively during the late postoperative period. The postoperative course was uneventful. At six months follow-up the patient presents no signs of progression of the disease.

## Discussion

Pelvic exenteration remains one of the most destructive gynecological surgical procedures but at the same time is the single potentially curative option in patients with locally advanced cervical cancer. The patient will develop various psychological problems, which were classified by Krouse *et al.* into four stages: in the first stage, attention is focused on exploration; then the patient will develop the acclimation climate stage, when treatment is initiated. After treatment, an adaptative or maladaptative stage will develop, followed by the resolution or disorganization stage, which occurs after treatment and concerns all the long-term complications and sequelae. While during the first stage the main symptoms are guilt, anxiety, isolation or denial of the disease, the latter phases are characterized by altered body image (10).

In order to minimize these psychological aspects and to increase the quality of life, multiple changes of the surgical technique have been proposed. While the resectional phase of pelvic exenteration has remained in principle unchanged, the reconstructive phase has been continually submitted to changes in order to re-establish the continuity of the digestive tract, urinary tract and even to create a neo-vagina. However, these reconstructions are not possible in all cases due to the presence of irradiation-induced fibrosis or due to the association of large necrotized or abscessed tumors. In such cases, most surgeons decide to perform digestive and urinary ostomies, abandoning an empty, poorly-vascularized and hypoxic cavity bordered by the pelvic bones. This cavity is origin of severe complications such as abscess, hematoma, and lymphocele, leading to persistent discharge and chronic infections (9). Due to the presence of this large hypoxic and potentially infected cavity, the viscera which will ultimately descend here will be predisposed to the development of severe complications. For example, the small bowel, which in most cases is submitted to irradiation itself, will adhere to the denuded surface and will lead to small bowel obstruction, fistula or perineal herniation (7). In our case, the mechanism of fistula formation was even more complex, being associated with the presence of the pre-irradiated bowel in the pelvis on the one hand, and with the development of a pelvic recurrence (probably related to the incomplete submission to the adjuvant therapy) on the other hand. These two factors coincided with the development of a debilitating enteral leak which imposed re-operation of the patient. Although a curative resection was not feasible due to the presence of the bony invasion, the leak was repaired and cytoreductive surgery was performed. In order to avoid the occurrence of another enteroperineal fistula and to keep the small bowel away from this area, we decided to place three Foley catheters with their balloons filled with 60 ml of saline each and to cover their surface with an omental flap.

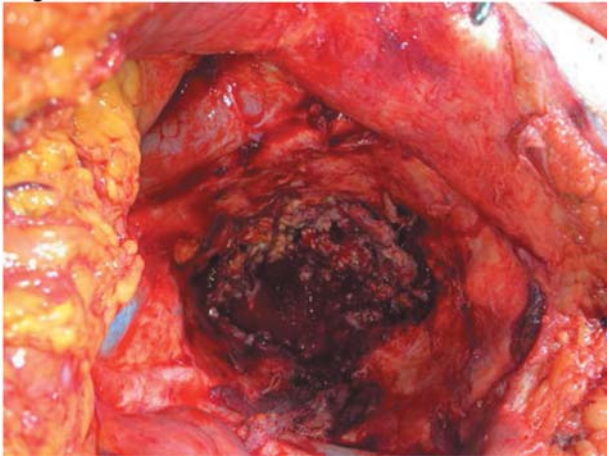


Figure 1. The final aspect after removing the pelvic recurrence en bloc with the invaded ileal loops. Residual tumor can be seen invading the bony pelvic structures.

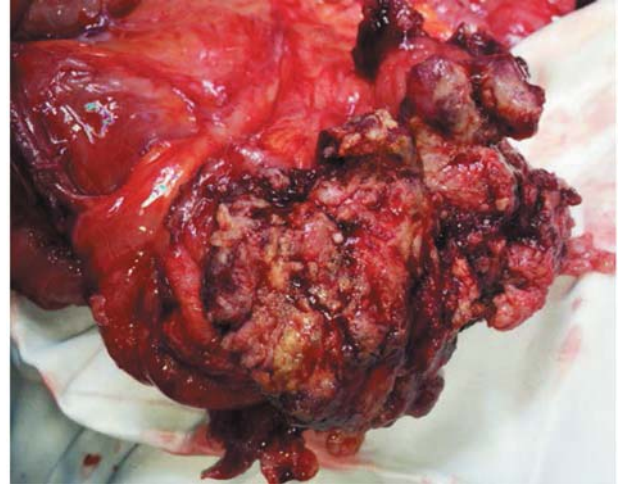


Figure 2. Segmental enterectomy en bloc with the pelvic recurrence.

Omental pedicle formation in order to provide an omental flap which will be placed in the pelvis was first conceived by Rutledge in 1977 and was performed in 296 patients submitted to pelvic exenteration. It involves omental detachment from the stomach and colon, dividing the right gastroepiploic artery and mobilization of the omentum, keeping the left gastric artery as the vascularization source (11). The method has the benefit of bringing well-vascularized tissue with high fibroblastic components to a poorly vascularized, hypoxic and potentially infected area, but it also presents the inconvenience that the omentum is not a strong tissue. For this reason, in most cases this process is associated with the placement of synthetic meshes (7).

Historically, in 1960, Schmitz *et al.* conducted a study on 75 cases submitted to pelvic exenteration in whom they used steel mesh in order to prevent small bowel herniation in the pelvis (12). Almost two decades later Sugarbaker reported the placement of silastic breast prosthesis in the pelvic space to hold the remnant viscera away from the denuded hypoxic floor (13).

In the past few decades, a variety of non-absorbable or absorbable materials have been proposed for reconstruction of the pelvic floor. While in cases in which non-absorbable materials are used there is a high risk of adhesion, cases in which absorbable Vycril-like meshes are used have a better outcome; although the mesh will have been resorbed in the subsequent months, granulation and fibrosis occurring on the mesh matrix will lead to the formation of a permanent pelvic diaphragm (14, 15).

More recently Said *et al.* reported successful pelvic floor reconstruction using human acellular dermal matrix and thigh flaps in a patient submitted to pelvic exenteration for a pelvic

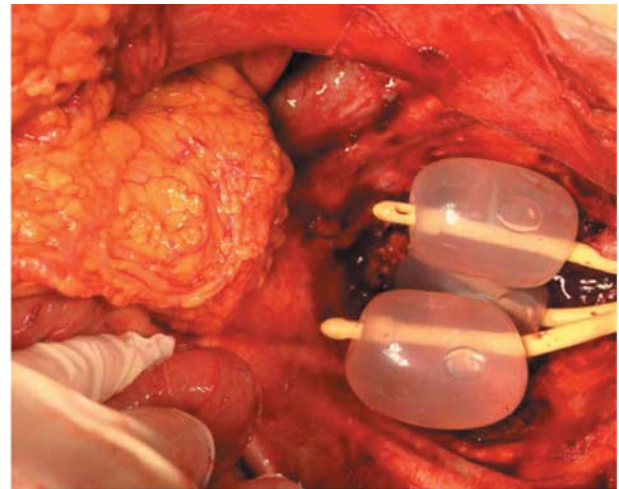


Figure 3. Insertion of three Foley catheters in order to prevent the herniation of the intestinal loops.

recurrence after vulvar cancer (16). The main advantage of using bioprosthetic meshes is that this kind of material is able to provide the durability of permanent synthetic meshes with minimal side-effects related to the presence of a foreign body (17). Other authors reported the benefits of using human acellular dermal matrix in association with an omental flap if an adequate muscular flap cannot be obtained (18).

In our case, we decided not to use any autologous graft due to the presence of the remnant recurrent tumor invading the bony pelvis. The placement of a Vycril mesh was also



difficult to perform due to the circumferential presence of the residual tumor. The placement of Foley catheters provided an efficient separation of the viscera from the residual tumor.

## Conclusion

In this particular case, surgery had a palliative intent – to eliminate the presence of the enteroperineal fistula and to provide acytoreduction of the pelvic recurrence. Keeping the pelvic space occupied by a synthetic material which impeded the herniation of other viscera also offered the patient the chance to continue palliative adjuvant therapy consisting of pelvic irradiation, which was then addressed to the space in which the small bowel could not descend so the likelihood of a new episode of radiation enteritis diminished. The presence of the Foley catheters also diminished the risk of early recurrence of an enteroperineal fistula by small bowel herniation or by direct tumoral invasion

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