Laparoscopic approach for gynecological cancer has expanded in the last years. Published data has demonstrated the feasibility and safety of this technique for several gynecologic oncology procedures. Main advantages when compared to open approach are less blood loss, decreased morbidity, shorter hospital stay, and earlier recovery. Tumor dissemination and port site implantation have been described for patients undergoing operative laparoscopy for resection of various carcinomas. However, rate of port-site metastasis after laparoscopic approach for cervical cancer is reported to be less than 1% (1).

Total pelvic exenteration is one of the most mutilating surgical procedures performed for pelvic malignancies. Since it was first reported in the 50’s, postoperative mortality and long-term survival have improved but associated complications occur in approximately half of the patients. New surgical strategies have to be made to decrease morbidity and improve patients’ quality of life (2). Laparoscopic approach for pelvic exenteration was first described in 2003 and since then, several series have reported on technical feasibility of the procedure (3).

**Total Pelvic Exenteration**

**Trocar Placement**

The laparoscope is placed at the level of the umbilicus. Four operative trocars are then placed, a 5 mm –trocar is inserted in the midline 10 cm above the umbilicus, a 10 mm-trocar 4 cm below the umbilicus, and two additional 5mm trocars are inserted on each iliac fossa (Figure 1).

The procedure is divided in two operative times, the laparoscopic and the perineal phase. Specimen is removed once the laparoscopic procedure is finished to avoid both carbon dioxide leakage and to decrease operative time.

**Laparoscopic Phase**

**Developing the Retroperitoneal Pelvic Spaces & Resection Phase**

A complete exploration of the abdominal cavity is required before starting the procedure to rule out intraperitoneal disease.

The procedure is started by opening the retzius, para-vesical, para-rectal and retro-rectal spaces. The bladder, uterus, vagina, ovaries and rectum are mobilized en bloc from the pelvic sidewall. Sigmoid vessels and anterior branches of internal iliac vessels are coagulated and divided. New surgical devices, such as vascular endoscopic staplers, ligasure bipolar cautery, and endoscopic staplers are used to decrease blood loss and operative time.

**Omental J-flap**

An omental J-Flap is performed laparoscopically by preserving the right gastroepiploic vessels. The omental flap is used to cover the urinary diversion and to fill the pelvic dead space at the end of the procedure.

**Left Colon Mobilization**

The left colon is mobilized up to the spleen flexure and the inferior mesenteric vessels are transected to perform a colo-anal anastomosis without tension.

**Ureter Mobilization & Urinary Diversion**

Both ureters are clipped and transected at their entry into the pelvis. Ureters are then mobilized, the right ureter is dissected up to the level of the inferior renal pole and the left one above the level of the inferior mesenteric artery. Ureters are fixed to the abdominal wall near the mini-laparotomy site, to facilitate their exteriorization.

A 5-cm minilaparotomy adjacent to the umbilicus trocar or at the level of the right 10-mm trocar is performed. Both intestinal ends are anastomosed to restore bowel continuity and the urinary diversion is created. (Figure 2).
Ileostomy and Trocar Closure

A loop ileostomy is performed on left iliac fossa at the level of the lateral left trocar to protect both ileal and colo-anal or colo-rectal anastomosis. Abdominal drainage is achieved through the upper umbilical trocar port site. As the two lateral trocars have been transformed for urinary tract diversion and ileal-enterostomy, the total abdominal scar is limited to the 5 cm minilaprotomy incision. The ileostomy is closed three months after the exenteration.

Perineal Phase

Specimen Removal and Colo-Rectal Anastomosis

The vagina is transected approximately 1 cm distally to the tumor and the specimen is removed. The rectum is transected at the level of the levator ani muscles or higher, depending on tumor location (Figure 3).

The residual vagina is sutured. The left colon is exteriorized through the anal sphincter to facilitate the colo-anal anastomosis (Figure 4).

Anterior Pelvic Exenteration With Miami Pouch Urinary Diversion

The laparoscope is placed at the umbilicus level and is used for urostomy placement and for catheterisation of the continent urinary reservoir.

Trocar placement, creation of retroperitoneal spaces, omental flap and specimen removal is the same as previously described.

Right Colon Mobilization, Isolation of Ileo-Colic Segment

The patient is then positioned in a 15° reversed Trendelenburg with 15° left sided rotation to facilitate the mobilisation of the ascending colon. The omentum and the second and third parts of the duodenum are dissected and the right colon mobilized up to and including the hepatic flexure. Colon mobilization facilitates harvesting of an appropriate length of colon for urinary reconstruction, as well as entry into the retroperitoneal space to mobilize the ureters.

Approximately 10 cm of terminal ileum along with the right colon proximal to the middle colic artery are isolated with an Endo-GIA. Identification of the ileo-colic artery before dividing the ileal mesentery is crucial, as it is the main blood supply for the pouch.

Ureter Mobilization

Both ureters are clipped and transected at their entry into the pelvis. Ureters are then mobilized, the right ureter is dissected up to the level of the inferior renal pole and the left one above the level of the inferior mesenteric artery. Ureters are fixed to the abdominal wall near the minilaparotomy site, to facilitate their exteriorization.

Minilaparotomy & Extracorporeal Miami Pouch Creation

A 5-cm minilaparotomy (Figure 5) adjacent to the umbilicus trocar or at the level of the right 10-mm trocar is performed. Ureters and the isolated ileo-colic segment are brough out. First, a side-to-side ileotransverse anastomosis and an appendicectomy are performed. Second, the Miami pouch is
created: the right colon is folded on itself in a U configuration and two stay suture are used to maintain the alignment. Two incisions are made at the medial tip of both ends, and the colon detubularized with a PolyGIA stapler, the pouch is everted and detubularizaion completed with a second PolyGIA stapler. Ureters are spatuled and anastomosed mucosa to mucosa to the base of the pouch. Single J stents are inserted and brought out of the pouch and of the abdominal wall. The pouch is closed. Distal ileum is narrowed with a GIA stapler to provide the continence mechanism. Finally, a blue-dye test is performed to ensure correct continence and integrity of the anastomosis. The pouch is replaced back, fixed to the posterior aspect of the abdominal wall, and the minilaparotomy is closed. Once the laparoscopic phase is completed, the ileal conduit is fixed to the umbilicus.

Abdominal drainage is achieved through the medial lower port site. Per-operative bleeding is approximately 200 ml and total time of the procedure of around 6 hours.

Discussion

Since 2003, less than 40 documented cases of laparoscopic pelvic exenteration for gynaecological malignancy, have been identified in the medical literature (4-7). Laparoscopic PE is feasible with curative intent to selected patients, especially for patients presenting with small centropelvic recurrences. Urinary reconstruction is an integral part of anterior or total pelvic exenterative procedures performed by laparoscopy or by open approach. Continent urinary diversion is a preferred option for urinary tract reconstruction in selected patients. A hand-assisted Miami pouch through a mini-laparotomy (5 cm) is the most adapted continent urinary diversion procedure, in order to safely perform ureteral anastomosis and restore bowel continuity. In addition, it permits to build the omental cylinder for vaginal reconstruction. In our experience, operative time for Miami pouch construction is less than 2 hours. In our experience, combination of perineal or vaginal approach, and extracorporeally creation of continent pouch diversion facilitates the procedure and decreases operative time.

Published preliminary experience has shown less blood loss but similar morbidity, mortality, and hospital stay when compared to a classical approach (5). Most frequent postoperative complications are associated to urinary and bowel reconstruction.

Conclusion

Laparoscopic or laparoscopy-assisted pelvic exenteration is feasible with curative intent to selected patients. Best candidates for laparoscopic approach are patients with central pelvic tumors of less than 5 cm without pelvic sidewall involvement, BMI inferior to 30, and no need to perform pelvic reconstruction. Advantages of laparoscopic compared to classical approach are still to be determined.

References