

Paraaortic lymphadenectomy in oncologic gynecology

Our experience on 62 patients

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Abstract

Aim. Performing paraaortic lymphadenectomy technique on 62 patients and those intra- and postoperative monitoring. **Materials and methods.** The procedure was performed in 62 patients, included in the study. We analysed the indications, surgical procedures, intra- and postoperative complications, number of pelvic and paraaortic lymph nodes (metastatic and removed), and the survival rate with or without recurrences. **Results.** From 62 patients, in 42 it was intervened for an advanced stage uterine cancer (IB2 stage or above), in 12 for a ovarian cancer, in 2 for a uterine carcinosarcoma, in 5 for a endometrial adenocarcinoma and in 1 for a undifferentiated pelvic sarcoma. Complications occurred intraoperatively in 10 patients (16.72%), and postoperatively in 9 patients (14.01%). The average number of removed pelvic and paraaortic lymph nodes was 24.66 (between 8 and 59) and 11.37 (between 3 and 32), respectively. Metastases were detected in pelvic lymph nodes in 26 patients (41.80%), and at those paraaortic lymph nodes in 11 patients (17.44%). All eleven patients with paraaortic malignant lymph nodes were positive for pelvic lymph nodes, also. The patients have been follow-up between the 2 and 53 months interval. Until present, 7 patients died as a result of malignant tumor, 1 it was excluded, and 55 survived. **Conclusions.** Paraaortic lymphadenectomy represents a feasible technique, encumbered with a relatively low rate of intraoperative complications. Postoperative complications seem to arise especially during prolonged interventions, but also in conjunction with retroperitoneal dissection. Its curative role should be established in the future. **Keywords:** lymphadenectomy, ovarian cancer, lymph nodes, metastases

Introduction

In the latest years, we observe a redefinition of the role played by the surgery in the oncologic gynecology. As a result of a more accurate knowledge of the carcinogenesis mechanisms, the natural history and evolution of the disease, new principles of surgical tactics and techniques have been developed. The extraordinary technical progresses both in surgery and in intensive anesthetic therapy have made possible the development of certain surgical techniques more and more radical, which near the progresses in radiotherapy, chemotherapy and immunotherapy led to significant improvements of the survival rate in cervical cancer, ovarian cancer, uterine carcinosarcoma, endometrial adenocarcinoma, and undifferentiated pelvic sarcoma⁽¹⁾.

Among the new surgical techniques developed, both for curative and staging purposes and consecutively in the therapeutic tailoring, the paraaortic lymphadenectomy (lombo-aortic) is included. It may be performed by open surgery but also by laparoscopic surgery, through a transperitoneal and also extraperitoneal approach, or by robotic surgery.

Most often, the indications of paraaortic lymphadenectomy encountered are:

■ for ovarian cancer:

- ✓ together with Ist class EORTC or Piver 1 total extracapsular hysterectomy⁽¹⁾ with bilateral adnexectomy, omentectomy, appendectomy, peritonectomy;
- ✓ in early stages (I-II), as a phase of a correct staging;
- ✓ in advanced stages (III-IV), after performing an optimal cytoreductive surgery, or when paraaortic enlarged lymph nodes are detected.

■ for cervical cancer:

- ✓ in early stages (IA2-IIB), when pelvic enlarged lymph nodes are detected or as a complementary staging procedure of the radical surgical treatment, together with IIIrd class EORTC or Piver 3 radical hysterectomy with pelvic lymphadenectomy;
- ✓ in advanced stages (IIB-IVA), for staging purposes, for a correct tailoring of the radiochemotherapeutic treatment.

■ for endometrial cancer:

- ✓ together with Ist class EORTC or Piver 1 total extracapsular hysterectomy, or together with IIIrd class EORTC radical total hysterectomy or Piver 3 in case of cervical invasion (FIGO stage II) with pelvic lymphadenectomy;
- ✓ in any Ist stage with Broder grade 3 tumor;
- ✓ in IC-IIIB stages with any Broder grade tumor;
- ✓ in clear cells or serous papillary histopathologic types;
- ✓ in tumors of more than 2 cm in diameter.

Materials and Methods

In 1st Gynecology-Obstetrics Clinique from Targu-Mures, the paraaortic lymphadenectomy is performed by open surgery, as a complementary stage of the IIIrd class EORTC radical hysterectomy or of the Wiart extracapsular total hysterectomy with pelvic lymphadenectomy, completed in certain cases with other reductive procedures, depending on the type of tumor and on the oncologic surgical protocols.

The upper limit of the paraaortic lymphadenectomy is represented by the renal veins plane. The lateral limit is represented by the psoas muscle and the ureteric path. The lower limit from the anatomic point of view is the aortic bifurcation, but technically the dissection is extended to the level where the ureters cross the common iliac vessels, being a completion of the pelvic lymphadenectomy.

The stages of the paraaortic lymphadenectomy have been as follows⁽¹⁾:

1. After performing the pelvic lymphadenectomy, the underumbilical midline laparotomy is extended supraumbilical about 2-3 fingers below the xiphoid appendix; two autostatic retractors are needed, one place under and the other supraumbilical;

2. The small intestinal loops are packed in a wet area up to the level of the mesentery root, together with the epiploon and the transverse colon, which are laid on the abdominal wall, emphasizing the posterior peritoneum;

3. The first assistant stands on the patient's left, the second cranially on the right, and the operator on the right more caudally;

4. The incision of the pelvic parietal peritoneum is extended from the level of the caecum cranially to the left and towards the midline, towards the root of the mesentery, tangent to the small intestinal loops, until Treitz's fascia level of the horizontal portion of the duodenum, which is gently cranially mobilized with a retractor by the second assistant; it is trying the visualization of the left renal vein;

5. For a better exposure, the posterior peritoneum incision may be extended laterally caudally to the caecum and then upward in the right parietocolic space, up to the level of Winslow hiatus, mobilising for more space the caecum and the ascending colon;

6. The dissection starts with the right ovarian vessels, which are dissected off the neighboring tissue and are ligated close to the confluence with inferior vena cava and respectively, aorta. The right ureter must be visualized on the entire path and eventually mobilized with a loop. There are branches of the ovarian vessels towards the ureter, which are ligated or electrocauteried;

7. Paracaval lymph nodes dissection. It must be avoided the right lumbar veins and the confluent vein on the anterior face of the inferior vena cava. The inferior vena cava may be mobilized easily with a retractor, to the left;

8. The dissection is continued with the interaortocaval nodes. In this case as well, it must be avoided the beginning of dissection for the left common iliac vein, which is located below the arterial plane and left of renal vein, which may present anatomic anomalies;

9. Mobilization of the sigmoid colon, by extension of the incision on the pelvic parietal peritoneum on the left, in the left parietocolic space;

10. Dissection of the left ovarian vessels up to a superior 1/3. The left renal vein must be avoided. Visualization of the left ureter on its entire length may be achieved by mobilization of this with a loop;

11. Dissection of the anterior face of the aorta, emphasizing the emergence of the inferior mesenteric artery;

12. Achievement of two windows in the meso-sigmoideum, one above, one below the inferior mesenteric artery. The ligature with left ovarian vessels is passed through the superior orifice;

13. Paraortic nodes dissection. The aorta could be mobilized gently to the right with a retractor. The dissection continues and ligation of left ovarian vessels at the confluence with the left renal vein and aorta, respectively. This represents the most dangerous point of the dissection. The left ureter must be avoided, as intercrosses through posterior the left ovarian vessels and also, the left lumbar vessels;

14. Dissection of presacral lymph nodes at the level of the bifurcation of the aorta and of the common iliac veins. The common iliac veins must be avoided.

The paraaortic lymphadenectomy has been performed on a number of 62 patients, in the November 2006 - February 2011 period. The procedure has been made after obtaining an informed consent signed by the patient. Among these, 42 have been operated for a cervical cancer, of which 30 preoperatively diagnosed in stage IIB and subjected to a neoadjuvant external radiotherapy (40-50 Gy, applied for a period of 4-5 weeks) with or without concomitant chemotherapy with Cisplatin (40-50 mg/m²) as radiosensitizer; 12 patients have been preoperatively staged as IB2-IIA and intraoperatively overstaged as being IIIB or IVB as consequence of presence of lymph nodes or intraperitoneal metastases confirmed by extemporaneous histopathological analysis. On 12 patients there were interventions for an ovarian neoplasm, on 8 as primary surgery in early stages and on 4 after 3-6 sessions of chemotherapy. On one patient there was an intervention for a suspicion of two synchronous genital cancers, one ovarian stage IIIA and one cervical stage IIB and which based on the final histopathologic result has proven to be a metastasized cervical cancer T2BN0M1 with massive ascites. Two patients were operated for a uterine carcinosarcoma, one diagnosed preoperatively, and the other one considered initially as an undifferentiated adenocarcinoma of the endometrium which has been proven a carcinosarcoma at the final histopathologic analysis. Three of them have been operated for an adenocarcinoma of the endometrium, intraoperatively staged at extemporaneous histopathologic analysis as stage IC or more advanced, and other two for a neoplasm which preoperatively was considered to be primitively ovarian, but postoperatively has proven to be serous papillary endometrial adenocarcinoma and endometrial adenosquamous carcinoma respectively, metastasized in the ovary and epiploon, with massive ascites.

Results

In table 1 are presented the average age of the patients, the indication and correct staging confirmed intra- or postoperatively, the type of surgical interventions performed, the intra- or postoperatively complications, the number of pelvic and paraaortic retrieved and metastasized lymph nodes, as well as the current condition of the operated patients.

Twelve of the patients with cervical cancer have been preoperatively substaged based on the clinical examination and/or the imagistic examination. The correct staging in a more advanced stage has been made intraoperatively and implicitly we resorted to performing the paraaortic lymphadenectomy on the ascertainment in a case of tumor invasion in parameter, and for the rest on the detection of certain macroscopic enlarged pelvic and paraaortal lymph nodes, respectively which at a extemporaneous hystopathological analysis have proved to be malignant.

There was no records on the duration of the surgical interventions, but all lasted between 4 and 7 hours. On patients with cervical cancer we have performed a IIIrd class radical total hysterectomy, with or without anexectomy, in addition pelvic and paraaortic lymphadenectomy. On the other patients it has been performed a Wiart extracapsular total hysterectomy. On 8 patients with ovarian cancers, and the appendix still present, an appendectomy has also been performed. In the case of ovarian cancer, of carcinosarcomas, on patients with advanced endometrial metastatic intraperitoneal cancers and in case of an undifferentiated pelvic sarcoma, of which point of departure could not be specified neither intraoperatively nor postoperatively, we performed also inframesocolic and supramesocolic omentectomy. On 2 patients with invasion of the peritoneal fold of the urinary bladder and of the pouch of Douglas we practiced peritonectomy. On a patient suspect of hepatic metastasis we performed a hepatic biopsy, which proved to be benign. On 2 patients have been removed the intraperitoneal metastases. It wasn't any residual tumor tissue left behind on all patients with ovarian cancers or intraperitoneal metastases, at the end of the surgery.

On all patients we placed a drain tube in the pouch of Douglas, or 2 surgical drains in the obturator fossa to control the hemostasis and the postoperative lymphorrhagia. Most of the patients have received postoperative blood transfusions and/or plasma transfusions to compensate the protein losses by lymphorrhagia. In the situations of abundant lymphorrhagia (over 1 L/24 hours), we have administered plasma, human albumin preparations and amino acid solutions.

All patients received an antibiotic treatment with a large spectrum, initiated on the induction of anesthesia and continued for minimum 7 postoperative days.

For the prophylaxis of vascular thromboses generated by pelvic or retroperitoneal vessels dissections, we administered to all patients anticoagulant treatment for at least 8 days, started at 12-24 hours postoperatively and completed with the mobilization of the patients as early as possible. In order to avoid dysfunctions of the urinary bladder generated by the dissection of uterosacral and vesicouterine ligaments, of the parameter and of the lumbar aortic sympathetic plexus and for the correct evaluation of the daily diuresis, the vesical catheter was maintained minimum 4 days and resumed in case of acute urine retention (at 24 patients, 38.40%). The intestinal transit was resumed generally at 48-72 hours postoperatively. Intraoperatively, we placed a nasogastric

tube to all patients, which was removed when restarted the intestinal transit. To all patients we have performed postoperative lab investigations (hemogram, coagulation tests and tests for the renal function).

Only in 10 patients (16.7%) we encountered intraoperative complications: 2 injuries of the urinary bladder, occurred in the moment of dissecting off the bladder from the uterine isthmus in patients previously irradiated, which was sutured in 2 planes. Six patients have suffered big venous injuries (inferior cava or common iliac) or of an affluent of the inferior cava vein, which were sutured with 5-0 thread. Two patients suffered intraoperative blood loss of more than 1000 mL, and needed intraoperative and postoperative hematologic re-equilibration, but without being intraoperatively in a vital risk.

Postoperatively there appeared complications in 9 patients (14.0%). In 3 patients (4.8%), it occurred an acute renal failure, solved by dialysis in two cases and by hemofiltration for the other patient. Other complication was the paralytic ileus occurred in 2 patients (3.2%), solved with activators of intestinal motility in the fourth postoperative day. Other 2 patients (3.2%) were rehospitalized for symptomatic lymphocele (fever, diarrhea, distension and abdominal pains), which were solved conservatively with antibiotic and anti-inflammatory treatment. In one patient (1.6%) it occurred a wound seroma, and to another one a right basal pneumonia with methicillin-resistant staphylococcus associated with a pleurisy, which needed a pleural puncture and an aggressive antibiotic treatment for 4 weeks. None of the 62 patients needed a relaparotomy or developed a postoperative fistula.

The number of removed pelvic lymph nodes was between 8 and 59 (an average of 24.66). In 26 patients (41.80%) we found pelvic lymph nodes metastases (between 1 and 14 positive nodes). In 11 of the patients (17.44%) there were detected metastases in the removed paraaortic lymph nodes (between 1 and 23 positive ganglia): in 7 patients in more than 6 removed paraaortic lymph nodes, and in the other 4 only in one or 2 lymph nodes. The number of removed paraaortic lymph nodes was between 3 and 32 (an average of 11,37). We didn't find paraaortic positive lymph nodes in patients with negative pelvic lymph nodes. Postoperatively these patients received adjuvant radiotherapy, completed by concomitant chemotherapy.

The follow-up of the 62 patients was accomplished between 2 and 53 months. Among them, 55 (88.70%) are alive at this moment. Seven of them (11.29%) are deceased, one by renal insufficiency, and the other six after occurrence of distant or pelvic (rectal) recurrences. In one asymptomatic patient it was detected 20 months postoperatively an urographically mute kidney, but subsequently she was excluded.

In one patient operated for uterine carcinosarcoma a cerebral metastasis was detected; she operated and irradiated subsequently, doing well at present. Other two patients operated for ovarian cancer and for pelvic sarcoma, respectively were detected with a central pelvic recurrence and they receive chemotherapy at this moment.

Table 1

Indications, surgical procedures performed, intra- or postoperative complications, number of retrieved and metastasized pelvic and paraaortic lymph nodes, as well as survival with or without tumor relapses

Patients' average age	50.22 years (between 26 and 70)
Final histopathologic diagnosis	
Cervix cancer	
■ st. IB with neoadjuvant radiochemotherapy	30 patients
■ st. IB2 or more with pelvic lymph nodes metastases	12 patients
Ovarian cancer	
■ primary surgery	8 patients
■ after chemotherapy (interval debulking)	4 patients
Cancer of the uterine corpus	
■ endometrial st. IC or more	5 patients
■ carcinosarcoma	2 patients
Undifferentiated pelvic sarcoma	1 patient
Type of surgical intervention	
■ Radical type III EORTC± bilateral adnexectomy+pelvic + paraaortic lymphadenectomy	43 patients
■ Total Hysterectomy ± bilateral adnexectomy + pelvic + paraaortic lymphadenectomy	19 patients
■ Inframesocolic and supramesocolic omentectomy	17 patients
■ Appendectomy	8 patients
■ Pelvic peritonectomy	3 patients
■ Tumorectomy	2 patients
■ Hepatic biopsy	1 patient
Average number of removed lymph nodes	
■ Pelvic	24.66 (between 8 and 59)
■ Paraaortic	11.37 (between 3 and 32)
Positive (metastasised) lymph nodes	
■ Pelvic	26 patients (41.80%) (between 1 and 14 positive nodes)
■ Paraaortic	11 patients (17.44%) (between 1 and 23 positive nodes)
Complications	
Intraoperative	
■ Vascular injuries (inferior vein cava and common iliac vein)	6 patients (9.6%)
■ Urinary bladder injury	2 patients (3.2%)
■ Hemorrhage over 1000 mL	2 patients (3.2%)
Total	10 patients (16.7%)
Postoperative	
■ Acute renal failure	3 patients (4.8%)
■ Paralytic ileus	2 patients (3.2%)
■ Symptomatic lymphocele	2 patients (3.2%)
■ Pneumonia with pleurisy	1 patient (1.6%)
■ Seroma of the wound	1 patient (1.6%)
Total	9 patients (14.0%)
Current condition of patients	
■ Alive without relapses	51 patients
■ Alive with relapses	3 patients
■ Deceased because of the disease	7 patients
■ Excluded	1 patient

Discussions

From the first studies of the Gynecologic Oncology Group which demonstrated the prognostic significance of paraaortic and pelvic lymphatic metastases in the endometrial cancer, the surgical evaluation of these lymph nodes has become more and wider spread⁽²⁾. FIGO recommends performing a paraaortic and pelvic lymphadenectomy as a mandatory phase of the endometrial and ovarian cancer staging^(2,3,4,5).

Paraaortic lymphadenectomy is a feasible technique, with relatively reduced complications. The duration of the procedure itself is less than one hour. The dissection of the fat retroperitoneal tissue that contains the lumbar-aortic lymphatic paths is relatively easy because it exists a good dissection plane in respect to vascular adventitia. Clear exposure and careful dissection of the retroperitoneal vessels, knowledge of the possibility of some vascular anomalies, especially venous, mastering simple techniques of vascular suture and assuring the existence of 4-0 or 5-0 threads or of some vascular clips contribute to lower significantly the complications risk and their easy and fast solving if they appear⁽⁶⁾. For our study, although we have started only in the recent years to practice this procedure, only one intraoperative complication occurred in direct relation to the paraaortic lymphadenectomy, injuring a venous affluent of the inferior cava, during the very first procedure performed in the clinic. We didn't find other studies to describe a higher rate of intraoperative complications in patients in which paraaortic lymphadenectomy was performed⁽⁷⁾.

Much more attention should be paid to the anesthesiology and intensive care. In fact, because it is about long lasting and laborious surgical intervention with marked dissection, with intraoperative and postoperative blood and lymph nodes losses, sometimes really significant, it is necessary a detailed preparation of the surgical procedure, careful monitoring of all intraoperative and postoperative parameters and a very close cooperation between the oncologic surgeon and the anesthesiologist. The occurrence in 3 patients of a degree of postoperative acute renal failure, proven to be of prerenal or renal origin, requires a strict control of the renal perfusion and intraoperative diuresis and a careful monitoring of the postoperative renal function.

An important percentage of the patients were understated preoperatively. The introduction as a routine step of the clinical examination and of the cystoscopy under anesthesia, as well as performing a routine examination by a computerized tomography, magnetic resonance or PET-CT, to detect some macroscopic lymph nodes might contribute to lower understanding of the gynecological cancer patients.

The average number of pelvic and paraaortic removed lymph nodes (24.66 and 11.37 lymph nodes, respectively) from our study is similar to other data. Therefore, the average number of removed paraaortic nodes by Mariani et al.⁽⁷⁾ by laparoscopy on patients with cervical cancer stage IB2-IIIIB is 6 (between 1 and 26), but the lymphadenectomy was performed only till the level of the inferior

mesenteric artery. The same authors⁽⁷⁾ showed that the paraaortic lymphadenectomy for endometrial cancer done by laparotomy and till the level of the renal vein can be considered adequate if more than 5 lymph nodes are removed, and in case of the pelvic one, 10 nodes or more. Puente and colleagues⁽⁸⁾ reported an almost identical number of pelvic⁽²³⁾ and paraaortic (9.2) removed lymph nodes in 42 patients operated for endometrial cancer with high risk of lymphatic spread. The percentages of positive pelvic and paraaortic lymph nodes were 50% and 38%, respectively⁽⁸⁾; other studies reported an average number of pelvic and paraaortic lymph nodes (17 and 5, respectively) for patients operated for an endometrial carcinoma^(9,10,11,12,13).

The number of patients in our group with metastases in pelvic (41,80%) and paraaortic lymph nodes (17,44%) is similar with data reported by the Puente et al.⁽⁸⁾ in cervical cancers: 6% in Ist stage, 12-24% in IInd stage and 30-38% in the IIIrd stage (quote by 4). Also Panici and colleagues⁽⁴⁾ reported a rate of positive paraaortic lymph nodes for the patients with ovarian cancer between 14 and 70%. Additionally, almost half of our patients have been follow a preoperative neoadjuvant radiotherapy ± chemotherapy, through which a part of the micrometastases could have been oncologically sterilized.

In a study of 173 patients operated with ovarian cancer, other study⁽¹⁴⁾ describes a rate of dissemination in pelvic and paraaortic lymph nodes of 59.3% for the serous epithelial histopathological type and of 14.4% for the un-serous one; the rate spreading at pelvic, inframesenteric paraaortic and supramesenteric paraaortic level being similar.

An important percent of patients from our study (30 out of 62) was represented by stage IIB cervical cancer patients subjected previously to neoadjuvant radiotherapy. On a similar batch of patients with cervical cancer in stages IB2-II, initially subjected to an almost identical neoadjuvant treatment, completed only on a part of the cases by an intracavitary brachytherapy, a study identifies a rate of paraaortic lymphatic dissemination almost identical with ours (18%), to an average of 17 paraaortic removed lymph nodes, the majority of metastasized paraaortic lymph nodes were found above the origin of the inferior mesenteric artery⁽¹²⁾.

The situation is even more complicated, because in patients with advanced stages of cervical cancer with negative paraaortic lymph nodes at initial histopathological examination performed by the classical hematoxylin-eosin staining, lymphatic micrometastases were detected by immunohistochemical staining using anti-cytokeratin antibodies on 2.1-8.33% of cases^(9,10). Thus, the real rate of patients with lymphatic metastases could be even higher.

The time interval elapsed from the moment of surgery up to present is quite low for the majority of patients. Furthermore, the study is a retrospective one and not a prospective randomized one. Hence the difficulty of statistic evaluation of the benefit brought by paraaortic lymphadenectomy and consecutively by the adjustment

of the postoperative adjuvant treatment as a consequence of information's provided by this procedure, in terms of free interval without relapses or survival of these patients. The rate of 5-years survival for patients with cervical cancer with lymphatic metastases is known to range between 51 and 78%⁽¹¹⁾.

Also, it is supported a therapeutic benefit of this technique for patients with cervical cancers and positive lymph nodes. The explanation could rely on a better response to the postoperative adjuvant radiotherapy or chemotherapy in relation to the quantity of remaining tumor tissue as reduced as possible. From this reason it results the indications to perform a more radical paraaortic lymphadenectomy and not to limit it only to a selective biopsy procedure ("sampling" or "picking").

Conclusions

The follow-up of the 62 patients was accomplished between 2 and 53 months. Among them, 55 (88.70%) are alive at this moment. Seven of them (11.29%) are deceased, one by renal insufficiency, and the other six after occurrence of distant or pelvic (rectal) recurrences. In one asymptomatic patient it was detected 20 months postoperatively an urographically mute kidney, but subsequently she was excluded. The paraaortic lymphadenectomy performed more radically may lead to the removal of some possible tumor cells tanks responsible of recurrences appearance. ■

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