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"Schauta sine utero": technique and results of laparoscopic–vaginal radical parametrectomy

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Abstract

Objective. Radical parametrectomy or radical cervical stump exstirpation is indicated in selected oncologic situations. We evaluated whether radical parametrectomy without or with cervical stump exstirpation can be performed by a combined laparoscopic–vaginal approach.

Methods. Between November 2001 and Dezember 2002 six patients with unexpected cervical cancer ($n = 3$) after simple hysterectomy, histologically confirmed vaginal recurrence of endometrial cancer ($n = 1$), or cervical stump recurrence of endometrial cancer after supracervical hysterectomy ($n = 2$) underwent radical parametrectomy. After cystoscopic placement of bilateral ureteral stents laparoscopic paraaortic and pelvic lymphadenectomy was performed. The vascular part of the cardinal ligament and the bladder pillar were transsected laparoscopically. According to a LARVH type III procedure vaginal vault or cervical stump with parametrial and paravaginal structures was removed transvaginally.

Results. In all patients R0 resection could be achieved ($n = 4$) or no residual tumor was detected ($n = 2$). There were no intraoperative complications. One patient developed acute kidney failure on postoperative day 1, with spontaneous recovery after 12 days. The median drop of hemoglobin on postoperative day 5 was 2.15 mmol/L (1.3–3.2) and no patient needed transfusion. Restitution of bladder function took 4.3 days on average. The mean operation time was 424 min (385–452).

Conclusion. Radical parametrectomy can be performed by a combined laparoscopic–vaginal technique without complications. Together with laparoscopic paraaortic and pelvic lymphadenectomy, it is a valid alternative to open surgery in selected oncologic patients.

Keywords: Parametrectomy; Laparoscopy; Unexpected cervical cancer; Unexpected endometrial cancer

Introduction

Treatment options following unexpected histopathologic verification of cervical or endometrial cancer after inadequate primary surgery are not standardized. The choice must be made between combined radiotherapy or radical parametrectomy ("Wertheim sine utero" procedure) [1–14]. In the past in early cervical cancer treated by simple hysterectomy, postoperative radiotherapy was associated with lower morbidity compared to perioperative morbidity by open parametrectomy [3]. On the other hand, under- or overtreatment may take place when the true extent of disease is not known: a minority of patients has involvement of parametria and/or pelvic, and/or paraaortic lymph nodes [15,16]. Knowledge of these tumor-associated risk factors may be useful to tailor the optimum therapeutic approach to the individual patient.

In this case series of six consecutive patients we evaluated whether, in comparison to conventional treatment, radical parametrectomy as a combined laparoscopic vaginal procedure ("Schauta sine utero") with laparoscopic lymphadenectomy is a valid alternative with respect to higher oncologic safety and lower morbidity.

Patients and methods

Between November 2001 and December 2002 six patients underwent radical parametrectomy with resection of

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Table 1
Personal, histopathologic, and surgical data of six patients who underwent laparoscopic-assisted vaginal radical parametrectomy with laparoscopic lymphadenectomy

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6
Age (years):	59	45	37	65	61	53
Body mass index:	20.7	21.9	21.4	32	43.4	25.5
Preoperative diagnosis	Vaginal stump recurrence of endometrial cancer	Squamous cell carcinoma of the cervix pT1a2 G2 L1, vaginal biopsy — VAIN III rule out invasion	Adenocarcinoma of the cervix pT1b1, margins questionable	Endometrial adenocarcinoma pT2a R1 resection	Cervical stump recurrence of endometrial adenocarcinoma pT1b N0 L0 V0, following 4× brachytherapy	Adenocarcinoma of the cervix pT1b1 V1(m)
Previous operation	Abdominal hysterectomy with BSO for atypical endometrial hyperplasia	Abdominal hysterectomy with biopsy of the right ovary for suspected CIN III	Vaginal hysterectomy without adnexae for suspected CIN III	Supracervical hysterectomy with BSO for adenomatous hyperplasia without atypia	Supracervical hysterectomy with BSO because of technical problems during operation	Vaginal hysterectomy with BSO for irregular perimenopausal bleeding
Operation	Cystoscopy, bilateral ureteral stents, pelvic and infrarenal paraaortic lymphadenectomy, radical parametrectomy, sacrocolporectopexy	Cystoscopy, bilateral ureteral stents, adhesiolysis, BSO, paraaortic (inframesenteric), pelvic and parametric lymphadenectomy, radical parametrectomy with BSO, sacrocolporectopexy	Cystoscopy, bilateral ureteral stents, infrarenal paraaortic, pelvic and parametric lymphadenectomy, radical parametrectomy, with BSO, sacrocolporectopexy	Cystoscopy, bilateral ureteral stents, radical trachelectomy, pelvic and inframesenteric paraaortic lymphadenectomy, sacrocolporectopexy	Cystoscopy, bilateral ureteral stents, adhaesiolysis, pelvic and paraaortic (inframesenteric) lymphadenectomy, radical removal of cervical stump	Cystoscopy, bilateral ureteral stents, inframesenteric paraaortic, pelvic and parametric lymphadenectomy, radical parametrectomy, sacrocolporectopexy
Intraabdominal cytology	Normal	Normal	Normal	Normal	Normal	Normal
Duration of operation (min)	413	385	452	431	426	436
Transfusion	No	No	No	No	No	No
Difference preoperative vs postoperative hemoglobin (mmol/L)	1.6	1.3	2.4	2.1	3.2	2.3
Intraoperative complications	None	None	None	None	None	None
Histology	Adenocarcinoma of vaginal stump, parametrial structures free of tumor, 0/13 paraaortic and 0/17 pelvic lymph nodes	Squamous carcinoma of the vagina, margins and paracolpic structures free of tumor, 0/12 paraaortic and 0/19 pelvic lymph nodes	No residual tumor, 0/20 paraaortic and 0/20 pelvic lymph nodes	Residual tumor of cervical stump, vaginal and parametric margins free, 0/11 paraaortic and 0/26 pelvic lymph nodes	Adenocarcinoma of cervical stump, vaginal and parametric margins free, 0/7 paraaortic and 0/12 pelvic lymph nodes	No residual tumor, 0/8 paraaortic and 0/35 pelvic lymph nodes
R0 resection	Yes	Yes	Yes	Yes	Yes	Yes
Postoperative complications	Urinary tract infection	Urinary tract infection	Urinary tract infection	Urinary tract infection	Acute kidney failure for 12 days, spontaneous recovery	None
Adjuvant therapy	Brachytherapy	Follow-up	Follow-up	Brachytherapy	Teletherapy	Chemotherapy Taxol/carboplatin
Follow-up			Complete remission after 12 months	Complete remission after 6 months	Complete remission after 6 months	
Restitution of bladder function after	3 days	4 days	5 days	4 days	5 days	5 days
Postoperative duration of ureteral stenting	14 days	14 days	8 weeks	3 days (dislocation on right side)	End of surgery	1 day (dislocation on right side)

the vaginal vault or cervical stump at the Department of Gynecology at the University Hospital of Jena, Germany. The indication for radical parametrectomy were histologically verified recurrence of the vaginal stump in endometrial cancer ($n = 1$), histologically verified vaginal intraepithelial neoplasia grade III following simple abdominal hysterectomy for cervical cancer pT1a2 G2 L1 ($n = 1$), simple vaginal hysterectomy for adenocarcinoma of the cervix pT1b1 with questionable sound margins ($n = 1$), and simple vaginal hysterectomy for cervical cancer pT1b1 with questionable clear resection margins and involvement of the hemovascular space (V1m) (Table 1). Radical parametrectomy including the cervical stump was done in two patients with the history of endometrial cancer (Table 1). One of these patients had undergone brachytherapy four times. Patients data were extracted from the patient file and surgical data were evaluated from video tapes containing the whole laparoscopic part of the procedure and from protocols of the surgeries. All patients received perioperative antibiotics and low-molecular-weight heparin postoperatively.

At the beginning of surgery two double-J stents charriere 7 of 28 cm length are placed in both ureters by cystoscopy. Then the patient is put in Trendelenburg position with straight legs. The surgeon starts the procedure on the left side of the patient, with one assistant on the right and another assistant on the left side of the patient's cephaled to the surgeon. Following subumbilical incision of the skin and insufflation of CO_2 a 10-mm trocar is placed through the umbilicus. Using a 0-degree 10-mm optic the abdomen is inspected for absence of intraperitoneal disease. Additionally, three 5-mm trocars are placed in the lower abdomen: one in the midline two fingers above the symphysis and two lateral of the epigastric vessels two fingers medailly and cranially of the anterior superior iliac spine. An additional 10-mm trocar is placed two fingers above the umbilicus in the left medioclavicular line. During the procedure this trocar is used to extract lymph nodes via an endobag. Aspiration fluid for cytologic examination is taken from the cul de sac. If present, adhesions are taken down followed by a right-sided and left-sided inframesenteric or infrarenal paraaortic, pelvic and parametric lymphadenectomy. (Our technique of lymphadenectomy has been described previously in detail [17,18].) Following pelvic and parametric lymphadenectomy the pararectal and paravesical fossa are opened and the uterine vessels are dissected (Fig. 1).

Parametrectomy (Fig. 2) starts by bipolar coagulation and transsection of the uterine vessels at their origin and of the vascular part of the cardinal ligament (Fig. 3). Following identification of the splinted ureter, the rest of infundibulopelvic ligament is coagulated bipolarly and then transsected. Ureter and mesocolon are dissected away from the rectovaginal ligament. The transsected infundibulopelvic and rectovaginal ligaments and the transsected uterine vessels are pulled cranially and dorsally by the assistants. The ureter is isolated to its entry into the bladder pillar.

After instillation of 200 cc saline into the bladder dissection of the bladder pillar is done. Following preventive bipolar coagulation the supraureteral and medial part of the bladder pillar is transsected by dissection from the peritoneal flap covering the filled bladder in the direction of the splinted ureter. This allows opening of the vesico-vaginal septum even in the presence of scar tissue between bladder and vaginal vault or cervical stump. Following transsection of the bladder pillar the ureter is completely isolated to its entry into the bladder. Dissection is facilitated by the ureteral splint which stretches the ureter to a straight line (Figs. 4 and 5).

Placement of a sponge stick into the vagina facilitates dissection of the vesico-vaginal space and mobilization of the upper third of the vagina from the bladder. In the posterior compartment of the pelvis the peritoneum covering the recto-vaginal ligaments and the cul de sac is incised.

The legs of the patient are put in stirrups and the vaginal part of the operation is started. Six straight Kocher clamps grasp the vaginal cuff circularly and then saline with 0.01% adrenalin is injected under the vaginal skin. The vagina is incised and dissected away from bladder and rectum and the vaginal vault is closed by continuous suture and grasped with straight serrated clamps. The rectovaginal septum is opened and the rectum is dissected away from the recto-vaginal ligaments. The vesico-vaginal septum is opened and the bladder is held away by a Breisky speculum. Following opening of the paravesical fossa a Breisky speculum is placed and the infraureteric bladder pillar is transsected and ligated. Now it is easy to identify the splinted ureters and to mark them by a silicon band. Under digital transrectal control the rectovaginal ligaments are put under tension, transsected, and ligated over Wertheim clamps. The surgical specimen is removed (Figs. 6 and 7).

In order to prevent prolapse of the vaginal vault and outlet obstipation sacrocolpopexy is performed: the posterior vaginal fascia is grasped and a monophilic nonresorbable suture 2-O (Seralone^R) is run continuously along the right peritoneal lining of the rectum and fixed through the anterior longitudinal ligament of the sacral os at the level of S3 and continuously sutured following the same path toward the posterior vaginal vault (Fig. 8).

The vaginal vault is readapted by continuous suture and the vagina is closed by interrupted suture following the placement of a 30 charriere catheter in the cul de sac. Finally, the sacropexy suture is tied and the vagina is elevated. Laparoscopy is done to confirm hemostasis and a suprapubic catheter is placed. Two intraabdominal drains of 18 charriere are placed in both obturator fossae.

Results

The mean age of patients was 53.3 (37–65) years; the Quetelet index was 27.5 (20.7–43.4) kg/m^2. Paraaortic lymphadenectomy was done in all patients to the inferior mesenteric artery, and in two patients to the level of the

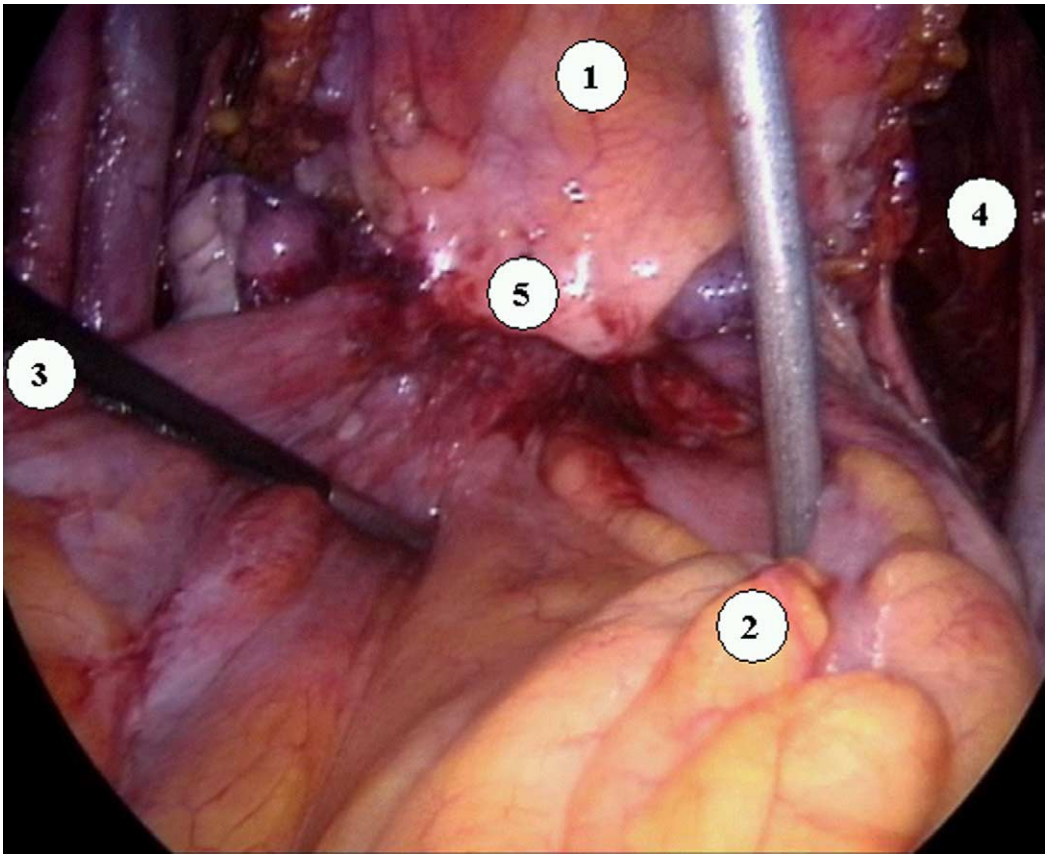

Fig. 1. Intraoperative situs following pelvic lymphadenectomy: bladder (1) and rectum (2) are attached to each other and cover the vaginal vault (5). The left external iliac vessels (3) can be seen and the right paravesical fossa (4) is widely opened.

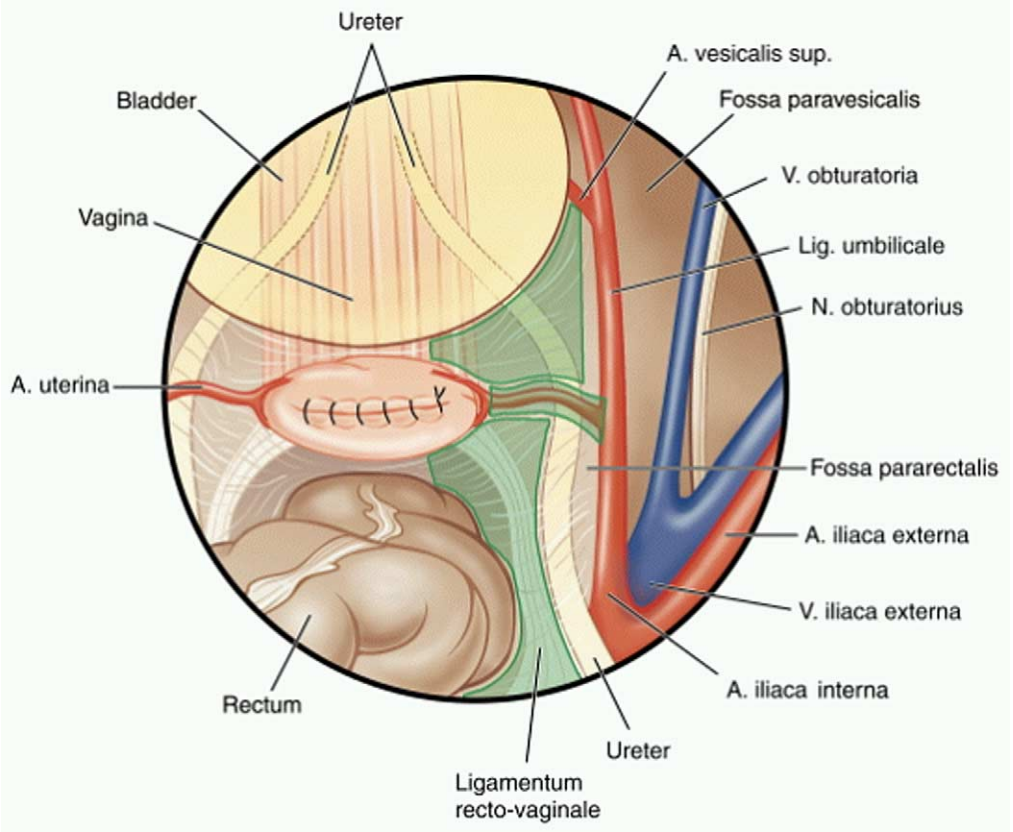

Fig. 2. Anatomical situs at the beginning of radical parametrectomy. Three parts of the parametrium are shown in green: ventrally the bladder pillar, posteriorly the rectovaginal ligament, and between the vascular part of the cardinal ligament.

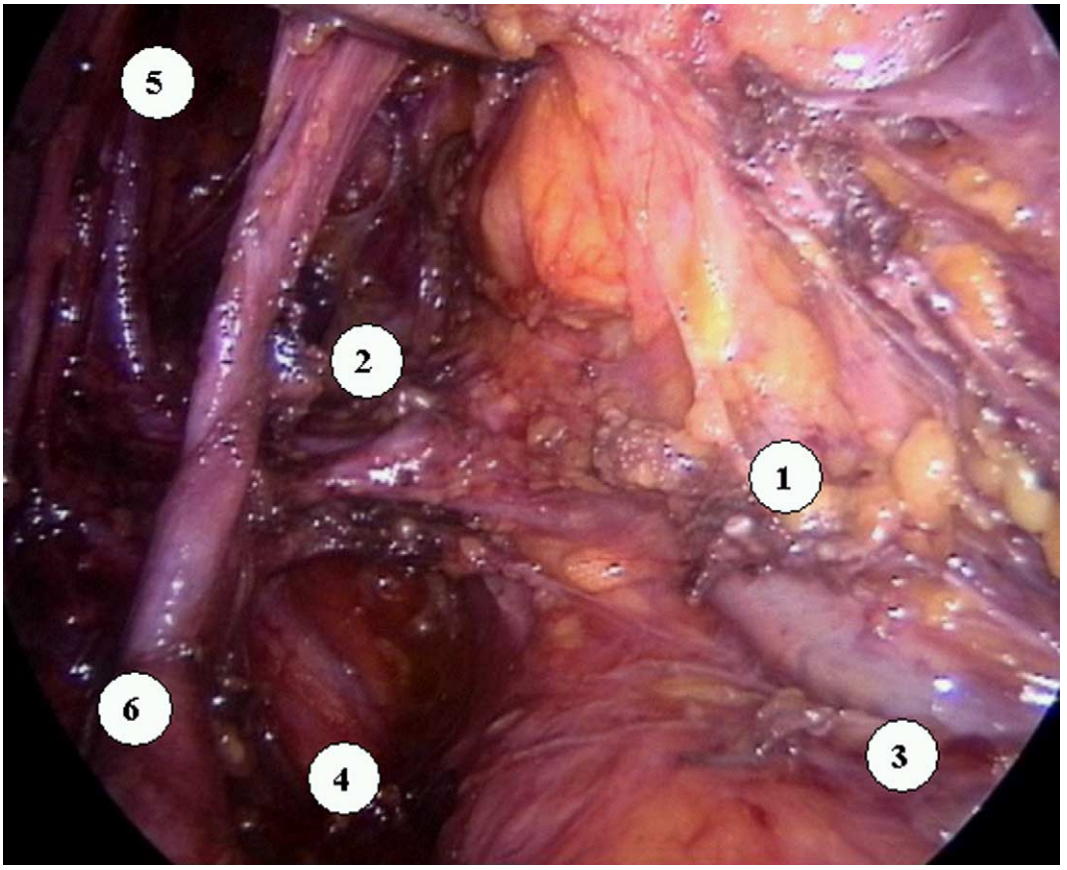

Fig. 3. Intraoperative situs following parametric lymphadenectomy and coagulation and transsection of the left uterine vessels (1, transsected uterine artery). The inferior vesical and rectal medial artery (2) are preserved. The splinted ureter (3) is medialized. Pararectal (4) and paravesical (5) fossa are widely opened; the internal iliac artery (6) is completely isolated.

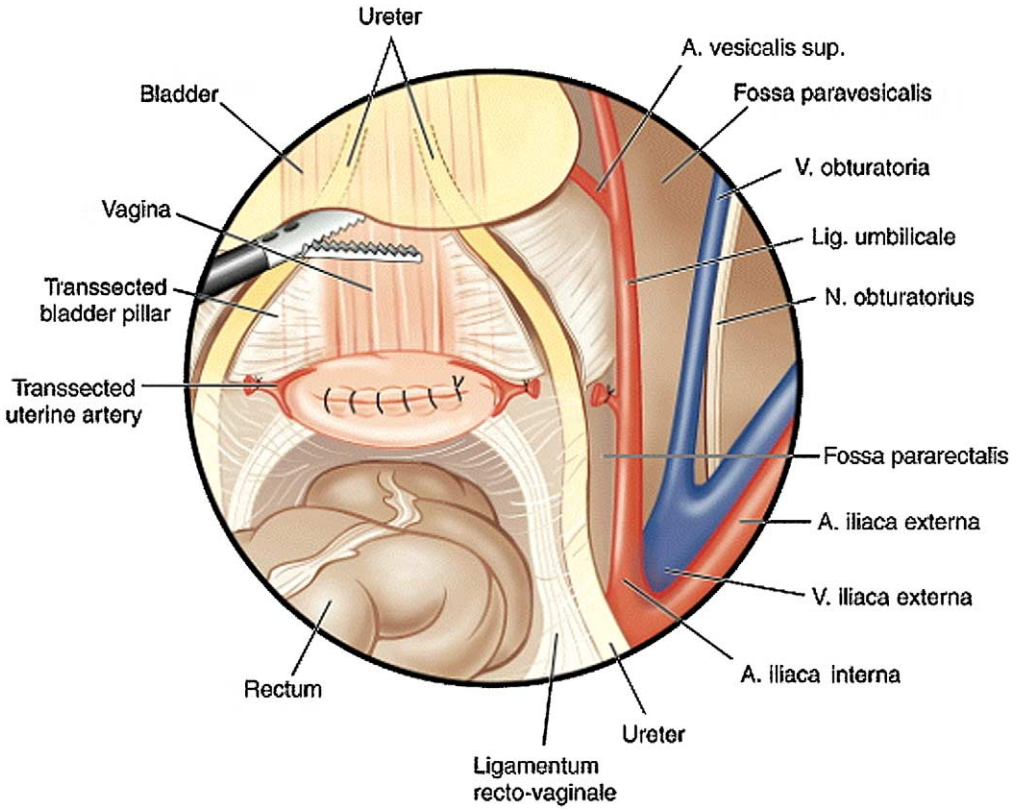

Fig. 4. By elevation of the instilled bladder the cranial and medial parts of the dissected bladder pillar remain attached to the vaginal vault.

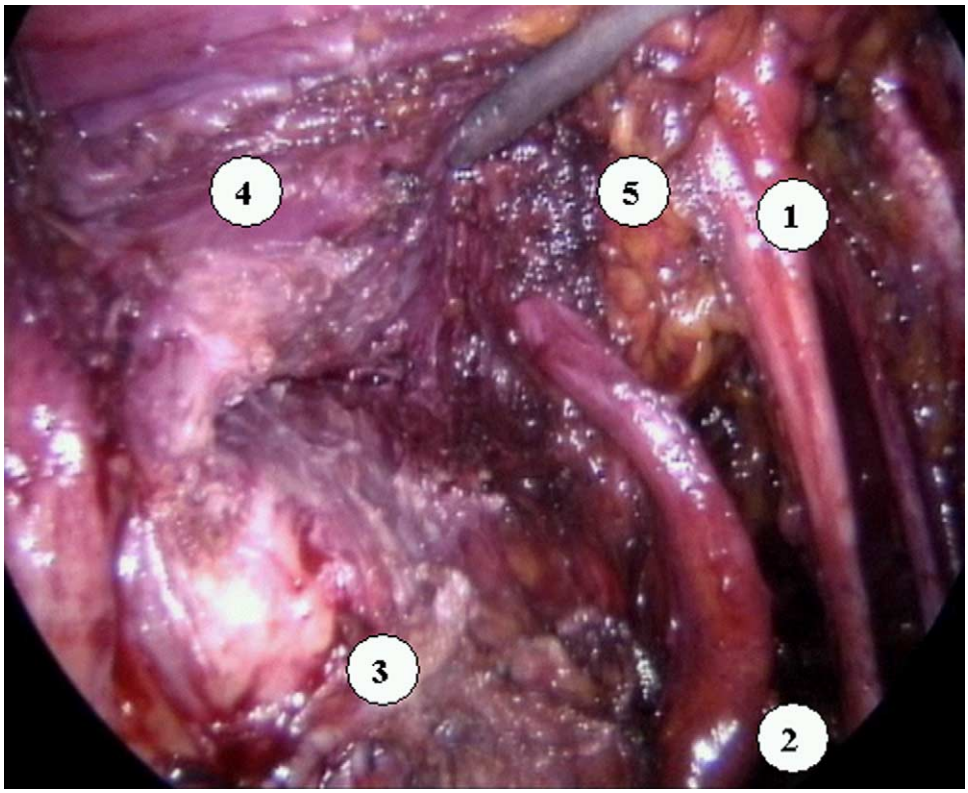

Fig. 5. Intraoperative situs after transsection of the right bladder pillar. The lateral umbilical ligament (1) with the superior vesical artery and the lateral bladder pillar (5) are visible. The ureter (2) has been isolated up to its entry into the instilled bladder (4). The vaginal stump (3) is slightly elevated.

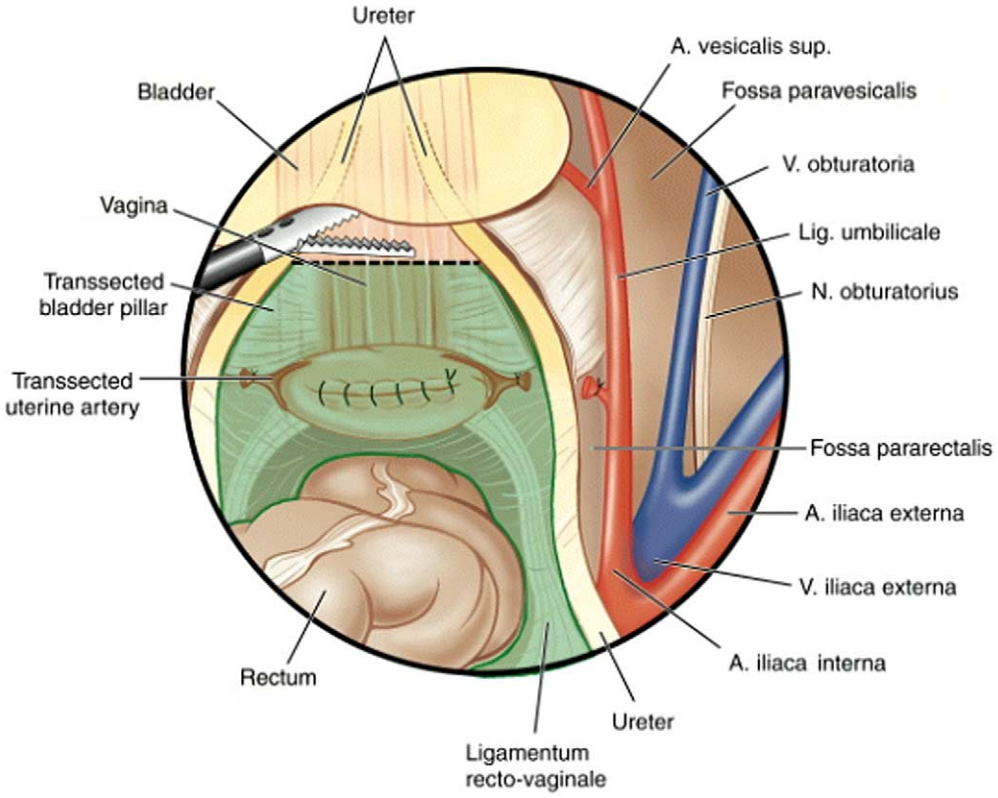

Fig. 6. Schema of the “butterfly”: the resected surgical specimen area including bladder pillar, rectal pillar, cardinal ligament, and vaginal vault form the shape of a butterfly.

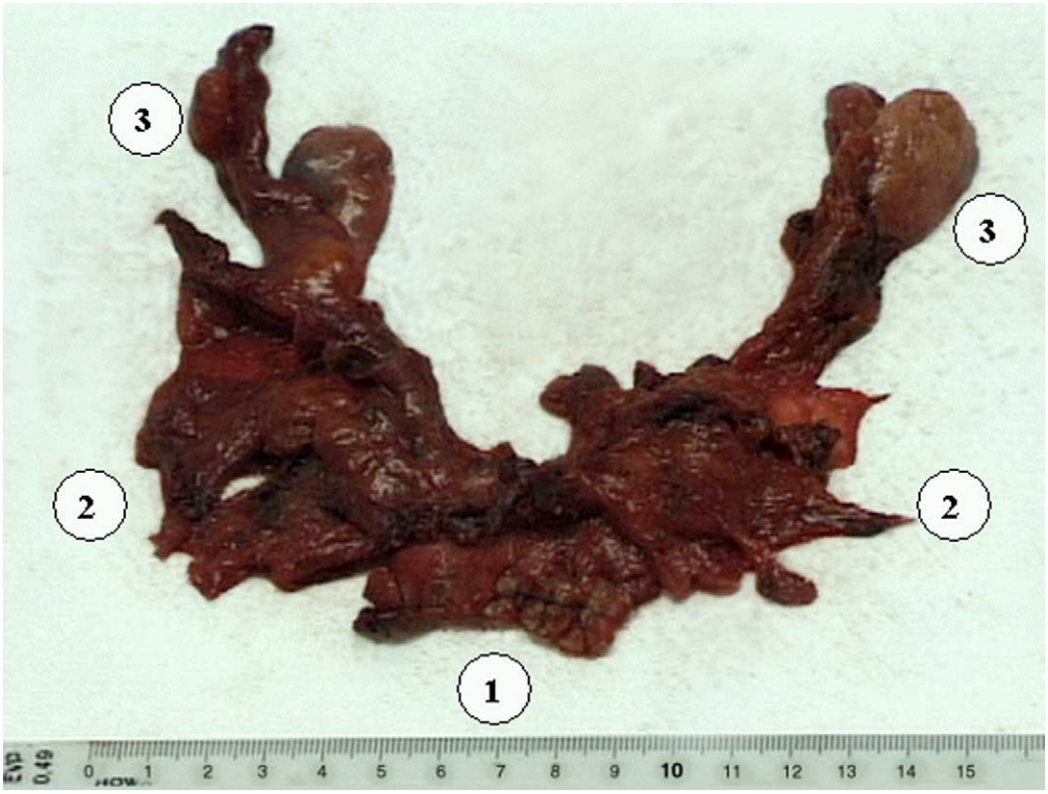

Fig. 7. Surgical specimen following parametrectomy with both adnexae. The vaginal cuff is closed by continuous suture (1), the transsected parametria (2), and both adnexae (3) can been seen. The length of the parametric tissue is 4.5 cm on each side.

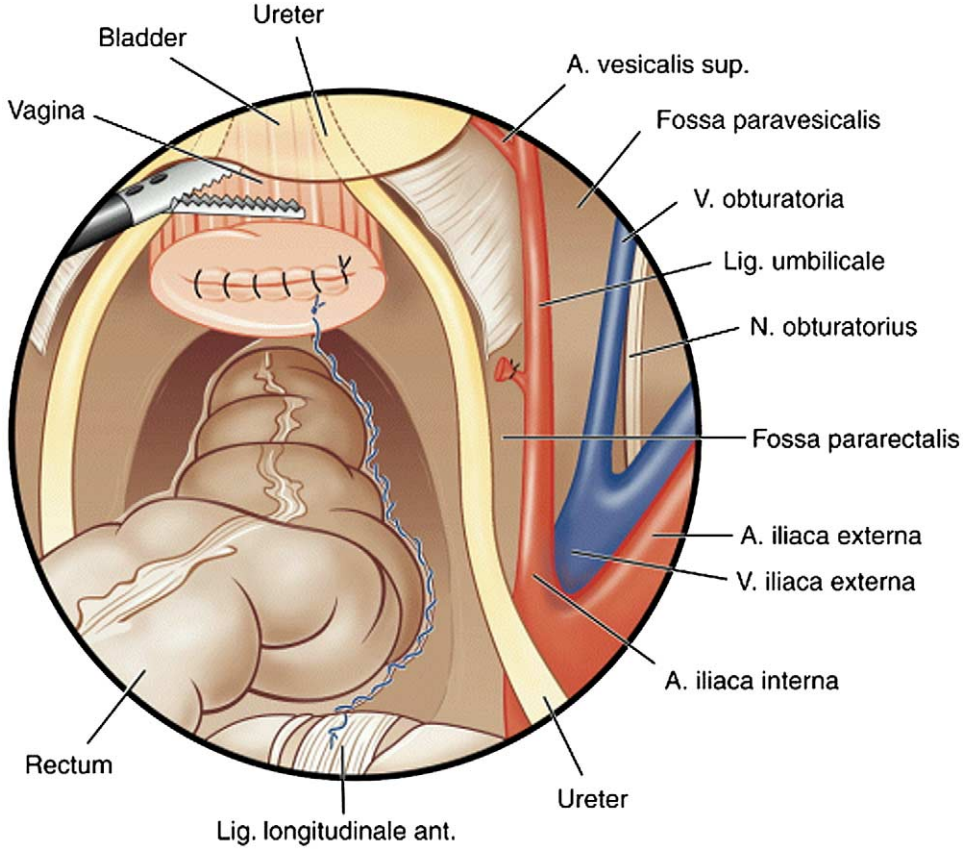

Fig. 8. Final situs. Both umbilical ligaments and ureters are completely isolated. The vaginal stump is fixed to the sacral os.

renal vessels. Pelvic lymphadenenctomy was also performed in all patients, parametric lymphadenectomy only in the three patients with a history of cervical cancer. Sacrocolpopexy was done in all patients with the exception of one patient who had been treated by brachytherapy and had adequate vaginal support following parametrectomy. The mean duration of surgery was 424 (385–452) min. Hemoglobin decreased by 2.25 (1.3–3.2) mmol/L between the preoperative day and Postoperative Day 5. No intra- or postoperative transfusions were given. There were no intraoperative complications. Postoperatively one obese patient (body mass index 43.4) developed acute renal failure, which resolved completely after 12 days of intermittent hemodialysis. Four patients needed antibiotic treatment for urinary tract infection without fever. In three patients grade I dilatation of the renal pelvis was seen postoperatively by sonography (unilaterally $n = 2$, bilaterally $n = 1$). The suprapubic catheter was removed after a mean of 4.3 days (3–5 days). The double-J stents were removed between Postoperative Days 1 and 64. In two patients a dislocated splint was diagnosed postoperatively by X-ray. In the surgical specimens resection was confirmed with sound margins in four patients and no residual tumor was present in two patients. All paraaortic (mean 11.8, 7–20) and pelvic (mean 21.4, 12–35) lymph nodes were free of tumor. In two patients brachytherapy, in one patient teletherapy, and in one patient chemotherapy were performed as adjuvant treatment. Following radical parametrectomy decision for adjuvant therapy was made in a interdisciplinary tumor board according to the guidelines of the German Association of Gynecologic Oncologists. For Patient 5 with cervical stump recurrence of endometrial cancer, adjuvant teletherapy was recommended. For Patient 6, with tumor involvement of the hämovascular space in the uterus specimen, chemotherapy was performed. All patients were free of recurrence with one patient of 1 year and two patients of 6 months follow-up (Table 1).

Discussion

The incidence of unexpected histologically confirmed cervical cancer following simple hysterectomy is 1%. Presence of persistent endometrial cancer in a cervical stump is even more rare since supracervical hysterectomy should be avoided in case of endometrial cancer. Tumor-related prognostic factors such as involvement of parametrium or lymph nodes remain open following incomplete surgery. Even in early cervical cancer direct tumor invasion or tumor involvement of lymph nodes or lymphatic vessels can be diagnosed in up to 31% of patients when complete histopathologic evaluation is performed [15]. In another study in nodal-negative patients with cervical cancer FIGO stage IB and tumor volume of less than 5 cm^3 continuous or discontinuous tumor infiltration of the parametrium was found in 6.7% [16]. In six patients tumor deposits were seen only in the lateral part of the parametrium, which may be a source of recurrence if a modified radical hysterectomy with only partial resection of the parametric structures has been done. Such data are not available for endometrial cancer; the risk of involvement of the parametrium rather increases in FIGO stage II tumors.

Following unexpected presence of cervical cancer in the hysterectomy specimen tele- and brachytherapy have good results: the 5-year overall survival is between 75 and 96% in FIGO stage IB1 if resection margins are free of tumor or if they show only microscopic involvement [1,4–7,10,13,14,19]. When macroscopic tumor remains after primary surgery, prognosis is poor [4,14]. In addition to the size of residual tumor, the histologic tumor type seems of prognostic value: following simple or supracervical hysterectomy for cervical cancer radiation is associated with lower survival in patients with adenocarcinoma compared to squamous cervical cancer [9,10]. Whereas in the elder literature radical surgery is associated with worse prognosis and considerable morbidity compared to radiotherapy [2], recent studies show that radical abdominal parametrectomy with partial colpectomy and pelvic lymphadenectomy is associated with adequate oncologic outcome: of 18 patients no residual tumor was seen in 15 and the 5-year survival rate was 89%. Radiation could be avoided in 78% of patients [3]. Surgical morbidity of radical parametrectomy is comparable to morbidity caused by primary radical hysterectomy [3,12]. When no remaining tumor is to be seen no additional therapy is needed, which is also a safe predictor of recurrence-free survival [12], with the exception of adenocarcinoma. Following radical parametrectomy with pelvic lymphadenectomy and partial colpectomy histological residual disease was seen in 4 of 27 (15%) patients, overall survival was 82%, and the 4 tumor-associated deaths were in patients with residual tumor or adenocarcinoma [11]. Among our patients persisting tumor or recurrence was histologically confirmed in 4 patients prior to resurgery. All patients were informed about the two alternatives of treatment—reoperation versus radiotherapy—and decided for surgery, subsequently. In one patient a history of brachytherapy allowed no choice but surgery. Persisting tumor was confirmed in all 4 patients and resection was done with clear margins. In the past, radical parametrectomy or radical extirpation of a cervical stump was achieved by abdominal surgery [2,3,11,12], but recently a laparoscopic–vaginal approach was performed in one patient with vaginal cancer [20] and two patients with cancer of the cervical stump [21]. We have developed our technique of laparoscopic-assisted radical vaginal parametrectomy through our experiences with laparoscopic-assisted radical vaginal hysterectomy [22]. Laparoscopy allows an exact staging of an oncologic disease. As a rule we start with paraaortic and pelvic lymphadenectomy. Radical parametrectomy is carried out only if frozen section confirms absence of metastatic disease. Otherwise the procedure is stopped and the patient undergoes radiotherapy or radiochemotherapy. Duration of surgery, with a mean of 424 min, is considerably longer than conventional surgery (mean 185, 200 or 210 min) [3,11,12]. Using disposable stapling

devices the laparoscopic–vaginal approach took 270 min [20]. Duration of surgery can be diminished by preoperative placement of ureteral stents 1 or 2 days prior to radical parametrectomy. Compared with open surgery blood loss in our series was considerably lower: in one series with open surgery all patients received transfusions and mean blood loss was 1750 mL [12]; in another series the transfusion rate was 89% [11]; blood loss was 900 cc [3]. Due to our minimally invasive dissection with preventive coagulation blood loss was minimal and transfusion was not necessary.

The rate of severe complications is important for deciding on operation or radiation. For radiotherapy following simple hysterectomy complication rate varies between 7 and 18.8% [4,5,10,13]; for adjuvant radiotherapy following radical hysterectomy the rate is 23.8% [9]. Complications include chronic diarrhea, obstruction of small bowel, vesicovaginal fistula, ileo-vaginal fistula, and stenosis of the ureter, as well as bowel perforation, hemorrhagic proctitis, and hemorrhagic cystitis, which require transfusion.

Following radical parametrectomy bladder dysfunction is found in 8.7% of patients [12], with 2 of 27 patients performing self-catheterization [11]. One intraoperative injury to the ureter required neoimplantation [3] and two uretero-vaginal fistulas were encountered in another series [11]. We did not observe any intraoperative complications. No explanation could be found for the postoperative acute renal failure in one of our patients, despite intensive nephrologic evaluation. Since the renal problem resolved spontaneously, there is no persistent morbidity for the patient.

Ureteral stents were removed immediately postoperatively when pain or hematuria due to dislocation occurred. Otherwise, not dislocated stents were removed cystoscopically 1 day prior to discharge of the patient (Patients 1 and 2). Patient 3 left the hospital earlier and stents were removed by the primary care physician 8 weeks postoperatively. Optimal duration of ureteral stenting is not known.

In five of six patients (83.3%) in our series percutaneous radiation could be avoided. However, two patients underwent brachytherapy, and one patient chemotherapy, respectively. Necessity of adjuvant therapy after radical parametrectomy needs to be assessed on an individual basis, depending on risk factors (e.g., hemovascular space involvement). Since follow-up is short we cannot make general recommendations on the basis of oncologic outcome.

Median time between primary surgery and laparoscopic—vaginal radical parametrectomy was 33 days (17–56 days) for Patients No. 2, 3, 4 and 6. For Patients 1 and 5 with vaginal or cervical stump recurrence of endometrial cancer the re-operation took place after 3 years or 1 year and 8 months respectively. Follow-up data will indicate whether the time interval between first and second operation is an independent prognostic factor.

Our findings suggest that laparoscopic-vaginal parametrectomy is a safe and effective alternative to conventional therapy in patients with undiagnosed invasive cancer at the time of simple hysterectomy or the cervical stump carcinoma at the time of supracervical hysterectomy.

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