

# A new approach to treatment of early-stage cervical carcinoma: entire laparoscopic abdominal radical hysterectomy with bilateral pelvic lymphadenectomy without vaginal cuff closure - case reports

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## Summary

**Objective:** The objective of this study is to describe a new technique of laparoscopic radical hysterectomy without vaginal cuff closure.

**Methods:** Three patients underwent laparoscopic radical hysterectomy, bilateral salpingo-oophorectomy and bilateral pelvic lymph node dissection using an Argon Beam Coagulator. Four trocars were used: umbilical port for the camera, two ports for the operating surgeon and a fourth port for use by the surgical assistant.

**Results:** All patients were clinically staged IB1. Ages were 53, 64 and 58 and BMI was 19.5, 25.2 and 21.4, respectively. Duration of surgery was 375, 325 and 335 minutes, respectively, from first trocar insertion to last closing stitch. Estimated blood loss was 300, 100 and 400 ml and removed pelvic lymph nodes 18, 15 and 26, respectively. The patients tolerated the surgical technique and recovered satisfactorily.

**Conclusion:** These are the first three cases of early-stage cervical carcinoma patients who have been treated with entirely laparoscopic abdominal radical hysterectomy (LARH) and bilateral pelvic lymphadenectomy (BPL) without vaginal cuff closure. To our knowledge, this has not been previously described in the literature. It is feasible and was well tolerated in this small series of patients.

**Key word:** Laparoscopy; Early stage cervical carcinoma; Radical hysterectomy; Pelvic lymph node dissection.

## Introduction

Evaluation of lymphatic pelvic lymph nodes by retroperitoneal pelviscopy started in January 1986 by Dargent [1]. Thereafter several authors reported on the role of laparoscopy in the management of cervical carcinoma both as a staging procedure [2, 3] and as surgical treatment by radical laparoscopic vaginal hysterectomy [4-6].

Even though Canis *et al.* [7] and Nezhat *et al.* [8] formally described a radical laparoscopic hysterectomy, they both used a vaginal incision at the end of the operation, culdotomy was performed and the paracolpion pedicle was removed below. Spirtos *et al.* [9] and Ostrzenski [10] were the first to describe a laparoscopic radical hysterectomy (Piver type III) without a vaginal approach. They both completed the procedure by closing the vagina above.

It is possible to perform a Wertheim operation laparoscopically if the surgeon is well trained in both radical gynecologic-oncology and advanced laparoscopic operations. After good hemostasis on the vaginal edges it seems safe not to close the vagina [11]. From 22/04/04 through 03/11/04, we performed entire laparoscopic abdominal radical hysterectomy with bilateral pelvic lymphadenectomy without vaginal cuff closure on three

patients. All had early-stage cervical cancer of less than 2 cm in diameter. The follow-up was from 18-24 months.

## Material and Methods

Three consecutive patients who fulfilled our inclusion criteria were included in the study. Patient selection is important and the inclusion criteria for our pilot study are listed below:

1) Women with diagnosed untreated invasive cervical cancer FIGO Stage IA2 (with lymphovascular invasion). 2) occult or clinical < 2 cm lesions, squamous, adenocarcinoma, and adenosquamous histology. 3) Quetelet body mass index < 25. 4) Desire for the laparoscopic approach. 5) Karnofsky performance > 90.

Suggested exclusion criteria: 1) Obvious metastasis beyond the uterus. 2) Prior retroperitoneal lymph node dissection, both pelvic and paraaortic. 3) Prior pelvic and abdominal radiation therapy. 4) Reduced bone marrow, renal and hepatic function. 5) Pregnancy.

Preoperative routine work-up included cervical and endometrial biopsy, endocervical curettings, and pelvic magnetic resonance (MR) imaging.

Our gynecologic oncology laparoscopy set contains the below listed instruments: trocars (12 mm/5 mm) reduction sleeves, Clermont-Ferrand uterine manipulator, bipolar coagulation forceps, irrigation and suction cannulas, endoshears (auto suture), endobag (auto suture), endoclinch (auto suture), endostitch (auto suture), endo-GIA 30-2.0 (auto suture), endovision video camera system and accessories (Karl Storz Endovision Video Camera, color monitor, video recorder, video color



Fig.1a

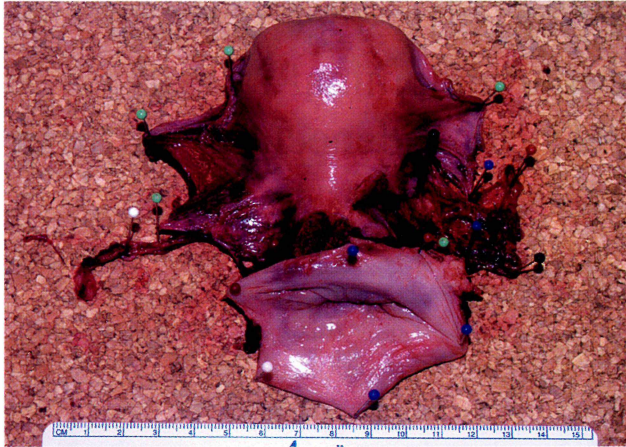


Fig.1c

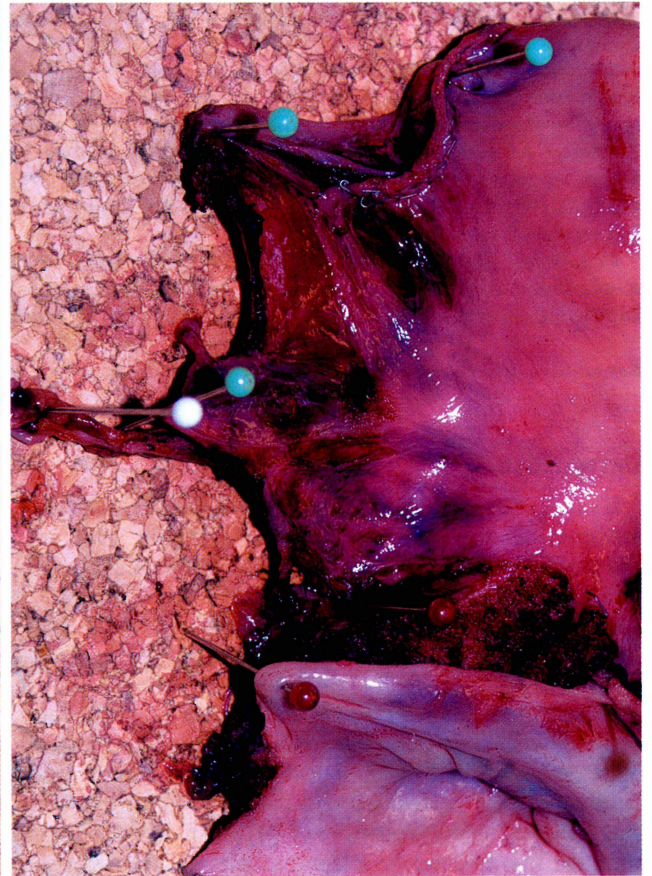


Figure 1. — Operative specimen with bilateral parimetrium and vaginal edge.

printer), cold light source and fiber optic light cable, Karl Storz electronic thermoflator and an argon beam coagulator (ABC) (Conmed Inc., USA). In addition to the instruments, a general surgery set with vascular instruments is available in the operating room in case of conversion to open surgery.

The same technique previously described by Spirtos *et al.* [12] was used except for two small differences. First the uterine manipulator (Clermont Ferrand, Storz) was used in all cases, and second the vaginal cuff was purposely not closed at the end of the operation.

Opening the vagina using both the ABC and endoscopes was initiated. After transection of the vagina the

operative specimen (Figure 1a) was removed by pulling the uterine manipulator out. Immediately afterwards, the vagina was packed with a compress, and the assistant closed the labium majora at the midline in order to obtain pneumoperitoneum. Hemostasis on the vaginal wall was completed with bipolar coagulation forceps. The vaginal cuff was left open (Figure 2).

### Case Reports

*Case 1* was a 53-year-old woman (G1, P2) who had delivered twins in 1970. She had undergone laparoscopic sterilization in



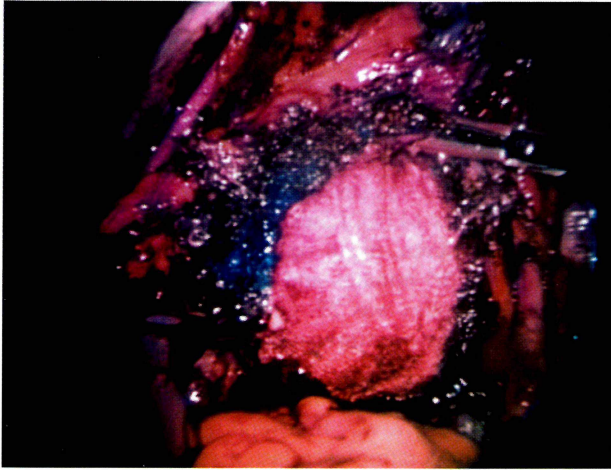


Figure 2. — Transection of the vagina.

1991, was treated by conization for CIN II-III in 1992, and regular follow-ups were normal. She went through menopause in 2000 and never used HRT. In February 2004 a colposcopic examination showed punctuation and cervical biopsy revealed squamous cell carcinoma of the cervix. MR examination showed a 10 x 12 mm tumor on the anterior lip of the cervix, no parametrial infiltration and no abnormal retroperitoneal lymph nodes. HPV type 16 was positive. She had chronic obstructive lung disease and was treated with steroids. Preoperative FIGO stage was IB1 and laparoscopic abdominal radical hysterectomy/bilateral salpingo-oophorectomy (LARH/BSO) and bilateral pelvic lymphadenectomy (BPL) were performed on the 22<sup>nd</sup> of April 2004 without any perioperative or postoperative complications. The operative time in our first case was six hours and 15 minutes, with an estimated blood loss of 300 ml. The final histology report showed squamous cell carcinoma, depth of infiltration 5 mm, no infiltration in either the parametrium or pelvic lymph nodes (0/18) with free resection margins. After formal fixation the left parametrium measured 20 x 12 mm, the right parametrium 25 x 10 mm and the vaginal edge 15 mm. One month later she had a symptomatic lymphocyst which was treated with percutaneous drainage.

Case 2 was a 64-year-old woman (G2, P2) who had previously had no health problems. Routine cervix cytology showed CIN III and possible squamous cell carcinoma of the cervix: Colposcopic examination showed abnormal vessels and colposcopy-directed multiple biopsies revealed squamous cell carcinoma of the cervix. MR examination showed a 10 x 19 x 9 mm tumor without parametrial infiltration and no abnormal retroperitoneal lymph nodes. Preoperative FIGO stage was IB1.

LARH/BSO and BPL were performed without perioperative and postoperative complications.

Final histology showed squamous cell carcinoma of the cervix, depth of infiltration 5 mm, no parametrial infiltration, pelvic lymph nodes without metastasis (0/15) with free resection margins. Every three months a control was carried out with colposcopy, cytology and MR examination which were normal.

The left parametrium was 20 x 15 mm, the right parametrium was 15 x 10 mm and the vaginal edge was 5-10 mm.

Case 3 was a 58-year-old woman (G1, P1) with postmenopausal bleeding during the previous two months. Endometrial pipelle sampling showed suspect well differentiated papillary adenocarcinoma of the cervix (endocervix/mucinous type). Endocervical curettings showed well differentiated adenocarcinoma with squamous cell differentiation of the cervix and a normal cervical biopsy. MR examination was also normal. LARH + BSO and BPL were performed on 03/11/04. A bladder injury was repaired by an endostich device laparoscopically. The postoperative period of 12 days due to this complication was otherwise uneventful. Final histology showed no remaining tumor and 26 pelvic lymph nodes without metastasis (0/26). The left parametrium was 22 x 10 mm (Figure 1d), the right parametrium 22 x 20 mm (Figure 1c) and the vaginal edge was 12-22 mm (Figure 1b). One month later a symptomatic lymphocyst was treated with percutaneous drainage.

All patients had routine IVP postoperatively and all were reported normal. Total pelvic lymph nodes were 18,15 and 26, respectively, and all nodes were negative after cytokeratin immunohistochemical examination. All surgical resection margins were reported as negative. No patients needed blood transfusion. All patients were satisfied with the good cosmetic results.

Patient characteristics are shown in Table 1 and surgical results are shown in Table 2.

Table 1. — Patient characteristics.

Patient no.	Age (years)	Height (cm)	Weight (kg)	Quetelet index	Clinical stage
1	53	168	55	19.5	IB1
2	64	170	73	25.2	IB1
3	58	170	62	21.4	IB1

Table 2. — Surgical results.

Patient no.	Operative time (min.)	Estimated blood loss (ml)	Pelvic lymph nodes	Transfusion	Hospital stay (days)
1	375	300	18	—	7
2	325	100	15	—	7
3	335	400	26	—	12

Table 3. — Summary of reports on laparoscopic radical hysterectomy with pelvic and paraaortic lymphadenectomy.

Author	Ref.	no.	Operation Time (min.)	Blood loss (ml)	LN	Hospital stay (days)	Comp.	Rec.
Osterzenski, 1996	[10]	6	280	—	6	3	1 hydronephrosis	—
Spirtos, 1996	[9]	10	253	300	24.8	3.2	0	0
Spirtos, 2002	[12]	78	205	250	34	—	1.3% tr., 3 cystotomies 1 UVF	8
Abu Rustum, 2003	[13]	19	370	301	25.5	4.5	2 transfusions 2 laparotomies	0
Gil-Moreno, 2005	[16]	12	271	445	18.6	5.25	0	0
Sert, 2005*		3	345	266	19.6	8.6	1 cystotomy	—

\* Entire laparoscopic radical hysterectomy with bilateral pelvic lymph node dissection.

## Discussion

The standard treatment for women with early cervical cancer FIGO Stage 1A2 with lymphovascular invasion and IB is radical hysterectomy with bilateral pelvic lymphadenectomy. Traditionally radical hysterectomy can be performed both abdominally and vaginally. Development of endoscopic instruments and surgical skills make more complicated procedures possible laparoscopically. The first case with laparoscopic radical hysterectomy was reported by Canis in 1989 [7]. Techniques, feasibility, and safety have been demonstrated by a large series of 78 patients reporting on the management of cervical cancers [12]. Different laparoscopic procedures have been reported to achieve the same surgical goals. Laparoscopic-assisted radical vaginal hysterectomy with pelvic lymphadenectomy has been very popular in the French school [5, 6]. Another group has also described a technique of laparoscopic abdominal radical hysterectomy with pelvic lymphadenectomy, but at the end of the operation colpotomy was done vaginally and the uterine pedicle was removed through the vagina [7-9]. We believe open surgery skills are an important essential factor in order to perform laparoscopic radical pelvic operations. There are no prospective randomized studies between entire laparoscopic radical hysterectomy and traditional open abdominal radical surgery regarding morbidity, mortality and quality of life. We believe it will not be possible to do such a study because of the decreased incidence in industrialized countries of cervical cancer after successful screening programs, and because of few skillful laparoscopic surgeons.

Several authors have reported the advantages of laparoscopic surgeries including reduction of blood loss, shortened hospital stay and improved quality of life. Long-term complications and survival data are not established yet [12-15]. Long learning curves and lack of such data are some of the concerns about this new technique. During the last 13 years several studies have been published [9, 10, 12-14, 16-18]. Only five papers have reported a technique performed entirely laparoscopically without transvaginal surgery [9, 10, 12, 13, 16].

We wanted to perform entire LARH and BPL which mimicked open radical hysterectomy. In our hospital, traditional open radical surgery has been the cornerstone in early-stage cervical cancer, but recently a minimally invasive surgical procedure has been established. We presented our first three cases where the entire procedure was done abdominally with the vaginal cuff left open. The main reason to leave the vagina open was to avoid fluid collection in the Douglas pouch and in addition also is time sparing, specially with the development of a new technique. All patients wanted laparoscopic surgery mainly due to esthetic reasons.

The first laparoscopic radical hysterectomy on a 30-year-old patient with Stage IA2, squamous cervical cancer, (depth of infiltration, 4 mm) lasted eight hours [7]. In 1995 the same group reported 13 cases of laparoscopic radical hysterectomy for cervical cancer from 1989 to 1992. Operative time on the last case was four hours and 20 minutes [19]. Later on they reported on a new series of 41 cases which was presented as an abstract at the IGCS meeting in Japan 1997 without showing any decrease in operative time [20]. Recently Pomel *et al.* presented 50 patients with a median operative time of

four hours and 20 minutes [14]. The mean number of pelvic lymph nodes was 13.22 per patient. The median postoperative stay was 7.5 days. The median BMI was 21.5 (range, 18-29). One bladder injury was sutured laparoscopically and follow-up was uneventful.

Nezhat *et al.* reported his first case with Stage IA2 and the operative time was seven hours and number of pelvic lymph nodes was 14 [8]. Later, he published a new report with seven patients; mean operative time decreased to five hours and 15 minutes and total number of removed pelvic lymph nodes was 22. One case was converted to laparotomy. No postoperative complications were reported [17].

Entire total laparoscopic radical hysterectomy without a vaginal component was first reported by Spirtos *et al.* [12]. The first operation case lasted seven hours and ten minutes. After ten patients the average operative time was four hours and 15 minutes and all operations were completed laparoscopically. Total pelvic lymph nodes were 18.3. In 2002 they published a large series of 78 consecutive patients and all but five patients had the surgical procedure completed laparoscopically (6.4% converted to laparotomy). The average operative time was three hours and 25 minutes (range 150-430 minutes) and estimated blood loss was 250 ml (range 50-700 ml). One patient (1.3%) required a transfusion. Three patients (3.9%) with previous cesarean deliveries had intraoperative cystotomies; two cystotomies were repaired laparoscopically, and one required laparotomy. The average hospital stay was 2.9 days (range 1-7 days). The average number of aortic and pelvic lymph nodes was 10.3 and 23.8, respectively. Nine patients (11.5%) had positive lymph nodes. Postoperative complications occurred in seven patients (9.1%). One patient developed an ureterovaginal fistula, one had deep venous thrombosis, one had urosepsis and one had a vaginal cuff abscess or abdominal wall hematoma. Two patients had pelvic lymphocysts that required percutaneous drainage. The average parametrial margin measured 3.3 cm (range 1.0-5.0 cm) and the average vaginal margin measured 2.15 cm (range 1.0-3.5 cm).

Sedlacek [18] reported on 14 patients with Stage IB cancer with an average operative time of seven hours. Four bladder injuries and four ureterovaginal or vesicovaginal fistulas were diagnosed postoperatively. Average blood loss was 334 mm vs 1380 ml compared with a series of patients treated by open abdominal radical hysterectomy. Abu-Rustum *et al.* [13] reported on 19 patients who underwent a total laparoscopic approach for definitive surgical treatment. The procedure was completed laparoscopically in 17 patients. Two patients were converted to laparotomy (10.5%), one patient due to parametrial bleeding and another due to pelvic adhesions and cystotomy. In this series the mean operating time was six hours and ten minutes (range, 230-600 minutes). Mean hospital stay was 4.5 days (range, 3-11 days), mean pelvic lymph nodes 25.5 (range, 15-39), number of transfusions (one patient) (5.3%) and BMI 23.1 (range, 18-30).

According to Santori *et al.* the probability of paracervical involvement was zero if the tumor was less than 2 cm [21]. Isolated positive paraaortic involvement without positive pelvic lymph nodes was 0.9% reported by Morice *et al.* [22]. We did not therefore attempt to do paraaortic lymph node dissection, as all cases were less than 2 cm of diameter (Stage IB1).

Recently Gil-Moreno *et al.* [16] reported on 12 patients with early invasive cervical cancer who underwent total laparoscopic radical hysterectomy with intraoperative sentinel node identification. They showed the feasibility of combining laparoscopic intraoperative sentinel node mapping and laparoscopic radical surgery in early-stage cervical cancer. In our first case sentinel node mapping with isosulfan blue and lymphoscintigraphy techniques were used. Blue channels were seen on the right interiliac vessel tissues, but no hot spot was localized using an external gamma probe.

Although we left the vaginal cuff open, two of three patients developed symptomatic lymphocysts. We did not find any transvaginal bowel evisceration which needed operative repair. Patients need to be instructed not to press during defecation right after the first week postoperatively. Bowel evisceration was reported by Pomel *et al.* [14] with reoperation and successful reversal two months after surgery. Herniation of the bowel through the vagina is rare, and most cases are described after vaginal surgery. The first case report of vaginal evisceration following an open radical hysterectomy and pelvic lymphadenectomy was reported in 1999 by Dawlatly *et al.* (1/974 radical hysterectomies). In their routine practice, the vaginal vault edge was oversewn with a continuous hemostatic suture and left open. The pelvic peritoneum was not closed. The incidence was almost 0.1% in their material [11]. Leaving the vaginal cuff open is not thought to be a cause of evisceration.

In our cases no postoperative vaginal bleeding was observed after hemostasis by bipolar coagulation on the vaginal vault edges (Figure 2). Not closing the vaginal cuff is time sparing and operative time during the learning curve is important for both patient and surgeon.

Intraperitoneal spread of cervical carcinoma after laparoscopic lymphadenectomy was reported by Cohn *et al.* [23]. Another controversial issue is port-site metastasis. Laparoscopic port-site recurrences following surgery were reported in patients with diagnoses of cervical cancer [24]. There is still no such case reported after entire laparoscopic radical hysterectomy and pelvic lymphadenectomy. More cases and long-term follow-up are needed in order to make a general statement about these controversial issues. We did not find any recurrence during the 1.5 to 2-year follow-up period.

After a very long period of traditional open surgery, we tried to establish a new minimally invasive surgery. We have shown that it is possible and feasible to perform Wertheim's operation with laparoscopy and with high radicality. We presented our results at a forum on oncology in Trans in November 2005 and our results are comparable with others in the literature [25].

To our knowledge an entire laparoscopic radical hysterectomy (Piver Type III) with bilateral pelvic lymphadenectomy for treating early-stage cervix carcinoma has not been previously described in Scandinavia.

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