PROSPECT OF LAPAROSCOPY IN TREATING EARLY STAGE CERVICAL CANCER

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SUMMARY

Cervical cancer is one of the most common malignancies of the female lower genital tract. There is mounting evidence that surgical management of cervical cancer could not only reduce mortality and recurrence, but it could also improve the quality of life of patients, especially if the treatment results of surgery are compared to those of radiation therapy. There is already consensus regarding the treatment of endometrial cancer using laparoscopy, since compared with laparotomy, laparoscopy results in a shorter hospital stay, fewer complications, less pain, and earlier resumption of normal activities. Most importantly, there is no significant difference in 3-year survival and recurrence rate of endometrial cancer with laparoscopy compared with laparotomy. Thus, there is now a trend of using laparoscopy to treat endometrial cancer. Some reports have pointed out that laparoscopic radical hysterectomy would have fewer complications. Our prospective study showed that the intraoperative complication rate from laparoscopy was comparable to that of laparotomy, but the incidence of postoperative complications was less with laparoscopy. No difference was noted in terms of operating time or recurrence rate between these two groups. Regarding blood loss, postoperative recovery, return of bladder function, external appearance of incisions, and gastrointestinal complications during radiation therapy, laparoscopy seems to have the better edge. Laparoscopy appears to be a promising method of managing cervical cancer. Moreover, in our experience, operative laparoscopy is easier in the management of stump cancer and trachelectomy. Thus, gynecologists should realize that laparoscopy will play a much more important role in the management of early stage cervical cancer in the near future. [Taiwanese J Obstet Gynecol 2004;43(1):5–9]

Key Words: cervical cancer, laparoscopy, stump cancer, radical trachelectomy, Lee-Huang portal

In Asia, cervical cancer is one of the most common malignancies of the female lower genital tract. Mortality is high, with approximately 7,800 and 970 deaths annually in the United States and Taiwan, respectively. There is mounting evidence that surgical management of cervical cancer could not only reduce mortality and recurrence, it could also improve the quality of life of patients, especially if the treatment results of surgery are compared to those of radiation therapy. Thus, surgical management may be the best treatment for cervical cancer.

There are some key points that need to be considered regarding cervical cancer treatment, whether it is laparotomy or laparoscopy that will be utilized. First, the feasibility of the surgery, i.e. can the surgery be handled by most surgeons? Second, indications of the surgery, i.e. can laparoscopy achieve the same treatment goal and standard of treatment as laparotomy, and do laparotomy and laparoscopy have the same indications for surgery? Third, regarding the cost and benefit to the patient, if the treatment is expensive but only results in a marginal advantage in terms of survival and quality of life, then it may not be worthwhile to offer the treatment to the public. On the other hand, if the cost of treatment...
is relatively low, and the prognosis and quality of life after treatment are better, then the cost-effectiveness of the surgery would be more favorable. Fourth, regarding the cost and benefit to the surgeon, a surgeon spends more time on difficult surgeries, so fewer patients will benefit and the surgery may then become impractical. Fifth, regarding the survival rate, does the surgery carry a high risk of mortality and/or postoperative complications? What is the 5-year survival rate compared with that of traditional surgery? Since therapeutic effect and subsequent survival are the most important factors to consider for cancer patients, whether laparoscopy can achieve the same goal as laparotomy depends on the survival rate. Sixth, regarding the recurrence rate, will there be less chance of cancer recurrence after the surgery? Is the surgery radical enough? These are all important factors that we need to consider when deciding on what treatment to offer our patients.

**Consensus in Treating Endometrial Cancer Using Laparoscopy**

There is already consensus regarding the treatment of endometrial cancer using laparoscopy, since compared with laparotomy, laparoscopy results in a shorter hospital stay, fewer complications, less pain, and earlier resumption of normal activities. Most importantly, there is no significant difference in 3-year survival and recurrence rate of endometrial cancer with laparoscopy compared with laparotomy. Hence, utilizing laparoscopy in endometrial cancer has its definite advantages. Thus, there is now a trend of using laparoscopy to treat endometrial cancer [1–5].

**Rationale for Laparoscopic Lymphadenectomy in Cervical Cancer**

Laparoscopic lymphadenectomy can be considered as a way of renewing the staging concept. If it can be utilized first, laparotomy could then be avoided in node-positive patients; and, for those with positive nodes receiving radiotherapy, the radiation field can be better defined. Since preoperative computer tomography scan or magnetic resonance imaging can identify node metastasis with a sensitivity of only 34–39% and a specificity of only 88–96% compared with surgical findings, laparoscopic lymphadenectomy could provide more direct information regarding the metastasis of pelvic lymph nodes. Moreover, staging can be performed by laparoscopy with minimal adhesion, and this advantage (radiation enteritis) should not be underestimated in patients who will be treated by radiotherapy. For cervical cancer patients, laparoscopic lymphadenectomy would offer appropriate staging, and the area for radiation therapy could be well-defined. In addition, it would be beneficial for the management of possible complications and the collection of specimens for pathology evaluation. Therefore, the survey by laparoscopic lymphadenectomy is worthwhile and feasible even prior to the performance of laparotomy.

**Rationale for Laparoscopic Radical Surgery for Cervical Cancer**

Since the 5-year disease-free survival rate of early cervical cancer, such as stage IB and early stage II, after surgery can be more than 90% for node-negative patients, surgery remains the best tool in the management of node-negative cervical cancer. Surgeons who have been trained in cervical cancer surgery using the vaginal approach can also use laparoscopy in performing lymphadenectomy, followed subsequently by radical hysterectomy through the vaginal approach; laparoscopy makes vaginal surgery easier. Many reports have indicated that laparoscopy results in fewer complications of uterine surgery compared with laparotomy. Moreover, some reports have pointed out that laparoscopic radical hysterectomy has fewer complications. From these points of views, laparoscopic radical hysterectomy can be fully accomplished.

**Radical Hysterectomy: Laparoscopy Versus Laparotomy**

There are only a few reports on the differences between laparoscopic radical hysterectomy and abdominal radical hysterectomy. The prospective study [6] from Chang Gung Memorial Hospital, Taiwan, in 2002 regarding this comparison is the most representative. In this study, each group had 30 patients with cervical cancer, and there were no significant differences between the groups regarding age, body weight, pathology and staging.

**Operating time**

The average operating times for laparoscopy and laparotomy are comparable. The mean operating time for the laparoscopy group (221 ± 42 minutes; range, 150–300 minutes) was only slightly longer than that for the laparotomy group (206 ± 36 minutes; range, 145–325 minutes) ($p = 0.2$). The major reason for this is the use of the Lee-Huang portal [7] to enhance the four-hand maneuver, resulting in a faster operation. A wider operative field can also be achieved by using the Lee-
Huang portal, and interference from the maneuver between the operator and the assistant can be avoided. Of course, the smooth cooperation between the members of a well-organized team is one of the most important reasons for shorter operating times. In addition, in this study, with the accumulation of surgical experience, there is no statistical difference between the operating times of laparoscopy and laparotomy. Usually, laparoscopic radical hysterectomy can be completed within 4 hours by experienced surgeons. Thus, in terms of operating time, laparoscopic surgery is very feasible.

Blood loss
The mean blood loss of 450 ± 284 mL (range, 10–1,800 mL) for the laparoscopy group was significantly less than the mean blood loss of 962 ± 543 mL (range, 300–3,500) for the laparotomy group (p < 0.001), which gives laparoscopy an advantage. It may be thanks to the magnification of laparoscopy, making complete homeostasis possible. Moreover, we used the ureteral stent as a marker. It is helpful in identifying the ureter while opening the vascularized ureteral tunnel in laparoscopic procedures, as well as in vaginal procedures while dissecting the paracolpium and cardinal ligaments. This may reduce the possibility of unnecessary bleeding.

Complications
The complications of radical hysterectomy and pelvic lymphadenectomy include hemorrhage or hematomas, lymphocysts, fistulas, postoperative ileus, wound infection, and incisional hernias. There were two major complications in the laparoscopy and laparotomy groups. One bladder injury and one vesicovaginal fistula occurred in the laparoscopy group. Since the ureter and bladder were free from the attached tissue in laparoscopic radical hysterectomy, urinary tract injury can be easily repaired through the vagina [8]. The other complication, vesicovaginal fistula, was repaired 3 months later, post radical hysterectomy, with an uneven outcome. One bladder injury and one external iliac vessel damage occurred in the laparotomy group. The bladder and vessel were repaired smoothly intraoperatively, since the complications are related mainly to the surgical technique. There was no significant difference in the complication rates of the two groups. As the surgeon becomes more experienced, the complication rate will decrease, whether laparotomy or laparoscopy is being used.

Number of lymph nodes retrieved
Lymph nodes of the lower para-aorta are untouched during laparoscopy for early cervical cancer, so the total number of lymph nodes retrieved are less than if laparotomy is carried out. In our study, the mean lymph node yield was 15.1 in the laparoscopy group, which was less than the yield of 22.0 in the laparotomy group from our open approach. There were 14 positive nodes in 3 patients (3/30) in the laparoscopy group and 5 positive nodes in 3 patients (3/30) in the open group. There was a significant increase in lymph node yield in the laparotomy group (p = 0.001). However, there were more positive nodes in the laparoscopy group. This result confirmed that 75–91% of nodes were resected at laparoscopy when compared with laparotomy. However, no positive nodes were missed at laparoscopy [9].

Length of hospital stay
More patients who had open surgery suffered from a delay in bladder function recovery. However, further evaluation is ongoing. The length of hospital stay was slightly less in the laparoscopy group; we think that this could be reduced much as the patients were well educated.

Portal-site metastasis
This has been one of the major reasons why laparoscopic surgery is so controversial in cancer surgery. There are four possible mechanisms for portal-site metastasis: first, increased exfoliation of tumor cells of unsuspected malignancy; second, increased contact time between tumor-laden instruments and the port site; third, malignant cells contacting the wound; and fourth, increased spillage of tumor cells following pneumoperitoneum.

Childers et al have shown that the incidence of abdominal implantation per puncture site was between 0.2% and 1.0% per procedure [10]. None of our 150 puncture sites (30 10 mm, 30 12 mm, and 90 5 mm portal sites) had tumor implantation. It may be due to the fact that we removed the adipolymphatic tissue with caution. We put an endobag at the cul-de-sac and put the lymphatic tissue into the endobag immediately after the adipolymphatic tissue was dissected off. When removed, the endobag does not come into contact with the abdominal wall.

Laparoscopy is promising in the management of cervical cancer
Our prospective study showed that the intraoperative complication rate for laparoscopy is comparable to that of laparotomy, but the incidence of postoperative complications is less in laparoscopy. No difference was noted in terms of operating time or recurrence rate between the two. Regarding blood loss, postoperative recovery, return of bladder function, external appearance of incisions, and gastrointestinal complications during radiation therapy, laparoscopy seems to have the better
edge. In this respect, laparoscopy is a promising tool for the management of cervical cancer, as far as enough surgical experience and advance of the instruments are concerned [1,11–16].

**Laparoscopic Radical Surgery for Carcinoma of the Cervical Stump**

As total hysterectomy has been recommended for the treatment of benign conditions of the uterine corpus, partly to prevent the occurrence of cervical cancer in the remaining cervical stump, the incidence of cervical stump cancer is low (0.11–1.9%) [17]. The treatment of cervical stump cancer differs from that of cervical carcinoma with an intact uterus. Traditionally, the majority of patients with cervical stump cancer were treated by radiation therapy, even at the low stage level, possibly because a radical operation was considered to be a technically difficult task [18]. Treatment with local radiation therapy includes the application of intracervical radium, which seems to improve the survival rate. However, cervical stump cancer often cannot be identified or is too short for intracervical radium application. Furthermore, removal of the uterus may result in loss of protection to the intestine from radiation exposure. Thus, severe rectum sigmoid complications after radiation treatment have been reported, including severe symptoms of proctitis with long-lasting and recto-vaginal fistula [19]. Thus, the treatments for cervical stump cancer remain controversial.

There are some important differences in the conditions encountered during radical surgery for cervical stump cancer. First, the loss of anatomic markers after supra-cervical hysterectomy. Second, the dissection of the bladder from the vagina is more difficult due to scarring from previous supra-cervical hysterectomy. Third, there is no uterine corpus to use in counter-traction during dissection of the pre-rectal or paravesicular space. These conditions make radical operation a technically difficult task.

There are some inherent advantages to using a laparoscopic approach in this radical surgery. First, use of the Allis forceps in holding the cervix to sustain the cervical stump makes dissecting the bladder from the vaginal space and creating a paravesicular space or pre-rectal space easier. It also has the same effect as traction of the uterus when performing laparotomy. Second, because the uterine corpus occupies no space in the pelvis, exposure of the pelvic organs is easier. Third, the ureteral stent may be used as a marker, which may reduce the difficulty of the radical procedures involved in dissecting the paracolpium and cardinal ligaments.

This may also reduce the possibility of ureteral injury when opening the vascular ureteral tunnel during laparoscopic procedures. Furthermore, an adequate and safe margin can be more easily obtained, while allowing resection of the vagina through a vaginal approach. These advantages make laparoscopic surgery a potent technique in treating cervical stump cancer.

In conclusion, the advantages of laparoscopic radical surgery include easy identification and unroofing of the ureter. Furthermore, there is no space occupied by the uterine corpus in the pelvis, making the exposure of the pelvic organs easier. Thus, laparoscopic radical surgery may be a useful alternative in treating early stage cervical stump cancer.

**Laparoscopic Radical Trachelectomy**

There is an increasing incidence of invasive cervical cancer in recent years in the young age group worldwide. Cervical cancer Stage IA1 can be treated with conization, provided that the patient is compliant to follow-up, the surgical margins can be free, and an endocervical curettage immediately performed after conization is negative [20,21]. However, the standard treatment for early stage (IA2–IIA) cervical cancer is either radiotherapy or a radical hysterectomy and bilateral pelvic lymphadenectomy. Both offer very high cure rates, but lead to the inevitable loss of fertility. Radical trachelectomy that preserves the uterine corpus and creates an anastomosis of the vagina cuff to the uterine corpus has been reported as an alternative treatment for young women with early stage cervical cancer who want to remain fertile. Up to the present, there have been 21 live births reported from women who have undergone the radical trachelectomy technique. Cancer recurrence or deaths are rare in these highly-selected, good-prognosis patients [22–24].

As a matter of fact, the procedures performed by laparoscopy can be done by a conventional abdominal approach with a large open field [25–27]. However, Smith et al. [28] found it difficult to simply dissect the uterine arteries from their origins at the external iliac arteries and hold them out of the operating field. They therefore divided the uterine arteries and performed anastomosis after the cervix, vagina and parametrium had been excised. Laparoscopy may provide a number of advantages over laparotomy, including reduced postoperative pain, lower probability of adhesions, and shorter hospital stay. Moreover, use of the telescope and long-leg instruments makes skeletonization of the uterine vessels in a small space possible. It makes laparoscopic radical trachelectomy (LRT) possible.
LRT may prove to be a viable option in well-selected patients with early cervical cancer who have a strong desire to preserve their fertility.

Current Trend of Utilizing Laparoscopy

We may follow the progress of laparoscopic oncologic surgery over the last decade. In 1991, Querleu et al, and in 1992, Dargent et al, proposed radical vaginal hysterectomy and laparoscopic pelvic lymphadenectomy. Then, in 1992 and 1993, Nezhat et al and Spirtos et al, respectively, published papers on the use of laparoscopy in radical hysterectomy. Until 1996, Lee and Huang performed laparoscopic radical surgery for cervical stump cancer. In 1994, Dargent et al started to utilize radical vaginal trachelectomy and laparoscopic pelvic lymphadenectomy. Subsequently, in 2000, Lee and Lai initiated the use of laparoscopic radical trachelectomy. Thus, from the last decade of progress in laparoscopy, gynecologists should realize that laparoscopy will play a much more important role in the management of early cervical cancer in the near future.

References