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# Sentinel Lymph Node Identification and Radical Hysterectomy with Lymphadenectomy in Early Stage Cervical Cancer: Laparoscopy Versus Laparotomy

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**ABSTRACT** **Study Objective:** To estimate the feasibility and results of sentinel lymph node identification and radical hysterectomy with pelvic lymphadenectomy entirely completed by laparoscopy versus laparotomy in early stage cervical cancer.
**Design:** Retrospective, nonrandomized clinical study (Canadian Task Force classification II-2).
**Setting:** Acute care, teaching hospital.
**Patients:** From September 2000 through January 2005, 50 consecutive patients with International Federation of Gynecology and Obstetrics stage $IA_2$, $IB_1$, and IIA disease less than 4 cm underwent radical hysterectomy and lymphadenectomy with intraoperative sentinel lymph node biopsy.
**Interventions:** The operation was performed entirely by laparoscopy in 20 patients and using the conventional abdominal approach in 30. Feasibility of sentinel lymph node identification, surgical morbidity, overall survival, and recurrence rate–free survival in both groups were compared.
**Measurements and Main Results:** The overall detection rate of the sentinel lymph node was 100% (false negative 0%). A mean of 2.50 sentinel nodes/patient was detected in the laparotomy group compared with a mean of 2.55 nodes in the laparoscopic group ($p = .874$). Bifurcation of the right common iliac artery was the most frequent nodal location. Blood loss and length of stay were significantly lower in the laparoscopic group, but surgical time was significantly longer. The median follow-up was 35 months (range 5–57) in the laparotomy group and 22.5 (range 2–52) in the laparoscopic group. Differences in overall survival and disease-free survival were not observed.
**Conclusion:** Sentinel lymph node identification and radical hysterectomy in the initial treatment of early stage cervical cancer can be performed safely by laparoscopy with lower morbidity and overall survival and recurrence-free survival similar to standard laparotomy. Journal of Minimally Invasive Gynecology (2008) 15, 531–537 © 2008 AAGL. All rights reserved.

*Keywords:* Sentinel lymph node; Cervical cancer; Lymphatic mapping; Lymphoscintigraphy; Isosulfan blue

Radical hysterectomy with pelvic lymphadenectomy by the vaginal or the abdominal route is the surgical procedure used in treating women with early stage cervical cancer [1]. Total laparoscopic radical hysterectomy [2] or laparoscopic-assisted radical hysterectomy [3] was shown to be feasible in accordance with the standards of gynecologic oncology. The single most important prognostic factor for patients with early cervical cancer is the presence of lymph node metastases, associated with recurrence and poor survival. During the last few years, the role of sentinel node biopsy [4] was proposed to treat patients with cervical cancer [5]. In more than 80% of patients who undergo lymphadenectomy, lymph nodes are negative so that no benefit is derived from the procedure and more conservative surgical strategies may be considered as an option [6,7]. Intraoperative accurate

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determination of nodal status in patients with cervical cancer would allow triage of node-positive patients to chemoradiation without radical pelvic surgery [8–11]. A number of studies have shown the feasibility of sentinel node biopsy and would suggest its validity to tailor lymphadenectomy in patients affected by early cervical cancer [12–25]. The method of detection may involve use of blue dye [12,21,23], radiocolloid tracer [13,24], or a combination of both [9,14–20,22,25].

The aim of this retrospective, nonrandomized clinical study was to estimate the feasibility and early and midterm outcome of sentinel lymph node identification and radical hysterectomy with pelvic lymphadenectomy entirely completed by laparoscopy versus open surgery in early stage cervical cancer. A combined technique of lymphoscintigraphy (Tc 99m colloid albumin injection around the tumor) and intraoperative mapping with blue dye was performed. To our knowledge, a comparison of sentinel node biopsy performed via laparoscopy or laparotomy in patients with cervical cancer was not previously reported.

## Patients and Methods

From September 2000 through January 2005, 50 consecutive patients (median age 49 years, range 30–78) with International Federation of Gynecology and Obstetrics (FIGO) stage $IA_2$ (n = 3), $IB_1$ (n = 43), $IB_2$ (n = 1), and IIA (n = 3) who were referred to our department for radical hysterectomy were asked to participate in this prospective study of sentinel node evaluation, approved by the local ethic committee. Exclusion criteria for the laparoscopic approach were severe cardiorespiratory disease precluding Trendelenburg position; uterus sized 12 or more weeks, unless enlarged by subserous myomas (removal of large uteri through the vagina might require morcellation with potential opening of the endometrial cavity and tumor spill in the peritoneal cavity); body mass index (BMI) 40 $kg/m^2$ or higher; and age 80 years or older. The decision to perform total laparoscopic radical hysterectomy or conventional transabdominal radical hysterectomy was left to the discretion of the attending physician. Patients were informed of the risks and complications of the laparoscopic procedure and provided written informed consent for possible conversion to laparotomy.

### *Sentinel Node Identification Procedure*

The day before surgery, the cervix viewed with a speculum was superficially injected in each quadrant around the tumor at 3, 9, 6, and 12 o'clock positions with depots of Tc 99m–labeled nanocolloid (Albu-res; Pharmaceutical Nycomed Amersham, Bruanschweig, Germany), each containing approximately 10 mBq of tracer in 0.2 mL of saline, using a 27-gauge hypodermic needle. Immediately after injection and removal of the speculum, dynamic lymphoscintigraphy was performed using a gamma camera. Additional static images were taken after the dynamic study and about 2 to 3 hours after injection to identify the sentinel node. At the time of surgery, after induction of general anesthesia and speculum viewing of the cervix, approximately 2 to 4 mL of isosulfan blue dye (Lymphazurin 1%; US Surgical Co., Norwalk, CT) was injected superficially around the tumor at the same locations as the tracer (depth of injection 0.5–1 cm). The sentinel node was detected before opening the peritoneum using a handheld (Europrobe; Ethicon, Somerville, NJ) or laparoscopic (Navigator; Tyco-Mallinckrodt, Hazelwood, MO) gamma probe. Nodal tissue was examined visually for blue staining and audible signs above background levels. If the counts were at least 10-fold above background levels, the node was considered sentinel. All sentinel nodes were recorded by their relative position to the major pelvic vessels. Each blue and/or hot lymph node was removed separately and submitted for pathologic examination.

Systematic, bilateral pelvic lymphadenectomy from the common iliac artery to the inferior boundary of the circumflex iliac artery vein was performed after the sentinel node procedure. All nodes were removed in endoscopic bags (Endo-Catch Gold 10 mm; AutoSuture, Norwalk, CT) to avoid port-site metastases. Paraaortic lymphadenectomy was eventually performed in cases in which lymphoscintigraphy suggested sentinel nodal location at this level and if suspicion of involvement by macroscopically affected pelvic nodes existed. Finally, patients with size of the primary lesion less than or equal to 2 cm underwent a type II radical hysterectomy and patients with tumors measuring greater than 2 cm a type III procedure.

### *Pathological Evaluation*

Sentinel lymph nodes were visually inspected by the pathologist. Nodes were cut perpendicularly to the long axis (1 slide/each 0.2-mm section) and submitted for routine hematoxylin-eosin staining. Negative hematoxylin-eosin sections were prepared for wide spectrum cytokeratin immunohistochemical analysis (CK-88). Frozen sections were performed only on request by the gynecologist oncologist.

### *Laparoscopic Radical Hysterectomy*

A 4-trocar transperitoneal approach was used. The laparoscope was introduced via an 11-mm umbilical trocar with a direct puncture technique, and 3 other trocars were inserted with the patient in a 25- to 30-degree Trendelenburg position. Two accessory 12- and 5-mm trocars were then placed under direct visualization in the iliac fossae, and 1 5-mm accessory trocar at the midline between the umbilicus and the left subcostal margin. After detection of the sentinel lymph node and removal of pelvic nodes with the same disposition of the 4 trocars, the paravesical, pararectal, rectovaginal, and vesicovaginal spaces were developed, thereby delineating the uterosacral ligaments and the paracervix. Uterine vessels were identified and cut at their origin from the hypogastric vessels using the harmonic scalpel (Ultraincision Harmonic Scalpel;