



Original research

Clinical efficacy and safety of laparoscopic nerve-sparing radical hysterectomy for locally advanced cervical cancer



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HIGHLIGHTS

- Evaluation of the feasibility and safety in the laparoscopic nerve-sparing radical hysterectomy.
- Laparoscopic nerve-sparing radical hysterectomy is a minimally invasive surgery procedure for Locally Advanced Cervical Cancer.
- Laparoscopic nerve-sparing radical hysterectomy is a feasible surgical approach to reduce the occurrence rate of surgical complications.

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ABSTRACT

Objective: To evaluate the feasibility and safety of laparoscopic nerve-sparing radical hysterectomy (LNRH) for locally advanced cervical cancer (LACC) after neoadjuvant chemotherapy (NACT).

Methods: 120 patients with stage Ib2 and IIa2 cervical cancer were treated with surgery combined with preoperative NACT in the Department of Obstetrics and Gynecology, PLA General Hospital. Eligible patients were divided into two groups according to surgery type: patients who underwent LNRH were assigned to one group, while the second group included patients who underwent laparoscopic radical hysterectomy (LRH) after administration of NACT. We compared these patients' general clinical information and surgical characteristics, and we assessed their bladder function and intestinal function recovery by questionnaire.

Results: No significant differences were found between the groups in patients' age or surgical characteristics. The mean duration of postoperative catheterization in the LNRH group was shorter than in the LRH group ($P < 0.001$). The intestinal and bladder function of patients in the LNRH group also recovered better than that of patients in the LRH group.

Conclusion: LNRH is a feasible and safe procedure for LACC after NACT and reduces surgical complications.

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1. Introduction

Cervical cancer is the second most common cause of cancer mortality in women worldwide [1]. In developing countries, more than 70% of cases are diagnosed at an advanced stage of disease,

and therefore cervical cancer is a major cause of morbidity and mortality in women [2]. Previous studies have investigated NACT followed by radical hysterectomy as a treatment for patients with LACC. It has been found that NACT reduces the volume of the tumor prior to surgery and reduces the number of patients who ultimately require adjuvant radiation treatment [3]. In addition, NACT can limit lymph node metastasis and parametrial invasion in patients with cervical cancer [4].

In regions such as Europe, Asia and Latin America, the combination of NACT and radical hysterectomy has been recommended for treating patients with LACC. Conventional radical hysterectomy causes damage to the pelvic autonomic nerves, which may lead to

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impaired bladder function, difficulty defecating, and sexual dysfunction [5,6]. As surgical technology has developed, the magnified horizon of laparoscopes has allowed clearer visualization of structures such as nerve branches. In turn, these changes greatly improve the quality of life of patients who undergo cervical cancer surgery. Advantages such as preserving sexual, bladder, and bowel function [8,9] favor the adoption of nerve-sparing techniques for radical procedures [7].

Thus far, abundant research has suggested that nerve-sparing radical hysterectomy is effective in treating LACC in its early stages, and the prognosis is similar to that for patients undergoing traditional radical hysterectomy. Therefore, laparoscopic nerve-sparing radical hysterectomy after NACT may be a viable surgical strategy for LACC. The present study was designed to evaluate the feasibility and safety of laparoscopic nerve-sparing radical hysterectomy for LACC after NACT to find a better treatment strategy for LACC patients.

2. Materials and methods

2.1. Study population

The present study was approved by the appropriate PLA General Hospital ethics review board. Eligible patients had no tumors besides cervical cancer and no cardiovascular or endocrine disease. Enrolled patients agreed to postoperative follow-up. We prospectively analyzed 120 patients with FIGO stage Ib2 to IIa2 cervical cancer who were treated with surgery and preoperative NACT between December 2011 and December 2012 in the Department of Obstetrics and Gynecology of PLA General Hospital. All patients received laparoscopic surgical treatments and were reviewed by the same gynecologic pathologist. Eligible patients were divided into two groups according to their surgical methods: patients who underwent laparoscopic nerve-sparing radical hysterectomy were assigned to the LNRH group. Patients who underwent conventional surgery after administration of NACT were enrolled in the LRH group. All patients were thoroughly informed about the surgical procedures and risks before they signed a consent form.

2.2. Neoadjuvant chemotherapy regimens

Patients with LACC received 2 or 3 cycles of PT treatment [10,11]. Specific plan: 10 mg intramuscular injections of dexamethasone were administered 12 and 6 h before administration of paclitaxel. Thirty min before chemotherapy, 25 mg diphenhydramine, 300 mg sago for butyl and 10 mg dexamethasone were injected intravenously. 175 mg/m² Taxol was added to 500 mL 5% glucose liquid paclitaxel and delivered intravenously within 3 h by infusion pump. Continuous ECG monitoring was maintained throughout treatment. 75 mg/m² hydrated cisplatin in 100 mL 3% salt water was applied on the second day. Three weeks was considered the period of treatment. The toxic effects of the chemotherapy regimen were monitored during treatment.

Tumor extension was re-evaluated clinically and by abdominal MRI and 3D ultrasound. The response of the tumor was assessed according to the revised Response Evaluation Criteria in Solid Tumors (RECIST) guidelines of 2009, with the following definitions [12]: complete response (CR): disappearance of all target lesions; partial response (PR): at least a 30% decrease in the sum of the longest diameters of target lesions; stable disease (SD): neither sufficient shrinkage to qualify for PR nor sufficient increase to qualify for PD; progressive disease (PD): at least a 20% increase in the sum of the longest diameters of target lesions.

2.3. Surgical procedures

All patients underwent surgical evaluation within 4 weeks following the administration of the last cycle. All operations were performed by the same gynecological oncology surgery team, and all team members were skilled at laparoscopic operations. A total of four trocars were used (Fig. 1): a 10-mm camera trocar was placed 2 cm above the navel (a), and two operator trocars were placed 5 and 10 mm to the left (b and c). An assistant trocar was also used (d). Classification of each radical hysterectomy was performed per the new definitions introduced by Querleu and Morrow [13]. The nerve-sparing radical hysterectomy technique was conducted per the standards laid out in previous research [14]. All surgical specimens were retrieved through the vagina.

The preoperative data included age, BMI, FIGO stage, pelvic surgery history, and histology. The operation time, blood loss, duration of hospital stay, indwelling bladder catheter time, follow-up time, and intestinal and bladder function of patients were compared between the two groups. An attempt to remove the catheter was made 9 days post operation. Patients' catheterizations were kept until the residual urine volume was less than 100 mL, and the draining time was recorded. Postoperative bladder and rectum function recovery was monitored. Patients sensitive to chemotherapy underwent two additional preoperative courses of chemotherapy following the plan described above. If pathological examination indicated additional vascular infiltration, radiation therapy was applied. Whether patients who were insensitive to chemotherapy needed postoperative radiation therapy was determined on the basis of pathological examination results.

2.4. Statistical analysis

Normally distributed continuous variables were expressed as the mean (range). Categorical variables were expressed as the absolute number or percentage. All statistical analyses were performed using SPSS 19.0. Student's *t*-test was used for analyzing normally distributed continuous variables. A chi-square test or Fisher's exact test was used to compare qualitative variables. Differences were considered statistically significant if the *p* value was equal to or less than 0.05.

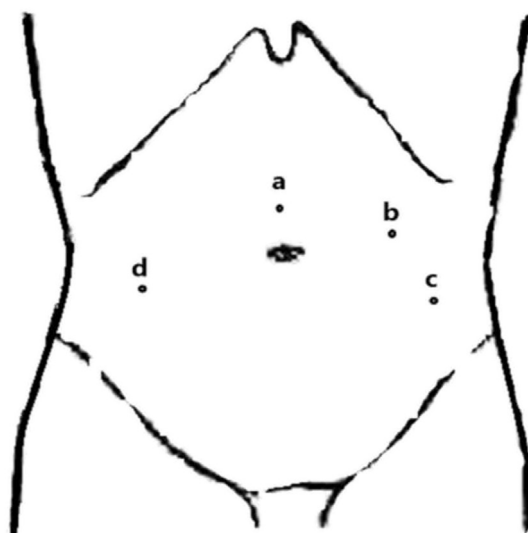


Fig. 1. Diagram of the laparoscopic trocars. a: camera trocar; b and c: the main operating trocars; d: assistant trocar.

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