APPLICATION OF LAPAROSCOPIC SURGICAL OPERATION IN THE TREATMENT FOR EARLY STAGE CERVICAL CANCER

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ABSTRACT

Objective: *To investigate the safety, feasibility and effectiveness of laparoscopic approach in the surgical treatment for patients with early stage cervical cancer and to compare with the traditional open technique.*

Methods: *Retrospective, descriptive cross-sectional and follow-up study on 36 patients with stage IA1 and stage IB1<2 cm cervical cancer who consists of two groups: 16 patient group with laparoscopic surgery and 16 patient group underwent Laparo-tomy from April 2005 to December 2014. Intra-and post-operative complications were graded per the Clavien-Dindo classification.*

Results: *No between-group differences in baseline, disease and pathological variables were observed (p > 0.05). Patients undergoing surgery via laparoscopy experienced longer operative time than patients undergoing open surgical ope-rations; while laparoscopic surgical group was correlated with shorter length of hospi-talization and lower blood loss in comparison to open surgical operations. Intra-and post-operative complication rate was similar between groups (p = 1.00). The execution of laparoscopic radical Hysterectomy or open surgical operations did not influence chance of recurrence (p > 0.2) as well as survival outcomes, in term of 5-year disease-free (p = 0.29) and overall survivals (p = 0.50).*

Conclusion: *The laparoscopic approach is a safe procedure and an attractive alternative to the traditional abdominal surgical approach.The significant advantages of this approach are less invasive than open surgical perations, less blood loss during surgery and shorter recovery time*

Key words: *Laparoscopic surgery, cervical cancer*

I. INTRODUCTION

Radical hysterectomy for cervical cancer is the standard surgery, has pretty good result for the survival time of patients over 5 years, but still a number of adverse impacts on the quality of life of patients later, as the pelvic dysfunction (dysfunction of the bladder, bowel, vagina ...), physiological and sexualdysfunction due to the more invasive characteristics of special surgery. Currently, the application of micro-invasive surgery, particularly laparoscopy are thriving and develop into areas of malignant tumors at early stages, including cervical cancer [1-4].

At Hue Central Hospital, we began implementing laparoscopic surgery technique for early stages cervical cancer since April 2005, this study was conducted in order to:

1. Survey the Safety, the applicability and efficacy of laparoscopic surgery in the cervical cancer at early stage.

2. Analysis the outcomes of postoperative survival time of laparoscopic surgery and traditional open surgery.

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II. MATERIALS AND METHODS

2.1. Object

Group of patients diagnosed with cervical cancer at Hue Central Hospital meet the following criteria:

- Selection criteria: The patient was diagnosed with cervical cancer with the clinical stage IA2 or IB1 <2cm, according to FIGO classification, and has positive pathological result.

- Exclusion criteria: Cervical cancer with the advanced stage from IB1> 2 cm, general anesthesia is contraindicated, the severe medical conditions (heart failure, liver failure, kidney failure, severe infection ...)

2.2. Methods

Retrospective, cross-sectional descriptive study on 32 patients with cervical cancer, consists of two groups: Group I: included 16 patients who were indicated treatment with laparoscopic surgery, and group II: 16 patients with open abdominal surgery, during the period from January, 2005 to December, 2014. All patients were informed and voluntarily accepted this treatment method. All patients received cervical biopsy, ultrasound, and computed tomography (CT) or magnetic resonance imaging (MRI).

Selection criteria for endoscopic surgical approach includes clinical evaluation in favor of cervical cancer in early stages, vaginal examination showed also good uterusmobile, less adherence and obese patients, without open surgery in history. Our criteria based on the recommendations of Childers [5] and CZEMPT protocol [6].

Patients were indicated open laparotomy is the case their condition is not suitable for laparoscopic surgery because of reasons such as high anesthetic risk ASA III classified by ASA (American Society of anesthesiologists), uterine enlargement, multiple previous open abdominal surgery, a history of peritonitis, abdominal more adherence.

Open surgery Group: Wertheim Meigs Method (Piver type II: Take proximal half of the uterine parameter, sacro-utero ligament untilupper 1/3 of the vagina).

Endoscopic group

Abdominal introduction with a 10 mm trocar through the umbilical site and three 5mm trocar at the lower abdomen. During the endoscopy procedure, we carefully inspect the entire peritoneal cavity. At the end of operation, the check again to make sure for hemostasis. Here we do not put draina as well as thrombosis prophylaxis after surgery.

Pelvic lymph node dissection through the peritoneum

Dissection begins by opening the broad ligament and the pelvic peritoneum between the round ligament and pelvic tuballigaments. The lymph nodes and fatty tissue were dissected from the Obturator foramen, after exposed to avoid blood vessels and nerve bundles. We dissected until we found the position of the iliac arterial branching root and the inner inguinal holes. The spaces next to the bladder and rectum are also carefully surveyed and dissected. Ureter was observed along the horizontal lines at the level of peritoneum of pelvic arterial branching stem.

Laparoscopic radical Hysterectomy

Firstly, introduce the uterine manipulator, then respectively follow surgical steps: cut off the round ligament, dissect the upper part on the broad ligament, cut off the pelvic tubar ligament and bilateral salpingo-oophorectomy, cut off the utero-sacro ligament, dissect the bladder from the lower uterine segment and the upper part of the vagina, ablation of uterine vaginal vascularization, open the vault of the vagina, the uterus taken through vaginal way, the vaginal wall closed, cutting vaginal vault, ureter via laparoscopy, trocar puncture hole closed.

Operation time is cauted from the skin incision until the last skin suture, the time of hospitalization is calculated from the first postoperative day until discharge. Complications during and after surgery when there is damage to surrounding organs and be evaluated according to Clavien-Dindo classification [7]. Adjuvant treatment after surgery: Chemotherapy + radiotherapy as pelvic lymph node (+), free edges of uterine parameter (+) and/or free edges of vagina <5 mm, radiation ther apy alone when at least 2 of the following 3 criteria : tumor size> 2 cm, penetrate cervical stromal> 50% and LVIS (+). Patients were

Periodically re-examined every 4 months during the first 2 years, every 6 months for 3 years and annually thereafter.

Statistical Analysis

Using SPSS 20.0 software to analyze, we evaluated and compared the difference in operative and postoperative results between 2 groups (Laparoscopy and Open surgery). The parameters were collected: the surgery duration, the number of lymph nodes (+), blood loss and length of hospital stay.

III. RESULT

Table 1. The general characteristics of patients

Charact.	Laparo. (n=16)	Open Surg. (n=16)	p
BMI	24.4 (± 2.9)	24.0 (± 4.3)	0.70 (NS)
Age	46 (28-78)	45.5 (29-79)	0.69 (NS)
Open Surgery in History	2(12.5%)	3 (18.75 %)	0.75 (NS)

The average age and age distribution range were similar in the 2 groups. The average age in the laparo. group is 46 year old, compared with open surgery group is 45.5 years. The difference in body mass index (BMI) between 2 groups was not significant, 24.4 in the laparoscopic group compared to 24.0 in the open surgery group. The difference in the rate of open surgery in history in two groups of patients was not also significant.

Table 2. Characteristics of histology, differentiation degree, staging according to FIGO

Charact.	Laparo. (n=16)	Open Surg. (n=16)	p
Histology			
Squamocarcinoma	14 (87.5%)	15(93.75%)	1.00 (NS)
Adenocarcinoma	2 (12.5%)	1(6.25%)	
Differentitation			
I &II	9 (56.25%)	8 (50%)	1.00 (NS)
III	7 (43.75%)	8 (50%)	
Staging (FIGO)			
IA2	4 (25%)	5(31.25%)	0.68 (NS)
IB1<2 cm	12 (75%)	11 (68.75%)	

No difference in histological type, differentiation degree as well as Staging according to FIGO between the two groups (p> 0.60)

Table 3. Characteristics of patients with lymphatic invasion, lymph node metastasis, invasive uterine parameter and Follow up time

Charact.	Laparo. (n=16)	Open Surg. (n=16)	p
LVIS (+)	6 (37.5%)	7 (43.75%)	0.37 (NS)
Lymph node (+)	1 (6.25%)	2 (12.5%)	0.49 (NS)
Invasive Para. (+)	2(12.5%)	1 (6.25 %)	0.49 (NS)
Follow up (month)	31(± 19.9)	48.7(± 27.3)	**<0.001**

There is no difference between the two groups in the characteristics such as lymphatic invasion, lymph node (+) as well as invasive uterine parameter (p> 0.30)

The average follow-up period in laparoscopy was 31 months and in the open surgery group was 48.7 months, the difference was in significant (p <0.001)

Table 4. Characteristics of patients on operation time, blood loss during surgery, cases need blood transfusions and complications during and after surgery

Charact.	Laparo. (n=16)	Open Surg. (n=16)	p
Operation time (minutes)	185.3 (±57.7)	155.7(±32.5)	**<0.001**
Blood Loss (ml)	50 (30-200)	200 (100-500)	**<0.001**
Blood transfusion (Cases)	1 (6.25%)	1 (6.25 %)	1.00 (NS)
Hospital Stay (days)	4 (3-11)	8 (6-14)	**<0.001**
Operative compl. (Cases)	1 (6.25%)	0	1..00 (NS)
Postoperative compl. (Cases)	1 (6.25%)	2 (12.5%)	0.69 (NS)
Urinary retention (Cases)	1(6.25%)	1 (6.25 %)	1.00 (NS)
Urinary Incontinence	0	0	>0.99

In laparoscopy group, mean operation time in longer compared to open surgery group ($p < 0.001$), while the amount of blood loss during surgery, as well as the number of days in the hospital less than ($p < 0.001$). The difference in the case of blood transfusion in the two groups was not significant ($p = 1.00$).

In laparoscopic group, 1 case of bladder injury during surgery was detected and treated immediately, 1 case of vesico-vagino fistula after 3 days, 1 case of postoperative urinary retention for 2 days. In the open surgery group, there was 1 case of cracked abdominal wall on the first postoperation day due to technical errors, 1 case of vesico-vaginofistula after surgery 2 days, 1 case of postoperative urinary retention in 5 days need physical therapy .

The difference in complications between 2 groups was not significant.

Table 5. 5–year survival outcome in two groups of patients

Charact.	Laparo. (n=16)	Open Surg. (n=16)	P
Adjuvant therapy			
Radiotherapy	3 (18.75%)	4 (25%)	0.71 (NS)
Chemotherapy	1 (6.25%)	2(12.5%)	0.53 (NS)
Chemo plus	1(6.25%)	1(6.25%)	1.00 (NS)
Radiotherapy	1 (6.25%)	1 (6.25%)	1.00 (NS)
Recurrent sites			
Local	0	1 (6.25%)	1.00 (NS)
Regional	0	0	1.00 (NS)
Distant	0	1 (6.25%)	1.00 (NS)
Death of disease	0	1 (6.25%)	1.00 (NS)

No cases of disease recurrence or death in the laparoscopic group. The open surgery group had 1 case of recurrence after 4 years in the cutting vaginal vault and 1 death after 3 years because of lung metastases, of whom histological diagnosis is poorly differentiated small cell carcinomawith invasive uterine parameter in operation.

The operation method which is laparoscopy or open surgery does not affect the recurrent location as well as 5-year survival outcome (PFS and OS)

IV. DISCUSSION

This study aimed to examine the changes related to surgical outcomes, morbidity and survival time related to laparoscopy group. We observe that there is a combination of a longer surgical time, less blood loss and shorter hospital stay in the laparoscopic group in comparison with the open surgery group, while no differences in morbidity and long-term survival outcomes exist. The Wertheim-Meigs surgery showed a high cure rate in both groups. Radical hysterectomy and tissue dissection of bilateral uterine parameter is highly effective in treating cervical cancer [8].

Many authors have demonstrated that the thorough removal of bilateral parameter tissue often related to higher morbidity and pelvic dysfunction due to injury of hypogastric plexus [9]. Actually in the early stages of cervical cancer IA2 and IB1 <2cm, the rate of parameter invasion is very low and it should not require the radical dissection [10-12]. According to Lee et al, only 1.1% were invasive in parameter in the case of tumors <20 mm [13]. These low-risk cases have as no lymphatic invasion, lymph node (-), the percentage of parameter invasion is very low <1%

Another study on 329 patients with cervical cancer shows that the Piver surgery type II and III are similar in terms of the outcome of recurrence and overall survival time after surgery [14].

Although there are a few reports about the applicability and safety of laparoscopic surgery for cervical cancer, but there is little data on laparoscopic surgery outcomes of PIVER type II, which is essentially on the PIVER types I, and this is the main goal of our research. In addition, our research shows that:

- The procedure was performed by a team of professional expert of laparoscopic surgery because this type of surgery is relatively difficult and new.
- The open surgery group had longer follow-up period than the laparoscopic group which reduced the strength of the statistical result analysis of outcomes of survival time between the two groups of patients.
- No differences in morbidity between the two groups and a low complication rate for this type of surgery (PIVER II)
- The open surgery group had positive LVSI rate slightly lower (P = 0.27), than that of the laparoscopy group, this suggested that there would be the relation with the introduction of uterine manipulator in the laparoscopic groups, clarifying this issue requires further research later.

V. CONCLUSION

Laparoscopic surgical methods in early stage of cervical cancer can be a better alternative to open surgery methods. Laparoscopy is capable of avoiding the long abdominal incision which have more infection after surgery, the patients heal better, and lose, less blood, have shorter hospital stay which still have all the benefits of a minimally invasive surgery, such as less pain, less scarring and a shorter recovery time. There were no differences in morbidity and 5-year survival outcomes but further research is needed in the future to assert more about this issue.

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