

Is laparotomy better than laparoscopic surgery in early cervical cancer?

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Summary

Introduction: Cervical cancer is the fourth most common cancer among women worldwide. Conventional open cervical cancer surgery was often performed in the past, but laparoscopic/robot-assisted surgery is now more common, in accordance with the recent trend toward increased use of minimally invasive surgery. **Materials and methods:** A total of 266 patients with early cervical cancer, who underwent type II, III radical hysterectomy with or without pelvic lymphadenectomy during the 10-year period between March 2008 and February 2018 at a tertiary hospital (performed by three surgeons), were divided into laparotomy (group 1, n = 132) and laparoscopic/robot-assisted surgery (group 2, n = 134) groups. The variables of interest in this retrospective chart review study were age, body mass index (BMI), cancer stage, surgery type (laparotomy or laparoscopic/robot-assisted), pathology, complications after surgery, additional therapy after surgery, recurrence, and mortality. **Results:** The surgery type differed significantly according to cancer stage: patients in early and later stages were more likely to undergo laparotomy and laparoscopic/robot-assisted surgery, respectively ($p = 0.016$). Patients with a higher BMI were more likely to undergo laparoscopic/robot-assisted surgery ($p = 0.032$). Most patients (n = 170) received adjuvant therapy following surgery. The cervical cancer recurrence rate was 8.3% (11/132) group 1 and 8.2% (11/134) group 2 ($p = 0.573$). The proportion of postsurgical complications was similar, 8% in group 1 and 5% in group 2, $p = 0.469$. **Conclusions:** In this heterogeneous group of patients, most of whom received adjuvant therapy, with found no difference by univariate analysis in the mortality or recurrence rate or the rate of postoperative complications.

Key words: Uterine cervical neoplasms; Laparotomy; Laparoscopy.

Introduction

Cervical cancer is the fourth most common cancer among women worldwide; although the incidence is decreasing gradually in the US, it remains high in developing countries [1]. The main treatment for cervical cancer, according to the National Comprehensive Cancer Network (NCCN) guidelines, is surgery; other treatments, such as radiation, may be applied after surgery [2]. Open surgery was often performed in the past, but laparoscopic/robot-assisted surgery has recently become the most common procedure in accordance with the trend toward increased use of minimally invasive surgery [3]. However, according to the results of the Laparoscopic Approach to Cervical Cancer Trial, published in 2018, laparoscopic/robot-assisted surgery for early cervical cancer is associated with lower disease-free survival and overall survival rates compared to open surgery, which calls into question the recent preference for minimally invasive surgery [4-6]. The purpose of this study was to compare and analyze the outcomes of open and laparoscopic/robot-assisted surgeries via chart review of cervical cancer surgeries conducted in a tertiary hospital over the last 10 years.

Materials and Methods

A total of 266 patients with early cervical cancer, who underwent type II, III radical hysterectomy with or without

pelvic lymphadenectomy between March 2008 and February 2018 in a tertiary hospital (performed by three surgeons), were divided into open surgery (group 1, n = 132) and laparoscopic/robot-assisted surgery (group 2, n = 134) groups. The variables of interest in this retrospective chart review study were age, body mass index (BMI), cancer stage, surgery type (open or laparoscopic/robot-assisted), pathology, complications after surgery, additional therapy after surgery, recurrence, and mortality. The chi-square test was used to calculate relative risks and odds ratios. The analyses were performed using SPSS software (version 14.0; SPSS Inc., Chicago, IL, USA). A p -value < 0.05 was considered significant.

Results

Table 1 shows the clinical characteristics of the patients by surgery type. The mean age of the overall cohort was 48.1 ± 11.0 years. The surgery type differed significantly according to cancer stage, where patients in the early and later stages were more likely to undergo open and laparoscopic/robot-assisted surgeries, respectively ($p = 0.016$). Patients with a higher BMI were also more likely to undergo laparoscopic/robot-assisted surgery ($p = 0.032$). No significant difference in histological type ($p = 0.311$) or rate of postoperative adverse events ($p = 0.469$) was observed between the groups.

Table 1. — Comparison demographic and clinical characteristics of patient by operation method.

			Group 1	Group 2	Total	<i>p</i> -value
			Laparotomy	Laparoscopic/robotic surgery		
Age	(Mean ± SD)	years	49.5 ± 12.1	46.7 ± 9.7	48.1 ± 11.0	0.782
Cancer Stage	Ia1	N (%)	24 (18.2)	31 (23.1)	55 (20.7%)	0.016
	Ia2-Ib1		59 (44.7)	42 (31.3)	101 (38.0)	
	Ib2-IIa		29 (22.0)	37 (27.6)	66 (24.8)	
BMI	IIB and above		20 (15.2)	24 (17.9)	44 (16.5)	0.032
	< 20 (kg/m ²)	N (%)	7 (5.3)	19 (14.2)	26 (9.8)	
	20 ≤ < 25 (kg/m ²)		80 (60.6)	63 (47.0)	143 (53.8)	
	25 ≤ < 30 (kg/m ²)		35 (26.5)	44 (32.8)	79 (29.7)	
Pathology	≥ 30 (kg/m ²)		10 (7.6)	8 (6.0)	18 (6.8)	0.311
	Squamous cervical cancer	N (%)	101 (76.5)	98 (73.1)	199 (74.8)	
	Non-Squamous cervical cancer		31 (23.5)	36 (26.9)	67 (25.2)	
Complication	No complication	N (%)	36 (40.0)	54 (60.0)	90 (100.0)	0.469
	Post operation complication		3 (50.0)	3 (50.0)	6 (100.0)	

SD = mean standard deviation; *BMI* = body mass index.

Table 2. — Comparison of recurrence and mortality.

			Group 1	Group 2	Total	<i>p</i> -value
			Laparotomy	Laparoscopic/robotic surgery		
Cancer recurrence	No recurrence	N (%)	37 (94.9)	56 (98.2)	93 (96.9)	0.360
	Recurrence		2 (5.1)	1 (1.8)	3 (3.1)	
Post operation CCRT or Chemotherapy	No recurrence		84 (90.3)	67 (87.0)	151 (88.8)	0.330
	Recurrence		99 (9.7)	10 (13.0)	19 (11.2)	
Total	No recurrence		121 (91.7)	123 (91.8)	244 (91.7)	0.572
	Recurrence		11 (8.3)	11 (8.2)	22 (8.3)	
		Death				
	Expired	N (%)	10 (7.6)	9 (6.7)	19 (7.1)	0.486
	Alive		122 (92.4)	125 (93.3)	247 (92.9)	

SD = mean standard deviation; *CCRT* = concurrent chemoradiotherapy.

Table 2 shows the recurrence and mortality rates of the two groups. The cervical cancer recurrence rate was 8.3% (11/132) in group 1 and 8.2% (11/134) in group 2 ($p = 0.573$). The difference remained non-significant when considering only those who received additional radiation chemotherapy (5.1% [2/39] vs. 1.8% [1/57]; $p = 0.360$), and only those without any additional therapy (9.7% [9/93] vs. 13.0% [10/77]; $p = 0.360$). No difference in mortality rate was observed between the two groups ($p = 0.486$).

Discussion

The benefits of minimally invasive surgery, including laparoscopic/robot-assisted surgery, are well-established and include less hemorrhage during surgery, shorter hospital stay, and a lower risk of surgical complications [7]. Previous retrospective studies have shown that the recurrence and overall survival rates associated with minimally invasive surgery are not inferior to those associated with open surgery [8, 9]. Furthermore, a meta-analysis comparing open and robot-assisted surgeries for early cervical cancer reported better perioperative outcomes for the former

surgery type [5, 10]. In this study, the rates of postoperative adverse events, recurrence and mortality were also not different between the two groups. However, significant group differences were observed in cancer stage ($p = 0.016$) and BMI ($p = 0.032$), where patients in the early and later stages were more likely to undergo open and laparoscopic/robot-assisted surgeries, respectively. Open surgery is rarely performed for cervical cancer; laparoscopic surgery is predominantly performed, except in cases of peritoneal metastasis [11]. A recent study reported a 4.5-year disease-free survival rate for cervical cancer of 86.0% with minimally invasive surgery and 96.5% with open surgery, (mean difference of -10.6%; 95% confidence interval [CI], -16.4 to -4.7) [4]. Minimally invasive surgery was also associated with a lower 3-year survival rate (93.8% vs. 99.0%; hazard ratio for death from any cause, 6.00; 95% CI, 1.77–20.30) [4]. The recurrence rate in group 2 (1.8%) in our study was lower than that in group 2 (5.1%), but not significantly ($p = 0.360$). The recurrence rate also showed no significant difference between the patients in group 1 (9.7%) and group 2 (13.0%) who received additional therapy ($p = 0.33$).

The higher cervical cancer recurrence rate in group 1 could be explained by low surgeon proficiency, where long training time and reduced frequency of conventional open cervical cancer surgery render the operations difficult. During surgery, the use of a uterine manipulator should be minimized to prevent tumor tissue from invading the uterus. Because use of a manipulator may lead to intraperitoneal or peri-organic metastasis, the uterus should be mobilized using an additional trocar. The recurrence rate could be lowered by removing the cancer through the vagina using a plastic bag, which would reduce the amount of contact between cancer cells and surrounding tissues, such as the vaginal vault.

This study was limited by the small sample size. A multi-center study with a larger sample size could validate the results. However, a strength of our study was that the surgeries were conducted by three surgeons with a similar proficiency level using similar procedures.

Conclusions

No difference in the mortality or recurrence rate was observed between patients with early cervical cancer who underwent open surgery and those who underwent laparoscopic/robot-assisted surgery in a tertiary hospital. Furthermore, there was no difference in the rate of post-operative complications. This suggests that both approaches are reasonable. Further studies are needed to further explore the limitations of laparoscopic/robot-assisted surgery.

Ethics approval and consent to participate

All subjects gave their informed consent for inclusion before they participated in the study.

Authors' contributions

Soo-Ho Chung designed the research study. Jeong In Choi wrote the manuscript. Jae Hong Sang analyzed the data and revised the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

The authors declare no competing interests.

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