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Study of Complications of Radical Hyste Rectomy with Pelvic Lymph Node Dissection for Cervical Cancer: A 10-Year Single Centre Retrospective Study

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ABSTRACT
The purpose of this retrospective study is to assess the safety of pelvic lymph node dissection (PLND) combined with radical hysterectomy (RH) in the setting of cervical cancer surgery. Particular attention will be paid to identifying potential problems that may affect the quality of life and well-being of patients. The study, which took place at a single tertiary cancer care facility over a period of ten years, intends to provide evidence and practical insights for the prevention and reduction of difficulties related to this surgical technique. RH+PLND was performed on 51 patients with cervical cancer who met the predetermined inclusion criteria. The study examined parameters linked to the occurrence of both short and long-term problems, as well as intraoperative damage to neighboring tissues, with great care. A total of 29.41% (15/51) of patients experienced intraoperative problems, these included 9.80% of patients with bladder injuries, 43.13% with short-term issues and 5.88% with long-term complications. Urinary tract infection, surgical site infection and urine dysfunction were shown to be the main short and long-term consequences, respectively, with urinary damage emerging as the most common harm to nearby tissues. The results of the study support the efficacy and safety of RH+PLND for cervical cancer. In order to reduce the likelihood of difficulties, coordinated efforts ought to be directed at cultivating skilled multidisciplinary diagnostic and treatment teams that are outfitted with cutting-edge technologies. Early detection, diagnosis, and treatment of cervical cancer depend heavily on the use of cervical cancer screening.

INTRODUCTION

The most common malignant tumor in the female reproductive system is cervical cancer, which is becoming more common every year, especially in younger patients. The most prevalent sites throughout the PBCRs in females were breast cancer, ovarian cancer and cervix uteri[1]. In emerging nations, this disease has emerged as a leading gynecological malignancy. The two most common cancers among Indian women at the moment are breast and cervical uteri. This is a significant public health issue that requires assistance from numerous health and other authorities in order to be resolved[2]. Reducing the incidence and mortality of breast cancer in Indian women requires a multidisciplinary approach that includes education campaigns, preventative measures, early detection screening programs, and treatment facilities.

Cervical cancer can be treated with surgery, radiotherapy, chemotherapy and concomitant chemoradiotherapy, among other methods. The use of neoadjuvant chemotherapy (NACT) has proven to be beneficial in expanding the surgical options available to patients with cervical cancer[3,4]. The objective is to maximize treatment-related side effects while achieving therapeutic efficacy, improving patient's overall quality of life in spite of the variety of treatment options available.

As a traditional surgical procedure for cervical cancer, abdominal radical hysterectomy (RH) with pelvic lymph node dissection (PLND) stands out due to its obvious therapeutic efficacy[5,6]. Radical operations for cervical cancer have changed from open procedures to less invasive methods like laparoscopic or robot-assisted laparoscopic surgery as surgical skills and medical technology progress. The latter has drawbacks, such as a smaller surgical area, even though it has advantages like less discomfort and fewer incisions. The postoperative quality of life is similar even though minimally invasive radical hysterectomy has a shorter disease-free survival and a greater recurrence rate than open surgery. Consequently, individuals with early-stage cervical cancer are advised to undergo an open radical hysterectomy[7].

Various groups have raised concerns about the laparoscopic approach to cervical cancer (LACC) study's results, citing a number of problematic elements, including the study's short follow-up periods, insufficient patient data and learning curve. There have been concerns raised regarding the possibility of tumor dissemination as a result of insufficient surgical scope, inappropriate operation and CO2 ventilation, which could lead to a worse survival rate in the minimally invasive group[8].

Reducing postoperative complications and improving survival rates in cervical cancer are the goals of multiple research investigating intraoperative radiation, postoperative adjuvant therapy and preoperative neoadjuvant therapy. There is ongoing discussion over the use of NACT in cervical cancer, with particular emphasis on its possible advantages in lowering postoperative pathological risk factors and maintaining fertility in young patients with early-stage squamous cervical cancer[9-11].

Regardless of the surgical approach selected, there is always a chance of harm to surrounding organs and pelvic autonomic nerves, which could lead to postoperative problems and long-term neurological effects. We carried out a retrospective analysis spanning ten years, observing the difficulties of RH+PLND in a single center, in order to address these concerns and enhance the quality of life for patients with cervical cancer. Our findings are intended to provide important clinical experience and proof for the decrease in surgical complications related to cervical cancer.

MATERIALS AND METHODS

Study design and participants: This study was conducted at Department of Gynaecological Oncology at State Cancer Institute, Aurangabad Maharashtra and written informed consent was obtained from participants. Ethical approval was obtained from the Ethical Committee of Government medical college and Cancer Hospital Aurangabad.

It was a single-center retrospective study, data were sourced from the record section of Government Cancer Institute. Eligible participants were cervical cancer patients meeting inclusion criteria between January 2013 and December 2022, possessing complete clinical information and follow-up data. Hospitalization details were recorded in the case, and post-discharge follow-up was performed via telephone. Missed cases were excluded from the enrollment criteria.

Inclusion criteria:

- No history of other malignant tumors
- Newly diagnosed and treatment-naive patients with pathologically confirmed cervical cancer
- International Federation of Gynaecology and Obstetrics (FIGO) 2009 stages IA2–IIA2
- Karnofsky Performance Scale (KPS) score $\geq$80
- No serious organic diseases of vital organs, able to tolerate surgery
- Underwentconventional RH+PLND
- Surgeries performed by proficient surgeons in abdominalRH+PLND

Exclusion criteria:

- Non-epithelial cervical malignancy
- FIGO 2009 stages>IA2–IIA2
- Patients with serious organic diseases of vital organs, unable to tolerate surgery
- Patients with rectal and bladder dysfunction
- History of abdominal and pelvic radiotherapy
- Patients with pre-operative NACT

Fifty one patients in all, with a median age of 48.5 years, who fulfilled the inclusion criteria were included. The patient's ages ranged from 25-72 years. Each of the 51 patients had a bilateral dissection of the pelvic lymph nodes along with an open Wertheim's radical hysterectomy. PLND, involving the left and right common iliac, internal and external iliac, obturator, deep inguinal and presacral lymph nodes, was carried out following RH with bilateral salpingo-oophorectomy.

Fifty-one of the included patients had open surgery and some of them also had concurrent chemoradiotherapy or postoperative radiotherapy. The average follow-up period was 36 months. Numerous problems were noted during perioperative care and lymphadema and urine dysfunction were part of the long-term follow-up.

Statistical methods: SPSS Statistics (version 21.0) was used for statistical analysis. Count data were presented as percentages.

RESULTS

The patient's ages ranged from 25-72 years with a median age of 48.5 years. 86.27% patients had squamous cell carcinoma, 11.76% patients had adenocarcinoma while 1.96% patients had adenosquamous carcinoma. Majority of the patients had G2 disease (47.05%) while 31.37% had G1 disease.72.55% patients had tumor size between 2-4 cm. The incidence of injury to bladder was 9.80% and most common followed by Ureteral injury and bowel injury in 5.88% and vascular injuries (3.92%).

Short-term complications: Urinary tract infections (13.72%), surgical site wound infections (13.72%), paralytic ileus (5.88%), urine retention (1.96%) and lower-extremity oedema (1.96%) were the most frequent short-term complications. Urinary incontinence, ureteral fistula and deep vein thrombosis were also noted.

Analysis of pelvic lymph node metastasis: The incidence of pelvic lymph node metastasis was 9.80%. More specifically, none of the patients with stage IA2 cancer had lymph node metastasis, whereas the incidence for stage IB1, IB2, IIA1 were 3.92%, 3.92%, 1.96% respectively.

Table 1: Clinical characteristics of patients included in study

Age	No. of Patients	Percentage
20-40	15	29.41
41-50	18	35.29
50-60	12	23.52
61-70	4	7.84
<70	2	3.92
Pathological type	No. of Patients	Percentage
Squamous cell carcinoma	44	86.27
Adenocarcinoma	6	11.76
Adenosquamous carcinoma	1	1.96
Pathological Grade	No. of Patients	Percentage
G1	16	31.37
G2	24	47.05
G3	11	21.56
Tumor size	No. of Patients	Percentage
<2 cm	13	25.49
Cm	37	72.55
>4 cm	1	21.56
Co-morbidity		
Yes	31	
No	20	
FIGO Staging	No. of Patients	Percentage
IA2	3	5.88
IB1	29	56.86
IB2	15	29.41
IIA1, IIA2	4	7.84

Table 2: Intraoperative injury to adjacent tissues

Types of Injuries	No. of Patients	Percentage
Bowel Injury	3	5.88
Bladder Injury	5	9.80
Ureteral Injury	3	5.88
Vascular Injury	2	3.92
Injury to adjacent tissues	2	3.92

Table 3: Short-term complications

Short term complications	No. of Patients	Percentage
Intestinal obstruction	0	0
Paralytic ileus	3	5.88
Lower extremity odema	1	1.96
Urinary incontinence	1	1.96
Urinary retention	1	1.96
Lymphatic leakage	7	13.7
Urinary tract infection	0	0
Lymphcyst	0	0
Surgical wound infection	7	13.72
Deep ven thrombosis	1	1.96
Ureteral fistula	1	1.96
Vaginal cuff dehiscence	0	0

Table 4: Postoperative pathological risk factors Pelvic lymph node metastasis/case

Parameter	No. of Patients	Percentage
Pelvie Lymph node metastasis		
N0	46	90.19
N1	5	9.90
Resection margin of tumor		
R0	48	94.11
R1	3	5.88
Parametrial invasion		
Positive	2	3.92
Negative	49	96.07
Lymph vascular space invasion		
Positive	5	9,80
Negative	46	90.19
Tumor size (cm)		
>4	6	11.96
4	45	88.23

Table 5: Long-term complications

Long Term Complications	No. of patients	Percentage
Urinary dysfunction	1	1.96
Bowel dysfunction	0	0.00
Pelvic organ prolapsed	0	0.00
Lymphedema	1	1.96
VVF	1	1.96

Table 6: Comparison of results of different studies

Authors	Sample size	Intraop complications	Short term complications	Long term complications
Huang *et al.*[16]	2226	7.68%	31.45%	2.96%
Zorlu et al.[15]	115	13.91%	33.04%	
Rameshkumar	50	12%	58%	
Present study	51	29.41%	43.13%	5.88%

Postoperative pathological risk factors: In this study, 9.80% of patients had a tumour invasion depth ≥2/3, 3.92% showed parametrial invasion and 9.80% were positive for LVSI.

Long-term complications: The long-term complication was urinary dysfunction, lymphedema and vesico vaginal fistula. The incidence of long-term complications was 5.88%.

DISCUSSIONS

Historically, the predominant treatment for cervical cancer has been the aggressive surgical method known as the Wertheim Meigs procedure, which combines radical hysterectomy (RH) with pelvic lymph node dissection (PLND)[12]. This treatment has been essential to the therapy of cervical cancer and includes both routine and aggressive excision of the pelvic lymph nodes. However, with extensive surgery for pelvic organ excision, there is a risk of harm to the autonomic nerves of the bladder, ureters and pelvic organs, which could result in bladder and rectal dysfunction[13,14]. Through the preservation of pelvic autonomic nerves and the modification of surgical techniques and procedures the incidence of problems associated with this surgical approach can be reduced. Complications such ureteral injury, bladder injury, surgical wound dehiscence, surgical site infection, urinary tract infection and pelvic lymphocysts have been observed despite efforts to improve safety. Pelvic autonomic nerve system issues can also result in intestinal blockage, urine retention, urinary fistula, incontinence and sexual dysfunction, all of which can negatively impact a patient's quality of life and require reoperation.

Though its safety and effectiveness are still up for debate the advent of laparoscopic or robot-assisted laparoscopic surgery has increased possibilities for surgical access and approach for cervical cancer. Minimally invasive surgery has been linked in certain studies to decreased rates of disease-free survival and overall survival in early-stage cervical cancer. Disagreements still exist, nevertheless, regarding the safety and effectiveness of laparoscopic radical hysterectomy, particularly in some stages of cervical cancer. Zorlu *et al.* [15] examined 115 women who had undergone surgery at the Gynecologic Oncology Clinic and had early-stage cervical cancer. Thirty were in stage II and eighty-five were in stage I. The percentage of patients who experienced intraoperative complications was 16.91%, which is lower than our intraoperative complication rate of 29.41. Among the 16 patients, there were 3 cases involving the bladder, 1 ureter, 1 aorta, 5 v. cava inferior, 1 internal iliac a., 3 internal iliac v., 1 obturator nerve and 1 recto-vaginal septum hematoma formation. There were 38 patients with postoperative problems (33.14%). Ten lymphocyst forms, six urinary infections, twelve wound infections, three pelvic infections, two eviscerations, one incisional hernia and fourteen bladder dysfunctions were among them.

Zing *et al.*[16] study from 2226 on radical hysterectomy with BPLND 34.41% (766/2226) of patients experienced postoperative complications, these included 7.68% with neighboring tissue injury, 31.45% with short-term difficulties, and 2.96% with long-term complications. Six (12%) of the 50 patients in the Rameshkumar *et al.*[17] research who had radical hysterectomy experienced procedural problems. Among the post-operative complications include 1 (2%) bladder injury, 3 (6%) ureteric injury cases, 1 (2%) bowel injury case and 1 (2%) great vascular injury case.One (2%) occurrence of bladder dysfunction was among the postoperative complications, 20 (40%) patients experienced infectious morbidity, 12 (24%) cases involved wound infection and 8 (16%) cases involved urinary tract infection. Blood transfusions were given to 22 patients (44%). Deep vein thrombosis (DVT) affected one individual (2%) while pulmonary embolism (PE) required critical treatment for another. After radical cervical cancer surgery the incidence of postoperative adverse events usually falls between 10.1-25.4%. The incidence in our retrospective analysis was 42.10%, which was greater than in some other findings. Common consequences were damage to the bladder, intestines and ureters short-term complications included wound infections, urinary tract infections, paralytic ileus, lower-extremity edema and deep vein thrombosis. Long-term side effects included lymphadema and urinary problems.

Age, tumor size, invasion depth, parametrial invasion, lymphovascular space invasion (LVSI), lymph node metastases, FIGO stage and surgical technique were found to be risk factors for problems in RH+PLND after the factors influencing postoperative complications were analyzed. Complications were more common in patients 40-60 years old, with tumors ≥4 cm, invasion depth ≥2/3, parametrial invasion, LVSI, metastasis of lymph nodes, FIGO stage >IB2 and open surgery.

Although the lack of a control group and randomization hinder the capacity to make direct

comparisons, this study offers insightful information about the difficulties linked to RH+PLND for cervical cancer. Variations in surgeon proficiency and the longer research period also introduce confounding variables. Additionally, the study does not include assessments of psychological states and postoperative sexual dysfunction, which makes it difficult to evaluate patient quality of life at various postoperative intervals. Subsequent research endeavors that tackle these constraints are imperative in order to attain a thorough comprehension of postoperative problems and to steer enhancements in surgical techniques, which will ultimately augment patient outcomes and quality of life.

CONCLUSIONS

Cervical cancer is still very common, which emphasizes the need for multimodality therapy. One essential part of treatment is radical hysterectomy (RH) along with pelvic lymph node dissection (PLND). The safety and usefulness of RH+PLND for cervical cancer are confirmed by our research. Urinary tract infection, surgical site infection and urine dysfunction were shown to be the main short- and long-term consequences, respectively, with urinary damage emerging as the most common harm to nearby tissues. In order to reduce the likelihood of difficulties, coordinated efforts ought to be directed at cultivating skilled multidisciplinary diagnostic and treatment teams that are outfitted with cutting-edge technologies. Early detection, diagnosis and treatment of cervical cancer depend heavily on the use of cervical cancer screening. Postoperative surveillance is essential, and patients who have complications should receive careful, customized care based on the particulars of their problems, which will ultimately improve their quality of life in general.

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