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Original Research Article

Hysterectomy for Recurrent/Residual Cervical Cancer after Definitive Radiotherapy: Insights from a Tertiary Cancer Center Experience

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Abstract:

Background: Persistent or recurrent cervical cancer after definitive radiotherapy (RT) or chemoradiotherapy (CCRT) is a foreboding treatment challenge, especially in low- and middle-income settings such as India where late presentation is prevalent. Salvage hysterectomy is a potential curative intervention, but its safety and efficacy are questionable and not proven.

Objective: To evaluate clinical outcomes, survival, and surgical feasibility by salvage hysterectomy in women with recurrent or residual cervical cancer after definitive RT/CCRT.

Methodology: Retrospective observational study was conducted in the Department of Gynecologic Oncology, Kidwai Memorial Institute of Oncology, Bangalore on 32 patients with FIGO Stage IB2–IIIB cervical cancer treated between the years 2014 to 2019. All the patients underwent prior RT/CCRT and salvage hysterectomy for biopsy-proven residual or recurrence. Demographic, clinical, pathological, and survival information were gathered and analyzed with SPSS v11. Survival was evaluated using Kaplan–Meier and Cox regression models.

Results: 32 patients (median age 48.8 years) presented with 71.9% residual disease and 28.1% recurrence. Squamous cell carcinoma was the most common histology. The patients presenting with residual disease lived significantly longer than the patients presenting with recurrence. Hysterectomy was observed to be a valuable and worthwhile treatment, especially in those patients presenting with early post-RT localized disease.

Conclusion: Salvage hysterectomy is an effective treatment approach in appropriately selected patients with recurrent or residually persisting cervical cancer after RT. Pre-identification and surgical treatment of residual disease could result in better outcomes. Prospective trials need to optimize patient selection and timing."

Keywords: Cervical Cancer, Radiotherapy, Recurrent Disease, Residual Disease, Salvage Hysterectomy, Survival.

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Introduction

"Cervical cancer (CC) is still one of the most common cancers in women globally and continues to be a major burden, especially in low- and middle-income countries like India. The majority of Indian patients approach the clinician with the disease in an advanced stage; hence it is more challenging to treat, and prognosis is worse. Based on the International Federation of Gynecology and Obstetrics (FIGO) 2018 staging system, locally advanced cervical cancer (LACC) is locally advanced stage IIB to IVA [1]. The worldwide standard of care for LACC is definitive platinum-based concurrent chemoradiotherapy (CCRT) [2]".

Although CCRT has contributed a great deal to the outcome of the therapy, the prognostic status of LACC is still suboptimal. Despite this aggressive multimodality therapy, about 35% of the patients still suffer from disease progression either in the form of residual tumor that survives in spite of radiation or as local recurrence after an initial complete or partial response [3]. The occurrence of residual or recurrent disease, as documented in the literature, is

between 10% and 30%, a significant clinical issue despite therapeutic advances [4].

Persistent or residual cervical cancer following definitive radiotherapy (RT) is highly refractory to treatment. The anatomical alteration due to radiation-induced changes and the tumor biology along with pre-existing treatment resistance render further treatments difficult and risky. These are generally cases of poor prognosis with limited treatments. Best supportive care (BSC), chemotherapy aiming to palliate the symptoms, or surgery in the form of pelvic exenteration or hysterectomy are generally the modalities, especially with recurrence being local within the already irradiated field [5].

Pelvic exenteration, while potentially curative in a highly selected group of patients, is a morbid and technically demanding operation with high complication rates and substantial impact on quality of life. Radical or simple hysterectomy, on the other hand, has been assessed as a salvage operation in the setting of central residual or recurrent disease, aimed at enhancing local disease control at lower complication rates than more radical operations [6].

Radical hysterectomy has traditionally been employed for the treatment of locally recurrent (LR) cervical cancer after radiation since it can remove all visible diseases. The procedure is however marred by excessive intraoperative and postoperative severe morbidity, such as bladder, bowel, and ureteric injury, and compromised healing of irradiated tissue. In recent years, several investigators have explored the application of salvage simple total hysterectomy as a potentially safer but equally effective alternative. This is driven by the desire to avoid excessive surgical morbidity without compromising substantial oncological results.

Studies that have evaluated the outcomes of salvage hysterectomy have reported 5-year OS of 49% to 72%, and even DFS of 90% in well-selected populations. Furthermore, complication rates of radical hysterectomy are extremely high, 42% to 44% [7, 8], and those of simple hysterectomy are extremely low, 0% to 14% [9, 10]. These findings suggest that simple hysterectomy may be able to provide a better trade-off between therapeutic benefit and safety, particularly in resource-limited settings where it may be challenging to manage severe surgical complications.

Placing these findings into context, it is obvious that the use of hysterectomy, especially the simple one, in treating residual or recurrent cervical cancer post RT remains questionable. Technical limitations, inability to get tumor-free surgical margins, and morbidity of operating in already irradiated tissue have limited the widespread use of this procedure. Nevertheless, current evidence supports the hypothesis that surgical resection of persistent or recurrent resistant tumor can provide increased local control and survival benefit for strictly selected patients.

Although such encouraging results are available, high volume cancer institute setting clinical data from India, where cervical cancer is prevalent and most of the patients are receiving CCRT as initial treatment, are scarce. Clinical advantage, safety, and long-term survival advantage of adjuvant hysterectomy—simple hysterectomy in itself—after recurrent or residual disease following radiotherapy are not well studied in the Indian context. Real-world practice experience from tertiary cancer centers, all of which receive a high volume of LACC cases, can give useful information regarding patient choice, surgical complexity, and oncologic results.

"In this current study, we aim to determine the efficacy, safety, and prognostic significance of salvage simple hysterectomy in women with residual or recurrent cervical cancer following definitive CCRT. Through our institutional database of a tertiary cancer center, we aim to add to the growing literature supporting the judicious use of salvage surgery and establish evidence-based practice guidelines for clinical management in advanced post-radiation recurrences/residual disease.

Methodology

Study Design: This was a retrospective observational study conducted to evaluate the clinical characteristics, surgical outcomes, and survival profile of patients undergoing hysterectomy for recurrent or residual cervical cancer following definitive radiotherapy (RT).

Study Area: The study was carried out at the Department of Gynecologic Oncology, Kidwai Memorial Institute of Oncology (KMIO), Bangalore, tertiary cancer care center located in South India.

Study Duration: The medical records of patients treated between January 2014 and December 2019 were reviewed for analysis.

Sample Size and Population: A total of 32 patients diagnosed with histologically confirmed residual or recurrent cervical cancer (FIGO Stage IB2–IIIB) post-definitive RT or chemoradiotherapy (CCRT) who subsequently underwent salvage hysterectomy were included."

Inclusion Criteria

- Patients with histologically confirmed squamous cell carcinoma or non-squamous carcinoma of the cervix.
- Those who had received prior definitive RT or CCRT.
- Patients who were diagnosed with residual or locoregionally recurrent disease confirmed via biopsy and imaging (MRI, CT or PET scan) ≥3 months post-radiotherapy.

- Absence of distant metastasis or gross pelvic lymph node involvement at the time of salvage surgery.
- Patients who underwent salvage hysterectomy (simple or radical) with or without bilateral salpingo-oophorectomy and pelvic lymph node sampling.

Exclusion Criteria

- Patients with distant metastases or unresectable pelvic disease.
- Incomplete treatment or follow-up records.
- Patients who underwent palliative surgery or non-hysterectomy salvage procedures.
- Non-epithelial histologies.

Data Collection: Data were retrieved from hospital records, operative notes, pathology reports, and follow-up charts in a retrospective manner. Information obtained included demographic information, clinical staging at presentation, treatment modality (RT/CCRT), histological subtype, time frame from RT to recurrence, type of operation undertaken, intra- and postoperative complications, histopathology of the resected specimen, and follow-up outcomes.

Procedure: The definitive management of RT consisted of EBRT comprising 50 Gy in 25 fractions and HDR- ICBT, along with concurrent weekly cisplatin (40 mg/m²) otherwise inj carboplatin if cisplation is contraindicated or intolerant. Patients were evaluated for recurrence with genito-pelvic clinical examination, imaging (MRI/CT/PET) if necessary, and biopsy of suspected lesions after at least 3 months from the completion of RT. Patients with residual or recurrent disease who were operable, non-metastatic, underwent total abdominal hysterectomy (TAH) with or without radical resection. Bilateral salpingo-oophorectomy (BSO) and pelvic lymph node dissection were done at the surgeon's discretion.

Statistical Analysis: "Data was analyzed using SPSS software version 11.0. Descriptive statistics were calculated to describe baseline characteristics. Survival outcomes were estimated using the Kaplan–Meier method, and subgroups were compared using the log-rank test. Multivariate analysis of prognostic factors related to survival was conducted using a Cox proportional hazards model. A p-value less than <0.05 was taken as statistically significant."

Results

A total of 32 patients with residual or recurrent cervical cancer who underwent salvage hysterectomy following definitive radiotherapy were analyzed. The median age at the time of surgery was 48.8 years (range: 26–68 years). All patients had previously received definitive RT or concurrent chemoradiotherapy (CCRT).

The distribution of patients according to FIGO 2008 staging is presented in Table 1. The majority had Stage IIIB disease (n=10), followed by Stage IB2 and IIA (n=8 each). Most patients had squamous cell carcinoma (SCC) (n=26).

Table 1: Baseline Clinical Characteristics of Patients (N = 32)

Characteristic	Number (n)	Percentage (%)
Age (median)	48.8 yrs	(Range 26–68)
FIGO 2008 Stage		
– IB2	8	25.0%
– IIA	8	25.0%
– IIB	5	15.6%
– IIIA	1	3.1%
– IIIB	10	31.3%
Histological Subtype		
– Squamous Cell Carcinoma	26	81.3%
– Adenocarcinoma	2	6.3%
– Adenosquamous Carcinoma	2	6.3%
– Poorly Differentiated Carcinoma	2	6.3%

Table 2 summarizes the primary treatment modalities received by the 32 patients. The majority of patients (78.1%, n=25) underwent concurrent chemoradiotherapy (CCRT) with cisplatin. A smaller proportion received CCRT with carboplatin (9.4%, n=3). Additionally, 6.3% (n=2) of patients were treated with extended field nodal boost followed by CCRT, and another 6.3% (n=2) received neoadjuvant chemotherapy followed by CCRT.

Table 2: Primary Treatment Modalities		
Treatment Modality	**Number (n)**	**Percentage (%)**
CCRT with Cisplatin	25	78.1%
Extended Field Nodal Boost + CCRT	2	6.3%
CCRT with Carboplatin	3	9.4%
Neoadjuvant Chemotherapy + CCRT	2	6.3%

Table 3 outlines the disease status of patients at the time of salvage surgery. A majority of patients (71.9%, n=23) had residual disease following initial treatment, while the remaining 28.1% (n=9) presented with recurrent disease.

Table 3: Disease Status at Time of Salvage Surgery		
Disease Status	**Number (n)**	**Percentage (%)**
Residual Disease	23	71.9%
Recurrent Disease	9	28.1%

The median overall survival (OS) for the cohort was 45.3 months. Subgroup analysis revealed:

- **Residual disease group**: median OS = **58 months**
- **Recurrent disease group**: median OS = **23.8 months**

Kaplan-Meier survival analysis showed a significantly better OS in the residual disease group (**Figure 2**).

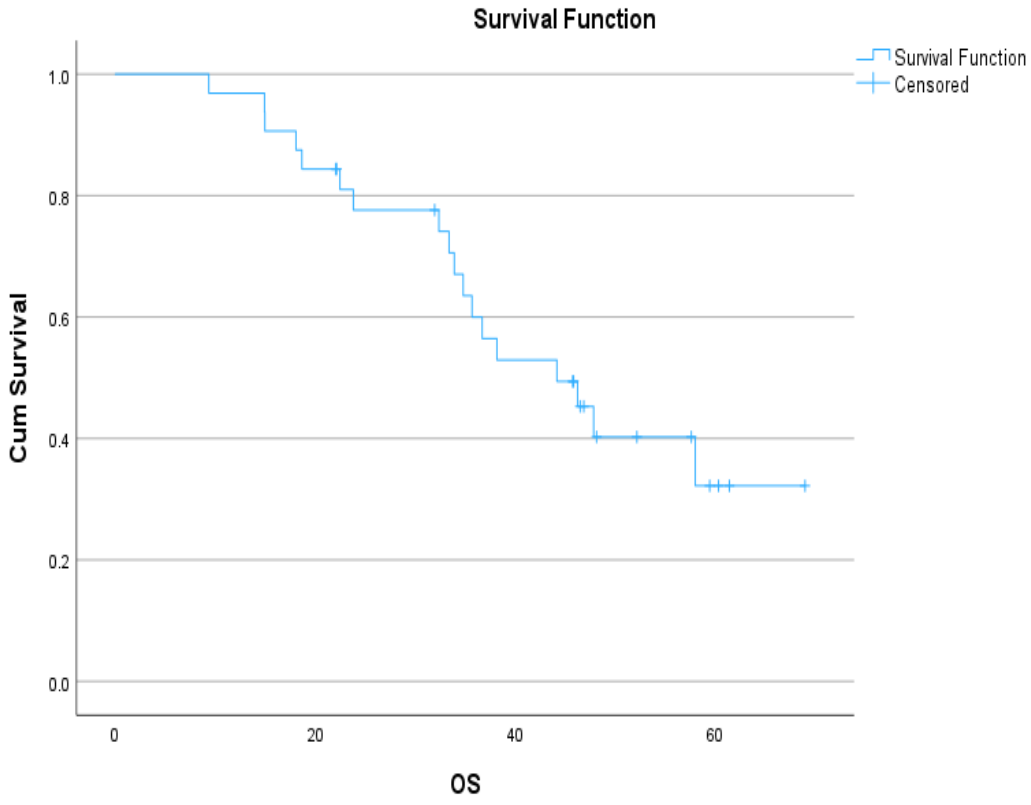

Figure 1: Kaplan–Meier Curve Showing Overall Survival (OS) Following Salvage Hysterectomy in Patients with Recurrent or Residual Cervical Cancer Post-Radiotherapy

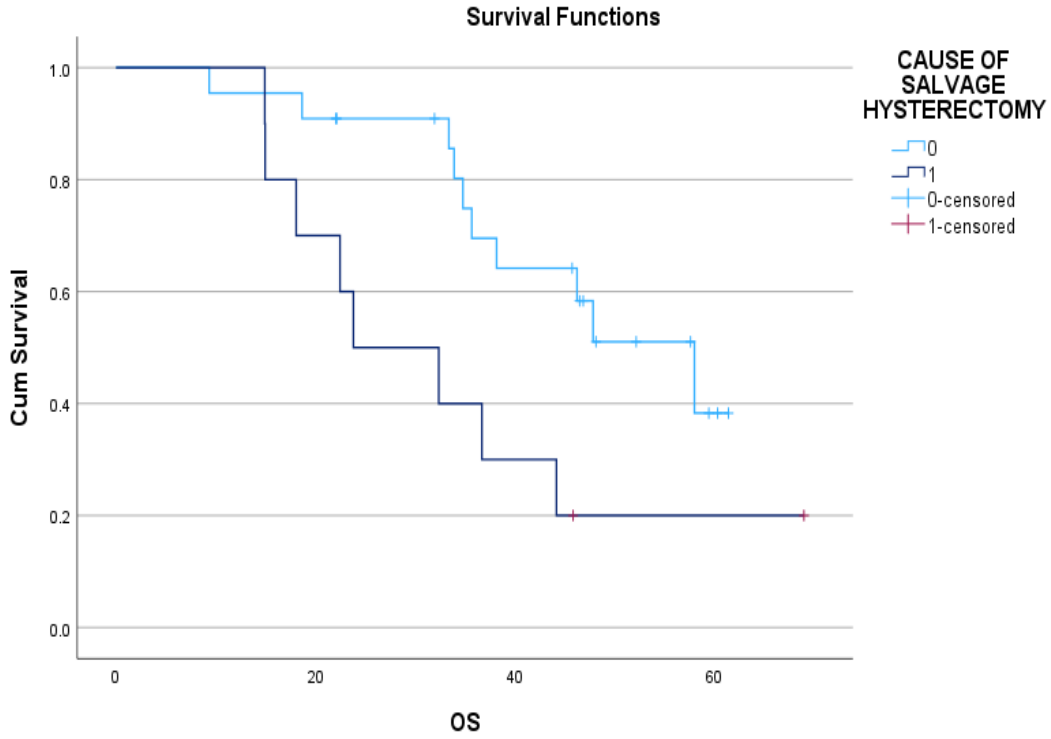

Figure 2: Kaplan–Meier Survival Curves Comparing Overall Survival in Patients with Residual vs. Recurrent Cervical Cancer

Table 4: Survival Outcomes	
Group	**Median OS (months)**
Overall (n=32)	45.3
Residual Disease	58.0
Recurrent Disease	23.8

Table 5 gives information about the mode of surgery open (n=24) being most common as already proven in literature, pelvic lymph node dissection was done in 5 patients, para ortic and total vaginectomy in 1 patient each along with hysterectomy.Surgical site infection and paralytic ileus being most common complication.

MODE OF SURGERY	
Open	**24**
Laproscopy	**6**
Robotics	**2**
HYSTERECTOMY ALONG WITH	
BPLND	**5**
PALND+PLND	**1**
VAGINECTOMY	**1**
COMPLICATION	
surgical site infection	**3**
paralytic ileus	**3**
Resuturing	**1**
bowel leak and diversion soma	**1**
lymphedema of abdominal wall	**1**

Discussion

This comparison of the clinical outcomes of salvage hysterectomy in patients with recurrent or residual cervical cancer after definitive radiotherapy (RT) or concurrent chemoradiotherapy (CCRT) is a question of direct practical importance due to limited curative treatment options in this subgroup. Our findings are that hysterectomy is an appropriate treatment

modality, particularly in patients with residual disease, whose survival outcome was significantly improved in comparison to recurrent disease.

Twenty-three of 32 patients had residual and 9 recurrent diseases. Median OS was 58 months in the residual group and 23.8 months in the recurrent group, as would be predicted from international experience of the prognostic benefit of early treatment of persistent disease and of low volume. Median OS for the entire group was 45.3 months, as would be predicted from the effectiveness of surgical treatment in appropriately chosen patients after radiotherapy.

Our findings align with literature. Nakasone et al. (2020) [11] reported a median OS of 63.3 months in residual and 19.6 months in recurrence cases, citing better outcomes in residual disease if treated. Takekuma et al. (2024) [12] also cited that patients with residual tumors ≤2 cm had significantly better progression-free survival and OS after salvage hysterectomy, citing the importance of tumor size as well as early intervention.

Complications of hysterectomy after radiation continue to be a cause for concern with tissue fibrosis, compromised healing, and heightened risk of urological and gastrointestinal damage. However, experience in our center proves the argument that, when performed by experienced gynecologic oncologists in high-volume centers, hysterectomy can be performed safely, as seen in the study by van Kol et al. (2021) [13], wherein they concluded that, although their complication rates (20–50%) were high, mortality was low, and survival benefit was high in well-selected patients.

Of note is the decision to offer hysterectomy in the recurrent scenario. While recurrent disease in our series had a poorer outcome, the median OS at 23.8 months suggests salvage hysterectomy may still offer a meaningful prolongation of survival and relief of symptoms, especially in the absence of distant metastasis or diffuse spread in the pelvis. This is the policy of choice as per literature, e.g., Zivanovic et al. (2008) [14] concluded local recurrences confined to the cervix or the upper vagina could still be respected, especially if these were early.

Limitations in our research are its retrospective nature, small number of patients, and the potential for selection bias as only operable patients with no distant metastasis were selected. In addition, data sets such as some complication rates, tumor size at surgery, and quality-of-life scores were not measured and may yield additional clinical data.

Nonetheless, this research provides valuable data from an Indian teaching hospital and lends support to the advancing view that salvage hysterectomy, especially for residual disease, must be included in the treatment of locally advanced cervical cancer where feasible. It also underscores the importance of early post-treatment follow-up for the detection of operable residual disease and improving outcomes.

Conclusion

This study shows salvage hysterectomy is a feasible and possibly valuable treatment option in patients with residual or recurrent cervical cancer after definitive radiotherapy, especially when performed by experienced surgeons in high-volume centre. Patients with residual disease appeared to derive greater survival benefit compared to those with recurrent disease, which stresses the importance of monitoring for structural recurrence and attempting timely surgical intervention with as limited onco-radiotherapy impact as possible. Although surgery after radiation treatment is inherently technically challenging, we encountered acceptable post-operative outcomes, which further emphasize hysterectomy as a valuable option in a multidisciplinary approach to select cases. Further planned prospective studies are needed to better define patient selection criteria, timing of surgical intervention, and outcomes.

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