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Clinical Outcomes of Cervical Cancer Patients Treated with Surgery and Concurrent Chemoradiation Therapy in CMH, Dhaka

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ABSTRACT

Background: Cervical cancer is a leading cause of cancer-related death among women, particularly in developing countries. Early-stage disease can often be cured with surgery or chemoradiotherapy, while advanced stages require combined treatment approaches. Outcomes vary depending on disease characteristics, patient factors, and healthcare resources. Limited data exist in Bangladesh regarding treatment responses, survival, and complications. This study aims to evaluate the clinical outcomes of cervical cancer patients undergoing radical hysterectomy and chemoradiation therapy in a tertiary care military hospital.

Methods: This retrospective cohort study at Combined Military Hospital, Dhaka, Bangladesh (2015–2022) included 192 cervical cancer patients treated with radical hysterectomy, concurrent chemoradiation, or both. Data on demographics, tumor characteristics, treatment, and follow-up outcomes were collected. Primary outcomes were 5-year overall and disease-free survival, while secondary outcomes included recurrence and post-treatment complications. Survival and recurrence analyses were performed using chi-square tests and Cox regression, with $p < 0.05$ considered significant.

Results: Among 192 cervical cancer patients, most were middle-aged with squamous cell carcinoma and stage II disease. Treatments included surgery, CCRT, or both, with 35% experiencing complications. Five-year survival was 71.9%, highest after surgery alone, and recurrence occurred in 18%, with advanced stage, adenocarcinoma, and positive lymph nodes predicting higher risk.

Conclusion: Survival and recurrence in cervical cancer are strongly influenced by disease stage and treatment type. Surgery is most effective in early stages, while CCRT is essential for advanced disease. Delayed detection highlights the need for early screening, HPV vaccination, multidisciplinary care, and a national cancer registry in Bangladesh.

Keywords: *Cervical cancer, chemoradiation, radical hysterectomy, survival outcomes, recurrence, HPV vaccination, Early detection.*

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INTRODUCTION

Cervical cancer is the second most prevalent cause of cancer death for women globally, accounting for 78% of cases in developing nations, [1] where it is the third most common cancer in women overall [2]. Every year 500,000 new cases are diagnosed [3] and 237,500 deaths from cervical cancer occurs. Recent years have seen significant advancements in the diagnosis and treatment of this malignancy. 80–95% of women with early-stage disease (stages I and II) and 60% of women with stage III disease can be cured with surgery or chemoradiotherapy [4, 5, 6, 7].

The choice of treatment is primarily guided by disease stage, tumor size, lymph node involvement, and patient performance status [8,9]. Surgery, particularly radical hysterectomy with pelvic lymphadenectomy, remains the standard of care for early-stage disease, whereas concurrent chemoradiation therapy (CCRT) is the preferred approach for locally advanced disease [10,11]. Despite these established treatment protocols, outcomes may vary due to patient factors, comorbidities, and variations in healthcare infrastructure, especially in developing countries.

In Bangladesh, data on clinical outcomes of cervical cancer patients managed with surgery and CCRT remain limited [12,13]. Understanding treatment responses, survival rates, and complication profiles is essential for optimizing patient management and guiding evidence-based clinical practice. This study aims to evaluate the clinical outcomes of cervical cancer patients undergoing several treatment modalities including Radical Hysterectomy & Chemoradiation therapy in a military hospital, focusing on survival rates, recurrence rates & post-treatment complications.

MATERIALS & METHODS

Study Design and Setting:

This was a retrospective cohort study conducted at the Department of Gynae Oncology, Combined Military Hospital (CMH), Dhaka, Bangladesh. The study period spanned from January 2015 to December 2022.

Study Population:

A total of 192 patients with histologically confirmed cervical cancer who underwent radical hysterectomy, concurrent chemoradiation therapy (CCRT), or a combination of these modalities were included. Patients who discontinued treatment prematurely, were discharged on request, or declined to participate in follow-up were excluded.

Data Collection:

Data were retrieved from hospital medical records, operative notes, and follow-up files. Variables included patient demographics, tumor characteristics (histology, stage, lymph node status), treatment details (surgical margins, adjuvant therapy), and follow-up outcomes (recurrence, complications, survival status).

Outcome Measures:

The primary outcomes were 5-year overall survival (OS) and disease-free survival (DFS). Secondary outcomes included recurrence rates, factors associated with recurrence, and post-treatment complications.

Statistical Analysis:

Data were entered and analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize patient demographics, clinical features, tumor characteristics, treatment modalities, and complications, with results presented as frequencies, percentages, means, and standard deviations. Survival outcomes were analyzed using 5-year overall survival rates, and comparisons between groups were performed using the chi-square test for categorical variables. Recurrence patterns were examined according to treatment type. Multivariate Analysis was conducted using the Cox proportional hazards model to identify factors independently associated with recurrence, with results reported as adjusted hazard ratios (HR) and 95% confidence intervals (CI). Statistical significance was set at $p < 0.05$.

Ethical Considerations:

Ethical approval was obtained from the Institutional Review Board of CMH, Dhaka. Patient confidentiality was strictly maintained, and all data were anonymized prior to analysis.

RESULTS:

This study evaluated the clinical characteristics, treatment patterns, and outcomes of 192 cervical cancer patients treated at CMH, Dhaka, between 2015 and 2022. The results are presented in terms of patient demographics and socioeconomic status, clinical presentation, tumor characteristics, treatment modalities, post-treatment complications, survival outcomes, and disease recurrence. Analyses were performed to assess the association of treatment type and tumor stage with overall survival, as well as factors predicting recurrence, providing a comprehensive overview of clinical outcomes in this cohort.

Table 1. Demographic and Socioeconomic Characteristics (N = 192)

Variable	Category	n (%)
Age (years)	<40	48 (25.0)
	40–59	102 (53.1)
	≥60	42 (21.9)
Marital Status	Married	174 (90.6)
	Widowed/Divorced	18 (9.4)
Age at Marriage (years)	<18	76 (39.6)
	18–24	104 (54.2)
	≥25	12 (6.2)
Parity	0–2	58 (30.2)
	3–4	92 (47.9)
	≥5	42 (21.9)
Education	No formal education	48 (25.0)
	Primary	68 (35.4)
	Secondary	56 (29.2)
	Higher	20 (10.4)
Occupation	Homemaker	138 (71.9)
	Service/Business	42 (21.9)
	Others	12 (6.2)
Socioeconomic Status	Low	102 (53.1)
	Middle	70 (36.5)
	High	20 (10.4)

Patient Demographics and Socioeconomic Characteristics

Among the 192 cervical cancer patients, more than half (53.1%) were between 40 and 59 years of age, followed by 25.0% below 40 years and 21.9% aged 60 years or above, indicating that middle-aged women were the most affected group. The majority of participants were married (90.6%), and a considerable proportion (39.6%) had been married before the age of 18, reflecting early marital practices. Nearly half of the patients (47.9%) had a parity of three to four children, suggesting a possible link between high parity and cervical cancer risk. Regarding education, one-fourth (25.0%) had no formal education, and only 10.4% had higher education, highlighting limited educational attainment among the patients. Most participants were homemakers (71.9%), and over half (53.1%) belonged to a low socioeconomic status, indicating that cervical cancer was more prevalent among socioeconomically disadvantaged women with limited education and occupational diversity. (Table 1)

Clinical Presentation and Comorbidities

The most common clinical presentation among the cervical cancer patients was abnormal vaginal bleeding, reported by 74.0% of cases, followed by vaginal discharge (16.7%) and pelvic pain (9.4%). This pattern indicates that abnormal vaginal bleeding remains the predominant and earliest warning symptom leading to clinical diagnosis. Regarding comorbidities, more than two-thirds of patients (67.7%) had no associated health conditions, while hypertension (14.6%) and diabetes (8.3%) were the most frequently observed comorbidities. (Table 2)

Table 2. Clinical Profile (N = 192)

Variable	Category	n (%)
Clinical Presentation	Abnormal vaginal bleeding	142 (74.0)
	Vaginal discharge	32 (16.7)
	Pelvic pain	18 (9.4)
Comorbidity	None	130 (67.7)
	Hypertension	28 (14.6)
	Diabetes	16 (8.3)
	Other	18 (9.4)

Table 3. Staging and Type of Carcinoma (N = 192)

Variable	Category	n (%)
FIGO Stage	I	64 (33.3)
	II	88 (45.8)
	III	40 (20.8)
Type of Carcinoma	Squamous Cell	150 (78.1)

	Adenocarcinoma	36 (18.8)
	Others	6 (3.1)

Tumor Characteristics

The majority were diagnosed at FIGO stage II (45.8%), followed by stage I (33.3%) and stage III (20.8%), indicating that most patients presented with early to locally advanced disease. Regarding histopathological type, squamous cell carcinoma was the predominant form (78.1%), while adenocarcinoma accounted for 18.8% and other rare types for 3.1%. (Table 3)

Table 4: Treatment Modalities and Post-treatment Complications (N = 192)

Variable	Category	n (%)
Treatment Received	Surgery alone	72 (37.5)
	CCRT alone	84 (43.8)
	Surgery + Adjuvant CCRT	36 (18.8)
Complications	None	124 (64.6)
	Wound infection	12 (6.3)
	Urinary tract injury	6 (3.1)
	Lymphocele	10 (5.2)
	Radiation proctitis	16 (8.3)
	Radiation cystitis	13 (6.8)
	Hematologic toxicity	11 (5.7)

Treatment and Complications

Regarding treatment modalities, 43.8% of the cervical cancer patients received concurrent chemoradiation therapy (CCRT) alone, 37.5% underwent surgery alone, and 18.8% received surgery followed by adjuvant CCRT, indicating that non-surgical combined therapy was the most commonly applied approach. (Table 4) post-treatment complications were reported in 35.4% of patients, while the majority (64.6%) experienced no adverse effects. Among the reported complications, radiation proctitis (8.3%) and radiation cystitis (6.8%) were the most frequent, followed by hematologic toxicity (5.7%), wound infection (6.3%), lymphocele (5.2%), and urinary tract injury (3.1%). (Table 4) These findings suggest that although most patients tolerated treatment well, radiation-related toxicities remained the most common complications among those receiving CCRT.

Follow-up and Survival Outcomes

Out of 192 cervical cancer patients included in the study, 138 (71.9%) were alive at follow-up, while 54 (28.1%) had died. (FigureI) The highest 5-year overall survival rate was noted in patients who underwent surgery alone (83.3%), followed by those treated with surgery plus adjuvant concurrent chemoradiation therapy (66.7%) and CCRT alone (64.3%). Five-year overall survival was significantly higher in patients treated with surgery alone (83.3%) compared to those receiving CCRT or combined therapy ($p = 0.021$). Similarly, survival rates declined with advancing FIGO stage, from 90.6% in Stage I to 40.0% in Stage III ($p < 0.001$), emphasizing the prognostic value of early-stage detection and timely intervention. (Table 5).

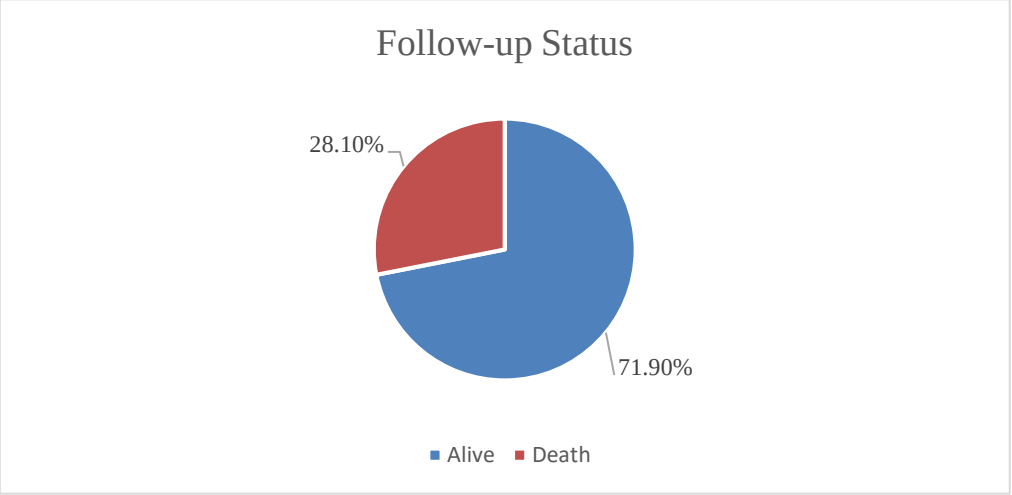

Figure 1: Follow-up Status (N = 192)

Table 5. Association Between Treatment Modality, FIGO Stage, and 5-Year Survival Outcome (N = 192)

Variable	Category	Alive n (%)	Death n (%)	5-year Overall Survival (%)	p-value
Treatment Modality	Surgery alone (n = 72)	60 (83.3)	12 (16.7)	83.3	0.021*
	CCRT alone (n = 84)	54 (64.3)	30 (35.7)	64.3	
	Surgery + Adjuvant CCRT (n = 36)	24 (66.7)	12 (33.3)	66.7	
FIGO Stage	Stage I (n = 64)	58 (90.6)	6 (9.4)	90.6	<0.001*
	Stage II (n = 88)	64 (72.7)	24 (27.3)	72.7	
	Stage III (n = 40)	16 (40.0)	24 (60.0)	40.0	
Total	**(N = 192)**	**138 (71.9)**	**54 (28.1)**	—	—

*p<0.05 statistically significant.

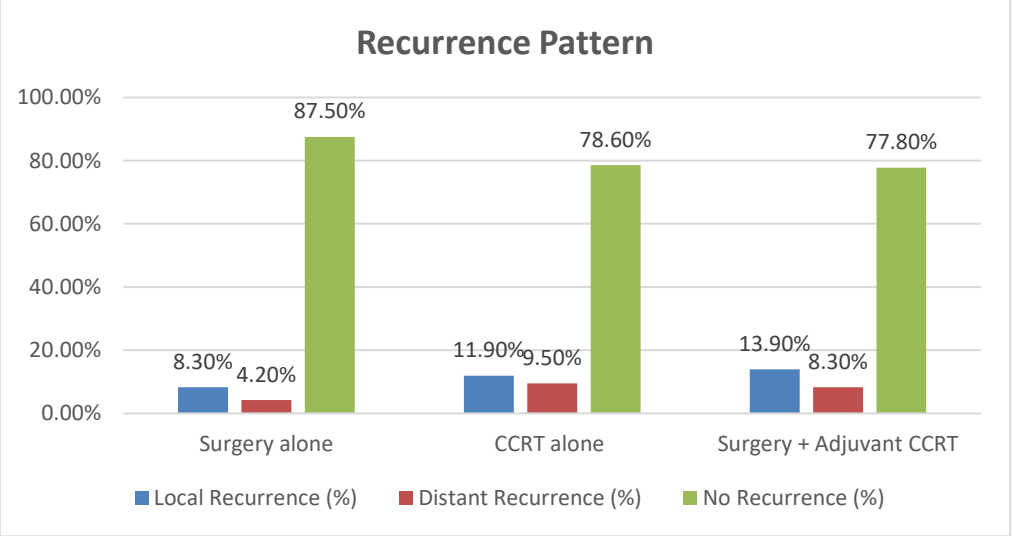

Figure II: Recurrence Pattern by Treatment Type (N = 192)

Recurrence of cervical cancer patients

Figure II shows that the recurrence was more common in patients treated with CCRT or combined modalities, possibly reflecting higher-stage disease in these groups. Among all the patients, 81.8% showed no recurrence during follow-up, while 10.9% experienced local recurrence and 7.3% developed distant recurrence. Recurrence rates varied by treatment modality, with surgery alone showing the lowest recurrence (12.5% combined local and distant), compared to CCRT alone (21.4%) and surgery with adjuvant CCRT (22.2%). The association between treatment type and recurrence pattern was statistically significant (p = 0.042). [Figure II]

Table 6. Factors Associated with Recurrence (Cox Proportional Hazards Model)

Variable	Adjusted Hazard Ratio (HR)	95% CI	p-value
Age ≥ 60 years	1.42	0.83–2.41	0.19
FIGO Stage III (vs I–II)	2.76	1.48–5.13	0.001*
Adenocarcinoma (vs Squamous)	1.98	1.01–3.87	0.047*
Positive Lymph Node	2.54	1.32–4.89	0.005*
Treatment (CCRT vs Surgery)	1.68	0.93–3.02	0.08

*p<0.05 statistically significant.

On Multivariate Analysis using the Cox proportional hazards model, FIGO Stage III, adenocarcinoma histology, and positive lymph node status were significantly associated with higher risk of recurrence (HR 2.76, 1.98, and 2.54 respectively; $p < 0.05$). Age ≥ 60 years and treatment modality (CCRT vs surgery) showed no statistically significant association with recurrence ($p > 0.05$). (Table 6)

DISCUSSION:

This retrospective study evaluated clinical outcomes among cervical cancer patients treated with surgery, concurrent chemoradiation therapy (CCRT) and the findings revealed that treatment modality and disease stage significantly influenced survival and recurrence outcomes, aligning with prior global and regional evidence [14,15].

The majority of patients were diagnosed between the ages of 40 and 59, consistent with the epidemiological trend in low- and middle-income countries where cervical cancer predominantly affects middle-aged women [16,17,18]. The high prevalence of early marriage and multiparity observed in this cohort mirrors established risk factors for cervical carcinogenesis, particularly in South Asian populations [19]. Additionally, low education and socioeconomic disadvantage were common among patients, supporting evidence that limited awareness and screening uptake contribute to delayed diagnosis in developing regions [20].

The predominance of FIGO Stage II disease (45.8%) indicates that most patients presented with locally advanced disease. Similar staging distribution has been reported in Bangladesh and neighboring countries, where barriers to early screening and diagnostic infrastructure often delay presentation [21,22]. Squamous cell carcinoma was the most frequent histologic type (78.1%), followed by adenocarcinoma (18.8%), a pattern consistent with global data [23,24]. However, adenocarcinoma was found to be independently associated with higher recurrence risk (HR 1.98, 95% CI 1.01–3.87), which aligns with studies showing poorer response of glandular lesions to radiotherapy [25].

Regarding treatment, the majority received CCRT alone (43.8%), followed by surgery alone (37.5%) and surgery with adjuvant CCRT (18.8%). This reflects the adoption of global treatment guidelines recommending CCRT as the standard for locally advanced disease [26,27]. The 5-year overall survival rate was highest in the surgery-only group (83.3%), followed by surgery with adjuvant CCRT (66.7%) and CCRT alone (64.3%), demonstrating superior outcomes in operable early-stage disease. Comparable survival differentials were that early-stage surgical management offered a clear prognostic advantage over chemoradiation alone [28].

Disease stage remained a pivotal prognostic determinant. Five-year survival decreased markedly from 90.6% in Stage I to 40.0% in Stage III, reinforcing that early diagnosis significantly enhances long-term outcomes [29]. Similar stage-dependent survival trends were observed in multicenter analyses [30,31]. The high recurrence rate among patients receiving CCRT or combined therapy may reflect more advanced disease burden at baseline. On Multivariate Analysis analysis, FIGO Stage III (HR 2.76) and lymph node positivity (HR 2.54) were strong predictors of recurrence findings corroborated by studies emphasizing nodal metastasis as a key determinant of treatment failure [32].

Radiation-induced toxicities, including proctitis (8.3%) and cystitis (6.8%), were the most common complications, consistent with existing literature (Mabuchi et al., 2018). Despite this, the overall complication rate (35.4%) was relatively low, reflecting improved radiation planning and multidisciplinary supportive care within the military hospital setting.

Collectively, these results highlight that surgical intervention remains superior for early-stage cervical cancer, while CCRT remains vital for locally advanced disease. The findings underscore the importance of early detection through national screening initiatives, timely referral for appropriate therapy, and targeted management of high-risk groups. This study contributes novel institutional evidence from a Bangladeshi tertiary care setting, offering valuable insight into real-world treatment outcomes. However, limitations include its retrospective design, potential information bias, and single-center scope, which may restrict generalizability. Nevertheless, it provides a robust foundation for developing multicentric prospective studies and strengthening national oncology protocols.

Policy Recommendations

To curb the cervical cancer burden, nationwide screening using VIA and HPV testing should be prioritized, particularly among women aged 30–60 years in low-resource settings to ensure early detection and prompt management. Integration of HPV vaccination into the national immunization program remains pivotal for primary prevention and long-term incidence reduction. Institutionalizing multidisciplinary collaboration between gynecologic oncology, radiotherapy, and surgical units can enhance treatment coordination and stage-specific interventions. Furthermore, establishing a comprehensive national cervical cancer registry will strengthen data-driven decision-making by enabling real-time monitoring of disease patterns, recurrence, and survival outcomes.

CONCLUSION:

This study confirms that treatment modality and disease stage critically influence survival and recurrence in cervical cancer. Most patients presented with locally advanced disease, reflecting delayed detection linked to socioeconomic and educational disparities. Adenocarcinoma showed a higher recurrence risk, underscoring the need for histology-specific management. Surgical treatment yielded superior outcomes in early-stage disease, while CCRT remained essential for advanced stages. Despite some radiation-related complications, overall tolerance was favorable. Though limited by its retrospective single-center design, this study provides valuable institutional insight, emphasizing early screening, HPV vaccination, multidisciplinary coordination, and a national cancer registry as key levers to reduce cervical cancer burden in Bangladesh.

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