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Original Research Article

Comparison of outcomes and toxicities of concurrent chemo-radiation with weekly cisplatin versus weekly paclitaxel in locally advanced cervical carcinoma

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ABSTRACT

Background: Cervical cancer remains a leading cause of cancer-related death among women. Concurrent chemoradiation with Cisplatin is the standard treatment for locally advanced disease, though outcomes remain suboptimal. Alternative non-platinum agents like Paclitaxel have been explored to improve efficacy and tolerability.
Methods: This quasi-experimental study was conducted at the Department of Radiotherapy, Rajshahi Medical College Hospital, from January 2022 to June 2023. Seventy patients with locally advanced squamous cell cervical cancer were equally assigned into two groups by purposive sampling. Arm A received weekly cisplatin (40 mg/m²) and Arm B received weekly paclitaxel (50 mg/m²), both with external beam radiotherapy followed by HDR brachytherapy. Patients were evaluated at weeks 4, 8, and 12 post-treatments. Data were analyzed using SPSS version 25.
Results: Of 70 patients, 68 completed treatment. Mean age was 48.46±8.80 years. Most patients were stage IIB (60.3%) and moderately differentiated (63.2%). Complete response was observed in 82.4% (Arm A) and 73.5% (Arm B), while partial response occurred in 14.7% and 20.6%, respectively ($p>0.05$). Hematologic toxicity and gastrointestinal side effects were higher in Arm B, whereas nausea, vomiting, and renal toxicity were more frequent in Arm A; differences were not statistically significant.
Conclusions: Weekly paclitaxel is not inferior to cisplatin in treatment response and may serve as an alternative when cisplatin is contraindicated, considering toxicity and cost.

Keywords: Chemo-radiation, Carcinoma cervix, Cisplatin, Paclitaxel, Toxicity

INTRODUCTION

Cancer is one of the most important emerging global health challenges and remains a leading cause of premature mortality worldwide. According to the World Health Organization, nearly 10 million cancer-related deaths were reported globally in 2020.[1] Among gynecological malignancies, cervical cancer is the most common cancer affecting women in many developing and low-middle-income countries (LMICs). Cervical carcinoma is defined as a malignant neoplasm of the cervix in which abnormal epithelial cells proliferate uncontrollably and form tumors.[2] Histologically, cervical cancer is classified into squamous cell carcinoma and adenocarcinoma, with squamous cell carcinoma accounting for approximately 70% of cases.[3] Globally, cervical cancer ranks as the fourth most common cancer among women.[4] In 2020, an estimated 604,127 new cases and 341,831 deaths were recorded worldwide.[4] The burden of cervical cancer is disproportionately higher in LMICs due to limited access to screening and treatment facilities.[3] In Bangladesh, cervical cancer is the second most common cancer among women, with an estimated 8,268 new cases and 4,971 deaths in 2020 according to GLOBOCAN data.[5] Although

Bangladesh lacks a nationwide population-based cancer registry, hospital-based data from the National Institute of Cancer Research and Hospital (NICRH) indicate that cervical cancer accounts for about one-fifth of female cancers in the country.[6] Between 2014 and 2018, more than 8,000 new cervical cancer cases were diagnosed at NICRH alone, highlighting the substantial disease burden.[6] A study reports that without effective interventions, cervical cancer mortality in LMICs will continue to rise markedly in the coming decades.[7] The incidence and mortality of cervical cancer can be significantly reduced through comprehensive strategies involving prevention, effective screening, early diagnosis, and appropriate treatment. Despite reductions in incidence in high-income countries, cervical cancer continues to be associated with high morbidity and mortality in LMICs .[8]

Alarmingly, nearly 85% of global cervical cancer deaths occur in LMICs, largely due to poor participation in screening programs, which limits early detection of precancerous lesions and early-stage disease.[3-8] Persistent infection with high-risk human papillomavirus (HPV), particularly types 16 and 18, is the most important etiological factor for cervical cancer.[9] Several epidemiological studies have demonstrated that the risk of cervical cancer is influenced by sexual behavior, including early age at first intercourse, multiple sexual partners, sexual behavior of male partners, and prolonged use of oral contraceptives.[10] Additional risk factors include tobacco use, immunosuppression, and HIV infection.[9] The principal treatment modalities for carcinoma of the cervix include surgery, radiotherapy, chemotherapy, or a combination of these approaches.[11]

Treatment selection depends on factors such as FIGO stage, tumor volume, histological subtype, lymph node involvement, age, and performance status of the patient. Radiotherapy plays a critical role, aiming to deliver an optimal dose of ionizing radiation to the tumor while minimizing damage to surrounding normal tissues. Most patients with cervical cancer in LMICs present with locally advanced disease, where radiotherapy forms the backbone of management.[12] According to the FIGO 2018 staging system, locally advanced cervical cancer includes stages IIB to IVA, characterized by parametrial involvement, vaginal extension, pelvic wall invasion, nodal disease, or invasion of adjacent pelvic organs.[12] Concurrent chemoradiation therapy (CCRT) is the standard of care for locally advanced cervical cancer and has been shown to improve local control and disease-free survival compared to radiotherapy alone.[8-11] Cisplatin-based CCRT followed by brachytherapy remains the standard treatment approach; however, cisplatin may not be suitable for all patients due to toxicity. Consequently, alternative chemotherapeutic agents have been explored. Paclitaxel is a cell-cycle-specific agent and a potent radiosensitizer that induces G2/M phase arrest and apoptotic cell death.[12] It has demonstrated favorable activity both as a single agent and in combination with cisplatin concurrent with radiotherapy, showing promising efficacy in locally advanced cervical cancer.[12]

METHODS

This quasi-experimental study was conducted in the Department of Radiotherapy at Rajshahi Medical College Hospital, Rajshahi, Bangladesh, over a study period from January 2022 to June 2023, with patient enrollment occurring between January and December 2022. After obtaining ethical approval from the Institutional Review Board and Ethics Committee of the hospital and written informed consent from participants, 70 patients with histopathologically confirmed locally advanced squamous cell carcinoma of the cervix (FIGO stage IIB–IVA) were recruited using purposive sampling. Patients were assigned to two concurrent chemoradiation arms: Arm A received weekly cisplatin (40 mg/m²), while Arm B received weekly paclitaxel (50 mg/m²), both administered concurrently with external beam radiotherapy (EBRT). EBRT was delivered to the whole pelvis using a Telecobalt-60 unit with conventional two-dimensional planning, to a total dose of 50 Gy in 25 fractions (2 Gy per fraction), five fractions per week over five weeks, followed by high-dose-rate intracavitary brachytherapy using a cobalt-60 after loading system delivering 21 Gy in three fractions to point A.

Chemotherapy was initiated on the first day of radiotherapy and continued weekly for five cycles with standard premedication, hydration, and monitoring. Baseline assessment included clinical evaluation, laboratory investigations, and imaging studies, while patients were monitored weekly during treatment and followed up at 4, 8, and 12 weeks post-treatment. Tumor response was assessed using RECIST criteria, toxicities were graded according to CTCAE version 5.0, and performance status was evaluated using the ECOG scale. Statistical analysis was performed using SPSS version 25.0, with continuous variables analyzed using the unpaired t-test and categorical variables using the chi-square test, and a p-value <0.05 considered statistically significant. Inclusion criteria comprised patients aged 18–65 years with ECOG performance status 0–2 and histopathologically confirmed FIGO stage IIB–IVA squamous cell carcinoma of the cervix, while exclusion criteria included age below 18 or above 65 years, ECOG status 3–4, prior treatment for cervical cancer, significant comorbidities such as severe cardiac disease, uncontrolled diabetes, malignant hypertension or severe renal impairment, and pregnancy or lactation.

RESULTS

Mean age was similar in Arm A (48.15±7.92 years) and Arm B (48.76±9.70 years; p=0.775). Early menarche (<12 years) occurred in 58.8% vs 52.9%, and early marriage (<16 years) in 73.5% vs 76.5% of Arm A and B, respectively. Multiparity (≥4) was observed in 52.9% (Arm A) and 58.8% (Arm B). OCP use >5 years was

reported in 55.9% vs 61.8%, and poor personal hygiene in 58.8% vs 64.7%. Diabetes mellitus was present in 20.6% vs 26.5%. ECOG 0–1 status accounted for 88.3% (Arm A) and 85.3% (Arm B). No baseline variable differed significantly (all p>0.05). FIGO stage IIB was predominant (61.8% in Arm A; 58.8% in Arm B), followed by stage III disease (35.3% vs 38.2%). Moderately differentiated tumors were most frequent (58.8% vs 67.6%). Vaginal discharge (79.4% vs 82.4%) and abnormal P/V bleeding (70.6% vs 73.5%) were the leading symptoms. Parametrial involvement was present in 97.0% of Arm A and 94.1% of Arm B. Distribution of stage, grade, and symptoms showed no significant inter-arm difference (p>0.05).

Table 1: Distribution of the study participants according to baseline demographic and clinical characteristics (n=68).

Characteristic	Arm A-cisplatin (n=34) N (%)	Arm B paclitaxel (n=34) N (%)	P value
Age (years)			
Mean±SD	48.15±7.92	48.76±9.70	0.775
Range	30-62	32-65	
Age of menarche			
Before 12 years	20 (58.8)	18 (52.9)	0.625
After 12 years	14 (41.2)	16 (47.1)	
Age of marriage			
Before 16 years	25 (73.5)	26 (76.5)	0.779
At or after 16 years	9 (26.5)	8 (23.5)	
Parity			
1-3	16 (47.1)	14 (41.2)	
4-7	17 (50.0)	18 (52.9)	0.781
≥8	1 (2.9)	2 (5.9)	
OCP use (>5 years)	19 (55.9)	21 (61.8)	0.622
Poor personal hygiene	20 (58.8)	22 (64.7)	0.618
Co-morbidities			
Diabetes mellitus	7 (20.6)	9 (26.5)	0.567
Hypertension	5 (14.7)	6 (17.6)	0.742
COPD	2 (5.9)	1 (2.9)	0.555
Ischemic heart disease	1 (2.9)	2 (5.9)	0.555
ECOG performance status			
0	11 (32.4)	8 (23.5)	
1	19 (55.9)	21 (61.8)	0.710
2	4 (11.8)	5 (14.7)	

*COPD: Chronic Obstructive Pulmonary Disease; ECOG: Eastern Cooperative Oncology Group; OCP: Oral Contraceptive Pill. *Data presented as N (%) unless otherwise specified, p-values calculated using Chi-square test or independent t-test as appropriate.

Table 2: Distribution of the study participants according to disease characteristics at presentation (n=68).

Characteristic	Arm A-cisplatin (n=34) N (%)	Arm B-paclitaxel (n=34) N (%)	P value
FIGO stage			
IIB	21 (61.8)	20 (58.8)	
IIIA	9 (26.5)	8 (23.5)	0.900
IIIB	3 (8.8)	5 (14.7)	
IVA	1 (2.9)	1 (2.9)	
Histological differentiation			
Well differentiated	9 (26.5)	7 (20.6)	
Moderately differentiated	20 (58.8)	23 (67.6)	0.752
Poorly differentiated	5 (14.7)	4 (11.8)	
Presenting symptoms			
Abnormal vaginal bleeding	24 (70.6)	25 (73.5)	0.787
Vaginal discharge	27 (79.4)	28 (82.4)	0.758
Pelvic discomfort	16 (47.1)	17 (50.0)	0.808

Continued.

Characteristic	Arm A-cisplatin (n=34) N (%)	Arm B-paclitaxel (n=34) N (%)	P value
Symptoms of anemia	22 (64.7)	21 (61.8)	0.801
Anorexia	18 (52.9)	20 (58.8)	0.625
Weight loss	11 (32.4)	9 (26.5)	0.595
Pre-treatment examination			
Cervical growth (P/V)	34 (100)	34 (100)	0.662
Parametrial involvement	33 (97.0)	32 (94.1)	0.349

*Data presented as N (%), p-values calculated using the Chi-square test.

Table 3: Distribution of the study participants according to symptomatic status at baseline and follow-up (n=68).

Symptom and follow-up	Arm-A (n=34) N (%)	Arm-B (n=34) N (%)	P value*
Per vaginal (P/V) bleeding			
Pre-treatment	24 (70.6)	25 (73.5)	0.787
At 1st F/UP	7 (20.6)	8 (23.5)	0.770
At 2nd F/UP	2 (5.9)	3 (8.8)	0.642
Unusual P/V discharge			
Pre-treatment	27 (79.4)	28 (82.4)	0.758
At 1st F/UP	10 (29.4)	12 (35.3)	0.604
At 2nd F/UP	5 (14.7)	8 (23.5)	0.355
At 3rd F/UP	3 (8.8)	5 (14.7)	0.452
Pelvic discomfort			
Pre-treatment	16 (47.1)	17 (50.0)	0.808
At 1st F/UP	5 (14.7)	8 (23.5)	0.355
At 2nd F/UP	3 (8.8)	6 (17.6)	0.283
At 3rd F/UP	2 (5.9)	3 (8.8)	0.642

*Data presented as N (%), p-values calculated using the Chi-square test.

Table 4: Distribution of the study participants according to tumor response at sequential follow-up visits (RECIST) (n=68).

Follow-up	Response	Arm A N (%)	Arm B N (%)	P value
1st (4 weeks)	CR	23 (67.6)	21 (61.8)	0.612
	PR	11 (32.4)	13 (38.2)	
2nd (8 weeks)	CR	26 (76.5)	23 (67.6)	0.417
	PR	8 (23.5)	11 (32.4)	
3rd (12 weeks)	CR	28 (82.4)	25 (73.5)	0.658
	PR	5 (14.7)	7 (20.6)	
	PD	1 (2.9)	2 (5.9)	

Table 5: Distribution of the study participants according to final treatment response and baseline prognostic factors (n=68).

Prognostic factor	Category	Response	Arm A: cisplatin N (%)	Arm B: paclitaxel N (%)	P value
FIGO stage	IIB	CR	20 (95.2)	18 (90.0)	0.520
		PR	1 (4.8)	2 (10.0)	
	IIIA	CR	7 (77.8)	6 (75.0)	0.893
		PR	2 (22.2)	2 (25.0)	
	IIIB	CR	1 (33.3)	1 (20.0)	0.766
		PR	2 (66.)	4 (80.0)	
	IVA	CR	0	0	NS
		PD	1 (100)	1 (100)	
Histological differentiation	Well differentiated	CR	5 (55.6)	1 (14.3)	0.230
		PR	3 (33.3)	4 (57.1)	
		PD	1 (11.1)	2 (28.6)	

Continued.

Prognostic factor	Category	Response	Arm A: cisplatin N (%)	Arm B: paclitaxel N (%)	P value
	Moderately differentiated	CR	19 (95.0)	20 (87.0)	0.365
		PR	1 (5.0)	3 (13.0)	
	Poorly differentiated	CR	4 (80.0)	4 (100)	0.343
		PR	1 (20.0)	0	
ECOG performance status	0	CR	10 (90.9)	8 (100)	0.381
		PR	1 (9.1)	0	
	1	CR	17 (89.5)	17 (81.0)	0.258
		PR	2 (10.5)	4 (19.0)	
	2	CR	1 (25.0)	0	0.232
		PR	3 (75.0)	5 (100)	

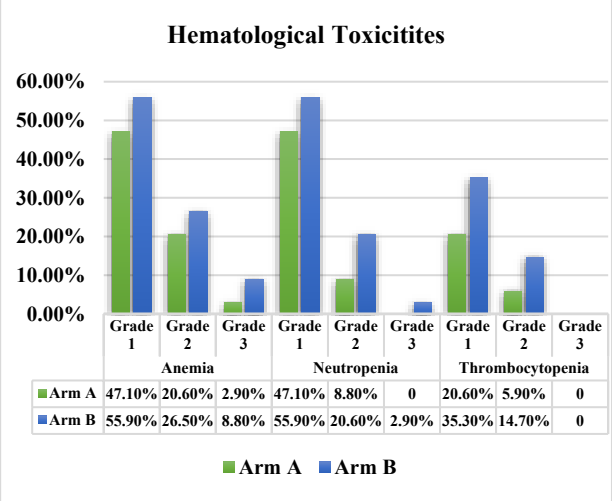

Figure 1: Hematological toxicity assessment during radiotherapy in two arms (n=68).
*p value was determined by Chi-square Test ($\chi 2$).

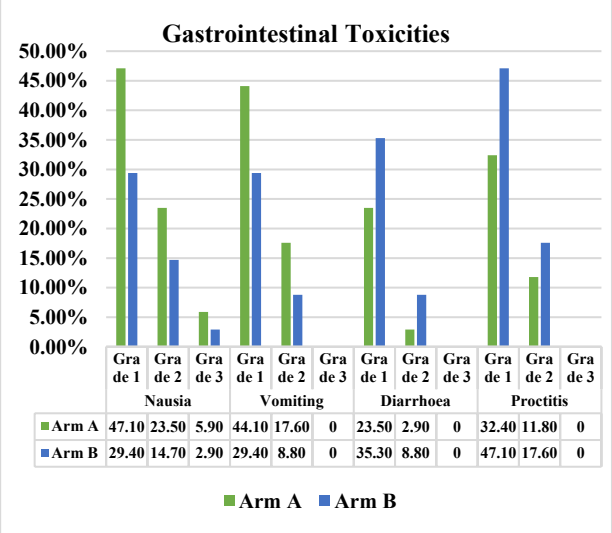

Figure 2: Gastrointestinal toxicity assessment in two arms during and after radiotherapy (n=68).
*p value was determined by Chi-square Test ($\chi 2$).

P/V bleeding reduced from 70.6% to 5.9% in Arm A and from 73.5% to 8.8% in Arm B by second follow-up. Vaginal discharge declined from 79.4% to 8.8% (Arm A) and from 82.4% to 14.7% (Arm B) by third follow-up. Pelvic discomfort decreased from 47.1% to 5.9% in Arm A and from 50.0% to 8.8% in Arm B. Symptom resolution was progressive and comparable between arms at all follow-ups ($p>0.05$).

At 4 weeks, CR was achieved in 67.6% (Arm A) and 61.8% (Arm B). CR rates increased to 76.5% vs 67.6% at 8 weeks and to 82.4% vs 73.5% at 12 weeks. PR at final follow-up was 14.7% (Arm A) and 20.6% (Arm B). PD was observed in 2.9% vs 5.9%, respectively. Response rates did not differ significantly at any time point ($p>0.05$).

In stage IIB disease, CR was achieved in 95.2% (Arm A) and 90.0% (Arm B). CR rates declined in stage III disease and were absent in stage IVA. Moderately differentiated tumors showed high CR rates (95.0% vs 87.0%). Patients with ECOG 0–1 had CR rates exceeding 80% in both arms, while ECOG 2 showed predominantly PR. No prognostic subgroup showed statistically significant inter-arm differences (all $p>0.05$).

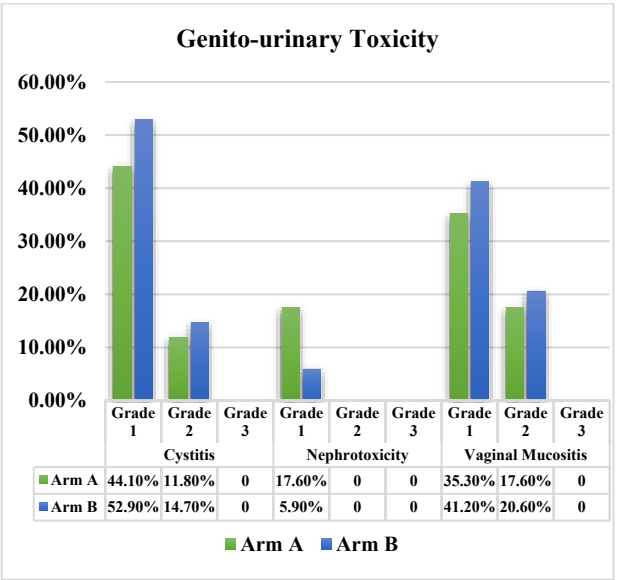

Figure 3: Genito-urinary toxicity assessment between two arms during and after radiotherapy (n=68).
*p value was determined by Chi-square Test ($\chi 2$).

Figure 1 shows, Grade 2 and 3 anemia was higher in arm B compared to arm A. 7 (20.6%) and 9 (26.5%) patients in arm A and B respectively had grade 2 anemia. Grade 3 anemia was 8.8% in arm B compared to 2.9% in arm A. Grade 2 neutropenia was more common in arm B (20.6%) compared to arm A (8.8%). Grade 3 neutropenia was observed only in arm B. In arm A, 20.6% patients and in arm B, 35.3% patients showed grade 1 thrombocytopenia. Acute hematological toxicities were higher in arm B compared to arm A but these differences were not statistically significant ($p>0.05$).

Acute gastrointestinal toxicities observed during and immediately after radiotherapy is shown in figure 2. Grade 2 and 3 nausea was observed more in arm A (23.5% and 5.9%) compared to arm B (14.7% and 2.9%) respectively. Vomiting was observed more in arm A compared to arm B. Grade 2 vomiting was observed in 17.6% patients in arm A compared to 8.8% in arm B. Diarrhoea was observed more in arm B compared to arm A. Grade 2 diarrhoea was observed 2.9% patients in arm A and 8.8% patients in arm B. Proctitis was slightly higher in arm B compared to arm A (11.8% in arm A and 17.6% in arm B). These differences between two arms were not statistically significant ($p>0.05$). Genito-urinary toxicities observed during and after radiotherapy, are shown in figure 3. The grade 2 cystitis was slightly more in arm B compared to arm A (11.8% in arm A and 14.7% in arm B). Renal toxicity was higher in arm A compared to arm B (17.6% patients in arm A and 5.9% patients in arm B). Grade 2 vaginal mucositis was more in arm B compared to arm A (17.6% in arm A and 20.6% in arm B). These differences between two arms were not statistically significant ($p>0.05$).

DISCUSSION

Cervical cancer constitutes a disproportionate public health burden in low- and middle-income countries (LMICs), including Bangladesh, largely because most patients present with locally advanced disease attributable to poor screening coverage and delayed health-seeking behaviour.[12] Based on GLOBOCAN 2022 estimates, an estimated 662,301 new cervical cancer cases and 348,874 deaths occurred globally, with approximately 90% concentrated in LMICs.[1] The present study compared weekly cisplatin-based and weekly paclitaxel-based concurrent chemoradiation therapy (CCRT) in patients with locally advanced squamous cell carcinoma of the cervix (FIGO stage IIB to IVA), followed by high-dose-rate intracavitary brachytherapy. This comparison carries direct clinical relevance: while cisplatin-based CCRT remains the global standard of care, its dose-limiting nephrotoxicity and cumulative haematological effects frequently restrict full delivery, particularly in patients from LMICs where pre-existing renal impairment, hydronephrosis from advanced pelvic disease, and inadequate hydration support are common constraints.[3,13] Identifying a feasible alternative therefore addresses both an oncological question and an equity imperative.

The mean age at presentation was 48.46 years (SD±8.80), consistent with the global pattern of cervical cancer predominantly affecting women in the late fourth to early sixth decade of life in LMICs.[12] Early sexual debut was the most conspicuous predisposing exposure, with approximately 75% of patients having married at or before 16 years of age. This is not merely an epidemiological observation; it has a clear mechanistic basis. The squamocolumnar junction of the adolescent cervix is a zone of active metaplastic transformation that is uniquely vulnerable to oncogenic HPV integration, and early sustained HPV exposure during this developmental window substantially heightens the probability of persistent infection and subsequent carcinogenesis.[9] Furthermore, more than half of our cohort was highly multiparous (four or more children), a well-established co-factor that promotes neoplastic transformation through sustained cervical inflammation, hormonal immunomodulation, and repeated mechanical trauma to the transformation zone.[14] Prolonged oral contraceptive use, documented in over 55% of patients in both arms, represents a further co-factor; exogenous oestrogens may upregulate HPV oncogene expression and impair cervical immune surveillance.[12] The convergence of these socio-demographic and reproductive risk factors in our cohort reflects structural vulnerabilities common to rural Bangladeshi women, reinforcing that cervical cancer in this setting is as much a disease of socioeconomic inequality as it is of infection. These findings are consistent with prior reports in similar South Asian populations.[15,16]

Performance status was satisfactory, with 88% of patients in Arm A and 85% in Arm B maintaining ECOG 0 to 1 at enrolment, enabling full-course CCRT delivery. Good performance status is not merely an eligibility criterion; it is a predictor of tolerance to concurrent chemotherapy and an independent prognostic factor for treatment response.[17] The predominance of FIGO stage IIB disease (approximately 60% in both arms) reflects the absence of organized population-level cervical screening in Bangladesh, and is in keeping with hospital-based data from other South Asian LMICs where most patients arrive with parametrial involvement.[15-18] Histopathologically, all cases were squamous cell carcinoma with predominantly moderate differentiation, consistent with the known epidemiology of HPV-associated cervical cancer globally.[10] This histological homogeneity strengthens the internal validity of our comparison between the two chemotherapy arms.

Symptomatic response was clinically meaningful and comparable across arms. Vaginal discharge was the most prevalent presenting symptom (80.9%), followed by abnormal per-vaginal bleeding, pelvic discomfort, and constitutional symptoms. The rapid and progressive resolution of these symptoms across three follow-up assessments in both arms suggests that CCRT, irrespective of the concurrent chemotherapy agent, achieves effective locoregional tumour debulking. This parallel symptomatic trajectory indicates that both cisplatin and paclitaxel exert

equivalent sensitizing effects on tumour vasculature and stroma in response to radiation, a finding that is mechanistically coherent given their distinct but complementary cytotoxic pathways.

At the primary endpoint of 12-week post-treatment evaluation, complete radiological response was achieved in 82.4% of patients in Arm A (cisplatin) and 73.5% in Arm B (paclitaxel), with partial response in 14.7% and 20.6% of patients respectively. While the numerical difference favoured cisplatin, it was not statistically significant ($p>0.05$), supporting a conclusion of non-inferiority for paclitaxel.[11-16] These response rates align closely with those of Das et al (83.3% and 73.3% for cisplatin and paclitaxel respectively) and are superior to those reported by Maurya et al (66.7% and 50% respectively), likely reflecting the higher biologically effective doses achieved through our HDR cobalt-60 brachytherapy protocol.[11,16] This interpretation is consistent with recent evidence confirming that optimized brachytherapy dosimetry is an independent determinant of local control in locally advanced cervical cancer.[19] From a mechanistic standpoint, the relative non-inferiority of paclitaxel warrants critical reflection. Paclitaxel induces G2/M phase cell cycle arrest, a radiosensitive phase, through microtubule stabilisation.

However, this radiosensitisation effect may be modest at conventional fraction sizes in cervical cancer cell lines, implying that paclitaxel's clinical efficacy in our study is likely mediated substantially through direct cytotoxicity rather than pure radiosensitisation alone. This distinction is clinically meaningful because it suggests that the timing and scheduling of paclitaxel relative to each radiation fraction may be an important variable requiring further prospective investigation.

Stage-wise response analysis demonstrated the expected inverse relationship between disease stage and treatment response: stage IIB achieved complete response in 95.2% (Arm A) and 90.0% (Arm B), while stage IIIB showed predominantly partial response and stage IVA yielded no complete responders. This progressive attenuation reflects the larger tumour volumes, greater hypoxia, and more extensive parametrial infiltration characteristic of higher-stage disease. Notably, even at stage IIB, both agents achieved near-complete tumour eradication, strengthening the argument for paclitaxel as a viable alternative in earlier locally advanced disease.

Consistent with this, a 2025 resource-limited setting study demonstrated that CCRT delivered without image guidance achieved 5-year disease-free survival approaching 89% in stage IB3 to IIA2 squamous cell carcinoma, suggesting that well-executed conventional CCRT in South Asian tertiary centers can deliver competitive oncological outcomes.[20] ECOG performance status also correlated with response: PS 0 to 1 patients achieved complete response rates exceeding 80% in both arms, while PS 2 patients predominantly showed partial response, confirming that functional status meaningfully influences the radiosensitisation achievable by concurrent chemotherapy.[21]

Toxicity profiling revealed a clinically important differential pattern. Cisplatin (Arm A) was associated with higher rates of nausea, vomiting, and renal toxicity, while paclitaxel (Arm B) produced greater haematological suppression, including higher-grade anaemia (grade 3 anaemia 8.8% vs 2.9%), neutropenia (grade 2 neutropenia 20.6% vs 8.8%), thrombocytopenia, and more frequent diarrhoea and proctitis. The renal toxicity differential deserves particular mechanistic emphasis: cisplatin accumulates preferentially in renal proximal tubular cells via organic cation transporter 2 (OCT2), inducing direct tubular injury, mitochondrial dysfunction, and inflammatory nephropathy.[22] Acute kidney injury occurs in 20 to 30% of patients receiving cisplatin-based regimens, and in the context of locally advanced pelvic disease, where obstructive hydronephrosis may already compromise baseline renal function, even a single dose reduction or omission of cisplatin can meaningfully compromise tumour radiosensitisation.[22] In this clinical reality, paclitaxel's favourable nephrotoxicity profile represents a genuine therapeutic advantage.

The higher haematological toxicity in Arm B likely reflects paclitaxel's dose-dependent myelosuppressive effect, which, while not reaching Grade 3 to 4 severity in the majority of patients, represents a practical monitoring consideration in resource-limited settings. Notably, a 2023 comparative study using propensity-score matching confirmed that non-platinum CCRT alternatives maintain equivalent disease control to cisplatin in locally advanced cervical cancer while offering a distinct toxicity profile, consistent with our own findings.[23] No treatment-related mortality occurred in either arm, an important safety affirmation in a setting where intensive supportive care may not always be available. All inter-arm toxicity differences were non-significant ($p>0.05$), further validating paclitaxel as a safe alternative.

Taken together, our findings support the position that weekly paclitaxel at 50 mg/m² is a clinically non-inferior, toxicity-differentiated alternative to weekly cisplatin at 40 mg/m² for CCRT in locally advanced squamous cell carcinoma of the cervix. The practical implications for Bangladesh are significant: in patients with pre-existing renal insufficiency, hydronephrosis, hypertension, or diabetes mellitus, where cisplatin carries heightened nephrotoxic risk, paclitaxel offers a viable pathway to full-course CCRT delivery without compromising oncological efficacy.

Future prospective randomized trials with larger sample sizes and extended follow-up to evaluate overall survival and progression-free survival are necessary to consolidate this evidence. Integration of HPV genotyping, molecular biomarkers of radiosensitivity, and image-guided adaptive brachytherapy into future protocols will further refine

patient selection and optimize therapeutic outcomes in this high-burden population.[24]

Limitations

The study had limitations including non-randomized sampling with possible selection bias, a small sample size affecting outcome accuracy, and inability to assess HPV association due to limited testing facilities.

CONCLUSION

Concurrent chemoradiation with weekly paclitaxel was noninferior to weekly cisplatin in terms of treatment response. It can be used as an alternative in the treatment of locally advanced cervical carcinoma when cisplatin is contraindicated.

Recommendations

Based on the findings of this study, further multicenter research with a larger sample size is recommended to improve the generalizability of the results. Long-term follow-up studies should also be conducted to evaluate overall survival, progression-free survival, and late treatment-related toxicities. In addition, future studies should consider the inclusion of HPV-positive cases to better understand disease behavior and treatment outcomes in this subgroup.

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