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Original Research Article

Effectiveness and Safety Profile of Cisplatin Versus Nab-Paclitaxel Concomitant Chemoradiotherapy in Postoperative Early-Stage Cancer of Cervix

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Abstract: *Cervical cancer is a prevalent gynecologic malignancy with significant morbidity and mortality. Concomitant chemoradiotherapy remains the cornerstone of treatment for locally advanced stages. Cisplatin is the standard radiosensitizer, but alternative agents such as nab-paclitaxel may offer comparable efficacy with fewer side effects.* ***Objective:*** *To compare the effectiveness and safety profile of concomitant cisplatin versus nab-paclitaxel chemotherapy in patients with locally advanced cervical cancer.* ***Methods:*** *A retrospective study was conducted at the Oncology Department, Nishtar Hospital, Multan, from March 2023 to March 2025. A total of 100 women with stage I or II cervical cancer who had undergone radical pelvic surgery were included. All patients received adjuvant chemoradiotherapy 4–6 weeks postoperatively. External beam radiotherapy was administered at doses of 45–58.8 Gy over 5–5.6 weeks (1.8–2.1 Gy per fraction, five days per week). Patients were divided into two groups: Group A (n=50): Received cisplatin (40 mg/m² IV weekly). Group B (n=50): Received nab-paclitaxel (100 mg IV weekly). Overall survival (OS), progression-free survival (PFS), and treatment-related adverse effects were assessed. Statistical analysis was performed using hazard ratios (HR) with 95% confidence intervals (CI) and p-values, with significance set at <0.05.* ***Results:*** *Both treatment groups demonstrated comparable outcomes in terms of OS (HR: 0.89; 95% CI: 0.061–14.10; p=0.85) and PFS (HR: 0.98; 95% CI: 0.11–15.53; p=1.0). The 2-year OS was 98% in the cisplatin group and 97% in the nab-paclitaxel group. PFS at 2 years was 98% for both groups. Hematological toxicity and gastrointestinal side effects were significantly higher in the cisplatin group (p<0.05), whereas alopecia was more prevalent in the nab-paclitaxel group. No treatment-related mortality was observed.* ***Conclusion:*** *Nab-paclitaxel combined with radiotherapy is a viable and effective alternative to cisplatin in the management of early-stage cervical cancer. It offers comparable survival outcomes with a more favorable safety profile, particularly concerning hematologic and gastrointestinal toxicity.*

Keywords: Carcinoma, Cancer, Chemotherapy, Radiotherapy

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Introduction

Cancer of cervix is the 4thmost commonly occurring cancer in women globally, especially in South-East Asian, Central American and Sub-Saharan African region (1). Surgery is the primary treatment for stage 1 and 2 cervical cancers. In addition to surgery, concomitant treatment with radiotherapy and adjuvant cisplatin or cisplatin alone chemotherapy reduces the risk of recurrence and ensure complete remission (2). This treatment is recommended in patients at high risk with parametrial invasion, positive vaginal resection margin and lymphatic metastasis.

For patients with moderate risk factors like a tumor larger than 4 cm, deep tumor penetration into the cervical stroma or lympho-vascular space invasion, combined treatment with radiotherapy and platinum chemotherapy is recommended by National Comprehensive Cancer Network (3). Cisplatin has been the first choice as chemotherapy agent in treating patients with cervical cancer (4). However, it can induce severe, intolerable adverse effects such as nephrotoxicity and gastrointestinal distress (5). Hence, it is important to try other safer alternatives.

A novel drug known as Nab-paclitaxel which is formed by combination of paclitaxel and albumin has shown effective results in locally advanced cervical cancer with lower recurrence rates (6, 7). However, there is scarce data regarding concurrent treatment of nab-paclitaxel in locally advanced carcinoma of cervix.

This study was conducted to compare the effectiveness and safety profile of concomitant cisplatin vs nab-paclitaxel chemotherapy in women with locally advanced cervical cancer.

Methodology

A retrospective analysis of cervical cancer patients was conducted in the Oncology Department of Nishtar Hospital, Multan from March 2023 to March 2025. Hundred womenwith stage 1 or 2 cervix cancer were included in the study after radical pelvic surgery. Patients who experienced severe adverse effects, failure to comply and those with progressive disease were excluded. All participants of the study consented to the treatment and inclusion in the research. The ethical board of hospital approved the study.

All patients were evaluated before treatment by taking the medical history and performing routine blood work and biochemical lab testing. Patients' abdomen and pelvic region was examined and radiological tests including MRI and abdominal and thoracic CT scan was performed.All patients received radiotherapy and chemotherapy 1-1.5 months postoperatively. Radiotherapy treatment of 45-58.8 Gray doses was given over 5-5.6 weeks with 1.8-2.1 Gray per session, five days a week by pelvic external beam. Patients were divided into two groups based on chemotherapy received; Group A included 50 patients who received 40 mg/m^2 cisplatin and Group B included 50 patients who received IV 100 mg nab-paclitaxel. Chemotherapy was given for a maximum of 6 doses every week in concurrence with radiotherapy. Nab-paclitaxel was given over 30 minutes during which blood pressure, respiration rate and heart rate were recorded by cardiac monitor after every 15 minutes. Treatment was discontinued in case of severe adverse effects or refusal to continue. Blood count was recorded twice weekly before and after chemotherapy. In addition,

hepatic and renal functionality was also checked after every two weeks. Side effects of treatment including neurotoxicity, baldness and gastrointestinal toxicity were noted.

Treatment effectiveness was assessed after every 3 months for the course of study along with pelvic exam, radiological imaging and serum tumor markers. The primary outcome was treatment associated reactions and secondary outcomes were overall survival and progression free survival at the end of study.

Data analysis was performed by SPSS version 22. Chi-squared test and Fisher's exact test was used to assess categorical parameters and Mann-Whitney U test was performed to assess continuous parameters. Adverse effects between groups were compared by Chi-square test. Kaplan-Meier method was used to estimate survival which was evaluated by log-rank test. A p value of less than 0.05 was taken significant.

Results

Table I shows tumor characteristics and treatment details between both groups. There was no significant difference between demographic and clinical parameters. However, the average chemotherapy cycles were more in nab-paclitaxel group than in cisplatin group (5 vs 4.4, p=0.001). The both treatment groups did not differ for overall survival (HR: 0.89, 95% CI: 0.061-14.10, p= 0.85) and progression-free survival (HR: 0.98, 95% CI: 0.11-15.53, p= 1.0). One patient died in each group. The 2-year OS was 97% in Group B and 98% in Group A and progression-free survival was 98% in both groups.

None of the patients in our experienced grade 4 toxicities. Hematological adverse effects were more frequent in cisplatin patients as compared to nab-paclitaxel patients (p<0.05). 23 (46%) patients in Group A and 11 (22%) patients in Group Bhad a grade 3 leukopenia (p=0.028). The difference in incidence of neutropenia was also significant between groups (p=0.017). Low grade thrombocytopenia was more frequent in cisplatin group (38% vs 16%, p=0.020). Gastrointestinal side effects were significantly more frequent in cisplatin group (p<0.05). Similarly, hair loss was highly incident in nab-paclitaxel group as compared to cisplatin group. No deaths occurred due to treatment related causes. The overall overview of adverse effects is shown in Table 2.

Table 1: Patients' Tumor Characteristics and Treatment Details of Study Groups

	Group A (n=50)	Group B (n=50)	P value
Median age	49 (28-72)	51 (23-65)	0.181
Tumor type			
Squamous cell carcinoma	43 (86%)	43 (86%)	0.92
Adenocarcinoma	4 (8%)	5 (10%)	
Adenosquamous carcinoma	3 (6%)	2 (4%)	
Tumor staging			
IB1	3 (6%)	6 (12%)	0.497
IB2	18 (32%)	16 (32%)	
IB3	11 (22%)	5 (10%)	
IIA1	8 (16%)	5 (10%)	
IIA2	10 (20%)	18 (36%)	
Chemotherapy cycles			
3	5 (10%)	2 (4%)	0.001*
4	12 (24%)	11 (22%)	
5	30 (60%)	25 (50%)	
6	3 (6%)	12 (24%)	
Chemotherapy dose			
45 Gy/ 25 Fx	26 (52%)	15 (30%)	0.229
50.4 Gy/28 Fx	15 (30%)	16 (32%)	
58.8 Gy/28 Fx	14 (28%)	19 (38%)	

Table 2: Comparison of Treatment Adverse Effects

Adverse effects	Group A			Group B			P value
	Grade 1	Grade 2	Grade 3	Grade 1	Grade 2	Grade 3	
Leukopenia	6 (12%)	22 (44%)	23 (46%)	18 (36%)	22 (44%)	11 (22%)	0.028*
Neutropenia	12 (26%)	18 (36%)	13 (26%)	16 (32%)	19 (38%)	7 (14%)	0.017*
Anemia	30 (60%)	13 (26%)	3 (6%)	23 (46%)	9 (18%)	-	0.393
Thrombocytopenia	12 (24%)	8 (16%)	-	4 (8%)	4 (8%)	3 (6%)	0.020*
Vomiting	12 (24%)	10 (20%)	2 (4%)	7 (14%)	3 (6%)	-	0.036*
Nausea	13 (26%)	10 (20%)	3 (6%)	9 (18%)	4 (8%)	-	0.040*
Anorexia	15 (30%)	10 (20%)	4 (8%)	9 (18%)	3 (6%)	2 (4%)	0.042*
Diarrhea	8 (16%)	4 (8%)	-	9 (18%)	3 (6%)	-	0.881
Constipation	7 (14%)	4 (8%)	-	6 (12%)	4 (8%)	-	0.947
Urocystitis	4 (8%)	-	-	6 (12%)	-	-	0.486
Weight loss	12 (24%)	3 (6%)	-	11 (22%)	3 (6%)	-	0.792
Fatigue	9 (18%)	5 (10%)	-	7 (14%)	3 (6%)	-	0.550
Hepatotoxic event	5 (10%)	-	-	3 (6%)	-	-	0.395
Baldness	3 (6%)	4 (8%)	-	6 (12%)	18 (36%)		0.001*

Discussion

The results of our study showed excellent overall (97% vs 98%) and progression-free survival rates (98%) in women with early-stage cervical cancer treated with concomitant radiochemotherapy with cisplatin and nab-paclitaxel, respectively. These results are significantly better than previous studies where a lower 2-year survival rates have been reported in women with squamous cell carcinoma of cervix (8, 9). This may be because the patient compliance in our study was satisfactory and patients mostly received 4-6 cycles of chemotherapy. The use of advanced radiotherapy has also influenced the outcome.

The hematological adverse effects including leukopenia (p=0.028), thrombocytopenia (p=0.020) and neutropenia (p=0.017) and gastrointestinal reactions were more severein patients treated with cisplatin.These results are similar to previous studies (10,11). Although the reactions were milder in nab-paclitaxel group, they had the same effect, hence, it can the recommended agent for concurrent therapies in advanced stages patients. According to NCCN guidelines for metastatic breast cancer, the recommended dose of nab-paclitaxel is 100-150 mg once a week. Han et al administered a 60 mg/m^2 weekly dose concurrent with IMRT in patients with head and neck carcinoma (12). Similarly, Jiang et al a weekly nab-paclitaxel dose of 50 mg current with 40 mg cisplatin in cervical cancer patients along radiotherapy (13).

In the present study, we gave 100 mg nab-paclitaxel over a surface area of 1.45-1.8 m^2 which can equate to 50-70 mg/m^2, similar to previous studies. Nab-paclitaxel is also FDA approved for metastatic pancreatic adenocarcinoma, recurrent metastatic breast cancer and lung cancer (14, 15). It has been reported to perform better in squamous cell carcinoma due to its antiangiogenic properties (16). Majority of the patients in our study (n=86) showed a pathologic pattern of squamous cell carcinoma which is why the results are better than previous studies.

Our study has some limitations. We had a short follow-up time after treatment completion, which prevented us from recording recurrence rates. A smaller sample size also limited the results.

Conclusion

Nab-paclitaxel combined with chemoradiotherapy can be successful alternative to cisplatin chemotherapy with lesser frequency of adverse effects and better survival rates in patients with early-stage cervical cancer.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-NHMM-64-23)

Consent for publication

Approved

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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

AB (SR),
Manuscript drafting, Study Design,
MJH (SR)
Review of Literature, Data entry, Data analysis, and drafting article.
AS
Conception of Study, Development of Research Methodology Design, All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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