



Impact of Hydroureteronephrosis on Prognosis of Stage IIIB Cervical Cancer

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Authors' contributions

This work was carried out in collaboration among all authors. Author DB designed the study and described the methodology. Author RJ wrote the protocol and the first draft of the manuscript. Author SP performed the statistical analysis. Authors UB and DB managed the analysis of the study. Author MN managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Cervical Cancer is the second most common cancer among women in India. Majority of the patients are diagnosed in an advanced stage. Stage IIIB Cervical cancer include those with pelvic side wall involvement or hydronephrosis. Presence of hydronephrosis negatively affects the prognosis. There are no guidelines for management of hydronephrosis in patients with cervical cancer also, there is no evidence that urinary diversion procedure improves survival.

Methodology: A retrospective analysis of all patients with Cervical cancer Stage IIIB (The International Federation of Gynecology and Obstetrics 2014 staging) between 1st January, 2015 to 31st January, 2015 presenting to the outpatient department of Dr. Bhubaneshwar Borooah Cancer Institute (BBCI), Guwahati was done. Eligible patients were divided into two groups, the study group was patients with hydronephrosis, and the control group patients were without hydronephrosis. Both the groups were compared based on demographic profile, cancer cell type, treatment duration, radiotherapy dose, chemotherapy, residual disease after 6weeks, 5-year overall survival.

Results: Total number of patients with Cervical Cancer Stage IIIB included in the study was 87, out of which 20 patients had Hydronephrosis (study group) and 67 patients without hydronephrosis

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(control group). The Mean age of patients in the study group was 53 years(44- 62) and in the control group was 51years(41-61). Among patients with hydronephrosis, 55% underwent urinary diversion procedures. The mean 5-year overall survival is 28.4 months (Median – 19.3months) in patients with hydronephrosis and 55.4 (Median-66.5 months) in patients without hydronephrosis (P= 0.001).

Discussion: The presence of hydronephrosis in patients with Cervical cancer is a predictor of poor outcome. Thus, special mention in staging should be considered about the presence of hydronephrosis. The management should be done by a multi-disciplinary team and patient counseling should be done thoroughly.

Keywords: Hydroureteronephrosis; hydronephrosis; cervical cancer; stage IIIB; overall survival.

ABBREVIATIONS

HDN : Hydronephrosis/Hydroureteronephrosis
ECOG : Eastern Cooperative Oncology Group
FIGO : The International Federation of Gynecology and Obstetrics
HR : Hazard Ratio

1. INTRODUCTION

Cervical cancer is the fourth most common and fourth leading cause of cancer death among women in the world [1]. India contributes to 1/5th worldwide cases of cervical cancer. As reported by ICMR- NCDIR (Indian Council of Medical Research - National Centre for Disease Informatics and Research, 2021), Cervical cancer is second leading site among women of North-East India with Age-adjusted incidence rates (AAR) of 12.2 per 100,000 population. Only one-fourth of the cases are diagnosed at localized stage, approximately 63.5% of women are diagnosed with distant metastasis [2]. Cervical Cancer Stage IIIB (The International Federation of Gynecology and Obstetrics 2014 staging) is defined as extension to the pelvic wall and/or hydronephrosis or nonfunctioning kidney (unless known to be due to another cause) and the recommended management option is Concurrent Chemo-radiation (CCRT) [3]. The survival of such patients is poor due to advanced stage, interruption of chemotherapy due to deranged kidney functions, poor performance status. However, whether the correction of kidney parameters result in improved outcome is yet to be known. This is the first study done in North-East India to study the impact of hydroureteronephrosis/ hydronephrosis (HDN) on prognosis of Stage IIIB Cervical Cancer.

2. MATERIALS AND METHODS

A retrospective analysis of patients diagnosed with Stage IIIB Cervical Cancer (FIGO 2014)

from 1st January, 2015 to 31st December, 2015 was done. Patients with congenital anomalies of renal system, renal/ureteric calculus, pelvic surgery, recurrence or relapse of carcinoma cervix were excluded from the study. The eligible patients were divided in two groups based on absence or presence of HDN. After initial workup, treatment modality was decided in multi-disciplinary tumor board. Urinary diversion procedure, namely Double J (DJ) stenting, percutaneous nephrostomy was done in patients with HDN prior to commencement of treatment. Curative treatment was given with External-Beam Radiotherapy of 2.5 Gy/day, 5 days a week in 25 fraction with concurrent weekly chemotherapy (Cisplatin/Carboplatin) followed by vaginal brachytherapy 6.5-7Gy/week in 3-4 fractions. Palliative radiotherapy was given as 3Gy/day in 10 fractions and palliative chemotherapy consisted 3-weekly Carboplatin and Paclitaxel for 6 cycles. Patients were followed up after 6weeks, 1-year, 5-year of completion of treatment. Both the groups were compared based on demographic profile, cancer cell type, treatment duration, radiotherapy dose, chemotherapy, residual disease after 6weeks, 5-year overall survival. Overall Survival was calculated from the day of presentation till last follow-up or death. Overall survival rates were calculated using Kaplan Meier plots of time. Cox regression model was used to estimate hazard ratio (HR), along with a 95% profile-likelihood confidence interval (CI). P value < 0.05 was considered statistically significant.

3. RESULTS

Total number of patients with Stage IIIB Cervical Cancer in the study period 199. Number of patients eligible for analysis were 87, out of which 20 patients had Hydronephrosis (study group) and 67 patients without hydronephrosis (control group).

3.1 Patient Characteristics

The Mean age of patients in study group was 53 years (44- 62) and in control group was 51years (41-61). More than 2/3rd of the patients belonged to ECOG (Eastern Cooperative Oncology Group Performance Status) 1 on presentation.

Table 1 represents the presenting complaints of women in both the groups. Majority of the women presented with post-menopausal bleeding as the chief complaint 90% in study group and 74.6% in control group.

In the study group, 4 (20%) patients had chronic pelvic pain and 1(5%) patient had swelling of lower limbs. The most common histological type was Squamous cell carcinoma (Non-keratinizing Large Cell) in both the groups (85% in study group, 67.2% in control group). The patients with hydronephrosis had significantly more anemia, higher levels of pre-treatment urea and creatinine as compared to those without hydronephrosis.

Among 20 women with hydronephrosis, 12 (60%) had mild, 7 (35%) had moderate and 1(5%) had severe degree of hydronephrosis. 14 (70%) women had unilateral and 6 (30%) had bilateral hydronephrosis. Urinary diversion procedure was done prior to commencement of treatment in 55% cases of study group, either Double J (DJ)

stenting (45%) or per-cutaneous nephrostomy (PCN) (10%). However, 45% of women with hydronephrosis did not undergo any intervention.

3.2 Treatment Characteristics

The treatment characteristics of both the groups is tabulated in Table 2. All patients in the control group received radical treatment whereas in study group 75% patients were given radical treatment. Mean treatment duration from start of external radiation to completion of brachytherapy was 8.2±4.2 weeks (range 1.8-17weeks) in study group and 9.9±2.9 weeks (range 6.8-19.5 weeks) in control group (*P* =0.04). Mean radiotherapy dose to the pelvis was 57.6±19.74 Gy and 72.35±2.52 Gy in study group and control group respectively (*P*=0.05).

4. OUTCOME

The response to treatment at 6weeks in both group of patients is tabulated in Table 3. Among study group patients, 75% patients had residual disease after 6weeks on the contrary only 24% patients in control group had residual disease after 6weeks. The risk of death is 6.5 times more if there is presence of residual disease after 6weeks of completion of definitive therapy (HR- 6.527, 95% CI 3.348-12.727, *P* =0.001).

Table 1. Frequency and percentage of patient’s presenting symptoms

Presenting symptoms	Study group (with HDN) Number (%)	Control group (without HDN) Number (%)
Bleeding		
Post-menopausal bleeding	18(90)	50(74.6)
Heavy menstrual bleeding	2 (10)	9 (23.4)
Post-coital bleeding	0 (0)	1 (1.5)
White discharge per-vagina	0(0)	7(10.4)
Chronic pelvic pain	4(20)	0(0)
Swelling of lower limbs	1(5)	0(0)

Table 2. Treatment characteristics of patients

Treatment characteristics	Study group (with HDN) Number (%)	Control Group (without HDN) Number (%)	<i>P</i> value
Treatment intent (Radical)	15 (75)	67 (100)	-
Treatment intent (Palliative)	5 (25)	0 (0)	-
Concurrent Chemotherapy			-
- Nil	6 (30)	0 (0)	
- Cisplatin	5(25)	27 (40)	
- Carboplatin	9 (45)	40 (60)	
Mean total radiotherapy dose to pelvis (Gy)	57.6±19.74	72.35±2.52	0.05
Mean treatment duration (weeks)	8.2±4.2 (Range 1.8-17)	9.9±2.9 (Range:6.8-19.5)	0.04

Table 3. Response to treatment after 6weeks

Response to treatment (after 6 weeks)	Study group (with HDN) Number (%)	Control Group (without HDN) Number (%)	P value
Complete	5 (25)	51 (76.1)	0.0001
Residual disease present	15 (75)	16 (23.9)	

The mean 5-year overall survival is 28.4 months (Median – 19.3months) in patients with hydronephrosis and 55.4 (Median-66.5 months) in patients without hydronephrosis. The 5-year OS is significantly worse in patients with hydronephrosis ($P = 0.001$). Graph 1 shows Kaplan Meier survival curve of study and control group.

The survival of patients at 1 years, 3year, 5years, as shown in Table 4 is significantly decreased in women with hydronephrosis (72.6%, 33.5%, 25% respectively) as compared to those without hydronephrosis (94%, 77.6%, 62.7% respectively) ($P=0.001$). There is dramatic rise in death among patients with hydronephrosis at the end of 3years of treatment (33.5 %).

4.1 Predictors of Outcome in Study Group

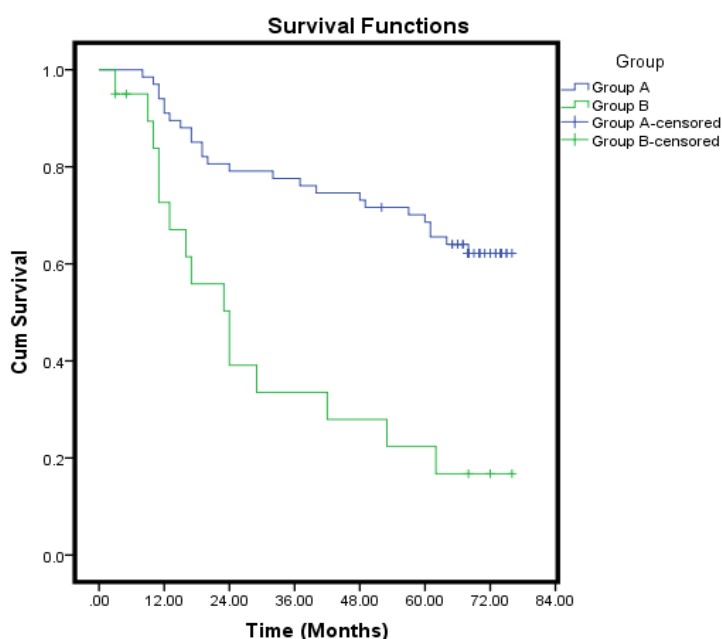
On multivariate analysis, the predictors of poor outcome in patients with hydronephrosis, as shown in Table 5, were bilateral hydronephrosis, para-aortic nodal involvement, residual disease

after treatment. Treatment of hydronephrosis does not improve the outcome of patients.

5. DISCUSSION

The survival of patients with Stage IIIB cervical cancer as demonstrated by various studies is dismal. Our study further consolidates this observation. The effect of age on survival of patients with hydronephrosis was documented by N. B. Elizabeth et al. [4]. The 5-year overall survival was significantly poor in patients > 50years of age as compared to those ≤50years. In our study no association was found between age and overall survival of women with hydronephrosis.

The morbidity associated with hydronephrosis among 20 patients in our study was reported in the form of chronic pelvic pain in 4 (20%) patients and swelling of lower limbs in 1(5%) patient. K Patel et al. reported hydronephrosis-related morbidity such as pain, urinary tract infections, nausea and vomiting, renal failure, and urinary tract bleeding [5].



Graph 1. Overall Survival (5years)

Table 4. Survival percentage of both groups

Survival percentage	1 year	3 years	5 years	P value
Study Group (%)	72.6	33.5	25	0.001
Control Group (%)	94	77.6	62.7	

Table 5. Predictors of outcome in patients with hydronephrosis

Variable	Hazard Ratio	95% Confidence Interval		P value
		Lower limit	Upper limit	
Age (<50years/>50years)	0.5	0.1	1.4	0.21
Pelvic lymph nodes	1.5	0.7	3.1	0.23
Para-aortic lymph nodes	3.1	1.1	9.0	0.03
Urinary diversion procedure	1.0	0.3	2.9	0.92
Residual disease after treatment (6weeks)	6.5	3.3	12.7	<0.001
Hydronephrosis	3.7	1.9	7.2	<0.0001
Unilateral	3.0	1.4	6.3	0.003
Bilateral	8.1	2.9	22.3	<0.001

The prognosis of patients with bilateral hydronephrosis was worse as compared to those with unilateral hydronephrosis in our study. The difference in survival was not seen studies by Goklu et al. [6] and Rose et al. [7]. However, analysis by T. S. Pradhan et al. showed significant difference in survival of patients with bilateral and unilateral hydronephrosis [8]. Thus, authors recommended to mention symmetry of hydronephrosis in staging.

The management of patients with hydronephrosis is challenging because of several factors such as lack of guidelines, no consensus among experts that relief of obstruction improves the prognosis, no recommended procedure of choice for urinary diversion, dilemma among treating physicians regarding offering radical treatment to all patients after diversion procedure or focusing on palliative treatment for all. In our study, at the end of 5 years, 20.2% of patients with intervention and 25% patients without intervention were alive. Thus, the overall survival is not statistically different with or without urinary diversion procedure. Lapitan MC et al. reported that urinary diversion procedure improved short-term survival markedly (at 6 months) without compromising the quality of life however, there was no difference in survival at 12 months [9]. Contradictory findings were documented by Rose et al, median PFS for patients without hydronephrosis was 46.6 months, with hydronephrosis (diversion procedure done) was 17 months, with hydronephrosis (diversion procedure not done) was 10 months [7].

There is vast literature to support the fact that hydronephrosis is a harbinger of death. In our study, the mean 5-year survival of patients with hydronephrosis was 28.4 months whereas that of patients without hydronephrosis was 55.4 months. The loss of 27 months of life is solely due to the presence of hydronephrosis.

Thus, the decision regarding which group of Stage IIIB patients with hydronephrosis requires diversion procedure, the choice of diversion procedure, and which group should be receive radical treatment should be taken by a multi-disciplinary team. The patients should be informed in details about the prognosis of their disease. Special emphasis should be given on the complications associated with the each of the diversion procedures and its unproven impact on the outcome of the disease.

6. CONCLUSION

One of the most important predictors of survival among patients with cervical cancer is stage. Among Stage IIIB patients, presence of hydroureteronephrosis should be considered as important prognostic factor and should be mentioned distinctly. Management of patients hydroureteronephrosis should be streamlined based on evidence-based guidelines. The poor predictors of outcomes among this subset of patients such as performance status, severity of hydroureteronephrosis should be highlighted. Identification of cohort of patients who will be relieved by diversion technique followed by

radical treatment is crucial. Individualised approach is ideal after thorough discussion in multidisciplinary tumour board. Patient and attendants should be counselled regarding poor prognosis and informed consent should be taken prior to commencement of therapy.

CONSENT AND ETHICAL APPORVAL

Patient consent and ethical approval has been taken as per Institution's ethical committee and is preserved by the author.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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