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Original Research Article

A study of paclitaxel induced maculopathy at the tertiary care centre of North West Rajasthan

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Abstract

Background: Paclitaxel (PTX) is important cytotoxic anti-cancer agents, are widely used to treat various solid tumours. Both may cause moderate or severe neurotoxicity, but ocular neurotoxicity is also occasionally reported.
Aims and objectives: 1) To study the demography of patients presenting with paclitaxel induced maculopathy at tertiary centre, 2) Various presentation and clinical manifestation of patients. 3)Establish a specific cause-effect relationship between paclitaxel and ocular complications.
Methodology: This prospective observational study was conducted on 50 patients who are aged between 30-60 year and who were prescribed Paclitaxel chemotherapy for the various carcinoma and reported to the OPD of Eye Department of Sardar Patel Medical College and associated group of hospitals, Bikaner. Eye screening was done before and After chemotherapy. Visual acuity was checked and OCT was done to check any macular oedema.
Result: Maximum (24%) study population belongs to 51-55 years age group and mean age of study population was 49.34 ± 8.56 years. 64% were females. 58% belongs to rural area. 22 Patients (44%) of study population had carcinoma since past 3-6 Years. Maximum study population had Breast carcinoma (54%), followed by Lung carcinoma (12%). Before paclitaxel treatment visual acuity was 6/6-6/9 in 48 eyes while 6/9-6/12 and 6/12-6/18 in 32 and 20 eyes respectively. After paclitaxel therapy visual acuity was decreased in 2 Eyes.
Conclusion: CME is a complication of paclitaxel. Physician should be aware of visual complaints when prescribing paclitaxel. Prompt diagnosis and discontinuation of the drug help visual recovery.
Keywords: Cystoid Macularoedema, PTX, Chemotherapy.

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1. Introduction

Paclitaxel is among the most active of all anticancer drugs, with significant efficacy against various types of solid malignant tumours like, breast cancer, prostate cancer, non-small cell lung cancer, ovarian cancer and carcinomas of head, and neck. It is combined with cisplatin in the therapy of ovarian and lung carcinomas and with doxorubicin in treating breast cancer.[1] Paclitaxel has rarely been associated with ophthalmic toxicities. Ophthalmic adverse effects may be visual loss due to optic neuropathy and cystoid macular oedema (CME).[2,3]

1.1 Objectives:

To study the demography of patients presenting with paclitaxel induced maculopathy at tertiary centre. Various presentation and clinical manifestation of patients identified as paclitaxel induced maculopathy. To Establish a specific cause- effect relationship between the use of chemotherapeutic drugs paclitaxel and ocular complications related to the irtoxicity. 2) Evaluate the responsible factors. 3) Apply individual and collective prevention measures.

2. Methodology

This prospective observational type study was conducted at Department of Ophthalmology, Sardar Patel Medical College and PBM Eye Hospital, Bikaner from period of January 2019 to October 2019. This study was

performed on both eyes of 50 patients who were on paclitaxel chemotherapy and reported to Eye hospital OPD. Patients of age group 30-60 years and on paclitaxel chemotherapy were included in the study. Patient who were not wiling and had history of ocular inflammation, ocular trauma or angle closure and patients with diabetic and hypertensive retinopathy were excluded from the study.

Patients who were prescribed paclitaxel chemotherapy for various cancers were screened at the eye OPD. Then again, they were screened after the 3rd month of paclitaxel treatment and macular oedema if found was detected. Standard diagnostic criteria were applied and investigations like fundoscopy, visual field analysis, OCT etc. were performed after complete clinical examination. The clinical records of all the patients were reviewed. Standard Examination protocol was followed and haematological tests were performed. The eye examinations were carried out by using a spectral is OCT (Heidelberg engineering) equipment's. The macular thickness was measured in all the four quadrants–temporal, superior, nasal and inferior in the perifoveal and parafoveal region.

3. Observations:

Table 1: Distribution of study population according to socio-demographic profile

Age group	Frequency	Percentage
30-35	7	14%
36-40	4	8%
41-45	9	18%
46-50	8	16%
51-55	12	24%
56-60	10	20%
Total	50	100%
Sex		
Male	18	36%
Female	32	64%
Total	50	100%
Residence		
Rural	29	58%
Urban	21	42%
Total	50	100%

Table 2: Distribution of study population according to Cancer type, duration of cancer

Types of cancer	Frequency	Percentage
Breast	27	54%
Prostate	4	8%
Gastric	5	10%
Pancreatic	4	8%
Lung carcinoma	6	12%
Ovarian	4	8%
Total	50	100%
Duration of cancer		
<3 yrs.	12	24%
3-6 yrs.	22	44%
> 6 yrs	16	32%

Table 3: Distribution of study population according to cumulative dose of paclitaxel

Cumulative dose (mg/m^2)	Male	Female	Total
<1500	3	2	5
1500-2000	4	27	31
2000-2500	6	2	8
> 2500	5	1	6
Total	18	32	50

Table 4: Visual acuity of study population before and after study population

	Before Paclitaxel treatment			After paclitaxel treatment		
Visual acuity	Rt Eye	Lt Eye	Total	Rt Eye	Lt Eye	Total
6/6-6/9	24	24	48	23	23	46
6/9-6/12	14	14	28	14	14	28
6/12-6/18	12	12	24	12	12	24
>6/18	0	0	0	1	1	2

Table 5: Macular thickness (by OCT) after treatment

Macular thickness	RE	LE	Total
Within Normal Limit	49	49	98
Increased	1	1	2

3. Results

This prospective observational study was conducted on 50 patients who are aged between 30-60 year and who were prescribed Paclitaxel chemotherapy for the various carcinoma and reported to the OPD of Eye Department of Sardar Patel Medical College and associated group of hospitals, Bikaner.

Maximum (24%) study population belongs to 51-55 years age group and mean age of study population was 49.34 ± 8.56 years. Out of 50 patients 32 (64%) were females. Out of 50 patients 29(58%) belongs to rural area.[22] Patients (44%) of study population had carcinoma since past 3-6 Years. Before paclitaxel treatment visual acuity was 6/6-6/9 in 48 eyes while 6/9-6/12 and 6/12-6/18 in 32 and 20 eyes respectively. After paclitaxel therapy visual acuity was decreased in 2 Eyes. Mean thickness of parafoveal area of study population before paclitaxel treatment in temporal, superior, nasal and inferior quadrant was 329.34±15.62, 342.48±14.73, 341.34 ± 15.43 and 341.21 ±14.86 µm respectively. Mean thickness of perifoveal area of study population before paclitaxel treatment intemporal, superior, nasal and inferior quadrant was 282.25±12.60, 294.73±11.47, 311.68±13.99 and 287.02±11.33 µm respectively. On initial visit all subjects had normal macular thickness but at 3rd month of follow up after paclitaxel treatment 2 eyes had shown increased macular thickness.

Macular thickness in effected eyes at fovea was 485µm but in the inner superior, inner inferior, inner nasal and inner temporal thick was 376µm,382µm,431µmand 405µm respectively. Thickness At outer superior, outer inferior, outer nasal and outer temporal was 312µm, 336µm, 357µm and 357µm respectively. Maximum study population had Breast carcinoma (54%), followed by Lung carcinoma (12%) and Gastric carcinoma (10%). Prostate, pancreatic and ovarian carcinoma was same (8%) in study population. Out of 50, 30 patients (60%) received 1500-2000 mg/m^2 cumulative dose of paclitaxel. After 1 month of discontinuation of Paclitaxel therapy the macular thickness of affected eyes came into within normal limit.

4. Discussion

In present study maximum (24%) study population belongs to 51-55 year age group. Case study done by Teitebalum *et al*[1] had shown the patient from the similar age group. Whereas Enzsolyetal 4 had shown patient from lower age group (45-50yr) and Smith *et al*[5] and Murphy *et al* [6] had shown patient from higher age group (56-60yr). In present study mean age of study population was 49.34 year. Whereas study conducted by Noguchi *et al* had study population with mean age 65 yrs. In present study majority (64%) of study population were female. In case study conducted by Shih *et al* [7], Smith *et al* [5], Rao *et al* [8] had female patient whereas case study conducted by Ying *et al* and Ham *et al* had male patients as a case.

In present study majority (58%) of study population belonged to rural area. In present study maximum (44%) patients had cancer for 3-6 years. In present study bilateral maculopathy had seen after paclitaxel treatment. Similar findings were found in study conducted by smith *et al* [5], Murphy *et al* [6] and Enzosly *et al* [4].

In present study most common clinical presentation after paclitaxel treatment was decreased vision. Similar findings were found in in study conducted by smith *et al* [42], Murphy *et al*[6] and Enzosly *et al*[4]. In present study macular thickness was measured by OCT which was within normal limit. After paclitaxel treatment macular thickness was increased. Macular thickness was increased in Fovea, inner and outer compartment.

In Present study maximum (54%) study population belong to breast carcinoma. Patient in case study conducted by Shih.*et al* [7], Smith *et al* [5], Rao *et al* [8] had breast cancer whereas study conducted by Bassi *et al* [9] case with ovarian carcinoma. In our study no case is suffered with the nasopharyngeal carcinoma whereas study conducted by the Ying Li had case suffered with nasopharyngeal carcinoma.

In present study majority (31) of patient received the 1500-2000mg/m^2 cumulative dose of paclitaxel. Maximum patient (27) received the 4 cycles of chemotherapy with each cycle 21 days. Similar cumulative dose of paclitaxel was given in study Bassi *et al* [9] and Tezcan *et al* [10]. In present study 6 week of discontinuation leads to recovery of decreased vision. Less period (4 weeks) was required for recovery in study conducted by smith *et al* [5] and Kuznetcova *et al*[11]. Cases in study conducted by Joshi *et al*, ham *et al* and Teitelbaum *et al* [38] taken same time (6 weeks) for recovery of visual impairment. All case study had shown the recovery of visual impairment after discontinuation of paclitaxel.

5. Conclusion

CME is a complication of paclitaxel, possible due to impairment of chorio-capillaries and Retinal Pigmented Epithelium. Physician should be aware of visual complaints when prescribing paclitaxel. Prompt diagnosis and discontinuation of the drug help visual recovery.

Conflict of interest: No conflict

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