

A Comparative Study of 3weekly Cisplatin and Weekly Cisplatin on Hearing of the Individual

Dr. Meka Pavani Rao, Dr. P. Veeranjanyulu

Abstract: Cisplatin based chemotherapy may lead to conductive, sensorineural or mixed hearing loss. So prevalence and pattern of hearing loss after cisplatin based chemotherapy should be studied. Cisplatin is chemotherapeutic agent that causes ototoxicity. The relationship of ototoxicity with duration and dosage of cisplatin should be evaluated. This is a comparative study between 3 weekly high dose cisplatin and weekly low dose cisplatin. **Materials and Methods:** 39 patients who are treated with cisplatin based chemotherapy for head and neck cancers of which 30 patients treated with 3weekly cisplatin and 9patients treated with weekly cisplatin at GSL Medical College & General Hospital from Sep 2017- Sep2019 are taken into the study. **Conclusion:** On comparison of 3weekly regimen with a weekly regimen, the hearing loss is not significant with p-value >0.05.

1. Introduction

Hearing loss is common complication in patients who have completed head and neck chemotherapy. Auditory testing is indicated to distinguish the etiology of hearing deficits

Patients with head and neck cancers are at increased risk of hearing loss for many factors including cochlear radiation, disruption of vascular flow and increased cisplatin doses. Cisplatin⁵ is mainly cochleotoxic affecting outer hair cells producing oxidative stress.

Cisplatin cause hearing loss due to variety of factors .platinum molecule is highly reactive and interacts with DNA.It targets the organ of corti, outer hair cells and type I spiral ganglion as well as striavascularis.

Dose delivery schedules⁹ of cisplatin ranged from high dose 100-120 mg/sq.m 3weekly and low doses of 30-50 mg/sq.mweekly. In theory high dose act by eradicating micrometastasis low dose act as radiosensitiser.

Pure tone audiometry⁶ is the first choice in measuring ototoxicity because of sensitivity of technique and its potential in detecting ototoxicity.

2. Review of Literature

Hitchcock¹ et al (2009) in a prospective study of 62 head and neck cancer patients with concurrent chemo-radiation noted low dose cisplatin with <10GyRT 9dB hearing loss, with >40Gy RT18.9 dB hearing loss. High dose cisplatin with <10GyRT hearing loss is 21.5db and with 40Gy hearing loss is38.4db. A dutta⁷ et al. (2005) study of effects chemotherapy on auditory function, 15% of the patients developed hearing loss. The patients receiving higher doses and high cumulative doses of cisplatin had increased chances of ototoxicity.

Aim and Objectives

The objective of study is to compare the effect of 3weekly cisplatin and weekly cisplatin on hearing of the individual.

Type of Study: Comparative study.

Period of Study: September2017–September 2019.

3. Materials and Methods

39 patients who are treated with cisplatin based chemotherapy are taken head and neck cancers at GSL Medical College & General Hospital from sep 2017-sep2019.

3.1 Methodology

39 patients who are treated with cisplatin based chemotherapy are taken up for study of which 30 took 3 weekly cisplatin of 100-120mg/sqm and 9 had taken weekly cisplatin of about 30-50 mg/sq.m for various head and neck tumours. Pretreatment hearing evaluation was done and counselling them to visit ENT OP for follow up after chemotherapy to identify the hearing patterns by thorough clinical examination, audiological history, tuning fork tests ,pure tone audiometry, impedance audiometry at 1, 3 and 6months after the chemotherapy.

Testing was done in a sound treated audiometric suite, masking was used if indicated.

Each patient served as his/her control with pretreatment audiogram serving as baseline. Hearing threshold change was determined relative to each patients baseline. Written and informed consent was taken from the patients willing for the study.

4. Observations and Results

Table 1: Weekly Cisplatin Vs 3weekly Cisplatin and Type of Hearing Loss

Cisplatin regimen	No of patients	No of patients with Right hearing loss			No of patients with Left hearing loss		
		SNHL	MIXED	CHL	SNHL	MIXED	CHL
Weekly cisplatin	9	5	4	0	5	4	0
3weekly cisplatin	30	11	9	0	15	6	0

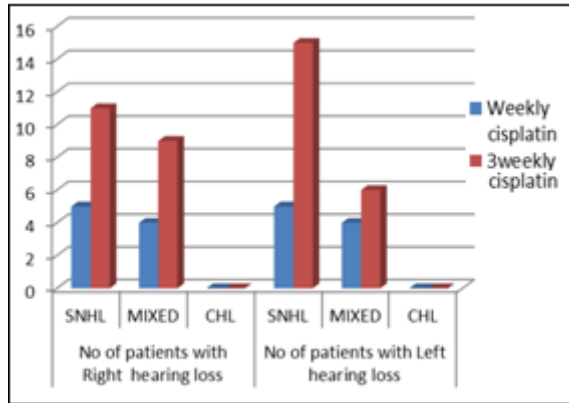


Chart 1: Weekly Cisplatin Vs 3weekly Cisplatin and Type of Hearing Loss

Table 2: Weekly Cisplatin Vs 3weekly Cisplatin and Quantity of Hearing Loss

Cisplatin regimen	No of patients	No of patients with Right hearing loss			No of patients with Left hearing loss		
		Mild	Moderate	Severe	Mild	Moderate	Severe
Weekly cisplatin	9	5	4	0	3	4	2
3weekly cisplatin	30	12	6	1	16	9	0

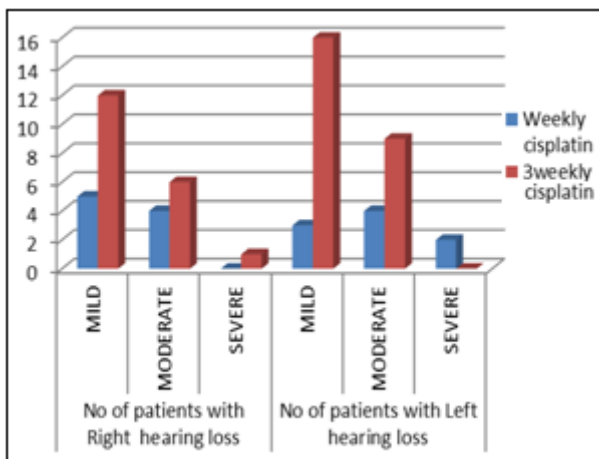


Chart 2: Weekly Cisplatin Vs 3weekly Cisplatin and Quantity of Hearing Loss

Table 3: Cisplatin and Mean Hearing Loss

Cisplatin regimen	No of patients	Mean right hearing loss	Mean left hearing loss
Weekly cisplatin	9	11.4dB	13.1dB
3 weekly cisplatin	30	10.3dB	13.2dB

5. Discussion

As illustrated in Table 1 and Table 2 & Chart 1 and Chart 2

Weekly cisplatinvs 3weekly cisplatin effect on hearing of the individual: Weekly cisplatin

In present study 9 patients are given weekly cisplatin of which, **Right ear:** the sensorineural hearing loss was seen in 5 patients that were in 55%. Mixed hearing loss was seen in 4 patients that were in 44% Moderate hearing loss was seen in 4 patients that were in 44%,mild hearing loss was seen in 5 patients that were in 55%.

Left ear: the sensorineural hearing loss was seen in 5 patients that were in 55%. Mixed hearing loss was seen in 4 patients that were in 44%.Severe hearing loss was seen in 2 patients that was in 22%. Moderate hearing loss was seen in 4 patients that was in 44%, mild hearing loss was seen in 3 patients that was in33%.

3 weekly cisplatin: In present study 30 patients are given 3 weekly cisplatin of which, **Right ear:** sensorineural hearing loss was seen in 11 patients that was in33%. Mixed hearing loss was seen in 9 patients that was in 27%. Moderate hearing loss was seen in 6 patients that were in18%, mild hearing loss was seen in 12 patients that were in36%, severe hearing loss in 1patient that was in 3%.

Left ear: the sensorineural hearing loss was seen in 15 patients that were in 45%

Mixed hearing loss was seen in 6 patients that were in 18%. Moderate hearing loss was seen in 9 patients that were in 27%, mild hearing loss was seen in 16 patients that were in 48%.

According to A Dutta⁴ et al in low dosage group sensorineural hearing loss was seen in 24%. In high dosage group, sensorineural hearing loss was seen in 66% of the individuals who are given high dosage cisplatin.

According to Jishu Das²et al.triweeklycisplatin increases the risk of severe irreversible ototoxicity.

Weekly vs 3weekly cisplatin regimen of cisplatin-mean hearing loss:

As shown in Table:3, Weekly cisplatin was given in 9 patients. After the weekly regimen of cisplatin mean hearing loss right ear is 12.1dB with standard deviation 4.7 and mean hearing loss right ear is 13.1dB with standard deviation 5.3. 3 weekly cisplatin was given in 30 patients. After the weekly regimen of cisplatin mean hearing loss right ear is 10.0dB with standard deviation 4.7 and mean hearing loss right ear is 13.2dB with standard deviation 6.8. On comparison of 3weekly regimen with a weekly regimen, the hearing loss is not significant with p-value >0.05.

6. Conclusion

An average significant hearing loss of 9-15dB has beenobserved in all patients after cisplatin based chemotherapy.

From this study, it has become implied that damage to cochlea or hearing system is a natural sequelae of chemo-radiation after head and neck malignancies.

On comparison of 3weekly regimen with a weekly regimen, the hearing loss is not significant with p-value >0.05.

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