

# **Incidence and associated risk factors for platinum-induced ototoxicity in pediatric patients**

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## **Abstract**

### **Objectives**

Platinum-based chemotherapy is effective against a variety of pediatric malignancies. Unfortunately, the use of cisplatin and carboplatin can lead to permanent and progressive sensorineural hearing loss which can affect the quality of life of cancer survivors. The objectives of this study were to evaluate the incidence of platinum-induced ototoxicity in children and analyze potential risk factors.

### **Methods**

Prospective cohort study. All pediatric patients receiving chemotherapy with cisplatin and/or carboplatin from 01/2012 until 10/2017 were included. Hearing evaluations were performed before every chemotherapy cycle, and following the end of chemotherapy, with auditory brainstem response, otoacoustic emissions and/or audiometry. Demographics, cumulative doses, cranial irradiation and exposure to other ototoxic agents were analyzed.

### **Results**

Twenty-eight patients were included, with a mean age of 7.2 years at the beginning of chemotherapy (range 5 months–15 years 2 months); twenty-one patients received cisplatin, four received carboplatin, and three received both agents. Twelve patients had cranial irradiation and seven received another ototoxic medication. The most frequent malignancies were germ cell tumors, medulloblastoma and gliomas. Sensorineural hearing loss occurred in 28.6% of the patients with a mean follow-up period of 21.5 months (range: 1–53 months). All patients evaluated with audiometry had  $\geq$  Chang 2b ototoxicity. Risk factors include age less than 5 years, cranial irradiation, and cisplatin cumulative dose greater than 400 mg/m<sup>2</sup>.

### **Conclusion**

Sensorineural hearing loss is a potential side effect of platinum-based chemotherapy. Pediatric patients receiving cisplatin chemotherapy with a cumulative dose exceeding

400 mg/m<sup>2</sup>, cranial irradiation as well as patients younger than 5 years are at greater risk of developing hearing loss.

**Keywords**

Cisplatin, Carboplatin, Incidence, Ototoxicity, Hearing loss