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Auditory Objective Measures

AUDITORY EVALUATION IN CHILDREN AND ADOLESCENTS WITH CANCER: IMPACTS OF DIFFERENT TYPES OF TREATMENTS

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ABSTRACT

Despite advances, pediatric cancer treatment still presents challenges, especially regarding the adverse effects of treatment. Cisplatin, a chemotherapy agent widely used in neoplasia treatment, has been associated with hearing damage in children and adolescents, causing bilateral progressive sensorineural hearing loss. Additionally, radiotherapy can affect the structures of the auditory system when directed to the head and neck region, as the applied radiation can directly damage hair cells, cause vascular injury, inflammation, and fibrosis in the inner ear. Finally, the combined use of cisplatin with other ototoxic drugs and/or radiotherapy in the therapeutic program enhances their ototoxic effect, resulting in more severe hearing damage than when administered alone. Thus, audiological evaluation of patients undergoing oncological treatment is essential to detect changes in auditory function and intervene early to preserve the quality of life of patients.

OBJECTIVES

To compare evaluations of the peripheral and central auditory pathways of children and adolescents undergoing different cancer treatments:

- Isolated cisplatin;
- Cisplatin combined with other ototoxic chemotherapeutic agents;
- Cisplatin combined with other ototoxic chemotherapy agents and radiotherapy.

METHODS and MATERIALS

Cross-sectional study approved by the institutional ethics committee, under number 1,556,648 in patients treated at a Brazilian public hospital specialized in pediatric cancer treatment.

Patients:

28 individuals (07 to 18 years) were divided into three groups:

- G1: 10 patients who used cisplatin exclusively
- G2: 10 patients who received a combination of cisplatin with other ototoxic drugs
- G3: 08 patients who underwent ototoxic chemotherapy and radiotherapy.

Exclusion criteria: pre-treatment for hearing loss and other risk factors for hearing impairment, such as syndromes or neurological disorders.

Procedures:

- Pure tone audiometry (PTA)
- High-frequency audiometry (HFA)
- Transient evoked otoacoustic emissions (TEOAE)
- Distortion product otoacoustic emissions (DPOAE)
- Auditory brainstem response (ABR)
- Long-latency auditory evoked potentials (LLAEP)

RESULTS

The use of cisplatin began, on average, at 6.9 years (±5.45) in G1, 6.3 years (±5.19) in G2, and 7.3 (±5.83) in G3. The cumulative dose of cisplatin differed among groups, averaging 365.5, 542.4, and 293 mg/m² for G1, G2, and G3, respectively. Additionally, 70% of participants in G2 and 50% in G3 used carboplatin, 40% in G2 and 37.5% in G3 used ifosfamide, and 40% in G2 used methotrexate. The G3 group showed a higher proportion of altered results in ABR - with longer latency of waves III and V in both ears - and in components P1 and P3 of LLAEPs (Figure 1).

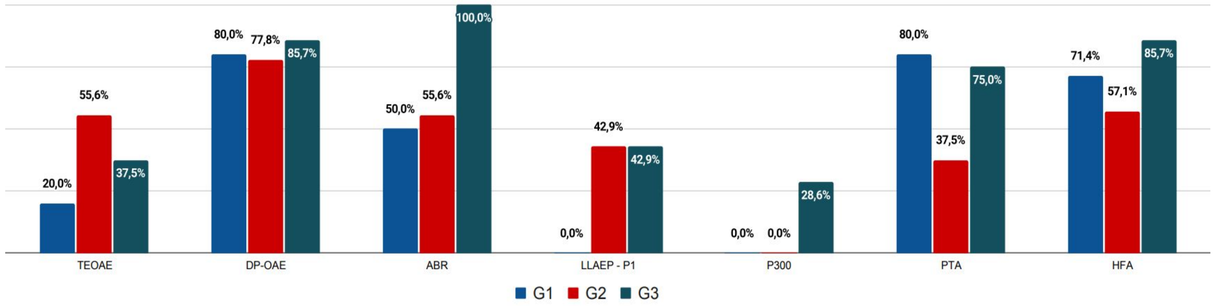

Figure 1. Proportion of altered results to each test and group.

CONCLUSIONS

Variation in cumulative dose of cisplatin and the presence of radiotherapy and/or other chemotherapeutic agents in the protocol may be more aggressive to the auditory system, increasing the risks of ototoxicity and neurotoxicity. We emphasize the importance of studies with larger samples to confirm these findings.

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