Introduction

Intratympanic gentamycin (ITG) is an effective method for the treatment of vestibular symptoms of Ménière’s disease (MD). Unfortunately, ototoxicity is a big drawback and it hinders its usage in patients with servicable hearing thresholds or bilateral disease. Intratympanic dexamethasone (ITD) may be considered for such patients, albeit with lower success rates. The aim of this study is to evaluate the effects of intratympanic gentamycin-dexamethasone combination (ITGD) on the rat inner ear.

Materials and Methods

Twenty six female Wistar albino rats were divided into four groups as follows:
- Group I (Control, n: 6): 0.03 ml of serum physiologic was applied intratympanically
- Group II (ITD, n: 5): 0.03 ml dexamethasone (4mg/ml) was applied intratympanically
- Group III (ITG, n: 7): 0.03 ml gentamycin (26.7 mg/ml) was applied intratympanically
- Group IV (ITGD, n: 8): 0.06 ml of a solution with 13.35 mg/ml gentamycin and 2mg/ml dexamethasone was applied intratympanically.

Basal ABR (4 kHz, 8 kHz, 16 kHz, 32 kHz) measurements were obtained on the first day of the study. ABR measurements were repeated on the 7th and 21th day and vestibular functions were evaluated by using airtight reflex, swimming and tailhanging tests. A blind observer rated the vestibular tests as 0 (normal), 1 (mildly affected) or 2 (severely affected). On the 21th day of the study, ABR and vestibular tests were repeated and then the animals were sacrificed in order to evaluate their inner ear structures by light microscopy and terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) method for detecting apoptosis.

Results

Vestibular disfunction results: Vestibular disfunction scores of ITG and ITGD groups were higher than the Control group both in 7th and 21th day measurements. The scores were not significantly different between these two groups ( group III and IV). Histopathological results: Histopathological investigations revealed severe apoptosis in the spiral ganglia and mild apoptotic changes in the cochlea and vestibule of ITG group of animals. In the ITGD group, apoptotic changes in the spiral ganglion as well as in the cochlea and vestibule were similar to those in the ITG group (Figures 3, 4, 5).

Conclusion

We observed that, ITGD combination led to a significant improvement in the hearing thresholds of rats in contrast to ITG application. Although subjective vestibular tests pointed to possible vestibulotoxic effects for both ITG and ITGD groups, histopathologic results revealed no signs of vestibulotoxicity in the ITGD group. We think that combined ITGD application may be less harmful to the hearing of MD patients by protecting against ototoxicity. Since the positive clinical signs of the desired vestibulotoxic effect of ITGD combination was not supported with the histological results obtained in this study, one may assume that the clinical effect may not be correlated with the apoptotic changes in the vestibule and/or combined ITGD may also prevent vestibulotoxicity at least with these doses and treatment regimen used in this study.