ABSTRACT

Objective: Using pre- and post-treatment otoacoustic emission (OAE) tests, this study aimed to assess the ototoxic effect of meropenem, amikacin and meropenem plus amikacin among neonates treated for *sepsis neonatorum* in a neonatal intensive care unit versus untreated outpatient controls.

Methods:

Design: Prospective Quasi-Experimental Controlled Clinical Trial
Setting: Tertiary Government Hospital
Subjects: Neonates treated for *sepsis neonatorum* in the Neonatal Intensive Care Unit between August to October 2012 who met inclusion criteria were included in this study. Controls were neonates born in the same institution who were not admitted and did not receive any antibiotic treatment. Excluded were those with APGAR < 5 at first minute, birth weight < 1000 grams, clinically evident congenital anomalies and initial “refer” results on OAE.

Neonates were subjected to OAE testing before and after seven days treatment with amikacin, meropenem or a combination of both drugs. Results were analysed using chi-square test. Maternal drug intake, family history of hearing impairment and clinical outcomes (whether expired or discharged improved) were not included in this study. Assessment of ototoxic effects were limited to OAE alone and not confirmed by ABR.

Results: OAE “refer” rates were as follows: no amikacin and no meropenem, 0% (0/42); amikacin only, 33.3% (3/9); meropenem only, 25% (2/8) and amikacin and meropenem, 50% (10/20). Statistical analysis showed that hearing loss was dependent on treatment ($\chi^2 = 23.741, p < 0.001$). Overall, statistical analysis showed that there is an increased risk of hearing loss when treated with amikacin, meropenem or a combination of both drugs. Results were analysed using chi-square test. Maternal drug intake, family history of hearing impairment and clinical outcomes (whether expired or discharged improved) were not included in this study. Assessment of ototoxic effects were limited to OAE alone and not confirmed by ABR.

Conclusion: There is an increased risk of ototoxicity when amikacin, meropenem or a combination of both drugs is administered to neonates. While the ototoxic effects of amikacin have been elucidated, further studies involving meropenem and its potential ototoxic effect are recommended.

Keywords: ototoxicity, amikacin, meropenem, otoacoustic emission testing, neonatal hearing loss