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Effect of Silver Nanoparticles in the Treatment of Otitis Media in Children

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ABSTRACT

Introduction: Otitis media is the most common disorder that causes hearing loss in children. The leading cause of this disease is the formation of biofilms and microorganisms in the ear airways. Silver nanoparticles are key nanotechnology components with high antimicrobial and antioxidant activity, especially against Staphylococcus aureus. This study aimed to investigate the effect of silver nanoparticles in treating otitis media in children.

Methods and Materials: This study was conducted systematically in June 2024 by searching for the keywords middle ear, silver nanopractic, therapy, and children in the PUBMED, Science Direct, Scopus, and Google Scholar databases by removing duplicate and unrelated articles. Finally, 17 Persian and English articles published from 2017 to 2022 were reviewed and studied.

Results: Studies have shown that silver nanoparticles, such as gels, implants, and prostheses, have been used to treat middle ear infections. These particles have promising antimicrobial and antibiofilm properties against pathogens common in drug-resistant otitis media, including Streptococcus pneumoniae, Pseudomonas aeruginosa, Escherichia coli, and Aspergillus flavus. The clinical use of this nano-seed has a significant effect on improving patients' hearing. Silver particles stimulate cytoplasmic contractions and generate excitatory waves on the surface of the cell membrane. These contractions result in cell wall rupture and cell death. It also inhibits the expression of genes related to cell division and ultimately inhibits the growth of bacterial biofilms.

Conclusion and Discussion: Silver nanoparticles can be used in treatment-resistant middle ear infections. These particles are inexpensive and available because they can be extracted from garlic extract. It is suggested to use Tanshinone II. A to improve antibacterial function.

Keywords: Middle ear, Otitis media, Silver