

Artificial Intelligence in Otitis Media Diagnostics - A Study of Diagnostic Accuracy and Trust in AI support Among Otorhinolaryngologists

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Background

Otitis media (OM) is a common condition, especially in children. It poses significant challenges for public health, including risk of hearing loss and unnecessary antibiotic use. Diagnostic accuracy for otitis media is around 70% among otorhinolaryngologists (ORLs) in earlier studies. Artificial intelligence (AI) outperforms clinicians in laboratory studies in diagnosing otitis media and could therefore improve clinicians' diagnostic accuracy when used together.

We aim to compare the diagnostic accuracy of OM with and without AI support among ORLs and specialist trainees (ORL-STs). We also aim to evaluate the participants' trust in AI.

Methods

Participants at a Swedish national conference for ORLs were recruited to the study. They assessed 21 images of tympanic membranes, both without and with AI support. Participants had three diagnostic alternatives to choose from: 1) Normal eardrum, 2) Otitis media with effusion (OME), and 3) Acute otitis media (AOM). Diagnostic accuracy and confidence in the diagnosis was evaluated with and without AI.

Results

AI support significantly improved diagnostic accuracy, rising from 73.9% without AI to 82.6% with AI (p-value <0.05). ORL-STs benefited more from AI support. Participants' mean confidence in choice of diagnoses for all images improved from 4.36 without AI to 4.65 (Likert-scale 1–6) with AI (p-value <0.05).

Conclusions

Participants' accuracy, confidence, and inter-rater agreement improved with AI support. AI can bridge diagnostic gaps in less experienced clinicians. Participants followed AI recommendations, indicating the need for developing AI tools with high accuracy when they are implemented in clinical settings.