Cochrane Corner: Interventions to Improve Hearing Aid Use in Adult Auditory Rehabilitation

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Abstract
The “Cochrane Corner” is a section in the journal that highlights systematic reviews relevant to otolaryngology–head and neck surgery, with invited commentary to aid clinical decision making. This installment features the Cochrane review “Interventions to Improve Hearing Aid Use in Adult Auditory Rehabilitation,” which identified 32 randomized controlled trials and concluded that there is low-quality evidence to support using self-management support and complex interventions (support plus delivery system design) in adult auditory rehabilitation.

Keywords
systematic review, hearing loss, hearing aids, auditory rehabilitation

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About 250 million adults worldwide have acquired hearing loss, which ranks 15th among the leading causes of the global burden of disease and is the second leading cause of total years lived with a disability. The authors of this Cochrane review chose to classify interventions for adult-acquired hearing loss using a chronic care model (CCM) that includes 6 categories, of which 2 are particularly relevant to this analysis. “Self-management support interventions” include assessment, patient education, patient activation (eg, changing behavior and developing practical management skills), self-management resources and tools (eg, battery replacement services and additional equipment to improve hearing aid benefit), and collaborative decision making. “Delivery system design interventions” are intended to reshape health care provider roles (eg, case managers and multidisciplinary teams) or reorganize the scheduling of care (eg, changes in systems, follow-up, or planned visits). Low-quality evidence was identified to support a potential benefit of these strategies in adult auditory rehabilitation.

Interventions to Improve Hearing Aid Use in Adult Auditory Rehabilitation

Disclaimer
This is an abstract of a Cochrane review published in the Cochrane Library (2013, issue 2) (see www.thecochranelibrary.com for information). Cochrane reviews are regularly updated as new evidence emerges and in response to feedback, and the Cochrane Library should be consulted for the most recent version of the review.

Background
Acquired adult-onset hearing loss is a common long-term condition, for which the most common intervention is hearing aid fitting. However, up to 40% of people fitted with a hearing aid either fail to use it or may not gain optimal benefit from it.

Objectives
To assess the long-term effectiveness of interventions to promote the use of hearing aids in adults with acquired hearing loss fitted with at least 1 hearing aid.

Search Methods
We searched the Cochrane Ear, Nose and Throat Disorders Group Trials Register; Cochrane Central Register of Controlled Trials (CENTRAL); PubMed; EMBASE; CINAHL; Web of Science; Cambridge Scientific Abstracts; International Clinical Trials Registry Platform (ICTRP); and additional sources for published and unpublished trials. The date of the search was November 6, 2013.

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Selection Criteria
We included randomized controlled trials of interventions designed to improve or promote hearing aid use in adults with acquired hearing loss compared with usual care or another intervention. We excluded interventions that compared hearing aid technology. We classified interventions according to the CCM. The primary outcomes were hearing aid use (measured as adherence or daily hours of use) and adverse effects (inappropriate advice or clinical practice and patient complaints). Secondary patient-reported outcomes included quality of life, hearing handicap, hearing aid benefit, and communication. Outcomes were measured over the short (<12 weeks), medium (12 to <52 weeks), and long (≥1 year plus) term.

Data Collection and Analysis
We used the standard methodological procedures expected by The Cochrane Collaboration.

Main Results
We included 32 studies involving a total of 2072 participants. The risk of bias across the included studies was variable. We judged the Grading of Recommendations Assessment, Development and Evaluation (GRADE) quality of evidence to be very low or low for the primary outcomes where data were available.

The majority of participants were over 65 years of age with mild to moderate adult-onset hearing loss. There was a mix of new and experienced hearing aid users. Six of the studies (1018 participants) were conducted in a military veteran population. Six of the studies (287 participants) assessed long-term outcomes.

All 32 studies tested interventions that could be classified as self-management support (ways to help someone to manage their hearing loss and hearing aid(s) better by giving information about practice and experience at listening/communicating or by asking people to practice tasks at home) and/or delivery system design (just changing how the service was delivered) interventions according to the CCM.

Self-management support interventions. We found no studies that investigated the effect of these interventions on adherence, adverse effects, or hearing aid benefit. Two studies reported daily hours of hearing aid use, but we were unable to combine these in a meta-analysis. There was no evidence of a statistically significant effect on quality of life over the medium term. Self-management support reduced short- to medium-term hearing handicap (2 studies with 87 participants; mean difference [MD], –12.80; 95% confidence interval [CI], –23.11 to –2.48 [0-to-100 scale]) and increased the use of verbal communication strategies in the short to medium term (1 study with 52 participants; MD, 0.72; 95% CI, 0.21 to 1.23 [0-to-5 scale]). The clinical significance of these statistical findings is uncertain, but it is likely that the outcomes were clinically significant for some, but not all, participants. Our confidence in the quality of this evidence was very low. No self-management support studies reported long-term outcomes.

Delivery system design interventions. These interventions did not significantly affect adherence or daily hours of hearing aid use in the short to medium term or adverse effects in the long term. We found no studies that investigated the effect of these interventions on quality of life. There was no evidence of a statistically or clinically significant effect on hearing handicap, hearing aid benefit, or the use of verbal communication strategies in the short to medium term. Our confidence in the quality of this evidence was low or very low. Long-term outcome measurements were rare.

Combined self-management support/delivery system design interventions. We found no studies that investigated the effect of complex interventions combining components of self-management support and delivery system design on adherence or adverse effects. There was no evidence of a statistically or clinically significant effect on daily hours of hearing aid use over the long term or the short to medium term. Similarly, there was no evidence of an effect on quality of life over the long term or short to medium term. These combined interventions reduced hearing handicap in the short to medium term (13 studies with 485 participants; standardized MD, –0.27; 95% CI, –0.49 to –0.06). This represents a small to moderate effect size, but there is no evidence of a statistically significant effect over the long term. There was evidence of a statistically, but not clinically, significant effect on long-term hearing aid benefit (2 studies with 69 participants; MD, 0.30; 95% CI, 0.02 to 0.58 [1-to-5 scale]) but no evidence of an effect over the short to medium term. There was evidence of a statistically, but not clinically, significant effect on the use of verbal communication strategies in the short term (4 studies with 223 participants; MD, 0.45; 95% CI, 0.15 to 0.74 [0-to-5 scale]) but not the long term. Our confidence in the quality of this evidence was low or very low.

We found no studies that assessed the effect of other CCM interventions (decision support, clinical information system, community resources, or health system changes).

Authors’ Conclusions
There is some low- to very low-quality evidence to support the use of self-management support and complex interventions combining self-management support and delivery system design in adult auditory rehabilitation. However, effect sizes are small, and the range of interventions that have been tested is relatively limited. Priorities for future research should be an assessment of long-term outcomes a year or more after the intervention, the development of a core outcome set for adult auditory rehabilitation, and the development of study designs and outcome measures that are powered to detect incremental effects of rehabilitative health care system changes over and above the provision of a hearing aid.
Comments on Cochrane Review

Comments by Adams

The uptake and consistent use of hearing aids remain low, despite mounting evidence of negative consequences of hearing loss on health and well-being. Estimates from the United States National Health and Nutrition Examination Survey (NHANES) suggest that only 14% of hearing-impaired Americans over 50 years of age use hearing aids, leaving 23 million untreated. The prevalence of use in the youngest group, 50 to 59 years, is just 4%. A substantial proportion (5%-40%) of those who choose to be fitted with a hearing aid do not use it.

Why do people not use their hearing aids? A recent scoping study reviewed articles seeking to answer this question during the digital hearing aid era. In addition to device factors and the patient concerns that physicians typically expect, such as perceptions of poor sound quality/poor benefit, difficulty hearing in background noise, and financial barriers, many patients report nonuse due to problems with discomfort, care, and handling of the device. A reasonable conclusion therefore is that better training, counseling, and support may be as important as technological advances to overcome nonuse.

Accordingly, this Cochrane review focuses on modifications of care delivery and excludes comparisons of technology and fitting strategies. The diverse interventions were grouped into elements of the CCM, a framework used to achieve quality care for long-term illnesses such as diabetes and heart failure. In using the CCM, the authors helpfully call attention to the need to shift from an episodic, clinician-driven acute care focus on hearing health to one in which we collaborate with patients to see themselves as the principal managers of a long-term condition.

All trial interventions fell under the CCM elements of self-management support, aimed at helping patients and families acquire skills to manage their hearing loss and hearing aids (eg, communication training and counseling), delivery system design, aimed at changing the way that the support is provided (eg, individual vs group fitting), or a combination of the two. It is apparent that there are numerous avenues left to explore. For instance, there were no trials employing the CCM elements of clinical information systems (in which computerized medical records could be used for registries to recall struggling patients), decision support (use of guidelines and standards), community resources, or changes in health care organizations.

The limited outcome data available for the review highlight the difficulty of defining a gold standard for hearing aid “success.” There was a lack of data on the primary outcomes of hearing aid use, including adherence (number of aids in use/number fitted) and, to a lesser extent, daily hours of use. Also, the same patient-reported secondary outcomes of quality of life, benefit, communication, and handicap were often measured differently across studies. Perez and Edmonds also emphasized the lack of consistency and robustness in reporting hearing aid usage when their systematic review identified 15 different measures of use.

As the authors of the Cochrane review note, use cannot be equated with benefit but is a prerequisite to some degree—but how much? A person may adhere to daily use and be unsatisfied, while another may choose to use aids selectively and experience tremendous subjective and objective benefits. Use itself can be measured in different ways, such as time per day versus frequency of use versus a binary use/nonuse judgment, each with its pros and cons. Multidimensional measurements need to continue, but trials should incorporate a more consistent measure of use to allow for comparisons and further analyses of its impact on all facets of “success.”

The 32 randomized trials provided low-to very low-quality evidence to support the use of the tested interventions. The reasons for the low-quality grade are perhaps more interesting than the findings themselves. The majority of trials had a high or unclear risk of bias due to avoidable shortcomings in design. For instance, while it is understandable that hearing aid users could not be blinded to the treatment group (to reduce performance bias), blinding in the outcome assessment could have been employed more frequently to reduce detection bias. Also, most studies failed to adequately describe or implement a randomization protocol and, most strikingly, were simply underpowered to yield precise estimates or clinically meaningful differences. The populations were also heavily skewed toward older hearing aid users and veterans, calling into question the direct applicability of the findings to the largest group of nonusers.

In addition to the limited study quality, it is notable that not all of the included studies tested interventions truly designed to promote hearing aid use over traditional methods, despite the title and stated objective of the Cochrane review. For example, the large sample size in the study of Collins and colleagues dominates the estimates of no difference in adherence and use in the delivery system design group, but this was a noninferiority trial of individual versus more cost-effective group hearing aid fitting. The trial succeeded in demonstrating significant cost savings without a decrement in use or benefit. One cannot conclude that nontechnological interventions are without merit, and as a whole, these data point to the need for more methodological rigor in approaching hearing aid use.

Comments by Burton

It is always disappointing when a review identifies a large number of primary studies but then finds that relevant outcome data are limited. Those preparing Cochrane reviews are encouraged to identify no more than 3 “primary” outcomes, one of which should be adverse events, and a limited number of “secondary” outcomes. All of these, but in particular the primary ones, should be patient centered and relevant.

In this review, the first primary outcome was hearing aid use as assessed by adherence and hourly usage per day. As Dr Adams notes, this seems entirely reasonable as usage is the focus of the review (and the interventions), but equally, if a hearing aid user wears their aid for long periods despite...
limited benefits, this can hardly be deemed a “success.” Perhaps the review might have focused on interventions to improve the “successful and beneficial use of hearing aids.” Initially at least, it seems attractive to consider a simple dichotomous outcome of “proportion of patients successfully using and/or benefiting from the use of hearing aids.” Yet, how would this be consistently measured within and across studies?

Dr Adams is right to be disappointed at the quality of evidence presented in the review. As she implies, there is little excuse for failure to implement an appropriate randomization schedule and to report the necessary details about the way that it was conducted. I have written before in these “Corners” about the importance of accurately reporting randomization methods and following the requirements of the CONSORT (Consolidated Standards of Reporting Trials) statement. The statement is a minimum set of evidence-based reporting standards that provide information to allow a reader to assess the risk of bias in a study.

It is important to realize that it is “risk of bias” and not “quality” of a trial or study that needs to be assessed. There can be confusion because the word “quality” is often applied to the evidence from a trial or study. A trial may be of high quality because it has been planned, conducted, and reported extremely well. Yet, the results may still be at risk of bias if, for example, it was impossible to blind participants or study personnel.

In her critique, Dr Adams also raises the issue of statistical power, noting that “most studies . . . were simply underpowered to yield precise estimates or clinically meaningful differences.” This is another disappointing feature of the individual studies. Many editors and reviewers would expect to see a power calculation as part of the protocol for a trial and in the final write-up of the results. This would be one mark of a “high-quality” study. Yet, the absence of such a calculation would not be a sign, indicating a significant risk of bias in the study.

An important advantage of a systematic review and meta-analysis is that when a set of underpowered (often small) studies can be combined, this may generate the statistical power required to identify a small significant difference and a more precise estimate of a treatment effect. Will this inevitably be a “clinically meaningful” difference? Not necessarily. In any good study, trial, or review, researchers should decide, before they start, what difference is meaningful. I should correct this last sentence and say that ideally clinicians and patients together should decide on the smallest difference that is meaningful and clinically relevant to patients.

Comments by Rosenfeld

So what is the take-home message for clinicians when a Cochrane review concludes that little or nothing can be concluded from an existing morass of research? Regrettably, this type of conclusion is not uncommon, despite a reasonable bunch of (in this case, 32) randomized trials because of pesky concerns over bias, generalizability, and statistical power.

Such a finding, in my opinion, begs for humility when speaking with patients. There is no room for a cocksure, dogmatic approach to therapeutic recommendations in the face of ubiquitous uncertainty. Rather, clinicians should share the inconclusiveness of evidence with the patient, spend a few minutes trying to understand—or, as some may say, “diagnose”—their values and preferences, and then engage in shared decisions that balance the known risks and costs of interventions against the uncertain benefits.

In this context, a Cochrane review may not always provide all the answers, but as a refined systematic overview of the evidence, it promotes understanding, perspective, and robust debate. Hopefully, the review herein, and those in other “Corners,” can be used in this manner to enable constructive dialogue and more informed management decisions.

Author Contributions

Martin J. Burton, interpretation, drafting, and final approval; Meredith E. Adams, interpretation, drafting, and final approval; Richard M. Rosenfeld, concept, drafting, and final approval.

Disclosures

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