

Acute otitis externa in children

Colin J. McWilliams Christine H. Smith MBBS Ran D. Goldman MD FRCPC

Abstract

Question In the summer months I see many children with uncomplicated acute otitis externa (AOE). I am aware of the multiple ototopical preparations. Which is the best first-line agent to treat AOE, and is there a role for an oral antibiotic?

Answer There are no specific Canadian guidelines for the management of AOE. However, current American guidelines promote initial ototopical therapy without systemic antibiotics for uncomplicated AOE; suggest there is little difference between the various ototopical preparations; and recommend the choice of treatment be based on the specific clinical situation. In practice, this often results in prescribing an antibiotic-steroid formulation for 7 to 10 days. This ototopical treatment option is supported by a recent Cochrane review that has documented the superiority of an antibiotic-steroid combination when compared with placebo or acetic acid in providing clinical resolution of AOE.

Otite externe aiguë chez l'enfant

Résumé

Question Durant l'été, je vois de nombreux enfants qui présentent une otite externe aiguë (OEA) sans complications. Je connais l'existence de nombreuses préparations otiques topiques. Quel est le meilleur agent de première intention pour traiter une OEA et est-il indiqué de prescrire des antibiotiques par voie orale?

Réponse Il n'existe pas spécifiquement de lignes directrices canadiennes sur la prise en charge de l'OEA. Cependant, les lignes directrices américaines actuelles favorisent une thérapie otique topique initiale sans antibiotiques systémiques pour les OEA sans complications et font valoir qu'il y a peu de différences entre les diverses préparations otiques topiques. Elles recommandent que le choix du traitement se fonde sur la situation clinique particulière. Dans la pratique, cela se traduit souvent par la prescription d'une formule antibiotique-stéroïde pendant 7 à 10 jours. Une récente synthèse critique par Cochrane corrobore ce choix de traitement otique topique et documente la supériorité d'une combinaison antibiotique-stéroïde par rapport à un placebo ou à l'acide acétique comme solution clinique dans les cas d'OEA.

Acute otitis externa (AOE) is a common condition in the pediatric population characterized by diffuse inflammation of the external acoustic meatus.¹ The 2003 to 2007 data from the Centers for Disease Control and Prevention estimate a yearly incidence of 8.1 per 1000 population, with a higher incidence during the summer months in children between the ages of 5 and 14 years old.²

Acute otitis externa is colloquially known as *swimmer's ear* for its preponderance in children who have a history of prolonged water exposure.³ Other predisposing factors include humidity, maceration, local trauma, external devices, dermatitides, anatomic abnormalities, and canal obstruction, which might make the canal epithelium susceptible to infections.⁴

Diagnosis of AOE

A diagnosis of AOE requires a rapid onset (within 48 hours) of signs and symptoms of external acoustic meatus inflammation with or without infection.⁵ Typical

symptoms include otalgia, itching, and aural fullness. Signs include tenderness of the tragus and pinna, diffuse ear canal edema, conductive hearing loss, erythema, and otorrhea.⁵ Acute otitis externa must be distinguished from other causes of external ear pain including furunculosis, herpes zoster oticus, otomycosis, chronic otitis externa, malignant otitis externa, acute otitis media with perforation, contact dermatitis, and retained foreign body, as these will all have varying treatments.⁴

Overall, 90% of AOE cases are unilateral,¹ and in North America more than 90% of the time AOE is caused by bacterial infection, with a low incidence of fungal infection.⁶ *Pseudomonas aeruginosa* and *Staphylococcus aureus* are the most common pathogens responsible for AOE, with *Staphylococcus* spp being less prevalent in children than in adults.⁶

Rationale for treatment

A 2012 prospective observational study of 106 patients who presented to an ears, nose, and throat emergency

clinic in the United Kingdom reported that 42% of the patients had not received treatment before arrival, 14% received topical antibiotics alone, and 44% received oral antibiotics either alone or with topical treatment.⁷ Although none of the patients was younger than 18 years of age, this research highlights the variation in how AOE is treated. All patients eventually received otological antibiotics from the clinic.⁷

Local treatment with antibiotic ear drops is the initial treatment of choice because it creates antibiotic concentrations 100-fold to 1000-fold higher⁵ than systemic therapy, and has the advantage of not causing systemic side effects or promoting resistance.⁶ Topical aminoglycosides (neomycin, gentamicin) and fluoroquinolones (ciprofloxacin, ofloxacin) are efficacious against bacteria that cause AOE.^{5,6} However, if there is a proven or suspected perforation of the tympanic membrane, then aminoglycosides are contraindicated owing to their ototoxic properties.⁸

The addition of steroids to reduce inflammation of the external acoustic meatus or the addition of acetic acid to reduce the pH of the ear canal is also common practice.⁹ The rationale for use of acetic acid is to return the pH to an acidic and more antimicrobial environment.⁸ There is anecdotal evidence that avoidance of swimming while healing is beneficial, and inciting factors such as the use of cotton buds should be discouraged.^{4,9}

In children with edematous ear canals, drops cannot penetrate the entire length of the canal and an ear wick can be used as a conduit.¹⁰ In addition, the need for oral analgesia should be assessed, as this is often required before otological treatment takes effect.⁵

Treatment guidelines


In 2006 the American Academy of Otolaryngology—Head and Neck Surgery Foundation published a clinical guideline supporting the use of topical antimicrobials as first-line treatment in otherwise healthy patients with AOE.⁵ A meta-analysis of 2 trials that compared topical antimicrobials with placebo reported an absolute rate difference of 0.46 (95% CI 0.29 to 0.63, number needed to treat=2), supporting antimicrobials over placebo.⁵ Meta-analyses of different topical antimicrobials showed no significant differences in clinical cure rates and demonstrated that regardless of which topical agent was used, 65% to 90% of patients had clinical resolution within 7 to 10 days.⁵ In a study of 842 patients with AOE between the ages of 2 and 85, Pistorius et al demonstrated that the addition of steroids to ciprofloxacin resulted in a reduction of 0.88 days in the duration of ear pain ($P=.039$),¹¹ which might be clinically significant for many children.

Initial therapy of diffuse uncomplicated AOE should include a topical antimicrobial agent, and there is consensus that adding a systemic antibiotic is unlikely to be

beneficial.⁹ This is supported by a double-blind trial¹² of 100 patients randomized to receive topical and oral antibiotics or topical antibiotics with placebo that reported no significant changes in severity, duration, or cure rates of AOE in the primary care setting ($P>.4$, $P>.5$, $P>.8$, respectively). The role of systemic antibiotics is in treating patients with AOE complicated by immunosuppression or by infections outside the ear canal, such as cellulitis, osteitis, abscess formation, necrotizing otitis externa, and mastoiditis.^{5,13}

Otological treatment with an antibiotic-steroid combination was significantly more effective than placebo drops (odds ratio [OR] 11, 95% CI 2.00 to 60.57) based on data from a double-blind trial¹⁴ of 40 patients aged 2 to 68 years old used in a Cochrane review from 2010.¹⁵ In a 3-armed randomized controlled trial of 213 adults in the primary care setting, van Balen and colleagues compared topical treatments containing acetic acid, acetic acid and steroid, and antibiotic and steroid.¹⁶ They demonstrated that acetic acid was less effective than antibiotic-steroid drops at 2 weeks (OR 0.29, 95% CI 0.13 to 0.62) and 3 weeks (OR 0.25, 95% CI 0.11 to 0.58), with a median recovery in the antibiotic-steroid group of 6 days (95% CI 5.1 to 6.9 days) compared with 8 days (95% CI 7.0 to 9.0 days) in the acetic acid group.^{15,16} The Cochrane review reported no clinically meaningful differences in clinical resolution of AOE when comparing various otological antimicrobials but insists they are effective with or without steroids, with cure rates of 55% to 100% as compared with 10% for placebo drops.¹⁵ There were no significant differences found when comparing quinolone versus nonquinolone otological antibiotics, and ciprofloxacin was not inferior to previously used aminoglycosides.^{15,17} As the clinical trials identified no relevant clinical differences, other factors such as ototoxicity, contact sensitivity, antibiotic resistance, availability, cost, and dosing schedule need to be considered when selecting otological antimicrobial treatment.^{5,15}

Conclusion

Otological antimicrobials are effective in the treatment of AOE regardless of which preparation is used, and it is not necessary to prescribe an oral antibiotic unless there is infection outside the external ear canal. It is advisable to use an antibiotic-steroid formulation for 7 to 10 days, as it has been shown to be superior to placebo or acetic acid in providing clinical resolution of uncomplicated AOE. The choice of antibiotic remains dependent on the clinical scenario. In the specific setting of a disrupted tympanic membrane, fluoroquinolones are indicated given the potential ototoxicity of aminoglycosides. 

Competing interests
None declared

Correspondence

Dr Ran D. Goldman, BC Children's Hospital, Department of Pediatrics, Room K4-226, Ambulatory Care Bldg, 4480 Oak St, Vancouver, BC V6H 3V4; telephone 604 875-2345, extension 7333; fax 604 875-2414; e-mail rgoldman@cw.bc.ca

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