

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on "Acute Otitis Media." These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedsCases.com/podcasts.

Acute Otitis Media

Developed by Peter MacPherson and Dr. Sarah Forgie or PedsCases.com.
September 4, 2009
*Updated April 10, 2016

Peter: Hi everyone, my name is Peter MacPherson and I'm a medical student at the University of Alberta. In this podcast, we'll be talking about the diagnosis and treatment of acute otitis media. Today, I'm joined by Dr. Sarah Forgie, a pediatric infectious disease specialist at the Stollery Children's Hospital.

Sarah: Hi, I'm really glad to be here.

Peter: So, our listeners will probably know that acute otitis media is an infection of the middle ear. It's generally caused by bacteria, although it can be viral.

Why don't we start by discussing how acute otitis media happens?

Sarah: Acute otitis media is extremely common in children - in fact 3/4 of children have had at least one episode by one year of age. The primary defect leading to AOM is Eustachian tube dysfunction and obstruction. Kids have shorter, more horizontal Eustachian tubes, compared to adults, and these tubes can become obstructed with enlarged adenoids, allergies or viral infections. Once the Eustachian tube is obstructed, two things happen. First, the mucociliary clearance is impaired, and mucus becomes trapped in the middle ear space. Secondly, resorption of gases within middle ear space creates a pressure differential, akin to a vacuum, which pulls bacteria from the nasopharynx into the middle ear space. Once introduced into this space, the bacteria can proliferate and may cause a secondary infection. It is important to note that it is rare to develop AOM without a preceding viral upper respiratory tract infection and otitis typically develops after several days of viral symptoms. Acute bacterial otitis after the first day of a runny nose does not happen.

Peter: Which children are at higher risk for acute otitis media and tell us how parents can reduce some of those risks?

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Sarah: Sure. The two major risk factors are young age and attending daycare. With respect to age, the peak incidence is around 6 to 9 months of age. Other risk factors include oral and facial abnormalities, lack of breastfeeding, immunodeficiencies, exposure to cigarette smoke, a family history of otitis media and being of Aboriginal ancestry.

The best prevention strategies for parents would be excellent hand hygiene, breastfeeding and avoiding exposure to tobacco smoke. If bottle feeding can't be avoided, parents should not prop the bottle and should use a fully ventilated bottle.

Peter: Alright- next big topic: How do you diagnose acute otitis media?

Sarah: To diagnose acute otitis media properly, you need three things: signs of a middle ear effusion, signs of middle ear inflammation and an acute onset of symptoms. We'll tackle each of these separately.

The most important sign of a middle ear effusion is an immobile tympanic membrane. You can demonstrate that using pneumatic insufflation where a special bulb is attached to the otoscope and a puff of air is sent into the ear canal.

Inflammation of the middle ear would be seen as a bulging tympanic membrane. The membrane will be discoloured. It can be hemorrhagic, red, gray or yellow. In acute otitis media, the membrane may or may not be red. A red tympanic membrane is called myringitis. Myringitis is not important as a clinical sign. In fact, screaming or crying is often enough to produce a red ear drum!

Acute onset of symptoms is the last element needed to make this diagnosis. There will an acute onset of ear pain (otalgia). In preverbal children, it generally presents as unexplained irritability. There will sometimes be a fever or symptoms of a cold. Some children over the age of 12 months may pull at their ears, but this is not specific for acute otitis media.

Peter: So let's recap: you need three things to diagnose acute otitis media:
Middle ear effusion -the tympanic membrane will be immobile
Inflammation of the middle ear -look for a bulging membrane
Acute onset of symptoms -the main ones are earache and irritability

Sarah: Exactly

Peter: So let's say I've diagnosed acute otitis media in a child. What's next?

Sarah: It's important to realize that the majority of cases of otitis media resolve spontaneously and without complications. Only about 10% of children with acute otitis media will need antimicrobials for symptom resolution.

One of the most important things to do in all cases is advise the family about pain control. Pain or fever should be controlled with acetaminophen or ibuprofen.

Peter: Alright. You've told us that some children with acute otitis media will need antimicrobial therapy. I'm going to go out on a limb here and guess that you don't advocate prescribing antimicrobials indiscriminately.

Sarah: That's right. We know that, on average, giving antimicrobials will result in quicker resolution of symptoms. However, the effect is quite small. You would need to treat about fifteen kids to result in one instance of symptom resolution at 48 hours. It's also not clear whether antimicrobial therapy reduces the incidence of the complications of such as mastoiditis. If it does, the number needed to treat to prevent one complication would be in the thousands.

You should also remember that there are risks associated with antimicrobials. These risks include diarrhea, anaphylaxis and Stevens-Johnson syndrome. Another risk at the population level is antimicrobial resistance.

Peter: So if it's only a minority of children who need antimicrobials for symptomatic resolution, how do we know when to prescribe immediate antimicrobial therapy and when to wait and see if it resolves spontaneously?

Sarah: That's a good question. In many cases, it's most appropriate to use what we call a "watchful waiting" approach. This means that you observe the child without antimicrobials for 24-48 hours*. You can either have the family return if the child does not improve or provide a prescription for antimicrobials that can be filled in a few days at the parent's discretion. As I mentioned earlier, in most cases, the symptoms will resolve spontaneously and antimicrobial therapy will not be required.

The watchful waiting approach is appropriate if:

The child is older than 6 months of age,

The illness is not severe. That is, the otalgia seems mild and the fever is less than 39 degrees Celsius.

Parents are able to recognize signs of worsening illness and readily access medical care.

You also want to ensure that the child does not have serious health concerns, anatomic abnormalities of the head and neck, or a history of complicated otitis media. If these conditions are met, the watchful waiting approach should be followed.

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Peter: So, if a child is younger than 6 months, has any of the health concerns that you listed or had more severe symptoms such as a toxic appearance, severe otalgia or a fever over 39 degrees, the watchful waiting approach goes out the window?

Sarah: You've got it. In those cases, immediate antimicrobial therapy would be the best option. You would also prescribe antimicrobials if you could not assure follow-up.

Peter: So now that we've figured out when to prescribe, what's the first line antimicrobial therapy?

Sarah: The three main bacteria that cause the vast majority of cases are *Streptococcus pneumoniae*, *Moraxella catarrhalis* and *Haemophilus influenzae*. Without a doubt, the best antimicrobial for the treatment of acute otitis media is high-dose amoxicillin. The recommended dose is 75-90 mg/kg/day, divided into two or three daily doses. A five-day course of amoxicillin is recommended for children over the age of 2. A ten-day course of amoxicillin is recommended in children younger than 2 years old, children who have failed initial antimicrobial therapy or children with complicated or recurrent acute otitis media.

There are a number of second-line agents but the main reason to choose something other than amoxicillin is an allergy to beta lactams.

Peter: Amoxicillin it is then. Let's consider a situation when a course of amoxicillin is started and the child does not get better. What should we do?

Sarah: That's a good question. After starting antimicrobials, symptoms should be improving within 1 to 2 days and should resolve within 2 to 3 days. If symptoms aren't getting better after two days of therapy, you should reassess whether acute otitis media is still your diagnosis.

If it is, you should adjust your antimicrobial therapy to address possible resistance. If the initial therapy fails, the recommended therapy is a ten-day course of amoxicillin-clavulanate to cover beta- lactamase producing organisms.

If the symptoms still do not improve 2 to 3 days after starting the new antimicrobial, you can try three doses of intramuscular ceftriaxone, refer to ENT for urgent tympanocentesis or call an ID specialist for other options.

Peter: And what should we do if there's a persistent middle ear effusion after a course antimicrobial therapy?

Sarah: I'm glad you asked that question; it brings me to an important point. Most often, you don't need to do anything about a persistent effusion. Remember that acute otitis media is preceded and followed by a middle ear effusion, which is also called otitis media with effusion. This is just the build up of fluid in the middle ear and does not need to be treated. These effusions are painless and can persist for weeks or months despite resolution of the acute otitis media.

Peter: Well, we're nearing the end of the podcast. Dr. Forgie, would you like to go over the take-home messages?

Sarah: Sure, Peter. The key things to remember are:

- A viral URTI often precedes acute otitis media by several days.
- A diagnosis of acute otitis media requires middle ear effusion, inflammation of the middle ear and an acute onset of ear related symptoms
- Most cases will resolve spontaneously in a few days without complications. Don't forget pain control!
- A watchful waiting approach is appropriate for many otherwise healthy children over six months of age.
- The first line antimicrobial treatment is high-dose amoxicillin. If the initial therapy fails, the recommended agent is amoxicillin-clavulanate. If that fails you can try three doses of intramuscular ceftriaxone, refer to ENT for urgent tympanocentesis or call an ID specialist for other options.

Peter: Thank you for joining us today Dr. Forgie. If you would like more information on this topic, Dr. Forgie and two of her colleagues have just written a new set of Canadian guidelines on the management of acute otitis media. They can be accessed by going to the website of the Canadian Pediatric Society, <http://www.cps.ca>

Thanks for listening.

Update (April 10, 2016)

Since the release of this podcast updated [CPS guidelines](#) have been released on the management of acute otitis media. While they include updated evidence, the majority of the recommendations in this podcast remain consistent with the current guidelines.

Notable changes include:

- *A watchful waiting period of 24-48 hours rather than 48-72 hours.*
- *Antibiotic treatment should be offered if symptoms have lasted longer than 48 hours.*
- *Delayed prescriptions can be given to families to fill if symptoms do not improve in 24-48 hours rather than returning for follow-up.*

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References

References available upon request.