

# Clinical and bacteriological study on acute otitis media due to *Turicella otitidis*

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## ABSTRACT

**Background:** *Turicella otitidis* is a Gram-positive bacillus recently recognized as a possible cause of acute otitis media (AOM) in pediatric patients. Little is known about the clinical and microbiological characteristics of *T. otitidis* AOM.

**Method:** Retrospective medical-chart study of consecutive *T. otitidis* AOM cases seen at a teaching hospital in Paris, from January 2000 to August 2003.

**Results:** We identified 65 *T. otitidis*-positive pediatric cases of AOM (44 boys and 21 girls, mean age 30 months). Both ears were affected in 24 patients. A protracted course with antimicrobial therapy before microbiological sampling was noted in 11 patients including 4 with incipient mastoiditis. Spontaneous drainage occurred in 19 (29%) patients including one with a grommet. In 19 other patients, a second organism was found (*Streptococcus pneumoniae*, *Haemophilus influenzae*, or *Staphylococcus aureus*). Susceptibility of *T. otitidis* to penicillin was excellent in 62 patients. Amoxicillin with clavulanic acid was the most widely used first-line treatment (29 patients). Of the 35 patients with outcome data, 34 achieved a full recovery and 1 experienced persistent drainage.

**Conclusion:** *T. otitidis* is a pathogenic bacteria found at all ages and responsible for variable clinical aspects. Widely used antimicrobials were usually effective in this series.

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**Keywords:** Amoxicillin, Microbiology, Acute otitis media, *Turicella otitidis*.

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**INTRODUCTION**

The epidemiology of acute otitis media (AOM) in the pediatric population changes over time. Both the distribution of causative organisms and their antimicrobial resistance profile vary from one year to the next in a given geographic area [1-2]. Wide variations across geographic areas occur in the bacterial flora from AOM samples. For instance, the prevalence of *Moraxella catarrhalis* has ranged across countries from 2% to 23% [3-5]. Whether organisms found mainly in chronic otitis (e.g., *Pseudomonas aeruginosa*.) play a causal role in AOM is controversial [6]. *Turicella otitidis* was identified in 1994. *Turicella* is a genus of Gram-positive coryneform bacteria, of which most members are considered normal commensals of the upper airways [7]. A pathogenic role for *T. otitidis* in AOM was suggested in 1996 [8]. However, only anecdotal case-reports have been published in the literature, a fact that has generated debate about the role for *T. otitidis* in AOM [9-11]. Recently, numerous cases of AOM with recovery of *T. otitidis* were observed in otorhinolaryngology emergency departments in Paris, France. This provided an opportunity for investigating the clinical and microbiological features of pediatric AOM with *T. otitidis* recovery.

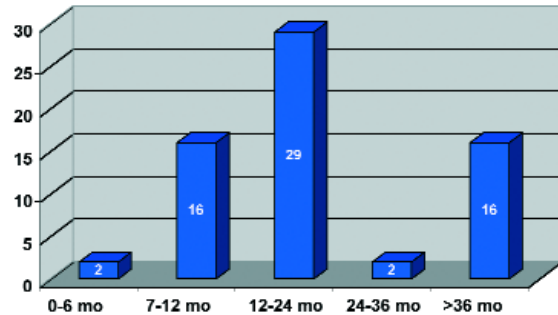
**PATIENTS AND METHODS**

We retrospectively investigated consecutive *T. otitidis*-positive AOM cases seen at the otorhinolaryngology emergency department of the Necker Children's Teaching Hospital, Paris, France, from January 2000 to August 2003. The following were abstracted from the medical charts: demographic data, clinical features, microbiology findings, treatment given after microbiology sampling, and short-term outcome.

**RESULTS**

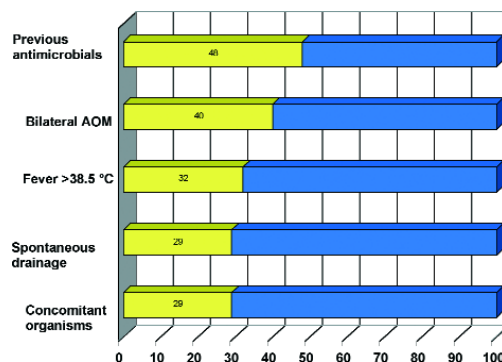
We identified 65 cases of *T. otitidis*-positive AOM in patients aged 4 to 166 months (mean age, 30 months); 54% of patients were 6 to 24 months of age (Figure 1). There were 44 boys and 21 girls. These 65 cases represented 3% of all microbiologically documented AOM cases seen at our institution over the 3.5-year study period. *T. otitidis* was the fifth most common ear pathogen in our institution, after *Streptococcus pneumoniae*, *Hemophilus influenzae*, *Staphylococcus aureus*, and *P. aeruginosa*.

**Figure 1: Age at onset of *Turicella otitidis*-positive acute otitis media (n=65).**



A fever of more than 38.5 °C was present in 27 (60%) of 45 patients for whom body temperature was recorded. Severe pain, a protracted course, tympanic membrane perforation, or marked tympanic membrane bulging prompted the microbiological study. Spontaneous drainage was noted in 19 (29%) patients including 1 patient with a grommet. Nearly half the patients (31/65, 48%) received antimicrobial therapy before microbiological sample collection; among them, 4 patients presented with incipient mastoiditis (Figure 2). In 19 (29%) patients, cultures recovered a second organism: *S. pneumoniae*, n=7; *H. influenzae*, n=6; and *Staphylococcus aureus*, n=6 (Figures 3 and 4). *T. otitidis* was susceptible to penicillin and amoxicillin in 62 (95%) patients and to aminoglycosides, ofloxacin, vancomycin, and rifampin in 1 patient; in 2 patients, antibiotic susceptibility test results could not be interpreted.

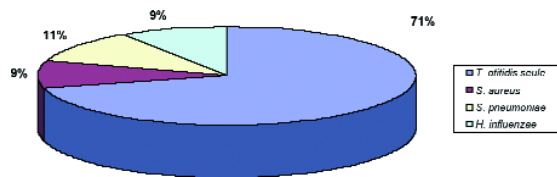
**Figure 2: Clinical features in 65 pediatric patients with *Turicella otitidis*-positive acute otitis media.**



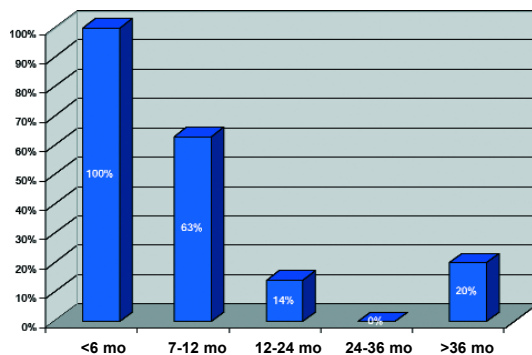
After sample collection, the treatments prescribed were nearly always consistent with recommendations for highly painful or protracted AOM. The following antibiotics were used: amoxicillin-clavulanic acid (29 patients, 44.6%), ceftriaxone (9 patients, 13.9%), cefixime (6 patients, 9.3%), cefotaxime (1 patient, 1.5%), and cefuroxime axetil (1 patient, 1.5%).

## Turicella otitidis Otitis

**Figure 3: Concomitant bacteria.**

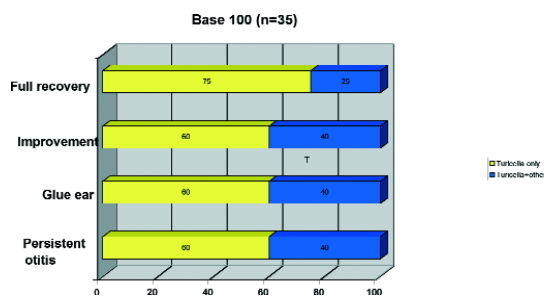


**Figure 4: Presence of a second organism according to age.**



Outcome data were available for 35 (54%) patients, of whom 34 (97%) promptly achieved a full recovery. In 1 patient, the course was protracted, but no complications occurred (Figure 5). In none of the patients were the antibiotics changed because of the microbiology findings.

**Figure 5: Outcomes according to microbiological findings.**



## DISCUSSION

The clinical and microbiological roles for *T. otitidis* in pediatric otitis remain unclear [12]. The present series of 65 patients with *T. otitidis*-positive AOM is by far the largest in the international literature. The microbiological characteristics of the *T. otitidis* strains are worthy of note. Susceptibility to penicillin and amoxicillin was the rule. The 3 (4.5%) strains with in vitro penicillin resistance were susceptible to amoxicillin,

in keeping with data from the literature [13]. Furthermore, in 48% of cases, *T. otitidis* was recovered despite previous treatment with an antimicrobial considered active against the pathogens usually responsible for AOM; interestingly, these antimicrobials were active against the *T. otitidis* strains recovered in the present series. Poor treatment compliance, limited bioavailability, and possible sample contamination should be considered in view of these findings. The retrospective design of our study precluded an evaluation of these three potential factors.

The patients were seen at an emergency department and were not given appointments for follow-up visits. As a result, data on the short-term outcome after antimicrobial therapy were available for only 54% of the patients. The 30 patients lost for follow up are due to the fact that they were seen in the emergency unit and no appointment was given for a systematic clinical follow up. Of the 35 patients with follow-up data, 97% experienced a full recovery or marked improvement within 3 to 15 days of sample collection. Regardless of the treatment used, the clinical outcome was favorable. No firm conclusions regarding the optimal treatment can be drawn from our data; nevertheless, amoxicillin in a dosage that covers the overwhelming majority of *S. pneumoniae* strains [5, 14-15] seems consistently effective.

During the study period, 3% of cases of microbiologically documented AOM managed at our institution were associated with *T. otitidis*, which was the fifth most common pathogen found in AOM samples. *T. otitidis* was the only pathogen in 71% of the samples. This raises the possibility that *T. otitidis* may be pathogenic in pediatric AOM, in keeping with studies indicating a potential pathogenic role [10-11]. Alternatively, recovery of *T. otitidis* in AOM samples may indicate contamination by a commensal strain or a strain present in the environment near the middle ear. *P. aeruginosa* has been described as an opportunistic organism that originates in the external auditory canal and proliferates in ear effusions due to other factors, which are usually responsible for chronic otitis [6]. Similarly, *T. otitidis* may be an opportunistic organism in patients with AOM due to common pyogenic bacteria masked by previous antibiotic therapy or in patients with postinfectious inflammatory ear effusion. A key consideration in the debate about the pathogenic role for *T. otitidis* is the clinical picture that leads to microbiological sampling. The clinical profile in our patients was consistent with expecta-

tions for a pediatric population with AOM [16]. However, the known predominance of males in infants and children with AOM [17] was particularly high (M/F ratio > 50%) in our study. A detailed study of a comparable pediatric population with AOM due to common pyogenic bacteria would be useful for identifying the clinical features associated with *T. otitidis*.

### CONCLUSION

*T. otitidis* was found in 3% of pediatric patients with AOM managed at an otorhinolaryngology emergency department over a 3.5-year period. We are not aware of previous data reporting similarly high rates. No specific clinical features were identified compared to AOM ascribed to other organisms. Widely used antibiotics ensured recovery in the overwhelming majority of cases. In order to evaluate the impact of our results on the general management of AOM in children, a prospective microbiological study needs to be undertaken with as a control group, patients with common bacteria and try to find predictive clinical factors of *T. otitidis*.

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