



# The role of respiratory viruses in acute myringitis in children less than 2 years of age

M.J. Kotikoski\*, A.A.I. Palmu, J. Nokso-Koivisto, M. Kleemola

*Department of Otorhinolaryngology, Tampere University Hospital, Hämeenpuisto 1 A 28,  
PO Box 2000, 33210 Tampere, Finland*

---

**Keywords:** Bullous myringitis; Otitis media; Virology; Respiratory infection; Children

---

## 1. Background

Acute bullous myringitis (BM) is a clinical manifestation with blisters on the tympanic membrane. The etiology of BM remains controversial although it is usually considered similar to that of acute otitis media (AOM). In most cases of BM, a bacterial pathogen has been detected from the middle ear, but the role of respiratory viruses has remained unclear.

## 2. Objective

The objective of this study is to assess the frequency of respiratory viruses in the nasopharyngeal aspirate (NPA) and in the middle ear fluid (MEF) in BM, and to compare the viral distribution with AOM.

## 3. Methods

A prospective longitudinal cohort study of 2028 children, aged 7 to 24 months, in the FinOM Vaccine Trial during 1997–1999. BM was defined as an inflamed tympanic membrane with blister(s) detected in otoscopy. NPA and MEF samples taken at the diagnosis of BM and AOM (if middle ear fluid was detected) were analysed by a time-resolved fluoroimmunoassay (TR-FIA) for antigen detection of adenoviruses, influenza

---

\* Corresponding author. Tel.: +358-32124450.

E-mail address: kotikoski@koti.tpo.fi (M.J. Kotikoski).

Table 1

The detection rates of different respiratory viruses in nasopharyngeal aspiration (NPA) and middle ear fluid (MEF) samples in children with bullous myringitis (BM) and acute otitis media controls (AOM)

Virus type	Nasopharyngeal aspirate (NPA)		Middle ear fluid (MEF)	
	BM (n = 80)	AOM (n = 298)	BM (n = 82)	AOM (n = 415)
Human rhinoviruses, %	38	22	11	10
Human enteroviruses, %	20	26	9	16
Respiratory syncytial virus, %	9	15	4	11
Influenza virus A, %	6	4	2	1
Influenza virus B, %	0	0	0	0
Adenoviruses, %	1	3	0	1
Parainfluenza virus 1, %	1	1	0	0.2
Parainfluenza virus 2, %	0	0	0	0
Parainfluenza virus 3, %	4	0	1	0
Dual virus detection, %	9	7	0	0.1
Positive for any virus, %	70	64	27	37
Negative for viruses, %	30	36	73	63

viruses A and B, respiratory syncytial virus and parainfluenza viruses 1, 2 and 3, and by reverse transcription polymerase chain reaction (RT-PCR) for human rhinoviruses and human enteroviruses.

#### 4. Results

BM was diagnosed in 82 children, in 92 ears. A respiratory virus was detected from NPA in 70% of BM and in 64% of AOM events. MEF was virus positive in 27% of BM and in 37% of AOM ears. Human rhinoviruses (11%) and human enteroviruses (9%) were most commonly detected in BM. Respiratory syncytial virus (4%) and influenza virus A (2%) and parainfluenza virus (1%) were also detected from the MEF. The viral distribution was similar to that in AOM (Table 1).

A bacterial pathogen (*S. pneumoniae*, *H. influenzae* or *M. catarrhalis*) was found in 76% of cases of BM. There was only one ear (1%) that was bacteriologically sterile, and a (rhino) virus was found in the MEF (Fig. 1).

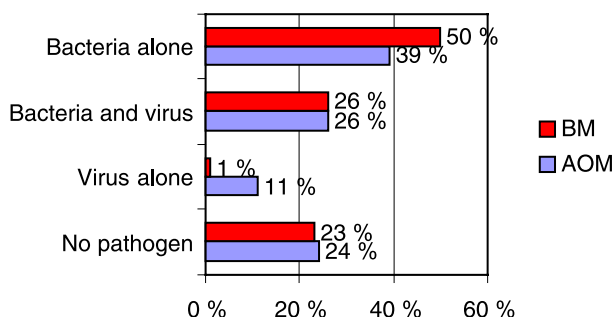


Fig. 1. The etiology of bullous myringitis (BM) and acute otitis media (AOM).

## **5. Conclusions**

We could not confirm any specific respiratory virus to be the etiologic agent of BM. However, the high rate of virus detection during the course of acute myringitis supports the concept of viral contribution to the pathogenesis of the disease. The etiology of BM is similar to that of AOM in children less than 2 years of age.