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Case Report

Complication of otitis media leads to opisthotonos in a toddler

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ABSTRACT

Opisthotonos, extreme involuntary neck and back extension, is rarely seen in modern emergency departments. Vaccines have prevented the most common causes of this clinical presentation. Alternatively, otitis media is one of the most common pediatric infections and is characteristically non-invasive and harmless. In exceedingly rare cases, otitis media can develop complications and progress to invasive pneumococcal diseases including mastoiditis and meningitis. *Streptococcus pneumoniae* accounts for the majority of otitis media infections, however, since the introduction of the 7-valent pneumococcal conjugate vaccine (PCV7) and 13-valent pneumococcal conjugate vaccine (PCV13) otitis media and its complications have decreased significantly. The present case reports of a previously healthy and immunized child presenting to a pediatric emergency department (PED) with opisthotonos, and was found to have pneumococcal meningitis, bacteremia and mastoiditis arising from otitis media.

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1. Introduction

Opisthotonos, extreme involuntary neck and back extension, is rarely seen in modern emergency departments. Alternatively, otitis media is one of the most common pediatric infections, characteristically non-invasive and harmless [1,2]. In exceedingly rare cases, otitis media can develop complications, such as invasive pneumococcal diseases including mastoiditis and meningitis, most commonly due to *Streptococcus pneumoniae* [3,4]. The present case reports a previously healthy and immunized child presenting to a pediatric emergency department (PED) with opisthotonos, and was found to have pneumococcal meningitis, bacteremia and mastoiditis from otitis media.

2. Case report

A 17-month-old, healthy, immunized girl presented to the PED with two days of worsening neck and back arching, and with vomiting, in the setting of a recent acute otitis media (right ear). She completed three days of high dose oral amoxicillin and intermittent dosing of antipyretics. Her fever improved after the first day of amoxicillin. She was unable to walk for two days prior to presentation to the PED. She had no previous otitis media infections, surgeries, recent wounds and did not attend daycare. On exam, she was afebrile, tachycardic and

normotensive for age. In the supine position, her neck and back were extended such that her thoracic and lumbar spines were lifted off the bed, and thus preferred to lie on her side, where the opisthotonos remained. Her right tympanic membrane was intact, bulging and opaque. Her left tympanic membrane was opaque, but not bulging. She had bilateral anterior cervical lymphadenopathy. Her skin was mottled but warm, and her capillary refill time was 3 s. She was irritable, difficult to console and had no improvement with intravenous fluids and ketorolac. Complete blood count revealed elevated white blood cells (WBC) (9.9 thousand/mm³), with 32% neutrophils and 41% bands. The C-reactive protein (145 mg/L) and procalcitonin (6.91 ng/mL) were elevated. Urinalysis showed no signs of infection. Blood and urine cultures were obtained, and broad spectrum antibiotics, including Ceftriaxone and Vancomycin were initiated. A head computed tomography (CT) scan revealed opacified right middle ear and mastoid cavities (Fig. 1). A lumbar puncture (LP) revealed elevated WBC (1008 thousand/mm³) and protein (68 mg/dL).

On hospital day (HD) 2, her blood and cerebral spinal fluid (CSF) cultures returned positive for *S. pneumoniae*, and she was continued on broad spectrum antibiotics. She underwent myringotomy with tube insertion and mastoidectomy, which showed copious clear fluid with some purulence and an area of thinned bone on the mastoid. On HD 3, a femoral peripherally inserted central catheter (PICC) was placed for 14-day Ceftriaxone treatment. The initial cultures showed *S. pneumoniae* was resistant to Penicillin and Ceftriaxone. However, on HD 11, a final LP documented sterility of CSF. The antibiotic treatment was completed on HD 14, the PICC was removed, and the patient was

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Fig. 1. A head computed tomography (CT) image (axial view) showing the right mastoid air cells and middle ear completely opacified as indicated by the arrow.

discharged on HD 16 after returning to a playful ambulating toddler at her baseline activity level.

3. Discussion

Opisthotonos is a rare clinical feature presenting in scenarios including, meningitis, tetanus, drug toxicity, Chiari malformations, asphyxia, trauma, encephalitis, cerebral palsy and neurosurgical patients [5,6]. Opisthotonos occurs when the axial muscles along the spinal cord spasm and cause the body to hyperflex with the head and heels arched back [5].

Otitis media is one of the most common infections seen in children under 5-years-old [1]. This typically non-invasive and harmless infection peaks between 6 and 18 months [2]. In rare cases, complications can arise, such as acute mastoiditis, suppurative labyrinthitis and acute petrositis [5]. These complications may progress intracranially, most notably to meningitis [1,3,4,7].

Streptococcus pneumoniae comprises of 30–55% of otitis media cases with potential to develop complications such as pneumonia, bacteremia and pneumococcal meningitis [1,3,4]. In 2000 and 2010, PCV7 and PCV13 were introduced, respectively, and have been effective in decreasing the prevalence of otitis media and its complications, impacting mastoiditis the most [1,2,7,8]. PCV13 prevented approximately 30,000

cases of invasive pneumococcal disease and 3000 deaths, a 48% decline of otitis media cases, a 53% decline in invasive pneumococcal disease in children <2 years old with an 86.0% vaccine effectiveness against PCV13 serotypes [1,3,4,8]. While our patient's blood and CSF cultures grew *S. pneumoniae*, the organism was subcultured and sent to our state lab for serotyping where it did not grow, likely due to a technicality. Thus, our patient may have been infected with a serotype that is not included in the vaccine.

In most pneumococcal meningitis cases, infection advancement is related to a susceptible host with advanced age, immunodeficiency, or blood/brain barrier integrity disruption, none of which were present in our patient [2]. Terao et al. hypothesized the connections between hematopoietic bone marrow and middle ear of an infant could cause childhood otogenic meningitis [9]. These connections were thought to close between 16 and 18 months [9]. On the other hand, our patient had *S. pneumoniae* bacteremia which may have also seeded her meninges.

4. Conclusion

This case serves to recognize rare opisthotonos in a healthy, immunized toddler as a presentation of meningitis in the post-vaccine era.

Authors' contribution

All authors provided substantial contributions to the case report.

Declaration of competing interest

None.

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