GROUP A STREPTOCOCCAL MENINGITIS AS A COMPLICATION OF EAR INFECTION WITH SIXTH AND SEVENTH CRANIAL NERVE INVOLVEMENT

Asma Mohammadi, MD[1], Yassin Mohamed, MD[2], Gerritt Lagemann, MD[3]

1. Department of Medicine, UPMC Mercy, University of Pittsburgh Medical Center
2. Division of Infectious Diseases, University of Pittsburgh Medical Center
3. Department of Radiology, University of Pittsburgh Medical Center

BACKGROUND

- Group A Streptococci (GAS), or Streptococcus pyogenes, is a Gram-positive beta-hemolytic bacterium historically linked to acute pharyngitis, rheumatic fever, and skin and soft tissue infections.
- Recent studies reveal rising cases of GAS infections such as mastoiditis, pneumonia, and osteomyelitis[1].
- GAS is a rare cause of acute bacterial meningitis (<0.2% of cases)[2].
- We present a case of a young woman displaying right mastoiditis, meningitis, and ventriculitis due to GAS infection.

CASE SUMMARY

- A previously healthy 35-year-old woman presented due to a two-week duration of a sore throat, a right ear infection, and a two-day decline in mental status.
- She was tachycardic, febrile, and had leukocytosis 26.1 K.
- Exam findings indicated right seventh and bilateral sixth cranial nerve palsies.
- Brain MRI showed right mastoiditis and skull base osteomyelitis—no cerebritis or cerebral abscess.
- She underwent mastoidectomy and tube placement.

CASE SUMMARY

- CSF analysis indicated bacterial meningitis but with 2000 WBC. Vancomycin, cefepime, and steroids were started.
- Blood and OR cultures returned positive for GAS.
- She was treated with Ceftriaxone for 6 weeks for skull base osteomyelitis.
- A month after discharge, she complained of dizziness and gait instability on a follow-up visit.
- Brain MRI showed an extension of the right sided mastoiditis along right internal auditory canal and right facial nerve, along with labyrinthitis.

DISCUSSION

- In a prospective observational cohort study conducted by MJ, Lucas et, al, GAS was identified in 2% (26 of 1322) of patients with community-acquired bacterial meningitis[3].
- This combination of sixth and seventh cranial nerve involvement secondary to meningitis related to complicated ear infection is extremely unusual.
- Our patient did not display any meningeal signs, however, despite treatment, her infection progressed from mastoiditis to ventriculitis to labyrinthitis.
- The reason for our patient's complications was due to a delay in seeking medical attention.
- Ear infections need to be treated early and aggressively, especially if there is mastoid involvement to avoid potential CNS complications.

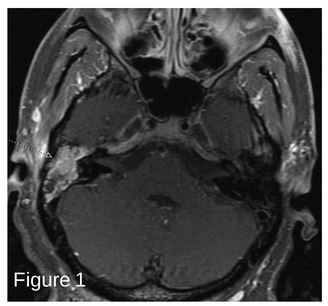


Figure 1

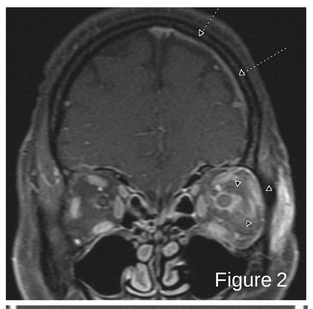


Figure 2

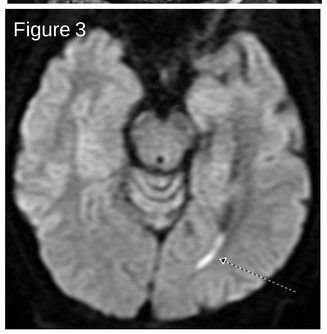


Figure 3


Figure 4

- Figure 1. Enhancement of the mastoid air cells (arrow) consistent with mastoiditis.
- Figure 2. Pachymeningeal thickening and avid enhancement (arrows) consistent with pachymeningitis. Increased enhancement of the left orbital retrobulbar fat (arrowheads) is consistent with retrobulbar inflammation.
- Figure 3. A collection with marked internal reduced diffusion layering within the left lateral ventricle occipital horn (arrow). This collection represents pus from ventriculitis.
- Figure 4. Coronal temporal bone CT imaging shows a focal subtle defect within th e tegmen mastoideum (arrow). This defect is the likely site of spread of infection from the mastoid air cells (mastoiditis) to the intracrania l contents (meningitis and ventriculitis).

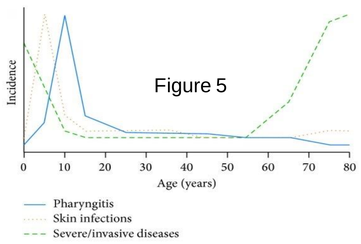
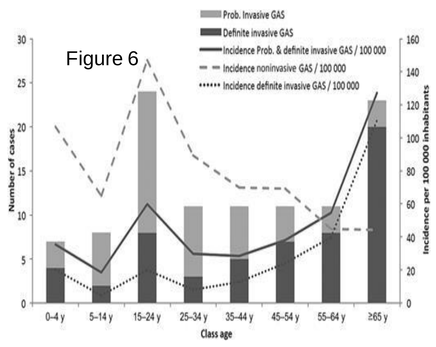


Figure 5: Schematic representation of incidence of group A streptococcal diseases by age using data from epidemiological reports.
Tsoi SK, et al. doi: 10.1155/2015/167089.

Figure 6: Age distribution and incidence of invasive and noninvasive group A streptococcal diseases, (n = 311), 2012.
Baroux N, et al. Clin Infect Dis. 2014 doi: 10.1093/cid/ciu49.



REFERENCES

1. Laakso JT, Rissanen V, Ruotsalainen E, Korpi J, et, al. Severe acute otitis media and mastoiditis caused by group A beta-hemolytic streptococcus. Laryngoscope Investig Otolaryngol. 2021 Sep 16;6(5):1158-1166. doi: 10.1002/lio2.659. PMID: 34667861; PMCID: PMC8513450.
2. Randhawa E, Woytanowski J, et, al. Streptococcus pyogenes and invasive central nervous system infection. SAGE Open Medical Case Reports. 2018;6. doi:10.1177/2050313X18775584
3. 3. Lucas MJ, Brouwer MC, et al. J Infect. 2015 Jul;71(1):37-42. doi: 10.1016/j.jinf.2015.01.008. Epub 2015 Jan 20. PMID: 25614959.