HO CHI MINH CITY ENT HOSPITAL

TREATMENT OF ACUTE MASTOIDITIS IN CHILDREN

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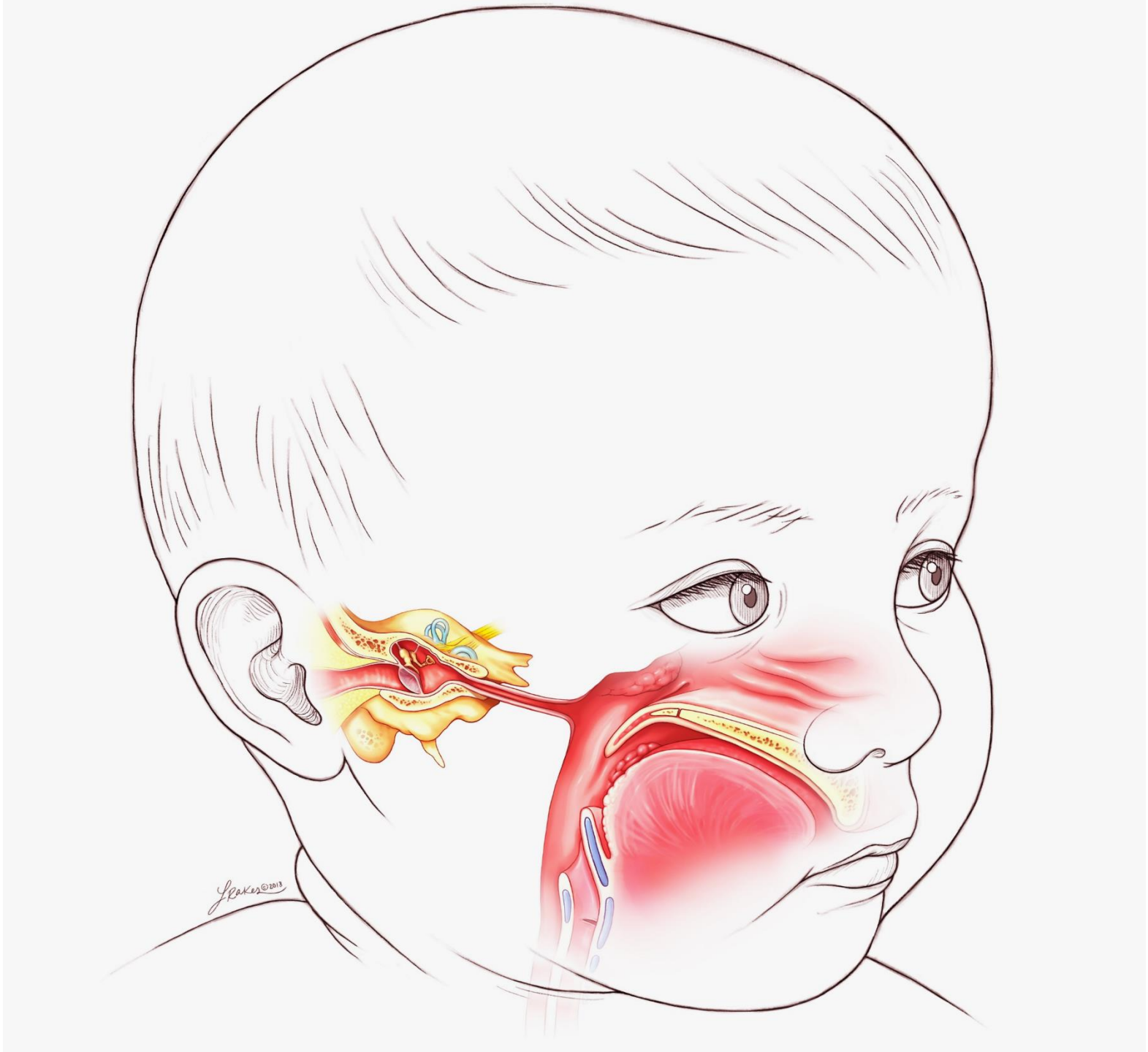
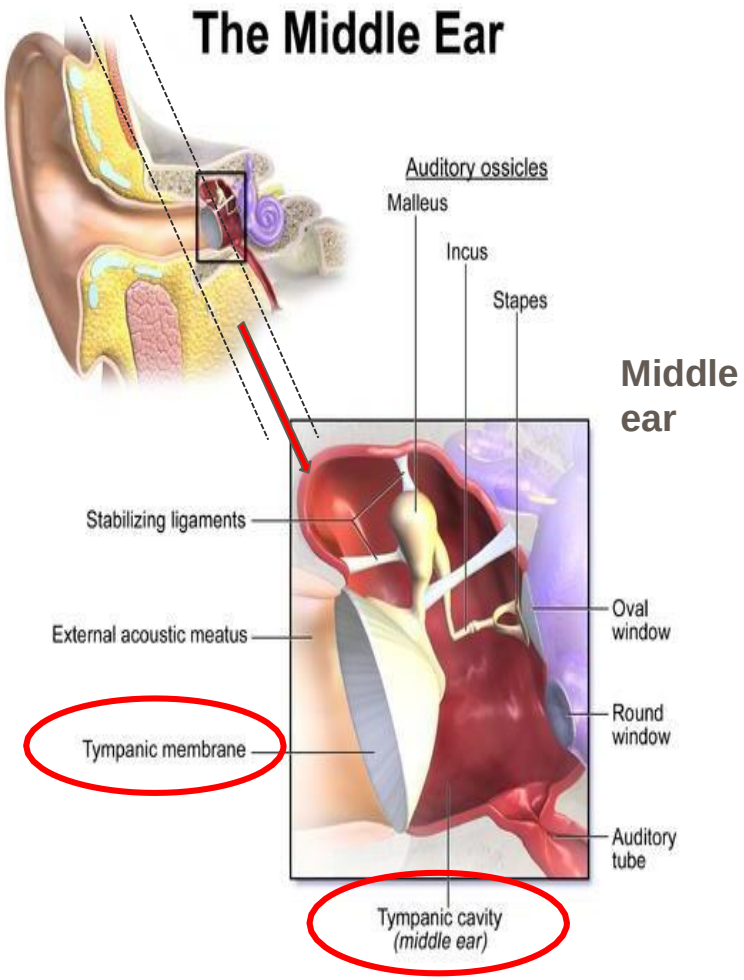


WHAT IS OTITIS MEDIA?



Otitis media: all infections occur in middle ear cavity[1]

Risk factors:

- Recurrent upper respiratory tract infection
- Tonsilitis and adenoiditis
- Chronic rhinosinusitis
- Allergic rhinitis
- Cleft palate
- Nasopharyngeal tumor….

Symptoms:

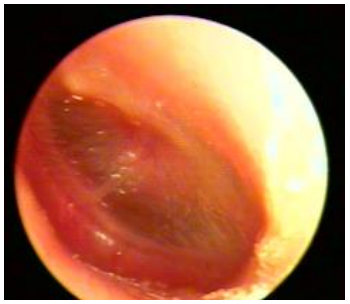
- Acute nasopharyngitis
- Fever
- Ear pain
- Ear discharge
- Tinnitus
- Hearing loss

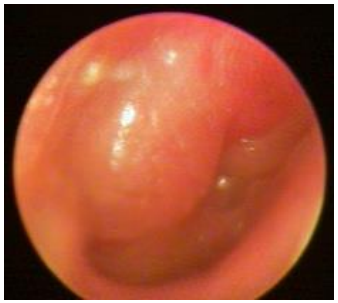
Signs: Otoscopy

1. Monasta L, *et al. PLoS One* 2012;7(4):e36226.
Image: Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". *WikiJournal of Medicine* 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436.

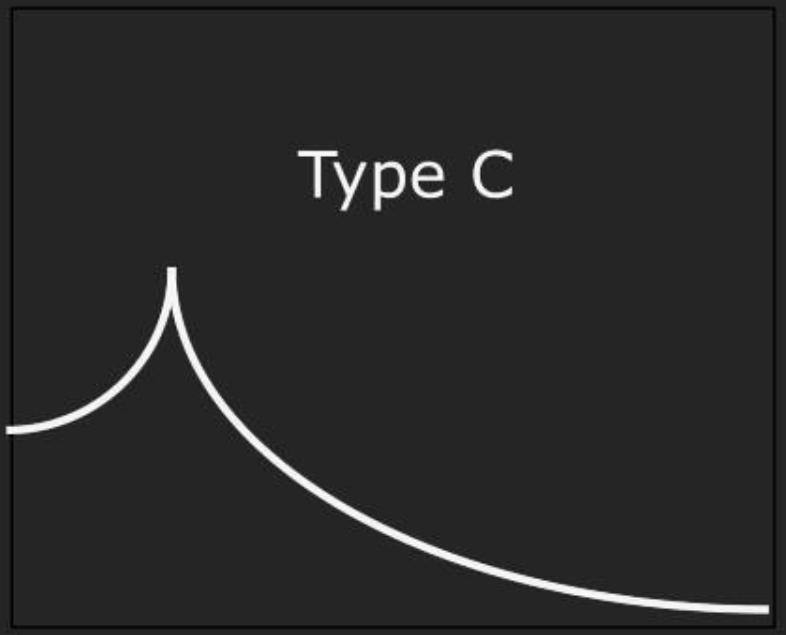
ACUTE OTITIS MEDIA

- Hyperemia stage
  - High fever
  - Ear pain
  - Tinnitus
  - Hearing loss
  - Tympanic membrane: hyperemic around the periphery, hyperemic along the handle of malleus
- Suppurative stage
  - More pronounced signs of infection
  - Ear pain: worsen, radiate to the temporal region, hearing loss
  - Tympanic membrane: swelling, redness, loss of light reflex, bulging (convex, resembling a watch glass)
- Ruptured stage:
  - Reduced fever, reduced ear pain
  - Tympanic membrane perforation
  - Ear discharge through perforation




Tympanometric Configurations: Middle Ear Pathology



- Negative pressure
  - Eustachian Tube dysfunction
  - Developing otitis media
  - TM retraction

AOM CAN LEAD TO COMPLICATIONS AND SEQUELAE

- If the first episode of AOM is not properly treated, it can lead to different forms of AOM, such as CSOM.[1,2]
- CSOM is associated with a high mortality rate due to complications such as brain abscess and meningitis[3]
- The most common complications of AOM include:[1]
  - Hearing loss → Delayed mental development
  - Labyrinthitis
  - **Mastoiditis with periosteal abscess**
  - Facial paralysis
- Less common complications:[1]
  - Brain abscess
  - Meningitis
  - Dural sinus thrombosis

AOM: Acute Otitis Mediia; CSOM: Chronic Supprative Otitis Media

1. Bluestone. Pediatr Infect Dis J 2000; 19: S37–46. 2. Bluestone. Int J Pediatr Otorhinolaryngol 1998; 42:207-23. 3. WHO 2004. Chronic suppurative otitis media: burden of illness and

AOM COMPLICATIONS

Acute mastoiditis

Peripheral facial paralysis

Epidural abscess

Brain abscess

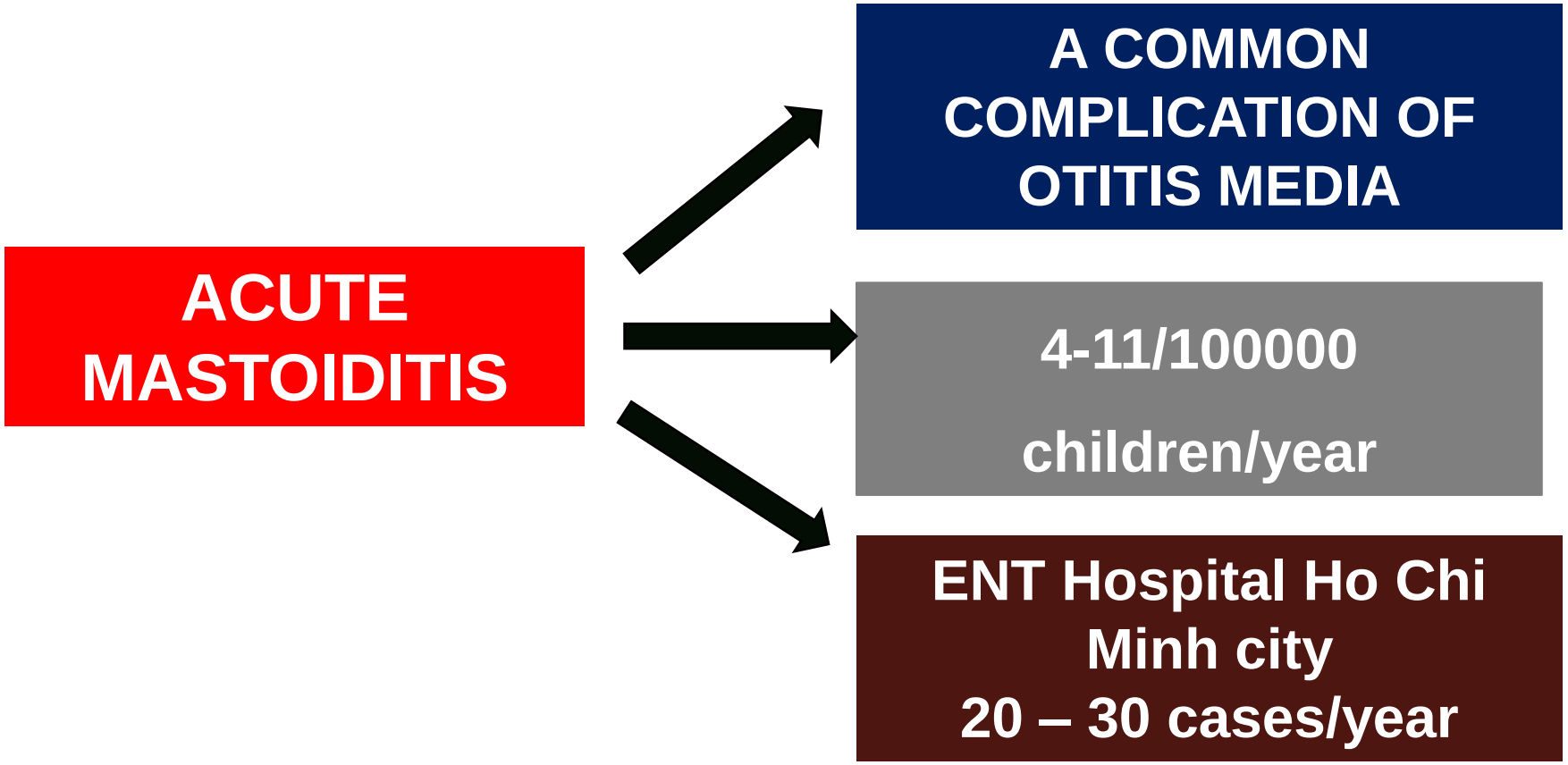
CAUSATIVE PATHOGENS IN AOM

CAUSATIVE PATHOGEN (96% AOM)	Frequency (%)
Bacteria and Virus	66 %
❑Bacteria: •*S. Pneumoniae* (40 – 50%) •*H. influenzae* and NTHi* (30 – 40%) •*Moraxella catarrhalis* (10 – 15%) •*Streptococcus pyogenes* (10 – 15%)	26%
❑ Virus : ➢ Rhinovirus ➢ Respiratory syncytial virus ➢ Parainfluenza virus ➢ Influenza viruses ➢ Enteroviruses ➢ Adenoviruses	4%

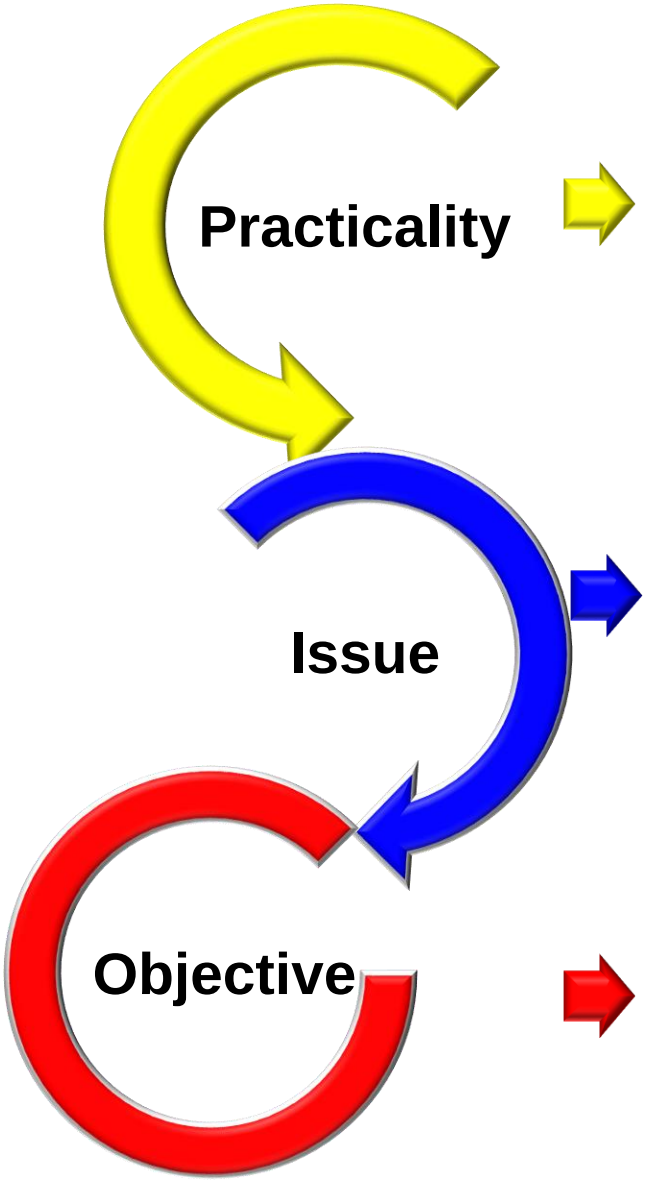
AAP. Diagnosis and management of AOM. Pediatrics 2013

ACUTE OTITIS MEDIA IN CHILDREN - UPTODATE 2016

PROBLEM STATEMENT



PROBLEM STATEMENT



The increasing trend of acute mastoiditis in children.

Difficulty in predicting the effectiveness of medical treatment.

Increased risk of requiring surgical intervention.

Contributing to the study of clinical presentation, investigation and treatment of acute mastoiditis in children.

RESEARCH OBJECTIVE

General objective:

- Study the clinical presentation, investigation and treatment of acute mastoiditis in children at ENT hospital HCMC

Specific objectives:

1. Study the clinical presentation of acute mastoiditis in children
2. Study the investigation of acute mastoiditis in children
3. Evaluate the effectiveness of treatment for acute mastoiditis in children

RESEARCH SUBJECT AND METHOD

1. Study design: case series

2. Research subject

▪Sample population: All pediatric patients ≤ 15 years old diagnosed with acute mastoiditis and treated at the ENT Hospital

▪Sample size:

- Research group: All pediatric patients ≤ 15 years old diagnosed with acute mastoiditis and treated at the Pediatric and General Department of the ENT Hospital from January 2015 to December 2019.

RESULT AND DISCUSSION

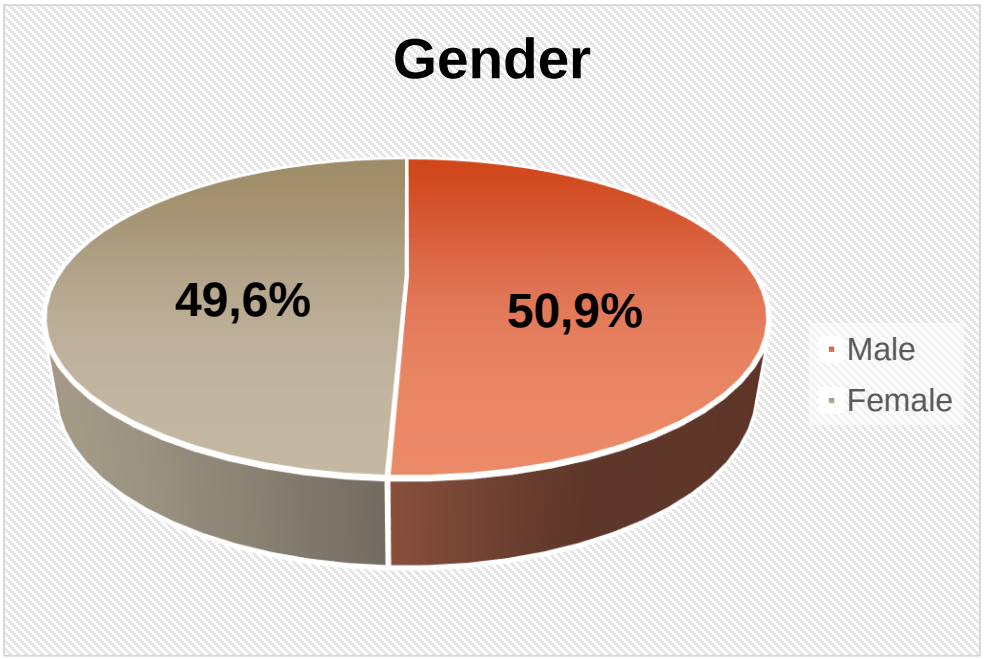
a/ General characterisitcs: Age

	Number of patients	Percentage (%)
≤ 1 year	2	2%
1 – 3 years	**84**	**73%**
> 3 years	**29**	**25%**
Total	115	100%

Average age 3,18 ± 2,3
Youngest: 8 months, Oldest: 14 years

RESULT AND DISCUSSION

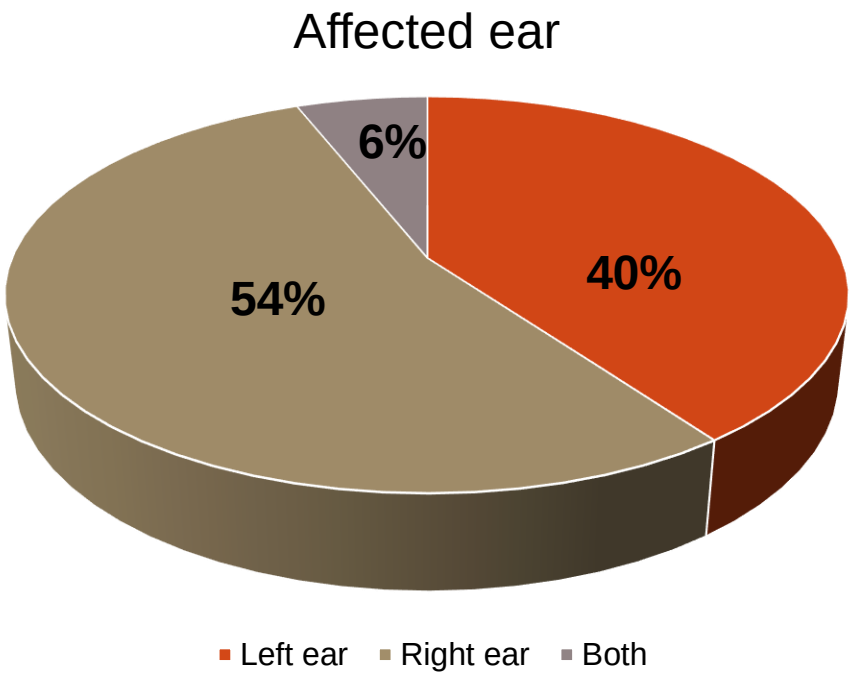
Gender



The total number of cases in the study is 115, with a Male:Female of 1,01:1

RESULT AND DISCUSSION

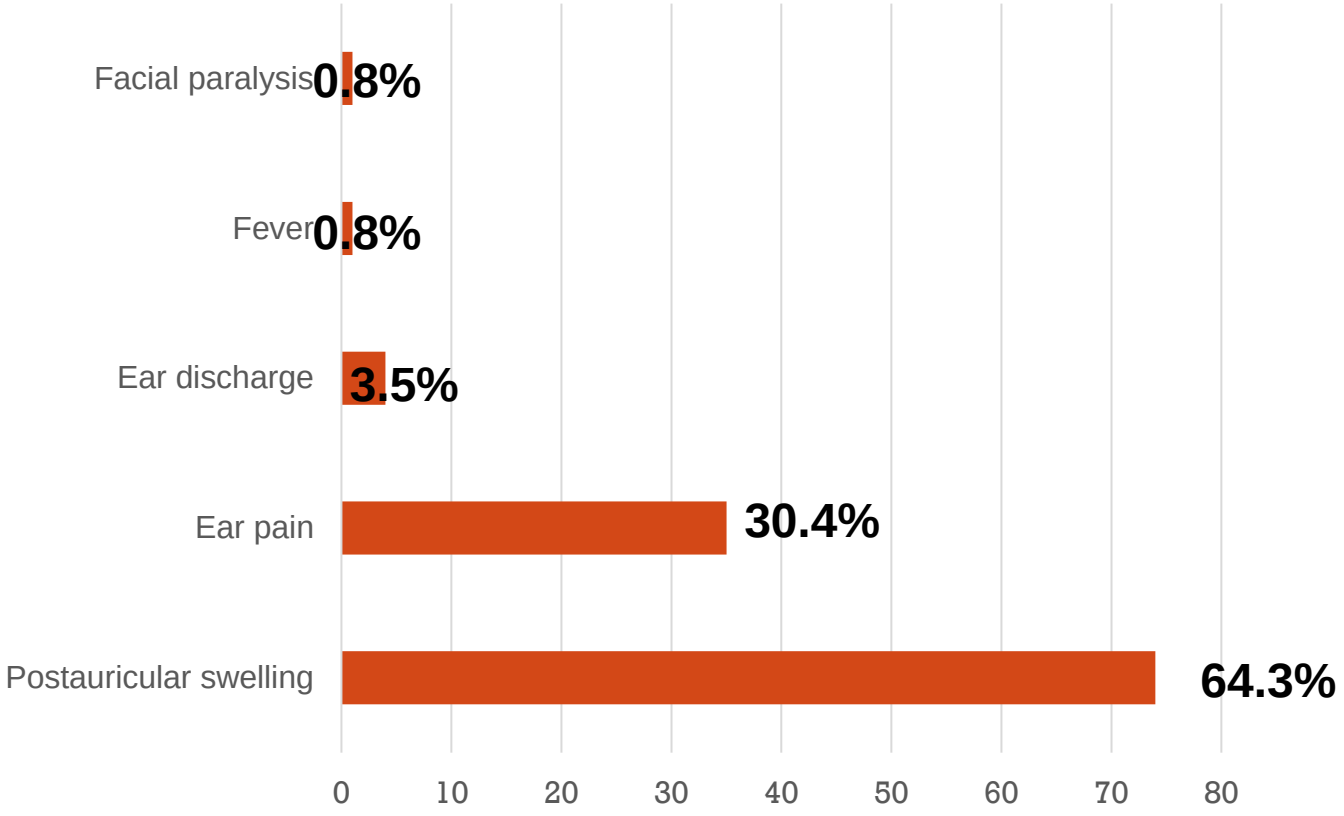
Side



Most cases of acute mastoiditis involved only one ear, with the right ear being affected more often than the left ear. There were 7 cases (6%) where both ears were affected.

RESULT AND DISCUSSION

Reason for admission



RESULT AND DISCUSSION

Complete blood count

	Medication (n = 64)	Surgery (n= 51)
WBC count (x10^9/l)	16,5 ± 5,3 (7,45 – 31,3)	17,5 ± 6,6 (9,4 – 35,93)

- White blood cells count between the two groups, those receiving only medical treatment and those undergoing surgery, showed no significant difference.
- An elevated white blood cell count is not an indication for surgery but should be based on the patient's clinical progress

RESULT AND DISCUSSION

Imaging

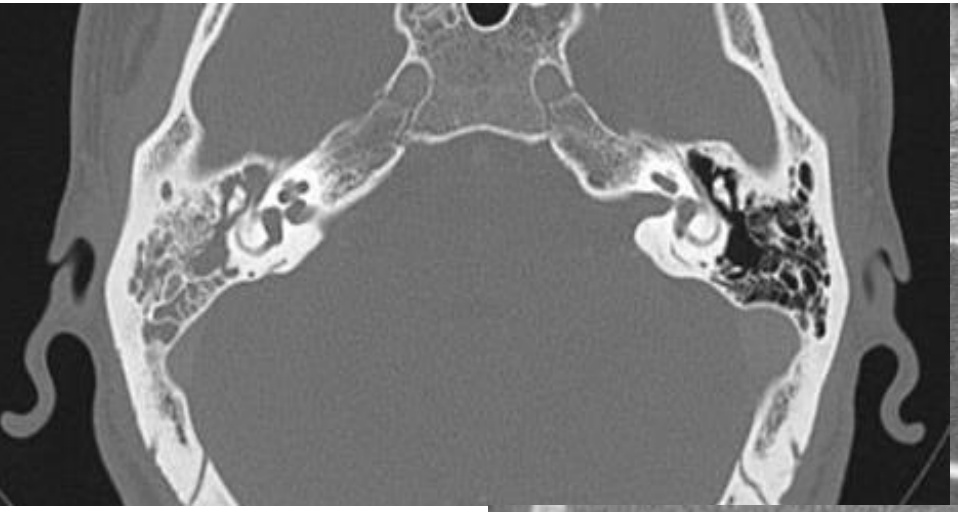
Imaging	Number of patients	Percentage(%)
Schuller X-ray	78	67,8
Temporal bone CT-scan	37	32,2

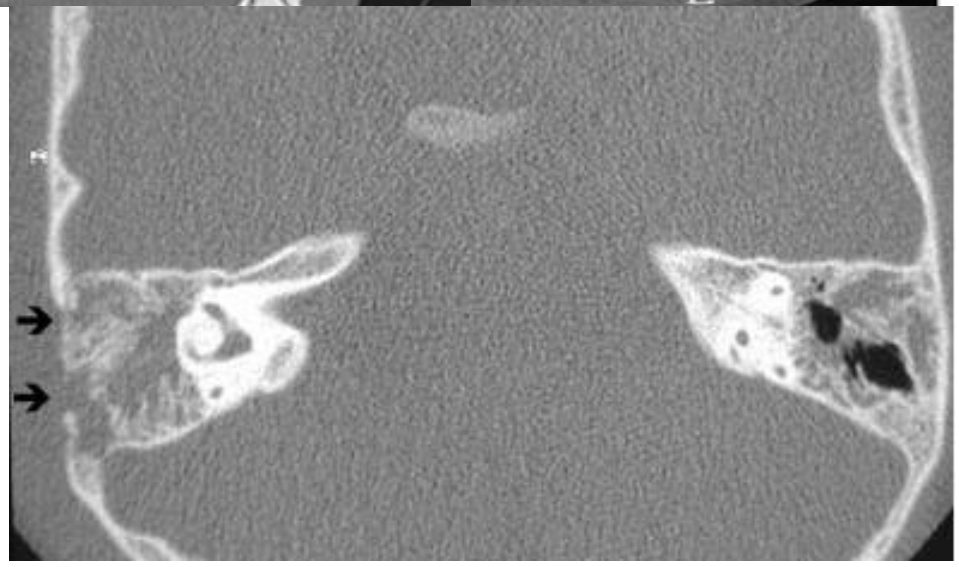
- Schuller X-ray (78/115): Images show bone erosion or opaque mastoid air cells.
- Temporal bone CT-scan (37/115): Images show mastoid bone erosion

RESULT AND DISCUSSION

Acute mastoiditis	CTscan
Acute mastoiditis without periostitis and osteitis	Opaque area corresponding to the inflammation of the mastoid air cells with no signs of bone destruction.
Acute mastoiditis with periostitis	Thickening of the periosteum and soft tissue behind the ear, with no signs of osteitis or bone destruction.
Acute mastoiditis with osteitis	CT images showing osteitis with bone destruction: ○Loss of the bone septum between the mastoid air cell ○Mastoid bone cortex destruction with discontinuity ○Thickening of the periosteum, with subperiosteal abscess

RESULT AND DISCUSSION





RESULT AND DISCUSSION

Treatment

	Number of patients	Percentage (%)
Medication	64	55,7%
Medication + surgery	51	44,3%
Total	115	100%

RESULT AND DISCUSSION

- Medical treatment goals
  - Eliminate the infection
  - Prevent the spread of infection to surrounding structures around the mastoid bone.

  → Identify the causative bacteria

  → Choose appropriate antibiotics based on antibiotic susceptibility results, administer antibiotics via the most effective route, ensure adequate duration of antibiotic use, and closely monitor the patient's response.
- Surgical treatment goals
  - Drain all pus and remove necrotic bone.
  - Restore the normal ventilation of the mastoid antrum and epitympanum

RESULT AND DISCUSSION

- Medication-only treatment accounts for 55.7% of cases
- The initial antibiotic choices: Intravenous Ceftazidime, with some cases using Ceftriaxone, Augmentin, or Cefuroxime.
- Empirical antibiotic choice:
  - No history of recurrent acute otitis media or recent use of antibiotics: antibiotics should cover common pathogens (S. pneumoniae, S. pyogenes, S. aureus, H. influenzae).
  - For recurrent acute otitis media or recent antibiotic use: P. aeruginosa-targeted antibiotics should be used until culture, staining, antibiogram results are obtained.
  - Children with recurrent acute otitis media (under 6 months): treatment should include a combination of antibiotics covering both gram-positive and gram-negative bacteria.

RESULT AND DISCUSSION

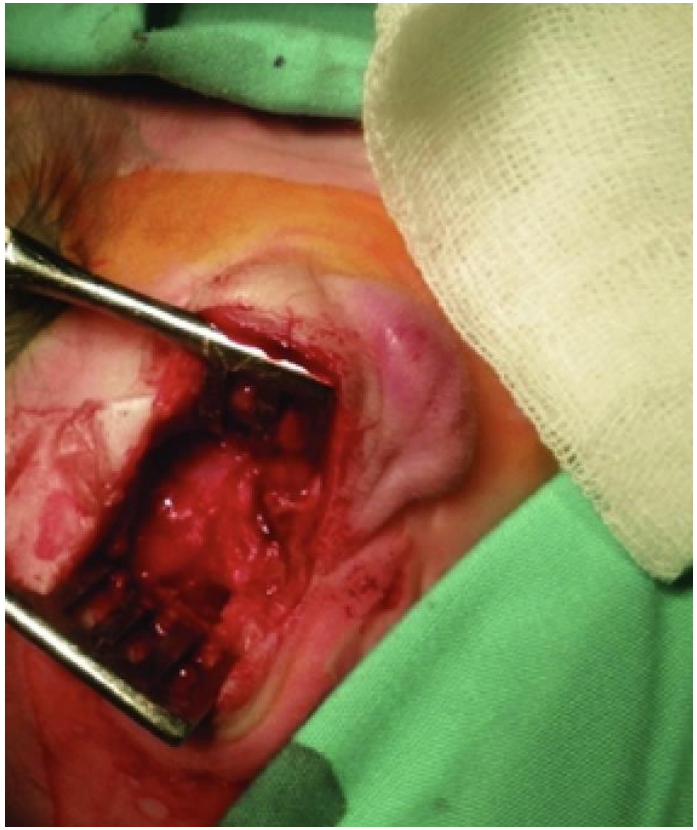
Treatment

	Number of patients	Percentage (%)
Mastoidectomy for drainage and removal of disease	51	100

- Mastoidectomy surgery: Mastoiditis with osteitis, risk of invasion causing complications, or clinical conditions that do not improve after 24-48 hours of conservative treatment.
- In cases with signs of bone destruction on CT scan, clinical signs of pus discharge under the skin, and failure of medical treatment → Mastoidectomy for drainage (44.3%) is performed and the postauricular incision is left open.

RESULT AND DISCUSSION

- Mastoidectomy



RESULT AND DISCUSSION

Microbiological Results

		Number of patients	Percentage (%)
Culture Results	**Streptococcus pneumonia**	**24**	**20,9**
	Streptococcus spp	6	5,2
	Staphylococcus aerius	1	0,6
	Staphylococcus spp	8	7
	Total	39	34
No result		76	66

Sensitive	Resistant
Ceftriaxone	Clindamycine
Rifampicin	Erythromycine
Vancomycine	Penicillin
Ciprofloxacine	Bactrim

RESULT AND DISCUSSION

Treatment

- The average treatment duration is 9 days.
- The hospital stay of patients who underwent surgical intervention was longer compared to patients who only received non-surgical medical treatment.
- The rate of surgical intervention is gradually decreasing
  - Availability of good antibiotics
  - Effective medication treatment

  → Fewer surgeries, less pain, and cost savings in treatment.

RESULT AND DISCUSSION

Treatment

- Factors that help predict the need for surgical intervention include
  - Postauricular fluctuation
  - White blood cell count over 20,000/mm^3
  - Symptoms of acute otitis media lasting over 6 days before hospital admission, with extensive use of antibiotics prior to admission.

RESULT AND DISCUSSION

Recurrence

	Number of patients	Percentage (%)
1 recurrence	5	4%
2 recurrences	1	1%
3 recurrences	1	1%
Total	7	6%

7 cases of recurrence after surgery: Recurrence timeline::

- 2 cases of recurrence after 10 days
- 2 cases of recurrence after 3 weeks
- 3 cases of recurrence after 8 months

RESULT AND DISCUSSION

- Among the recurrence cases:
  - 1/7 case recurred after 3 weeks of surgery, requiring a second mastoidectomy to inspect the surgical cavity and clean the inflamed tissues within the antrum and mastoid bone.
  - 6/7 cases underwent surgery once, and the remaining recurrences responded to medical treatment.
  - Associated with Streptococcus pneumoniae infection.
- No cases of intracranial complications of mastoiditis were recorded in the study sample.

CONCLUSION

- Acute mastoiditis often occurs in young children (especially those aged 1-3 years). The condition typically affects one side of the ear.
- S. pneumoniae is the most common pathogen associated with acute mastoiditis.
- CT scan is an important and necessary test that should be conducted in cases of mastoiditis that respond poorly to medical treatment and before surgical intervention.
- Acute mastoiditis is a pediatric emergency. If diagnosed and treated promptly, patients will respond to medical treatment and simple mastoidectomy.
- Mastoidectomy must ensure the complete removal of diseased tissue to avoid recurrence.
- Effective treatment of otitis media helps prevent complications of acute mastoiditis.

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THANK YOU, HONORED DELEGATES!