ROUND TABLE EMERGENCIES IN PAEDIATRIC ENT

MASTOIDITIS CONTROVERSIES

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Overview

- **What we know**
  - Background data
  - Diagnosis of Acute Mastoiditis
  - Management of Simple Uncomplicated Mastoiditis

- **Areas of Uncertainty**
  - Place for Scanning
  - Place for Surgery
  - Extent of Surgery
  - Management of Thrombosed Lateral Venous Sinus
  - Management Intracranial infection
Acute Otitis Media
Acute Otitis Media

- Commonest reason for office antibiotic prescription in USA, Europe - primary care discouraged for giving antibiotics.

- Greatest risk at age 6 – 12 months life, common up to 5 years of age

- Diagnosis: Middle ear infection behind a reddened eardrum with short duration of illness
Complications of AOM

- CSOM + - cholesteatoma
- Mastoiditis
- Facial Nerve Palsy
- Petrositis/ Gradenigo’s Syndrome
- Bezold’s Abscess
- Intracranial Sepsis
- Labyrinthitis – sensorineural hearing loss
Acute Mastoiditis

- Diagnosis
- Whether to do CT scan?
- Operate or Antibiotics only?
- If Surgery – What Surgery?
  - Drain post aural abscess only?
  - Ventilation Tube?
  - Full mastoidectomy?

- Management of Complications
  - Lateral Sinus Thrombosis
  - Intracranial infection
  - Raised CSF Pressure
Acute Mastoiditis

**Diagnosis**
- Otalgia
- Fever - spiking
- Post auricular Swelling
- Protrusion of Pinna
- Abnormal TM

**Masked Mastoiditis**
- Acute OM signs settled on antibiotics
- TM not bulging
- Insidious course
- Presents with a complication of mastoiditis.

**Organisms** (refs 11 & 49):
- Strep. Pneumoniae (58%)
- Strep pyogenes
- H. Influenzae
- Staph. Aureus
- Klebsiella pneumonia
- Pseudomonas aeruginosa
Differential Diagnosis – Rhabdomyosarcoma
Ear Infections – Differential Diagnosis: LCH
Acute Mastoiditis
Changing Incidence of Acute Mastoiditis?

- 18 per 100,000 in 1954-59
- 4-7 per 100,000 from 1999-2005
- 13-16 per 100,000 over 5 years to 2005 = 3 per 100,000 per year.

- 75% cases or more occur in children under 2 years

- 1990-2002 - A significant increase in the incidence of AM in infants recorded (p= 0.01). Tel-aviv, (Ref 11)

- 2000-2007, Michigan/Philadelphia, Positive correlations for, mastoiditis and subperiosteal abscess (p< 0.001) over time. (Ref 9)

- 1999-2005 Madrid, Spain: Increasing Incidence (Ref 64)

- 1996-2005 Melbourne: The yearly number of cases of AM treated remained stable (ref 36)
  - The percentage of mastoiditis patients given prior antibiotics for AOM decreased over time to 2005
Changing Incidence of Acute Mastoiditis ctd.

- 1989 – 2002 Iceland Increasing incidence (Ref 60)
- 1999 – 2005, Norway, No change in incidence (ref 61 & 62)
- UK 2.6 million GP database 1990-2006 (ref 63)
  - Only 35% mastoiditis was preceded by Acute OM
  - Incidence 1.2 per 10,000 child years (2.17 per 100,000 per year)
  - Risk of Mastoiditis doubled after AM if not given antibiotics
  - No. AM to treat to prevent 1 case mastoiditis = 4800
50 - 60% Receive surgery
- Mastoidectomy in > 25% (ref 8)
- Grommet +/- post-aural abscess (ref 6)

Complications in under 2 year olds (ref 8)

Only 45% of patients had received oral antibiotics prior to presentation.
Clinically Simple mastoiditis
- I V Antibiotics alone
- Co Amoxiclav or 3rd generation Cephalosporin

- If fails to improve in 24-48 hours
  - CT scan to exclude intracranial spread
  & Surgical drainage.
Your Opinion Please

- Child with clinically simple acute mastoiditis
  Would you routinely request a CT scan? (Ref 58)

- Child with Acute Mastoiditis and subperiosteal abscess clinically:
  Would you always request a CT scan?
  Would you always operate?
Whether to Scan? CT with contrast

- CT diagnosis
  - coalescent left mastoiditis
  - No thrombosis
  - No obvious brain abscess
Acute Mastoiditis and subperiosteal abscess, No suggestion of lateral sinus or intracranial complications. You have decided to operate:

What Operation do you perform?
- Simple Drainage of Post aural Abscess?
- Full Cortical Mastoidectomy?
Mastoiditis Complications – Spread of infection

- 30% Subperiosteal Abscess (ref 11)
- 12% Lateral Sinus Thrombosis
- 25% with coalescent mastoiditis had i.c. complications (ref 65)

- Extradural / Subdural Abscess
- Brain Abscess
- Meningitis
- Hydrocephalus
- Venous infarction
Lateral Sinus Thrombosis

**Clinical:**
- Headache
- Spiking fever,
- Vomiting,
- Torticollis,
- Tender IJV,
- Papilloedema
- Seizures

**Diagnosis:**
- Contrast CT / MRI / Magnetic resonance venography (MRV)
  - isointense on T1 and hypointense on T2-weighted MR images.
  - Is it the dominant Lateral Sinus?
- Neck U/S of upper IJV
Lateral Sinus Thrombosis

- *Fusobacterium necrophorum* - inducer of hemagglutinin-mediated platelet aggregation (ref 54)
- Thrombophilic tendency in some patients (ref 56)

- Anticoagulation? (ref 55)
  - Pros – recanalization and normalise ICP (ref 57)
  - Cons – bleeding, release of septic emboli - Lemierre syndrome.
  - Depends on extent of thrombus propagation & if dominant sinus?

- Surgery
  - How extensive?
  - Needle Sinus
  - Open sinus and evacuate clot
Investigation & Medical Treatment of Venous Thrombosis

- **Anaerobic Culture** &/or broad range 16s rDNA PCR & sequencing for F. necrophilium (ref 66)

- **Thrombophilic Tendency** (ref 67 & 68)
  - Elevated Factor VIII
  - Elevated D-dimer
  - Homozygous tMETHFR gene
  - (low protein C, factor V Leiden & prothrombin mutations not found)

- **Drugs**
  - Low mol wt heparin or
  - Vit K antagonist (Warfarin) for 6 months
  - 50% chance of recanalization
  - Steroids/ acetazolamide for intracranial hypertension
Case 1

- 2 year old
- Earache & fever
- Treated by GP and A & E Department over 10 days with Amoxycillin then Co-amoxiclav orally
- Referred with vomiting, and generalised malaise
- Spiking pyrexia

On examination:
- TM not red or bulging - dull
- No postauricular Subperiosteal swelling
- Clumsy but no neurological/ Cr nerve signs
Poor CT from referring hospital - so Enhanced MRI obtained
Case 1 Ctd.

- Neurosurgeons declined to assist
- Otology surgery, extended mastoidectomy
- Trans-dural drainage of Posterior fossa subdural pus and sigmoid sinus pus
- Full anticoagulation for 6 months
- No re-canalisation of dominant sinus.
- No long term ill effects
Management of Lateral Sinus

- Expose sinus if extradural abscess
- Needle Sinus for blood or pus and to establish if thrombosed
- Do not open sinus to evacuate blood clot and establish free flow – Intimal trauma will prevent future recanalization
- Open sinus if frank pus within it.

- Screen for thrombophilia & Anticoagulation - up to 6 months
Case 2

- 4 year old girl
- Acute OM left ear, malaise & photophobia & vomiting
- High Pyrexia
- Given i.v antibiotics in local hospital (Ceftriaxone)

What would you do?
- Lumbar Puncture?
- Scan?
Case 2 ctd.

- CT Scan – movement artefact, mastoid opacity not coalescent, no Intracranial abscess
- LP refused by Parents
- Ventilation tube inserted – Gp A Strep cultured
- Not better – referred to Evelina Hospital
1 week later left VI nerve palsy developed
Headaches continue
Papilloedema developed
What now?
MRI scanning

Lateral Sigmoid Sinus is not thrombosed
Case 2 Ctd

- Operate?
Case 2 - Resolution

- Child recovered well, papilloedema settled
- Full Recovery of VI palsy
- Ear dry
- Risk of Cochlear ossification noted: need for late audiometry
Summary – Bacteriology and Anti-microbial Therapy

- Strep Pneumoniae most common
- Mixed organisms 1/3
- Concomitant Anaerobes in 29% with I.C. complication
- Fusibacterium necrophorum in thrombosis/Lemierre syndrome (ref 66)

Treatment for 2-6 weeks

- Amoxicillin/clavulanic acid i.v.
- or 3rd generation Cephalosporin i.v.
- + Metronidazole or Clindamycin
- Long-term 2 mo.+ Rx for Lemierre Syndrome
Trans-mastoid drainage of cerebellar abscess

Acknowledgement to Mr Richard Irving - Neurotologist Birmingham, UK
Consider spread of infection if: headaches, vomiting, ill child, neurological signs, spiking pyrexia continues.

CT with contrast or MRI with MRV-venogram essential.

Surgery is indicated for Complicated Mastoiditis:
- Full cortical mastoidectomy
- Needle sigmoid, explore only if pus, not if thrombus
- Extend surgery for peri-sinus extradural/subdural abscess
- Consider drainage of cerebellar abscess post aurally.

Anticoagulate post-operatively if thrombus propagation or dominant sinus involved.
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Thank You