SHUNT INFECTION

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Introduction

- Ventricular catheter placement one of the most common neurosurgical procedures
- One of the most common complications associated is infection
- Infection: positive CSF culture or from shunt hardware
- More common in pediatric population
Implications

• High mortality/ morbidity
• Extended hospital stay
• Loss or delay of educational/ developmental milestones
• Reduced health related quality of life
• Large cost
Infection Rate

- Varied rate at different centers
- Walter et al., 18%/ patient: 20 year study
- 5% / surgical procedure
- Ammirati et al., 22%/ patient and 6%/ procedure
- Borgberj et al., 7.4%
- ISPN multi centric study: 6.5%
Time to Infection

• 92% of infections occurred within 3 months
• This finding generally confirmed by most
Risk factors

- Age: <6 months-19% versus 7% in older population
- Time period
- Educational level/ surgical skill of surgeons
- Length and time of surgery
- Use of antibiotic before and after surgery
- Method for placement of distal catheter
• Type of shunt
• Reason for shunt
• Shunt revision
• Concurrent infection
• Presence of spinal dysraphism
Route of infection

- Blood stream
- Shunt tubing
- Contamination with epidermal commensals during surgery
Organisms

- Early/ late
- Staphylococcus *epidermidis*: coagulase negative
- Staphylococcus *aureus*
- Escherichia *coli*
• Proteus *mirabilis*
• Klebsiella *pneumonia*
• Propionibacterium
• Fungal
Presentation

- Variable and age dependent
- Headache
- Lethargy
- Nausea/vomiting
- Irritability
- Apnea
• Bradycardia
• Fever
• Gait disturbances
• Seizures
• Visual disturbances
• Gaze palsy
• Papilloedema
• Abdominal pain
• Erythema/ edema along shunt tube
• Fluid collection and pseudo cyst
• Features of shunt nephritis
• Sub acute bacterial endocarditis
Evaluation and Diagnosis

- Detailed history
- Physical examination
- Routine blood tests: Hb/ TLC/ DLC/ urine analysis/ blood cultures
- X-Ray
- USG
- CT scan: ventriculitis/ malfunction
- Shunt tap with CSF analysis and culture
Treatment

- Surgical removal of the infected shunt
- Antibiotic usage: empirical/ culture based
- Re-insertion: 10- 14 days later with at least 48 hours of sterile culture
- Shunt exteriorization
- Repeated lumbar drainage
• Shunt replacement: new/ contra lateral site
• Procedures for pseudo-cyst/ abscess
• Antibiotics alone: less effective
• Role of intrathecal/ ventricular antibiotics
Prevention

- Sterile surgical technique
- Perioperative antibiotic use
- Role of first dose antibiotic
- Post operative antibiotic coverage
- Use of shunt tubing with polymeric silicon
• Impregnation of antibiotic
• Use of one piece system
• Hypothermia during surgery
• Annual or biannual screening
Thank you