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 dependant
- 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