Spontaneous Intraventricular Empyema in a Patient with Bacterial Sinusitis

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Objectives

1. Define intraventricular empyema and its potential risk factors.

2. Identify signs of bacterial sinusitis and acute purulent meningitis progressing to intraventricular empyema.
The purpose of this study is to educate nurses of the potential for intraventricular empyema in patients without intraventricular surgical intervention to enhance early identification and treatment of the complication.
Background: Neuroanatomy and Physiology
- Ventricles
  - Hollow cavities in the brain that produce and secrete cerebrospinal fluid that help protect the cerebrum

- Cerebrospinal fluid
  - Protects, nourishes and provides waste removal
  - Reduces the pressure of spinal cord
  - Maintains homeostasis to allow for adequate neuro functioning

- ICP
  - When intracranial pressure is increased it places the patient at risk for herniation and causes other neurological symptoms: LOC, pupils, HA, blurred vision, Nausea/vomiting

- Hydrocephalus
  - Build up of fluid in the brain causing extreme pressure that leads to increased ICP
Background: Pathophysiology
Intraventricular Empyema

Well understood complication of intraventricular surgery (AKA pyogenic ventriculitis)

- Purulent material within the ventricles leading to abnormal production and reabsorption of cerebrospinal fluid. Complications can lead to hydrocephalus, herniation and death.

- Symptoms:
  - AMS, fever, changes in LOC
  - Signs of sepsis
  - Signs of meningitis: photophobia, nuchal rigidity

- Intraventricular drains vs primary intraventricular empyema
  - External Ventricular Drain
  - Ventriculoperitoneal Shunt
  - Less than 10 documented cases.
Methods

- Chart review
- Interprofessional team involvement
  - Primary registered nurse, neurologist, medical student

This is the first case to be presented looking at a life-threatening case of intraventricular empyema following bacterial sinusitis and bilateral endoscopic sinus surgery with a total ethmoidectomy without surgical procedures within the ventricles.
Case presentation

64 yo Male with admit diagnosis of acute purulent meningitis following bacterial infection

- Subdural empyema and left cavernous thrombosis
- Bilateral endoscopic sinus surgery with maxillary antrostomy, total ethmoidectomy, frontal sinusotomy and sphenoid sinusotomy.
- Aggressive antibiotic therapy: Vancomycin and Zosyn
Case presentation continued

5 days admission

- Abnormal patient symptoms
- Worsened status per MRI
  - Neurosurgical intervention was not warranted
- Antibiotics increased
- Prior to discharge, MRI revealed no changes
  - The patient was stabilized neurologically and sent home with home care on an extended course of IV antibiotics.
Patient follow up

A follow up MRI on over 3 months after discharge from the hospital revealed complete resolution of bacterial meningitis and ventriculitis with some residual edema.
Conclusion

• Potential for misdiagnosis
  • Similar presentation to meningitis
• Future work
• Look out for:
  • Persistent infection despite intervention
  • Worsening neuro status despite intervention

Implications

• Nursing considerations
  • Watch for lack of clinical improvement
  • Recommendation of imaging
    • MRI over CT
Thank you