Intracranial Focal Infections

Children's Mercy KANSAS CITY | Evidence Based Practice

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Patient presents with concern for intracranial infection

Obtain the following diagnostic tests:
Imaging:
MRI with and without contrast w/ Stealth imaging (unless MRI unobtainable), if unobtainable, then CT scan with and without contrast w/ Stealth imaging
Laboratory tests:
CBC with differential, BMP, LFTs, CRP, and blood culture

NOTE: Patients with meningitis & sterile subdural effusions do not warrant extension of antimicrobial therapy beyond standard meningitis treatment.

Is diagnostic testing concerning for epidural abscess, subdural empyema, or brain abscess?

- No → Patient off algorithm; treat appropriately
- Yes → Consult Neurosurgery

Does Neurosurgery agree with focal intracranial assessment?

- No → Patient off algorithm; treat appropriately
- Yes → Consult ID

Abbreviations:
AFB = Acid-fast bacteria
ID = Infectious disease

Antibiotic dosing in patients with normal renal function:
Ceftriaxone: 50 mg/kg IV q12h (max 2000 mg/dose)
Metronidazole: 10 mg/kg IV q8h (max 500 mg/dose)
Vancomycin (Consider an empiric maximum dose of 1000 mg/dose):
- *3 months to < 12 years*: 20 mg/kg IV q6h
- *≥ 12 years*: 15 mg/kg IV q6h

Does pt. have concurrent sinusitis or mastoiditis?

- Yes → Consult ENT
- No

Start empiric antibiotics:
- ceftriaxone
- metronidazole
- +/- vancomycin

Patient conditions in which neurosurgical intervention may be beneficial:
1. Focal neurological deficit or does not follow commands
2. New onset seizures in the absence of meningitis
3. Subdural empyema per neurosurgery

Is the pt exhibiting any conditions that may benefit from neurosurgical intervention?

- Yes → **If going to OR:** Obtain aerobic and anaerobic cultures. If immunocompromised or penetrating trauma, obtain fungal and AFB cultures in addition to routine cultures. Consider fungal cultures if patient has dermatophytes.
- No

Continue antibiotics and tailor antibiotics based on microbiology results (if available) and ID recommendations

Obtain:
- Weekly CBC with diff + BMP + LFTs
- Twice weekly CRP (when pt is stable, consider spacing CRP to weekly until normalized)
- MRI with/without contrast one week post-op

Does the patient have clinical improvement (e.g. laboratory values, physical exam, etc)?

- No → Repeat MRI imaging → Does pt need neurosurgical intervention or antimicrobial modifications?
  - Antimicrobial modifications → Continue antibiotics and tailor antibiotics based on microbiology results (if available) and ID recommendations
  - Neurosurgical intervention → If going to OR: Obtain aerobic and anaerobic cultures. If immunocompromised or penetrating trauma, obtain fungal and AFB cultures in addition to routine cultures. Consider fungal cultures if patient has dermatophytes.
- Yes → Continue intravenous (IV) antibiotics for a minimum of 2 weeks

- Total antibiotic duration usually ranges 4-8 weeks depending on surgical interventions, clinical response, & agreement between ID & neurosurgery.
- If significant clinical improvement after initial 2 weeks of IV antibiotics, transition to oral antibiotics for the remainder of the duration may be considered if there is a highly bioavailable option that penetrates the CNS.

Schedule ID and neurosurgery follow-ups prior to discharge

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