

COMMON CLINICAL DIAGNOSES AND CONDITIONS**CENTRAL NERVOUS SYSTEM INFECTIONS****INTRODUCTION**

Central nervous system (CNS) infections in children vary widely in incidence and severity. Enteroviral meningitis is relatively common and usually resolves without sequelae. In contrast, viral encephalitides and suppurative CNS infections are less common, but are associated with significant mortality and long-term morbidity in survivors. Children with CNS implanted devices are particularly diagnostically challenging. All of these infections require prompt diagnosis and initiation of therapy which may require coordination of care with neurologists, neurosurgeons, infectious diseases, neuroradiologists and other subspecialists for optimal outcomes. Pediatric hospitalists are often in the best position to render both coordinated acute care and transition to outpatient care or rehabilitation facility.

KNOWLEDGE

Pediatric hospitalists should be able to:

- Describe the features of the history (such as back pain, trauma, sinus disease, emesis and others) that suggest CNS infections for varied age groups, including those features that differentiate encephalitis, meningitis, brain abscess, and spinal epidural abscess.
- List the physical examination findings (such as focal neurologic findings, rash, mental status changes and others) that suggest CNS infections for varied age groups, including those features that differentiate encephalitis, meningitis, brain abscess, and spinal epidural abscess.
- List key elements to obtain in the history such as travel, environmental exposures, animal and insect bites, water sources, and explain how each assists with development of a differential diagnosis for potential etiologic pathogens.
- Identify the elements of the history and physical examination that may present in a different manner in patients with underlying co-morbidities such as ventricular shunts/reservoirs, implanted CNS devices, immunosuppressant use, developmental delay and others.
- Compare and contrast the cerebrospinal fluid (CSF) analysis values found in viral, bacterial, atypical bacterial and fungal meningitis, encephalitis, brain abscesses, ventricular infections, and suppurative parameningeal foci.
- Identify conditions that predispose to focal, suppurative CNS infections.
- Discuss the risks, benefits, and indications for lumbar puncture.
- State appropriate microbiologic, virologic, and serologic tests utilized to establish a diagnosis.
- Compare and contrast the value of computed tomography versus magnetic resonance for imaging possible CNS infections of the head, neck, and spine, attending to sedation needs, local availability, radiation exposure, and value of contrast versus non-contrast images.
- Summarize the indications for imaging for meningitis, encephalitis, brain abscess, ventricular infections, and parameningeal infections stating modality of choice for each diagnosis.
- Describe the approach toward initial antimicrobial therapy for CNS infections, attending to age, likely pathogens, and site of infection.
- Explain the importance of CNS drug penetration, microbial drug resistance, and age on initial antimicrobial therapy choice.
- Name the most common significant complications of CNS infections such as fluid and electrolyte imbalance, seizures, and increase intracranial pressure.

SKILLS

Pediatric hospitalists should be able to:

- Elicit key historical data that may distinguish between types of CNS infections.
- Demonstrate proficiency in performing a careful global physical examination to document features to support or refute various infectious etiologies.
- Perform a thorough neurologic examination to identify global or focal neurologic deficits.
- Efficiently and effectively perform a lumbar puncture.
- Determine best patient placement (bed or ward assignment) based on local monitoring and nursing capabilities and patient clinical status.
- Initiate appropriate empiric therapy for CNS infections and modify therapy based on proper interpretation of microbiologic, virologic and serologic data.

COMMON CLINICAL DIAGNOSES AND CONDITIONS

- Anticipate, recognize, and manage acute complications of CNS infections.
- Recognize the indications for transfer to higher level of care and effectively coordinate the transfer.
- Obtain and coordinate appropriate consults in a timely manner.
- Identify patients with neurologic sequelae and make appropriate referrals for therapy and rehabilitation services.
- Coordinate care with subspecialists and the primary care provider and arrange an appropriate transition plan for hospital discharge inclusive of therapies, school needs, and psychosocial support.
- Consistently adhere to proper infection control practices.

ATTITUDES

Pediatric hospitalists should be able to:

- Engage consultants in sensitive and clear communications with the family/caregiver regarding potential long term neurologic sequelae as appropriate.
- Realize the impact of the illness on the family/caregiver, and maintain empathy at all times.
- Recognize that the family/caregiver may not assimilate information during times of stress, and that delivering a clear, coherent assessment and plan on repeated occasions may be needed.
- Collaborate with subspecialists and the primary care provider to ensure coordinated longitudinal care for children with CNS infection.
- Collaborate with public health officials when indicated.

SYSTEMS ORGANIZATION AND IMPROVEMENT

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Lead, coordinate or participate in the development and implementation of cost-effective, safe, evidence-based care pathways to standardize the evaluation and management for hospitalized children with CNS infections.
- Collaborate with hospital administration, hospital staff, and others to create a multidisciplinary approach toward care and support for children with CNS infections.
- Work with hospital and community leaders to assure proper services are available for children requiring short and long term support services.