



Pediatric Clips

NURSING

Neurological Complications from Seasonal Illnesses

by Erin Newkirk, RN, MSN, C-FNP

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Pediatric Nursing Clips by Pediatric Advanced Practice Nurses at Dayton Children's provides quick reviews of common pediatric conditions.

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Nursing professionals know just what to expect in the fall and winter months. They prepare for cold and flu season with resignation and resolve. This year the new strain of H1N1 influenza presented a challenge with an out-of-season peak of pediatric flu cases, as well as full-to-capacity primary practices and emergency departments. Nurses are well-versed in handling most seasonal infectious diseases, but some of the most common seasonal illnesses in the United States can result in neurological complications with unique presentations. Understanding how to approach these complications of seasonal illness may aid in the diagnosis and prompt treatment in the primary clinic, urgent care and emergency department.

The fall and winter season pathogens in the United States include influenza, para influenza pneumococcus (streptococcus pneumonia), rotavirus and meningococcus. Group B hemolytic streptococcus has a late winter peak, but is commonly seen earlier in the year.¹

Febrile Seizures

When a child presents with a febrile seizure, it may be due to an infection of the central nervous system (CNS), an underlying seizure disorder or a completely benign age-limited phenomenon. Acute CNS infection is the most likely cause of a febrile illness with manifestations of CNS involvement.² When a child presents with a seizure caused by an infection in the CNS, they usually have an altered level of consciousness after the seizure or develop status epilepticus. This clue will help the practitioner determine the need for a lumbar puncture. A child who returns to baseline after a febrile seizure and whose fever has an identified etiology or subsides quickly usually does not have a CNS infection.^{3,4} Any bacte-

rial or viral infection outside of the CNS that can trigger a fever can be linked to a febrile seizure.

Encephalitis/Meningitis

Encephalitis is an acute infectious inflammation of the brain. Influenza and pneumococcus infections are among the most common causes.⁵ The child can present with drowsiness, coughing, weakness, headache, fever, neck rigidity, sensitivity to light and clumsiness. Diagnosis of encephalitis is made through analysis of cerebral spinal fluid (CSF). CT scans are usually not helpful in identifying encephalitis unless an abscess is present.² CSF findings indicative of encephalitis include leukocyte count of 10-1000/mcL, occasional elevation in protein and generally normal glucose. The CSF is also evaluated for Immunoglobulin G, viral culture and PCR for herpes encephalitis. If symptoms of encephalitis are present, but the CSF reveals a normal leukocyte level, a noninfectious encephalopathy instead of encephalitis is a differential. The cause is more likely to be toxic, metabolic or vascular.² Fever can occur in an encephalopathy unrelated to infection. Negative CSF findings indicate a need to collect more history and search out a noninfectious cause. Treatment for encephalitis is based on the pathogen found and may include antibiotics, antivirals and steroids.

Meningitis is a viral or bacterial inflammation of the protective membranes that cover the brain. The most common presentations are neck pain or stiffness, headache, confusion, sensitivity to light and sound, vomiting and fever with irritability or altered consciousness. In a small child, drowsiness and irritability with a febrile illness may be the only clues. Because long-term outcomes can include epilepsy, deafness and cognitive deficits, prompt lumbar

puncture and initiation of treatment are critical to prevention of poor outcome. Before a lumbar puncture, the child must be assessed for signs of increased intracranial pressure including focal neurological signs, respiratory abnormalities, dilated or unequal pupils, or coma. In these cases, a CT before the lumbar puncture is indicated. Initial lumbar puncture can often be negative and it's important to repeat the lumbar puncture if symptoms persist and to send the initial sample for culture. CSF findings indicative of meningitis include elevated leukocytes, protein more than 100Mg/dL and glucose less than 40 Mg/dL. H. influenza type B, meningococcus and streptococcus are common culprits in meningitis. Rotavirus gastroenteritis can lead to aseptic meningitis in the very young.²

Cerebellitis

Acute post-infectious cerebellitis should be considered when confronted with a sudden, unchanging loss of ability to sit, stand or walk steadily in an otherwise normal appearing child.³ Cerebellitis is an inflammation of the cerebellum which is involved with motor control in the limbs and trunk and complex motor acts. Signs of cerebellitis may include nystagmus, headache, photophobia and increased intracranial pressure.⁶ Differentials to rule out include toxin ingestion and conversion disorder. There may be report of a preceding mild respiratory or gastrointestinal illness one or two days before symptom onset. Meningitis can occur simultaneously. CSF sampling and brain imaging to rule out CNS infection and tumor are completed to exclude other causes.² Pathogens associated with this para-infectious disorder include both viruses and bacteria, including streptococcus. The symptoms will

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improve without treatment in several days with complete recovery sometimes taking weeks.

Guillain-Barre' Syndrome

A child with weakness of the lower extremities that worsens over several days, sometimes including weakness in upper extremities, double vision or difficulty swallowing should be evaluated for Guillain-Barre' Syndrome (GBS). In this subacute autoimmune reaction to a pathogen, more than half of patients report a preceding viral (usually respiratory) infection.³ GBS patients may have a wide-based gait, lower extremities reflexes, especially the Achilles reflex, are greatly diminished or absent. Fine motor coordination testing is usually unremarkable and there is no nystagmus helping to differentiate GBS from cerebellitis.⁶ Epstein-barr virus, campylobacter jejuni, varicella-zoster, and herpes simplex are the most common pathogens. Influenza and m. pneumoniae infections can also lead to GBS.² CSF may reveal elevated protein without pleocytosis, but the

diagnosis can be best confirmed by an abnormal nerve conduction study. The treatment for GBS is most commonly IV immune globulin, or plasmapheresis. GBS can worsen to include the autonomic system affecting pulmonary and cardiac function, so hospitalization, monitoring and prompt treatment are first priority.⁶

Fortunately, neurological complications from common seasonal infections are the exception, not the rule. An understanding of presenting symptoms can improve triage, diagnosis and treatment. It can also help nursing staff compassionately educate families faced of these uniquely presenting infection-related complications.

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FEATURED NURSE SPECIALIST



ERIN NEWKIRK, RN, MSN C-FNP is a nurse practitioner in the department of neurology at Dayton Children's. Erin is

an Ohio native who received her bachelor's degree from Franklin University and her master's degree from The Ohio State University.

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