

PROGENY



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NEONATAL SEIZURES

Newborn seizures are a symptom of neurologic dysfunction and are often the result of a significant brain insult. They may involve motor, behavioral, or autonomic function. Virtually any condition that affects neonatal brain function can cause seizures. The occurrence of seizures in this country is approximately 1.8 to 5/1000 live births. These numbers are significant in that 20 to 50 percent of these babies will go on to have some neurological sequelae, such as developmental delays, motor deficits, or subsequent seizures. Seizure activity in the newborn should be diagnosed and treated as quickly as possible for several reasons. Seizures may signal an underlying disease or disorder that is life threatening. They may also interfere with critical supportive measures, such as feeding and respiratory support. During a seizure, the infant is at risk for respiratory depression and arrest. Finally, newborn seizures may actually cause brain injury. Research shows that seizure activity can permanently disrupt brain development and cause reduction in DNA content and number of brain cells. With this in mind, neonatal seizures can no longer be considered benign events.

Etiology of Neonatal Seizures

Hypoxic-ischemic encephalopathy, usually secondary to birth asphyxia, is the most common diagnosis with neonatal seizures. Seizure activity often begins within the first 12 hours of life and is difficult to control. Infection is another common cause of neonatal seizures. The infectious agents can be viral or bacterial and acquired in utero or postnatally. Viral infection caused by TORCH (toxoplasmosis, rubella, CMV, HSV) agents can cause severe encephalitis resulting in seizures. Intracranial hemorrhage is another primary cause of newborn seizures. In these cases, seizure activity usually occurs within the first three days of life. Neonatal seizures can be associated with acute metabolic conditions, such as hypoglycemia, hypocalcemia, hypomagnesemia, and hypo- or hypernatremia. Early detection and rapid treatment is key to preventing neurologic symptoms. There are several inborn errors of metabolism that have been known to cause seizures in newborns. These include organic acid or amino acid abnormalities, pyridoxine (vitamin B6) deficiency, or problems with glucose metabolism. Other less common causes include Central Nervous System (CNS) malformations, kernicterus, neonatal drug withdrawal, vascular disease, and benign familial or idiopathic seizures.

Clinical Manifestations

Subtle seizures may include apnea, tachycardia, blood pressure fluctuations, eye deviations, staring, blinking, eyelid fluttering, nonnutritive sucking, chewing, tongue thrusting, lip smacking, drooling, and pedaling/cycling or boxing movements.

Tonic seizures may resemble decerebrate posturing with generalized tonic extension of all extremities, or decorticate posturing with flexion of the upper limbs and extension of the lower extremities.

Clonic seizures present as well-localized rhythmic twitching of the face, upper and/or lower extremities on one side of the body. These clonic movements may migrate from limb to limb without specific pattern. *Myoclonic seizures* are brief spasmodic contractions and relaxation of the muscles of the trunk or limbs.

Seizures vs Jitteriness

Jitteriness can easily be mistaken for seizure activity in the newborn, so it is important to distinguish the two. In the jittery infant there are no ocular changes or autonomic abnormalities associated with the behavior. The dominant movement is tremor versus clonic jerking with seizures. Jitteriness can often be induced with stimulation, but stimulation will not induce seizures. Finally, gentle restraint will usually stop jittery movements, whereas restraint has no effect on seizure activity.

Diagnostic Work-up

Simultaneous EEG and Video Recording: Electrical seizures are seen as focal or multifocal “spikes” or sharp waves, often rhythmic in nature. Video recording is important because it demonstrates a correlation between clinical signs and electrical activity. A burst-suppression pattern is seen as long periods of voltage suppression or no activity in the intervals of bursts of activity, high voltage spikes, sharp waves, and slow activity.

Laboratory Studies: Serum levels of glucose, calcium, magnesium, ammonia, and amino acids should be obtained, along with a chemistry panel and blood gas analysis with lactate. Urine should be analyzed for organic acids, and CSF should be sent for culture, chemistry, cell count, and amino acids. An elevated number of red cells or protein content in the CSF may indicate subarachnoid hemorrhage. Other studies include a toxicology screen, as well as maternal and fetal titers for congenital infection (TORCH).

Brain-Imaging Studies: Head ultrasound, computerized tomography (CT), and magnetic resonance imaging (MRI) are used to detect structural abnormalities or intracranial hemorrhage. Skull x-rays should be obtained if trauma is the etiology.

Nursing Care

The most important aspects of care *during* a seizure involve maintaining adequate ventilation and preventing injury. Place the infant on his side to help prevent aspiration. Monitor his breathing, color, and vital signs closely, and do not leave the infant unattended. If there is prolonged apnea, provide bag and mask ventilation. Do not attempt to restrain the infant or force anything into his or her mouth. Notify a physician or nurse practitioner as soon as possible. *Immediately following* a seizure, transfer the infant to the intensive care nursery and attach cardiac/apnea monitors and a pulse oximeter. Obtain vital signs including blood pressure, and if the infant does not have IV access, start a peripheral IV. Administer anticonvulsant medication and IV fluids as ordered. As soon as the infant is stabilized, obtain a serum glucose level, chemistry panel, and blood gas. Continue to monitor closely for any signs of deterioration or subsequent seizure activity. Nursing documentation should include the time the seizure begins and ends; body parts involved; type of movement; level of consciousness before, during, and after the seizure; color and respiratory status; nursing interventions; and response to pharmacological treatment. With prompt recognition of seizure activity and rapid treatment we can improve the odds for a good outcome in babies with newborn seizures.

(References available upon request)

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