# Nursing Process as Applied to a Pediatric Patient with Seizures

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## Data Collection

### General Information about Child and Family

J.B. is a six month old Caucasian male with no known allergies. He was born on August third in 2011. He was full term and was delivered vaginally. He has been having seizures since November 27 as per his family's statements. The seizure leading to this hospitalization occurred on February 21, 2012 when he was in a bouncy toy and his left arm began twitching so his family called for emergency assistance; he was having a partial seizure. In the ambulance, the mother reported that J.B. was unresponsive in a tonic-clonic seizure for two minutes in which he was unresponsive until his head and arms began to twitch again. When he arrived to the emergency department, he was not alert or awake. He was given Ativan intravenously which the mother says makes him "sleepy." On February 8, 2012, J.B. was started on Keppra and discharged home. On February 10, he was in the emergency department for Status Epilepticus and was intubated. His dosage was increased and then he was discharged after two days. He has been hospitalized several times and his lower extremities have not yet been involved in the seizures. On February 18, J.B. was brought in for a questionable seizure that affected his left arm. The mother and his family are very concerned because they think that the seizures are getting worse and that the medication isn't helping. The nurse said that the patient is having "breakthrough seizures." J.B. also has a history of fussiness.

His dosing weight is 7.30 kilograms (kg). His mother is a fifteen-year-old who was fourteen when she became pregnant; the nurse described her as "immature" when giving report. She is the main caregiver for J.B but she also lives with her mother who helps with his care as

well and her sister who is eighteen years old also lives with them as well. J.B.'s mother denies smoking but she did leave three times during our clinical day and came back to the room smelling of smoke. She also denied any alcohol, marijuana or other drug use. J.B.'s grandmother is a smoker, but she claims to "only smoke outside." J.B.'s mother is a high school student who takes classes online. She was concerned because she has to log in to do her lessons every day or she is filed as being "truant" in the system. She expressed that she has problems being filed as truant when J.B. needs hospitalization. J.B.'s grandmother was a waitress for a number of years before J.B. was born. Since the complications of his condition have developed, J.B.'s grandmother has quit her job to be able to monitor her grandson more fully. She is now receiving social security benefits. J.B. and his family have Buckeye Health Insurance. They are Christian and have started to go to church every week since J.B.'s seizures have gotten worse. J.B.'s grandmother, especially, has expressed comfort in attending church. J.B.'s father is not present in J.B.'s everyday life. He is currently eighteen years old and in jail for assault. J.B.'s mother, however, has not had any contact with him for over two months and now is in a relationship with someone else. Her boyfriend is sixteen years old and helps to care for J.B. J.B.'s mother says "He comes over almost every day." The family lives in East Sparta and has lived in the same home for a number of years. On J.B.'s father's side, there is a history of epilepsy through multiple generations. On J.B.'s mother's side, there is a history of heart disease, lung cancer and colon cancer. J.B.'s mother has a history of multiple bladder and kidney infections.

**Developmental Assessment**

J.B. is six months of age. His dosing weight is 7.30 kg. His length is 68 centimeters (cm). His head circumference is 43.5 cm. His length at birth was 49.50 cm. His weight at birth was 3.090 kg. It is expected that by the age of 5 months, the infant's birth weight should double and by one

year of age, their weight should be tripled (Feldman, 2011, p. 112). J.B. weighed 3.090 kg at birth and now weighs 7.30 kg at six months. He should be between 6.18 kg (his birth weight doubled) and 9.27 kg (his birth weight tripled) and he is which means he is growing adequately. His posterior fontanel has closed which normally closes at 8-12 weeks of age and his anterior fontanel is still open and soft which normally closes at 18 months (Davidson, London, & Ladewig, 2008, p.578). By one year of age, the infant is expected to grow almost a foot in length (which is 30.48 cm) (Feldman, 2011, p. 112). His length at birth was 49.50 cm so he is expected to growth to about 79.98 cm. J.B. has grown 18.50 cm in length so far so he is well on his way to meeting his length goal. At 6 months of age, J.B. weighs 7.30 kg which is 16.06 pounds which falls between 25% and 50% on the growth chart (Centers for Disease Control and Prevention, 2001). J.B. is 68 centimeters which falls between 50% and 75% for his age (Centers for Disease Control and Prevention, 2001). J.B.'s head circumference is 43.5 cm which falls between 25% and 50% for his age of 6 months (Centers for Disease Control and Prevention, 2000). These percentages are all reassuring that is within normal growth percentages for his age. Body Mass Index (BMI) is used to determine "if the child's height and weight are in proportion," (Ball, Bindler, & Cowen, 2010, p. 286). All of the resources that I viewed did not recommend calculating BMI for a child younger than 2 years.

Reflexes are "unlearned, organized involuntary responses that occur automatically in the presence of certain stimuli," (Feldman, 2011, p. 121). The Moro reflex is the "startle reflex" and is expected to disappear around 6 months (Ball et al., 2010, p. 245). J.B. did not have a Moro reflex. The Babinski reflex occurs when "an infant fans out its toes in response to a stroke on the outside of its foot," (Feldman, 2011, p. 121). It is supposed to disappear around 8-12 months. J.B. did have a Babinski reflex. No other reflexes were assessed that day.

As far as motor development goes, J.B. is able to roll over on his own, is able to grasp onto rattles and other toys, and is able to sit up without support which are all normal for his age. The mother reports that he has not been crawling (which normally occurs between 8-10 months) and only attempts walking or jumping when someone holds his hands. "At 9 months, most infants are able to walk by supporting themselves on furniture, and half of all infants can walk well by the end of their first year of life," (Feldman, 2011, p. 123) so it's normal that he hasn't been waking yet. He is not able to stand without support yet which is expected around 12 months (Ball et al., 2010, p. 241). Fine motor development milestones include transferring objects between hands at 7 months and picking up small objects at 10 months (Ball et al., 2010, p. 242). He was able to grasp onto objects (such as toys and rattles) but he did not seem to display the fine motor capabilities described yet.

The mother reported that J.B. has been babbling for over 2 months but has not said anything discernible yet. "The most obvious manifestation of prelinguistic communication is babbling. Babbling, making speech-like meaningless sounds, starts at the age of 2 or 3 months and continues until around the age of 1 year," (Feldman, 2011, p. 157). "First words generally are spoken somewhere around the age of 10-14 months, but may occur as early as 9 months," (Feldman, 2011, p. 159). J.B. is on track in his language development as well.

"The most important aspect of social development that takes place during infancy is the formation of attachment. Attachment is the positive emotional bond that develops between a child and a particular, special individual," (Feldman, 2011, p. 178). J.B.'s mother was a source of comfort for him and he cried when she left the room. The mother was very involved in J.B.'s care but there were times throughout the day that she seemed to take a few minutes to respond to her son when he was crying because she was involved in other tasks (like talking on the phone).

She also at one point in the day, went in the bathroom, closed the door, and left both sides to J.B.'s crib down which we addressed with her verbally. J.B.'s mother was sensitive to her child's needs, was aware of his moods, and appeared to be warm and affectionate towards him. The doctor on the pediatric floor assessed J.B. and determined that he was not lagging in any developmental areas. The doctor expressed that children with seizures often also have developmental delays.

Erikson has a theory which maps out psychosocial development of individuals and takes into account social interaction and behaviors characteristic for each age group (Feldman, 2011, p. 187). The first stage takes place during the first 18 months of life; it is the trust-versus-mistrust stage. The infant in this stage can develop a sense of trust (of others) if his needs are met by his caregivers and mistrust (of others) if his needs are not met. "Erikson suggests that if infants are able to develop trust, they experience a sense of hope, which permits them to feel as if they can fulfill their needs successfully. On the other hand, feelings of mistrust lead infants to see the world as harsh and unfriendly, and they may have later difficulties in forming close bonds with others," (Feldman, 2011, p. 187). J.B. was a rather content infant and seemed to have bonding and attachment with his mother so it would seem that his needs are being met successfully.

**Nutrition Assessment**

"Without proper nutrition, infants cannot reach their physical potential, and they may suffer cognitive and social consequences as well," (Feldman, 2011, p. 126). Assessment and inquiry about infant and child nutrition is very important to their development and well-being. J.B. eats Similac Sensitive formula and it is recommended that he eats 4-5 ounces (oz) every 4-5 hours. Based on the recommendations for his age, he should be taking in between 19.2 oz (which

is 576 milliliters) and 30 oz (which is 900 milliliters) per day. He was admitted to the pediatric floor at 1949 the day before our clinical day. During our clinical day, he ate 402 milliliters (ml) which is 13.4 oz at 0700, 120 ml (4 oz) at 0900, 215ml (7.17 oz) at 1000, and 120 ml (4 oz) at 1400. For the part of the day that we were there, J.B. took in 857 milliliters of formula which seems like a lot. The mother seemed to offer J.B. a bottle every time he cried. We talked to the mother about how often she normally feeds him at home and she expressed that she normally follows the recommendation. "While there is no clear correlation between obesity during infancy and obesity at the age of 16 years, some research suggests that overfeeding during infancy may lead to the creation of an excess of fat cells, which remain in the body throughout life and may predispose a person to be overweight," (Feldman, 2011, p. 128). It is important that we discussed the nutritional requirements for J.B. with his mother because whether she was or was not being honest about how often she feeds her son at home she was given the correct information and may try to follow the recommendation more closely. The mother reported that J.B. "only likes homemade mashed potatoes, not the instant stuff." She did not report trying any other foods with J.B. besides mashed potatoes yet. Normally between the age of 4 and 6 months, an infant may begin to try baby food and/or cereal twice daily as well as supplementation with formula (or breast milk) "our or more times daily consuming 4-5 oz (100-150 mL) per feeding (Ball et al., 2010, p. 278). Between the age of 6 and 8 months, an infant may eat baby food, rice cereal, mashed fruits, and/or mashed vegetables three times daily as well as supplementation with formula (or breast milk) four times daily consuming 6-8 oz (160-225 mL) per feeding (Ball et al., 2010, p. 278). J.B.'s mother should try to begin to integrate other foods besides formula into his diet.

**Pathophysiology of Seizures**

J.B. has had a number of different seizures since their onset on November 27 including Status Epilepticus, tonic-clonic seizures, breakthrough seizures, and complex partial seizures. The seizures manifested at first in his left arm and his right arm became involved in later seizures. J.B. has a history of fussiness as well. Most of the seizures have not been witnessed by medical personnel but by the mother and the grandmother. The family had videotaped some of J.B.'s seizures and brought them in for the doctor on the pediatric floor to view.

Seizures are defined as "periods of abnormal electrical discharge (excessive concurrent firing) in the brain that cause involuntary movement, and behavior and sensory alterations," (Ball et al., 2010, p. 1324). Seizures can be caused by a number of issues including central nervous system (CNS) disorders and defects, or other disorders that affect central nervous system functioning (Ball et al., 2010, p. 1324). There may be some genetic factors involved with seizures as well. Seizures are relatively common in children. It is estimated that 10% of people will have at least one seizure at some point in their life; of those people who have experienced a seizure only 1% to 3% will be diagnosed with epilepsy (Clore, 2010, p. 191). "Epilepsy is a chronic disorder characterized by recurrent, unprovoked seizures secondary to an underlying brain abnormality," (Ball et al., 2010, p. 1324). It is estimated that up to 30% of epilepsy cases are recognized by the age of 4 (Padgett, 2006, as cited Ball et al., 2010, p. 1324). There are many different types of seizures and J.B. has experienced all of the ones discussed below.

Simple partial seizures are caused by abnormal or excessive electrical activity that occurs only in one hemisphere of the brain (Ball et al., 2010, p. 1324). These seizures involve no loss of consciousness during the seizure and no confusion after the seizure; they can last up to 30 seconds. They can occur at any age. The motor activity associated with the seizure can involve one extremity, a part of an extremity, or extremities on one side of the body. The sensory aspect

of the seizure activity may include decreased sensation or tingling (paresthesia), hallucinations, dysphagia, flushing, auditory, olfactory or visual sensation changes, sweating or psychic sensations (Ball et al., 2010, p. 1325; Yamamoto, 2004, as cited by Clore, 2010, p. 191).

Complex partial seizures are caused by abnormal or excessive electrical activity that occurs only in one hemisphere of the brain in which consciousness is impaired during the seizure (Yamamoto, 2004, as cited by Clore, 2010, p. 191). The onset of these seizures is typically 3 years of age to adolescence. Complex partial seizures can last between 2 to 30 minutes and can generalize to both hemispheres of the brain (generalized seizure). These seizures are often followed by automatisms which are repetitive activities or movements that have no purpose. During the seizure, the individual may experience or exhibit abnormal motor activity, twitching, loss of muscle tone, tingling or numbness, abdominal pain, and/or posturing. The individual can appear to be awake but does not respond to outside stimulation and will not remember the events occurring during the seizure (Ball et al, 2010, p. 1325; Clore, 2010, p. 191-192).

Generalized or tonic-clonic seizures are caused by "diffuse electrical activity that begins in both hemispheres of the brain simultaneously and spreads throughout the cortex into the brainstem," (Ball et al., 2010, p. 1324). The seizure is typically 1-2 minutes and may affect the individual after the seizure for minutes to hours. Because the seizure is generalized and occurs on both sides of the brain, the motor activity that occurs during the seizure is likely to occur on both sides of the body (Ball et al., 2010, p. 1325-1326). This kind of seizure starts with a tonic phase that involves unconsciousness, strong constant contraction of the muscles, and body stiffness. The next phase is the clonic phase in which involves rhythmic repetitive jerking motions of the extremities. The postictal period is the last phase in which the individual has a decreased level of consciousness and may seem lethargic (Ball et al., 2010, p. 1325-1326). Tonic-clonic seizures

often involve pooling of mouth secretions placing the individual at risk for aspiration and respiratory compromise (Clore, 2010, p. 192). Other signs that distinguish tonic-clonic seizures include sleepiness, difficulty in arousal, hypertension, diaphoresis, headache, nausea, vomiting, decreased coordination, decreased muscle tonicity, confusion, amnesia, slurring of speech, visual disturbances, and combativeness (Ball et al., 2010, p. 1326). This kind of seizures can occur beginning at any age but are less common before the age of 6 months. There is a genetic predisposition to generalized seizures if a close relative has had one.

Status epilepticus is "a continuous seizure that lasts for more than 30 minutes or a series of seizures during which consciousness is not regained," (Riviello, Ashwal, Hirtz, et al, 2006, as cited Ball et al., 2010, p. 1325). Status epilepticus occurs in about 10% of children after being diagnosed with epilepsy (Berg, Shinnar, Testa, et al., 2004 as cited Ball et al., 2010, p. 1325).

Breakthrough seizures are seizures than occur in an individual who has previously had seizures but has attained control of their seizures for an extended period of time (Epilepsy Foundation Greater Chicago, 2012). Breakthrough seizures occur due to missed medication, ineffective dose, withdrawal from excessive intake of alcohol and/or illness (Epilepsy Foundation Greater Chicago, 2012). The anticonvulsant medication that J.B. was on (Keppra) was started at a low dose and increased gradually (with consideration to the blood levels of the medication) in order to find the best dosage that would be most effective for the patient with the least amount of risk for side effects and toxicity. J.B. may have experienced breakthrough seizures due to need for an increased dosage, missed medication dosage, or for other reasons.

J.B. is ordered pyridoxine (vitamin B6). Pyridoxine-dependent seizures were not listed in his chart or medical history but he was ordered pyridoxine as a supplement. Pyridoxine-

dependent seizures are “a rare autosomal recessive inborn error of metabolism that result in intractable neonatal or early infantile seizures which are controlled only after treatment with daily pharmacologic doses of pyridoxine (vitamin B6),” (Basura, Hagland, Wiltse, & Gospe, 2009, p. 698). Pyridoxine-dependent seizures are rare in newborns but are considered to be underestimated worldwide. “Pyridoxine dependency should be suspected in all newborn infants with recurrent seizures not responding to standard epileptic treatment,” (Hellström-Westas, Blennow, & Rosén, 2002, p. 978). Common clinical signs include irritability, restlessness, and metabolic acidosis. Some patients benefit from taking pyridoxine as well as anticonvulsant medications (Basura et al.,, 2009, p. 697). This kind of seizure is considered to be diagnosed when an infant or child with previously intractable seizure activity achieves complete seizure control with pyridoxine supplementation (without use of anticonvulsants) and has seizure recurrence if the pyridoxine is withdrawn (Basura et al., 2009, p. 698). Prolonged, excessive doses of pyridoxine (up to 2 g per day) can lead to sensory neuropathy (Basura et al., 2009, p. 703).

As I was taking care of J.B., I noticed that he was very fussy and irritable throughout the entire clinical day and his mother agreed with my observation. He did seem responsive, alert, and interactive when I assessed him. I did not notice any jerking or abnormal movements, decreased level of consciousness, flushing, diaphoresis, or body rigidity or stiffness throughout the day. At 1100 that day, J.B.’s mother and her aunt who was visiting called me into the room. As his mother was holding him, J.B. was falling asleep and his mother noticed that his left eye began to roll back into his head and began to droop and his left side became flaccid. When a fellow student nurse and I got into the room, we attempted to arouse J.B. and it took us at least 2 minutes. He was very lethargic and difficult to arouse. When I had woken him up earlier that

morning, it was not that difficult to do so. We assessed J.B. and found his pupils to be round, equal and reactive to light; also, his strength was equal on both sides and his oxygen saturation was within normal limits. His extreme lethargy and difficulty to arouse was consistent with a postictal state. His mother described that his motor manifestations occurred only on one side which would be more consistent with a partial seizure. J.B. has not been diagnosed with epilepsy and no seizure activity has been reported by anyone other than his mother. The doctor on the pediatric floor viewed their videotaped accounts of J.B.'s seizures at home.

**Treatment**

Upon patient admission, the nurse and medical team should complete a thorough history and assessment to help determine what seizure activity may have occurred, any other signs or symptoms that may be helpful in diagnosing the etiology of the seizure, and whether the seizure is a symptom of a separate condition. If a seizure is occurring during patient admission, the nurse is responsible for maintaining the patient's airway, suctioning airway to clear secretions, giving supplemental oxygen, assessing the duration and characteristics of seizure activity, performing neurovascular assessments, establishing intravenous access for possible medications, protecting the patient from injury, and administering benzodiazepines if necessary (Ball et al., 2010, p. 1327). If the patient is reported to have pooling of secretions, oxygen desaturation, or extensive motor involvement, the nurse should have oxygen bag and mask and suction available as well as seizure pads on bed rails (Clore, 2010, p. 192-193). The nurse should know about the characteristics of the patient's previous disorder in order to provide and anticipate the need for the correct supplies for the patient (Clore, 2010, p. 194).

In the management of recurrent seizures and epilepsy, the ultimate goal is to achieve freedom from all seizure activity (Wilmot-Lee, 2008, p. 38). The mainstay of treatment is anti-epileptic medication; the anti-epileptic medication should prevent the reoccurrence of seizure activity, avoid or reduce possible side effects, and improve the patient's quality of life (Wilmot-Lee, 2008, p. 38). The patient affected by seizures will most likely be started on one anti-convulsant medication in order to determine effectiveness and decrease likelihood of possible side effects which commonly include sleepiness, decreased attention, decreased memory, behavioral difficulties, and cognition changes (Ball et al., 2010, p. 1328). The level of the drug in the blood is considered to be the best indicator of compliance with medication therapy (Wilmot-Lee, 2008, p. 38); these levels must be taken in order to monitor for toxicity as well. If the patient is able to remain free of seizure activity for 2 to 5 years and have a normal electroencephalogram, gradual withdrawal from the medication may be attempted (Wolf & McGoldrick, 2006, as cited by Ball et al., 2010, p. 1328; (Wilmot-Lee, 2008, p. 38). Some surgical options exist to remove detected structural parts of the brain (like tumors) that may be causing the seizures (Ball et al., 2010, p. 1328). A doctor may suggest a ketogenic diet for patients with intractable seizures; this diet is high in fat, appropriate protein for growth, and low in carbohydrates in order to encourage weight maintenance, encourage ketosis, and increase seizure control (Ball et al., 2010, p. 1328). This diet may cause dyslipidemia, kidney stones, constipation, and decreased growth (Ball et al., 2010, p. 1328).

J.B. has been on Levetiracetam (Keppra) for less than 30 days and is also prescribed Diazepam (Valium) in case of the occurrence of prolonged seizure activity. The prescribed dosage for Keppra has been increased twice and was increased again during our clinical day. J.B.'s mother expressed that both times after the Keppra dose has been increased, J.B. has had

seizure activity within 24-48 hours afterwards. The doctor agreed to keep J.B. at the hospital for at least one more day in order to monitor him. His mother was not informed of any potential surgical options (because no brain structures or cells have been recognized as the cause of the seizure activity) or about the ketogenic diet. The patient's mother did inquire about a prescription for a home apnea monitor for J.B. because she is worried that he will have a seizure at night.

**Medications**

J.B. is currently taking Levetiracetam (Keppra), Pyridoxine (vitamin B6), Diazepam (Valium), and Acetaminophen only when needed. Discussion of further information about these medications is listed in the table below.

| Medication | Mechanism of action | Why ordered? | Recommended dose/Patient dose | Is this a safe dose? Why or why not? Show Calculations | Citation |
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| Levetiracetam (Keppra) Dose = 150 mg = 1.5 ml Given twice a day orally | Inhibits burst firing without affecting normal neuronal excitability and may selectively prevent hyper synchronization of epileptiform burst firing and propagation of seizure activity. It is used especially for complex partial | This medication is ordered for J.B. to decrease his seizure activity. | As given for generalized tonic-clonic seizures orally in children 6-15 years old (no younger ages were given): 10 mg/kg twice daily; Increase by 20 mg/kg/day at 2 week intervals | 150 mg is a safe dose because it is under the maximum dose of 219 mg/dose. Blood levels of the medication should be considered as well. Recommended dose = 30 mg/kg 2 times | Deglin, Vallerand, & Sanoski, 2011, p. 782-784 |

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| | seizures.<br>Therapeutic Effects: Decreased incidence and severity of seizures.<br>Classification: anticonvulsant | | to recommended dose of 30 mg/kg 2 times daily. | daily:<br>30 mg (7.30 kg) per dose (two times a day) = up to 219 mg/dose. There was no younger age for dosage calculation. We did give this medication in clinical and verified that it was safe because it was based on the child's weight. | |
| Pyridoxine (vitamin B6)<br>Dose = 25 mg = 0.5 tablet<br>Given each day orally | "Required for amino acid, carbohydrate, and lipid metabolism; Used in the transport of amino acids, formation of neurotransmitters, and synthesis of heme;<br>Therapeutic Effects: Prevention of pyridoxine deficiency; Treatment of | This medication is prescribed for J.B.'s history of fussiness; it may also be prescribed as an | "Given for pyridoxine-dependent seizures; Can be given PO, IM, IV in neonates and infants in doses 10-100 mg initially then 50-100 mg/day orally" | Yes this is a safe dose. It is within the recommended dose for neonates and infants of 10-100 mg initially.<br>The safe dose is not given by dosing weight but by age. For neonates and infants, the dose is | Deglin, Vallerand, & Sanoski, 2011, p. 1083-1085 |

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| | pyridoxine-dependent seizures in infants; Classification: vitamins" | adjuvant anti-convulsant medication. | | 10-100 mg initially then 50-100 mg/day orally. | |
| Diazepam (Valium) 2.5 mg PO | "Depresses the CNS, probably by potentiating GABA, an inhibitory transmitter; Produces skeletal muscle relaxation by inhibiting spinal polysynaptic afferent pathways; Has anticonvulsant properties due to enhanced presynaptic inhibition; Therapeutic Effects: Relief of anxiety. Sedation. Amnesia. Skeletal muscle relaxation. Decreased seizure activity" | This medication is ordered for J.B. to decrease seizure activity especially for Status Epilepticus. | Given for Status Epilepticus and/or acute seizure activity; Safe dose for children >6 months: 1-2.5 mg 3-4 times a day | The recommended safe dose for children more than 6 months of age is 1-2.5 mg 3-4 times a day. The ordered dose is within the recommended range. Safe dose for children more than 6 months of age: 1-2.5 mg 3-4 times a day. | Deglin, Vallerand, & Sanoski, 2011, p. 431-435 |
| Acetaminophen 80 mg = 0.8 | "Inhibits synthesis of prostaglandins that may | This medication | "Orally in infants, given 10- | Yes, this is a safe dose. 80 mg is | Deglin, Vallerand, & |

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|---|---|---|---|---|---|
| ml suspension as needed | serve as mediators of pain and fever, primarily in the CNS; Has no significant anti-inflammatory properties or GI toxicity; Classification: Antipyretics, nonopioid analgesics" | is ordered for J.B. as needed to decrease pain if he is assessed to be in pain or to decrease fever if it is present. | 15 mg/kg/dose every 4-6 hours as needed (not to exceed 5 doses in 24 hours)" | within the safe calculated range of 73 mg to 109.5 mg per dose. Recommended dose is 10-15 mg/kg/dose: 10 mg (7.30 kg) (1 dose) = 73 mg per dose; 15 mg (7.30 kg) (1 dose) = 109.5 mg per dose | Sanoski, 2011, p. 112-113 |

**Physical Assessment**

J.B. has two intravenous lines: a twenty-four gauge on the left side of his scalp which is heparin-locked and a twenty-four gauge on his right foot which has normal saline running at twelve milliliters per hour. I was notified that the angiocath of the foot intravenous line was coming out a little and to monitor that. J.B.'s mother wanted the scalp intravenous site taken out as soon as possible but we had to ensure that the foot site was stable. The maintenance rate for J.B. is 29.2 milliliters per hour:

$$7.30 \text{ kg } (4) = 29.2 \text{ millilters per hour}$$

He receives respiratory treatments every four hours and is on the respiratory pathway. He benefits from suctioning especially before feedings.

The most important physical assessment for J.B. is the neurovascular assessment due to his history of seizure activity. Neurovascular assessment should detect any seizure activity that could be occurring or any signs or symptoms that the patient may have had a seizure recently (or will have a seizure). When assessing J.B., I looked for his level of consciousness and his level of alertness. He was alert, awake, and was interactive with me. He was irritable and fussy throughout the day but more so in the morning. His pupils were equal, round and reactive to light and were able to accommodate. Both his upper and lower extremities bilaterally were strong; no flaccidity or rigidity was present upon movement. J.B. was responsive to things occurring in his environment like his mother moving. J.B.'s skin was within normal limits and was warm (not hot or cool). J.B. was reactive when I touched his fingers and toes; no decreased sensation was noted. No abnormal movements or jerking were noted at any point. All of his pulses were present and equal bilaterally. The doctor and his resident assessed reflexes in J.B., all of which were normal. J.B. did not have a fever at any point of the day and no diaphoresis was noted.

**Lab Values and Diagnostic Tests**

J.B.'s laboratory results that were within normal ranges included sodium, potassium, chloride, carbon dioxide, glucose, BUN, creatinine, calcium, white blood cell, hemoglobin, hematocrit, platelet, lymphocyte percentage, monocytes, and neutrophils. He had no abnormal laboratory results. His laboratory results from the day before were also normal.

J.B. had a 24-hour EEG (electroencephalogram) done at Aultman as well as a 72-hour EEG done at Akron Children's Hospital. Neither showed any seizure activity. The EEG "measures the electrical impulses produced by brain cells," (LeFever Kee, 2005, p. 518). Electrodes are applied to the scalp to document brain-wave activity and to detect possible seizure

disorders, neoplasms, cerebral vascular accidents, head trauma, and infections of the nervous system (LeFever Kee, 2005, p. 518). The EEG studies were ordered to try to detect seizure activity but no seizure activity was found in either case. Seizure would be indicated by sudden electrical bursts or slowing of brain activity on an EEG. It is not unusual to not detect seizures in EEG studies because of the unpredictable nature of seizures.

### Normal Growth and Development

If the seizures are not caused by structural problems in the infant's brain and the infant can achieve control over the seizure activity, growth and development may not be affected significantly. The severity and frequency of the seizures are a significant factor in how growth and development may be affected. It is recognized that epilepsy is common in pediatric patients with learning disabilities; behavioral and attention problems are common as well (Kerr, 2007 as cited by Wilmot-Lee, 2008, p. 41). Seizures need to be controlled in order to avoid possible injury to the body and to the brain which could affect normal growth and development (Lee, 2009). If a seizure becomes prolonged and oxygen status is compromised, brain damage can occur as well. At this point, J.B. is developmentally and physically normal for his age. If he is unable to control his seizures with medication (s), his growth and development may be affected.

## Data Grouping

### Nursing Process Map

| Primary Nursing Diagnosis |
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| Ineffective Airway Clearance related to inability to control secretions and uncontrolled movement during seizures (Ball et al., 2010, p.1330; Black & Hawks, 2009, p. 1816) |

**As evidenced by:**

Need for frequent suctioning throughout the day secondary to inability to clear secretions

- *Suctioning is a common need during seizures due to pooling of secretions and decreased control of body during seizures* (Black & Hawks, 2009, p. 1816); Infants often benefit from suctioning because of their decreased ability to clear secretions; J.B. required suctioning frequently throughout the clinical day, if he would have had a seizure he may be at increased risk for ineffective airway clearance

History of seizure activity

- *Certain types of seizures are associated with pooling of secretions which can contribute to ineffective airway clearance during and after seizures* (Ball et al., 2010, p. 1325); J.B. has had a number of different seizures and at least one episode in which his airway was compromised. His history of seizure activity contributes to his ineffective airway clearance.

Family history of epilepsy

- *Having a close relative with a history of seizures places the patient at risk for having seizures* (Ball et al., 2010, p. 1324); Certain seizures place the infant at risk for pooling of secretions and decreased level of consciousness which may contribute to ineffective airway clearance

Decreased level of consciousness secondary to seizure (reported by J.B.'s mother)

- *Loss of consciousness occurs in generalized or tonic-clonic seizures* (Ball et al., 2010, p. 1326); *Level of consciousness is a vital indicator of neurological function* (Ball et al., 2010, p. 1330); decreased level of consciousness during and after seizure activity places the infant at risk for increased ineffective airway clearance

Lethargy and fatigue secondary to seizure (reported by J.B.'s mother)

- *Sleepiness, difficulty in arousal common after generalized seizure especially during postictal state* (Ball et al., 2010, p. 1326); These manifestations may place the infant at an increased risk for aspiration secondary to ineffective airway clearance

**Goals**

**Short term:** J.B.'s mother will identify and demonstrate actions and measures to take when seizure activity begins by the end of the clinical day (Doenges, Moorhouse, & Murr, 2010, p. 215).

**Long term:** J.B. will not experience aspiration during hospital stay (Carpenito-Moyet, 2008, p. 537).

**Nursing Interventions for Short Term Goal**

**Monitor the infant to ensure adequate oxygenation every 2 hours and during any seizure activity; Teach the mother and family to monitor for decreased oxygenation status, at least 2 times per shift and more often if tolerated.**

- *Rationale: Airway and oxygenation may be compromised before, during, or after seizure activity; oxygen therapy may be required* (Ball et al., p. 1331); Seizures especially prolonged ones cause respiratory and/or circulatory compromise

**Inform and have J.B.'s mother demonstrate care measures for when her infant has a seizure, at least 2 times per shift and more often if tolerated.**

- *Rationale: There are specific first-aid techniques to care for a child who has a seizure* (Ball et al., 2010, p. 1333); J.B.'s mother may have less anxiety during her son's seizures if she knows what actions take priority; J.B. would benefit from having an educated caregiver with him during his seizures

**Nursing Interventions for Long Term Goal**

**Administer supplemental oxygen or bag ventilation, as needed postictally.**

- *Rationale: May reduce cerebral hypoxia resulting from decreased circulation and oxygenation secondary to vascular spasm during seizure* (Doenges et al., 2010, p. 217)

**Prepare for and assist with intubation, if needed.**

- *Rationale: Presence of prolonged apnea postictally may require ventilatory support* (Doenges et al., 2010, p. 217); J.B. has required intubation previously during a seizure.

**Suction before feedings, before respiratory treatments, and as often as needed.**

- *Rationale: Reduces risk of aspiration or asphyxiation* (Doenges et al., 2010, p. 217); *Larynx and glottis are higher in neck, increasing risk of aspiration* (Ball et al., 2010, p. 840); By suctioning, the amount of secretions is decreased which may reduce risk of aspiration during a seizure

**Place in lying position on flat surface and turn head to side during seizure activity.**

- *Rationale: Promotes drainage of secretions; prevents tongue from obstructing airway* (Doenges et al., 2010, p. 217); *Small oral cavity and large tongue increase risk of obstruction in pediatric patients* (Ball et al., 2010, p. 840)

**Assess respiratory status before and after respiratory therapy and after seizure activity (including breath sounds, rate, and rhythm**).

- *Rationale: These assessments can detect possible respiratory symptoms and complications* (Carpenito-Moyet, 2008, p. 537); Any respiratory complications may place the infant at risk for increased ineffective airway clearance

**Assist with positioning frequently and monitor for risk for aspiration with every contact**

- *Rationale: Reduces barrier to airway clearance* (Carpenito-Moyet, 2008, p. 538);

**Evaluation**

**Short term goal:** J.B.'s mother was able to identify priority actions to take when J.B. experiences a seizure, by the end of the clinical day. She was able to comprehend why certain actions like laying him on his side were important. Further practice, demonstration and reinforcement may be helpful in order to get these actions engraved into her mind because there is typically a lot of anxiety in parents when their children are experiencing a seizure.

**Long term goal:** J.B. did not experience aspiration during the clinical day (I was not present during his entire hospitalization) as evidenced by no respiratory compromise, no coughing, and no difficulty in swallowing or breathing. Especially after J.B.'s episode during the clinical day, no aspiration was reported or detected. Whether he remained free of aspiration for the rest of his hospitalization I am unsure.

**Secondary Nursing Diagnosis**

Risk for Injury related to tonic-clonic movements secondary to seizures (Carpenito-Moyet, 2008, p. 358).

**As evidenced by:**

History of seizure activity (with motor and sensory manifestations)

- *Seizures are a sign of neurologic dysfunction* (Ball et al., p. 1324); Neurologic dysfunction and seizures can contribute to J.B.'s risk for injury

Family history of epilepsy

- *Having a family history of seizures can place the patient at increased risk for seizures* (Ball et al., 2010, 1324); Seizure activity places J.B. at an increased risk for injury

Ability to roll over and crawl secondary to age

- *Mobility increases during the first year of life, progressing from squirming to crawling, rolling and standing placing the infant at increased risk for falls and injury* (Ball et al., 2010, p. 384)

Decreased level of consciousness secondary to seizure (reported by J.B.'s mother)

- *Loss of consciousness occurs in generalized or tonic-clonic seizures* (Ball et al., 2010, p. 1326); This loss of consciousness can contribute to risk for injury during and after seizure activity

Decreased general strength and muscle tone secondary to seizure (reported by J.B.'s mother)

- *Body can become rigid or flaccid during seizures and immediately after* (Ball et al., 2010, p. 1326); This decreased strength and muscle tone can contribute to risk for injury

**Goals**

**Short term:** J.B.'s mother will identify actions and measures to take to improve J.B.'s safety by the end of the clinical day (Doenges et al., 2010, p. 215).

**Long term:** J.B. will remain free from injury during hospital stay (as measured by no report of falls or injuries by mother and hospital employees) (Carpenito-Moyet, 2008, p. 364).

**Nursing Interventions for Short Term Goal**

**Encourage J.B.'s mother to keep padded side rails up with crib in lowest position, with each contact with her during clinical day.**

- *Rationale: Minimizes injury should frequent or generalized seizure occur while J.B. is in crib* (Doenges et al., 2010, p. 215). Teaching the mother to pad side rails and provide extra protection for J.B. at home will decrease risk for injury during seizure activity

**Encourage J.B.'s mother to stay with her son during and after seizure, at least 2 times**

**during shift and more often if tolerated.**

- *Rationale: Promotes client safety and reduces sense of isolation during event* (Doenges et al., 2010, p. 215); It is also important to note the duration and characteristics and to protect J.B. from his environment during seizures

**Teach mother to cradle J.B.'s head, place on soft area, or assist to floor if out of bed and to not attempt to restrain her son during a seizure, at least 2 times during shift and more often if tolerated.**

- *Rationale: Gentle guiding of extremities reduces risk of physical injury when client lacks voluntary muscle control* (Doenges et al., 2010, p. 216); J.B.'s mother should be knowledgeable about what to do when her son has a seizure

**Teach mother about signs of Status Epilepticus, at least once during shift and more often if tolerated.**

- *Rationale: May be result of repetitive muscle contractions or symptom of injury incurred, requiring further evaluation and intervention; This is a life-threatening emergency that, if left untreated, could cause a number of complications; Immediate intervention is required to control seizure activity and prevent permanent injury or death* (Doenges et al., 2010, p. 216); Status Epilepticus is a serious seizure complication and requires medical intervention to reduce further complications and possible injuries; J.B.'s mother should know about the signs of this condition in order to determine when to call an ambulance and/or administer Valium

**Educate mother about anti-convulsant medications and the importance of compliance with medication therapy, at least 3 times per shift and more often if tolerated.**

- *Rationale: Anti-epileptic medications treat and/or prevent seizures by raising the seizure*

*threshold, stabilizing nerve cell membranes, reducing the excitability of the neurons, or through direct action on the limbic system, thalamus, and hypothalamus; Goal is the optimal suppression of seizure activity with lowest possible dose of drug and with fewest side effects* (Doenges et al., 2010, p. 216); Education is very important in order to increase medication compliance and correct medication administration

**Inform mother of extra precautions that should be taken to increase safety and reduce risk for injury (such as a medic alert bracelet, frequent monitoring, etc.), at least 3 times per shift and more often if tolerated.**

- *Rationale: Children with recurrent seizures are at increased risk for injuries including burns, falls, and drowning* (Ball et al.,2010, p. 1332); Education is important in order to decrease risk for injury

**Nursing Interventions for Long Term Goal**

**Keep padded side rails up with crib in lowest position at all times during hospitalization.**

- *Rationale: Minimizes injury should frequent or generalized seizure occur while J.B. is in crib* (Doenges et al., 2010, p. 215); Seizures are unpredictable and precautions should be taken to decrease risk for injury at all times

**Stay with client during and after any seizure activity.**

- *Rationale: Promotes client safety and reduces sense of isolation during event* (Doenges et al., 2010, p. 215); Being present with J.B. during the seizure may ease his mother's anxiety about his seizure as well as provides the nurse with the opportunity to observe and document the specific characteristics and manifestations and duration of the seizure activity while providing for J.B.'s safety

**Cradle J.B.'s head, place on soft area, or assist to floor if out of bed and do not attempt to**

**restrain during seizure activity in hospital.**

- *Rationale: Gentle guiding of extremities reduces risk of physical injury when client lacks voluntary muscle control* (Doenges et al., 2010, p. 216); These measures provide for increased patient safety during seizure

**Perform neurological assessments and check vital signs every at least every 4 hours or more often if needed.**

- *Rationale: Documents postictal state and time and completeness of recovery to normal state; may identify additional safety concerns to be addressed* (Doenges et al., 2010, p. 216); Neurological assessments and vital signs are indicators as to the patient's condition and may indicate the beginning, the occurrence, or the end of a seizure

**Observe for Status Epilepticus during all contact with J.B.**

- *Rationale: May be result of repetitive muscle contractions or symptom of injury incurred, requiring further evaluation and intervention; This is a life-threatening emergency that, if left untreated, could cause a number of complications; Immediate intervention is required to control seizure activity and prevent permanent injury or death* (Doenges et al., 2010, p. 216).

**Administer medications as prescribed.**

- *Rationale: Anti-epileptic medications treat and/or prevent seizures by raising the seizure threshold, stabilizing nerve cell membranes, reducing the excitability of the neurons, or through direct action on the limbic system, thalamus, and hypothalamus; Goal is the optimal suppression of seizure activity with lowest possible dose of drug and with fewest side effects* (Doenges et al., 2010, p. 216); Keppra is a medication that requires consistent timing of administration and also monitoring of blood levels

**Evaluation**

**Short term goal:** J.B.'s mother did identify what actions and measures she should take in order to improve J.B.'s safety by the end of the clinical day specifically having the crib walls up whenever he is in the crib, preventing falls and injuries by supervising and observing J.B., and recognizing his increasing mobility and curiosity.

**Long term goal:** J.B. experienced no injuries during the clinical day (I wasn't present for his entire stay in the hospital) as evidenced by reports of no injuries by his mother and the nurses as well as no evidence of bruising or other injuries during assessment. J.B. experienced no injuries during the clinical day. We implemented safety precautions like frequently checking in and monitoring of J.B. in order to prevent injuries. Whether J.B. remained free from injury until discharge I am unsure.

**Nursing Action**

Throughout the clinical day, I checked in on J.B. every 1-2 hours to monitor his color and respiratory status as well as his oxygen saturation every 2-4 hours. He had been taken off the continuous monitor one hour prior to our arrival to the floor. His mother spent a lot of time talking on the phone or doing other activities so I made it a priority to walk past the room and check in as often as possible without bothering the patient and his family. At one point when checking in on J.B., his mother left J.B. in his crib with both sides down and she was in the bathroom with the door shut. I informed her that the walls of the crib need to be up whenever J.B. is in there. J.B. is 6 months old and is very capable of moving around in bed by himself which places him at risk for falling out of the crib. I noticed a couple times during the day that J.B. liked to move around in bed and was often laying in a different way than how we left him. I

asked the mother what she typically did when her son had a seizure. She said that she typically watches him to make sure that he is having a seizure for at least 15 seconds then she calls an ambulance or calls her mother into the room so they can go to the hospital. I informed her that it would be important to place J.B. on a flat (preferably soft) surface on his side so that he doesn't swallow any of his saliva, to avoid putting any tight clothing on J.B., to stay near J.B. in order to protect him from injuring himself, to stay with J.B. during the entire seizure, to check for responsiveness during the seizure, and to call an ambulance if the seizure lasts more than 5-10 minutes or if he doesn't regain consciousness right after the seizure. I talked with J.B.'s mother about the different types of seizures she has seen or knows about and she expressed that the doctors had talked to her about Status Epilepticus and the need for hospitalization when a seizure like that occurs. I also discussed with her the difference between Keppra and the Valium and which is given for what type of seizure.

J.B. had been on oxygen via nasal cannula running at 1 liter and his oxygen saturation was 98%. Throughout the day, we tried weaning him down to 0.5 liter then to 0.25 liter but his oxygen saturation was not adequate. Immediately after J.B.'s episode that day in the hospital, I checked his oxygen saturation to assess for the need for oxygen but it was adequate; I also checked his respiratory status (respiratory effort, rate and rhythm as well as lung sounds). I informed J.B.'s mother that suctioning him before feeding him may be beneficial. I suctioned him when initially assessing him in the morning, also before each of his respiratory treatments, and as needed several times throughout the day. Whenever I checked on J.B., I tried to make sure his head of bed was elevated unless he was eating. The mother seemed to be feed J.B. in positions that wouldn't place him at increased risk for aspiration. I performed neurological

assessments and checked vital signs every 4 hours during my shift. During the morning part of the shift, I needed help assessing J.B. because he was so fussy and irritable.

## Conclusion

J.B. was the first patient that I had ever taken care of that had seizures. I am glad that I got to learn more about seizures and the care of patients with seizures. A seizure seems like a very scary event and it can be in extreme circumstances but there are a number of things that nurses and families can do to support the treatment of recurrent seizures in pediatric patients. Just like with any pediatric patient, the nurse should support the patient and also the patient's family in order to provide for the best outcomes for the patient. This paper outlines the nursing process in depth and reminds me of the significant role of the nurse throughout all patient care.

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