Pediatric Process Paper: B.M.

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Data Collection

Description of Child/Family

B.M. is a 22-month-old male. He was born on November 13, 2010. B.M. lives at home with his parents in Perry Township. The parents stated that they wanted to stay in Perry while he is still under their care. He is an only child. Both his parents are Caucasian and both of them work. His mother is a graphic designer and his father works in a factory, forging parts. B.M. has grandparents, who are active in his care because he is their only grandchild. He goes to daycare 5 days a week. The parents have AultCare medical insurance through the mother's work. B.M. came in to the emergency department on October 2, 2012 during the night because he had difficulty breathing and had retractions at the intercostals and suprasternum.

Developmental Assessment

B.M. weighs 13.1 kilograms (28.88 pounds), which is in the 69th percentile for his age. His height is 89 centimeters (2.92 feet) and that is in the 81st percentile for his age. His head circumference is 47.9 centimeters (18.86 inches). He is in the 34th percentile for head circumference for his age (Baby Growth Chart, n.d.). His BMI is 16.5, which is healthy for a 22 month old (Ball, Bindler, & Cowen, 2010, p. 1558).

While taking care of B.M., I got to know a little about him. He was a very active boy. During the whole time I was taking care of him, he was up and about doing stuff. He also has 2 security objects, which were a pacifier and a blanket. He was very attached to these items and would sometimes get upset if he has to leave them. He had good fine and gross motor skills. For gross motor skills, he is able to walk around with no difficulty. For fine motor skills, he could pick up small foods and use utensils like spoons to feed himself. He has good sensory skills. He

is able to name different objects and use names. Moreover, he was able to even able to say what color an object was. He can speak in short sentences and answers when you ask him something. He does not seem to have stranger anxiety, as he was comfortable with the care I provided throughout the shift. According to Erik Erikson, B.M. is in the stage of autonomy vs. shame and doubt. In this stage the child, the child starts expressing their growing self-control by trying to do things for themselves and in activities like climbing and exploring. If the child is denied autonomy, then this could lead self-doubt (Coon & Mitterer, 2009, p. 136). It is important for the parent to allow the child to make their own decision, when possible, as this helps to promote communication (Ball et al., 2010, p.177). While B.M. was in my care, he showed signs of independence when he was playing in the playroom by picking out his own toys that he wanted to play with. In Sigmund Freud's psychoanalytic Theory, B.M. would in the anal stage. In this stage, the attention is on the process of elimination. This is the stage where parents try to toilet train their child. Freud thought that harsh or too lenient toilet training could cause anal fixation, which could lead to the child being anal retentive, which being obstinate, stingy, and orderly, or anal expulsive, which is disorderly, destructive, and messy, later in life (Coon & Mitterer, 2009, p. 430). At

Nutrition Assessment

For a toddler, the caloric needs are 1000 calories a day at age 1 and only 1300 to 1500 by age 3. The reason for such a minor increase in caloric intake is because the body is not growing as fast as in infancy. Fat intake should be 30% to 35% of total caloric intake before age 2 and 10% after age 2 (Muray, Zenther, & Yakimo, 2009, p. 308). Fluid intake for toddlers is 115 to 125mL/kg/day. At around 18 months, the toddler’s appetite usually declines and this is due to the body needing fewer calories, since it is growing less rapidly. Some toddlers may not eat as much

or refuse to eat to show autonomy. They might do things as well because they simply are not hungry that much anymore, they need attention, they might be fatigued, or they are distracted by other stimuli in their surroundings (Muray et al., 2009, p. 309). B.M. has a good appetite, but he is a picky eater. He got a regular meal tray and did eat most of the food off his tray, but not in one session. He was very active and it took a few eating sessions to get him to eat most of his tray. He as well drinks a large quantity of milk. Too much milk is undesirable, unless adequate nutrition follows, because it could lead to iron deficiency anemia due to omission of meats and vegetables, but B.M. does not seem to have a problem with this (Muray et al., 2009, p. 308). Parents informed me that this is his usual eating style and that while he is at daycare he eats well, as well. The parents did say that they try to make help B.M. make nutritional choices and that he might eat nutritionally better foods at the daycare, simply because they follow a stricter mel plan there. His fluid intake for the 0800-1500 shift is 1372, while his recommended fluid intake for a day is 1506.5mL to 1637.5mL. His fluid output for the shift is 359mL, which was recorded from three wet diapers and one diaper with stool.

Pathophysiology

B.M. Was diagnosed with Reactive Airway Disease vs. Bronchiolitis

Reactive Airway Disease

Reactive airway disease is a disease where wheezing is present, but it is not necessarily asthma that is the cause. Only around 30% of infants, who wheeze, develop asthma. The criteria to establish asthma as the cause of wheezing, not reactive airway disease, is that the child must be 5 years of age, they must have symptoms of airway hyper-responsiveness and airflow obstruction that are episodic, they must have a reversible airflow obstruction of at least 10% of the predicted forced expiratory volume in 1 second after using a short-acting beta agonist, and all

other alternative diagnoses must have been excluded. In the past, reactive airway disease was just a part of asthma. In reactive airway disease, many environmental stimuli start an allergen-antibody interaction, which causes a release of mediators, which induces bronchospasms, edema, and mucous secretions, which in turn create inflammation in the airways, which results in the increased work of breathing. The mediators include histamine, tryptase, heparin, leukotrienes, platelet-activating factor, cytokines, interleukins, and tumor necrosis factor. In infants and children under 3 years of age, the intrapulmonary airways are small and thus any infection in the lower airways results in decreased airway function. Children that have a mother who smoked during pregnancy or during the first year of the child's life may also be predisposed to develop reactive airway disease (Chin, 2011).

There are a few signs and symptoms of reactive airway disease. Wheezing, coughing, tachypnea, dyspnea, and intercostal retractions are major signs and symptoms for reactive airway disease. Flaring of the nares is also a major sign. Fever, along with tachycardia, can accompany reactive airway disease. Poor feeding as well can be a sign of reactive airway disease and diaphoresis can be indicative of reactive airway disease (Chin, 2011).

When B.M. was admitted, he had flaring nares, and erythematous and whitish discharge. He also was tachycardiac and his lungs had wheezes with fine crackles and rhonchi. He as well had abdominal and suprasternal retractions. He also had a low-grade fever and a loose non-productive cough. Going from the 0800 assessment to the end of the day, his retractions were disappearing to the point where you could hardly notice them. His axillary temperature was normal at 97^{o}C. The doctor as well came in during rounds and said that B.M. might be developing an allergy to something at home. He said that the medications being used that work

for B.M. are the ones used for asthma and wheezing, so he was thinking it was more reactive airway disease than bronchiolitis.

Bronchiolitis

Bronchiolitis is an acute inflammatory injury of the bronchioles that usually affects children less than 2 years of age. It is usually caused by a virus. RSV is the usual virus that causes this injury. This injury can occur to a person of any age, but the most severe symptoms are usually in only young infants. This is because of the infant's smaller airway, higher closing volume, and insufficient collateral volume compared to older children and adults (DeNicola, 2012).

The signs and symptoms for bronchiolitis are similar to those in reactive airway disease. Tachypnea and tachycardia are present. The child will as well have a fever. There might be retractions present with rales and wheezing in the lung sounds. Hypoxia can be present in this injury as well. Apnea occurs early in this disease as well (DeNicola, 2012).

During rounds that doctor made, he said he was quite certain that B.M. did not have bronchiolitis, even though he had some symptoms of bronchiolitis like tachycardia, fever, and wheezing with retractions. The main thing that was indicative of this decision for the doctor was that both the RSV test and chest x-ray came back negative. Moreover, the medications that were working were the medications that work in asthmatic patients, not bronchiolitis patients.

Treatment

Reactive Airway Disease

The main treatment for reactive airway disease is medication and oxygen. Oxygen can be delivered by nasal cannula or mask to help maintain oxygen saturation above 92%. The medications used for reactive airway disease are beta$_2$-agonist, like PO and inhaled albuterol, and

corticosteroids. Ipratropium with a beat-adrenergic agonist may be used as well because they improve the forced expiratory volume in 1 second than if they were used alone. Theophylline may be used in an outpatient setting for those patients that have poor compliance with inhaled beat-agonist (Chin, 2011).

The treatment that was used for B.M. was medication. He was receiving Prednisolone, a corticosteroid, and inhaled albuterol, a beta$_2$-agonist. These were given to reduce inflammation and cause bronchodilation, respectively.

Bronchiolitis

The treatments for bronchiolitis are oxygen therapy, maintaining hydration, and medications. This is done through administering oxygen to the child to keep their oxygen saturation above 92%. The goal of hydration in bronchiolitis is to replace deficits and provide the maintenance requirements because when infants and young children get bronchiolitis, they are mildly dehydrated, due to increased fluid loss from fever and tachypnea and decreased fluid intake. There are many medications used for bronchiolitis. Bronchodilators are used to dilate the airways, but they sometimes do not help treat or shorten the hospital stay of the patient due to the nature of bronchiolitis. A practice for using bronchodilators in patient with bronchiolitis is only continue using them clinical improvement is demonstrated after the use of bronchodilators. Antivirals and antibiotics can be used for bronchiolitis as well, depending on the nature of the etiology, but they are recommended against by the AAP, unless the infant or the young child is at high risk for a serious RSV disease. Hypertonic saline is another medication that has had some success with children who had viral bronchiolitis (DeNicola, 2012).

The treatment for B.M. was medications. His medications that worked were corticosteroids and beta$_2$-agonists. These medications are helpful in reactive airway disease, but

not so in bronchiolitis. His chest x-ray and RSV test both came back negative, making it unlikely that B.M. had bronchiolitis during his stay at the hospital.

Medications

B.M. Had a few medications that he had to take when he was at the hospital. He had two scheduled medications and one PRN medication.

Medication	Mechanism of action	Why has it been ordered?	Recommended dose	Is patient receiving a safe dose?
Prednisolone Corticosteroid 15mg/5mL -oral, QID -It was scheduled for 0700, 1000, 1300 and 1600.	Suppresses inflammation and normal immune response (Deglin, Sanoski & Vallerand, 2011).	It was ordered to reduce inflammation i the airways.	The safe dose is 0.1-2 mg/kg/day in 3-4 divided does (Deglin et al., 2011).	Yes because the range would be (0.1mg*13.1kg) which would equal 1.31, and (2mg*13.1kg), which equals 26.2, so the safe range is 1.31-26.2mg/day, which 15mg falls in between.
Albuterol (Proventil) Bronchodilator 2.5mg/mL -Inhaler, q3h -Respiratory took	It causes bronchodilation through binding to the $beta_2$-adrenergic receptors that are	It was ordered due to B.M. having wheezing and retractions.	The safe dose is 2-4mg in 3-4 times a day, but it is not to exceed 32mg/day	Yes because he was getting 2.5mg q3hrs, which is (2.5mg*(24/3=8))=20mg, which is under the max of 32mg.

care of this drug	located in the smooth muscle of the airways (Deglin et al., 2011).		(Deglin et al., 2011).	
Acetaminophen (Tylenol) Antipyretic 200mg -oral, q8h, PRN	It causes analgesia and antipyresis by inhibiting the synthesis of prostaglandins that can be mediators of pain and fever (Deglin et al., 2011).	It was ordered for any pain B.M. might be experiencing or a temperature over 38.6 degrees Celsius.	The safe dose is 10-15 mg/kg/dose every 4-6 hours as needed, but it is not to exceed 5doses/day (Deglin et al., 2011)	No because the range would be (10mg*13.1kg) which would equal 131, and (15mg*13.1kg), which equals 196.5, so the safe range is 131-196.5mg/day, which 200mg does not fall in between.

Physical Assessment

For the physical assessment, several parts are important for this patient and his conditions. As for all respiratory diseases, oxygen saturation, respiratory rate, and lung sounds, along with nasal flaring and retraction, are important in determining the severity of respiratory distress experienced by the patient. Heart rate is also important, as it is a common sign of respiratory distress and tachycardia may indicate hypoxia. Hypoxia can also cause irritability, restlessness, and abrupt changes in behavior. Observe the quality of a cough, if it is present. Observe the

overall color of the patient because patients with respiratory distress can can progress from a pallor color to a cyanotic color. Assess capillary refill and nail bed color because this helps determine if the patient is receiving enough oxygen to the extremities (Ball et al., 2010, p. 843). Tests that would be important are ABG's, which would show the efficacy of the patient blood gas exchange and a CBC, which would show if the patient has an infection or not. A detailed medical history and physical examination, along with spirometry function testing, may be done as well. Chest x-rays can be don't, if the patient has increased temperature, wheezes, and an absence of family history of asthma (Chin, 2011)

When B.M. was admitted at night, he had a low-grade fever and loose nonproductive coughs. During the 0800 assessment, his axillary temperature was 97.5^{o}F, while the normal is 96.6-98.0^{o}F. His oxygen saturation was 95%. He had a heart rate of 139, while the normal for a child of his age is 70-110, which indicates that he has tachycardia. He had a regular pulse. His blood pressure was 106/53, while the normal is 90-105/55-70. His respirations were at 34 and normal respiratory rate is 20-30, indicating that he experiencing tachypnea (Ball et al., 2010, p. 845). Using the FACES scale, his pain was recorded at a 0. His skin was pink and warm to the touch. His skin turgor was normal, his capillary refill was under 3 seconds, and he had no edema. His abdomen was soft to the touch and his bowel sounds were in all four quadrants. He had wheezing bilaterally, anteriorly, and posteriorly, but as the day progressed, the wheezing was fading away. He had retractions at the intercostals and suprasternum. During the 0800 assessment, they were noticeable, but by the end of the shift, they were very faint.

Lab Values/Diagnostic Tests

B.M.'s lab values were all normal, expect for pCO_2.

Abnormal Labs	Normal Value	Patient's Value	Analysis
pCO_2	32-48mm Hg (Ball et al., 2010, 779).	29mm Hg (Low)	pCO_2 is an ABG and if it is too low, then this can be indicative of hyperventilation (Ball et al., 2010, 782).

B.M. had a chest x-ray and a RSV test performed when he was admitted. His RSV test, which used detection by Rapid Membrane Immunoassay, came back negative with the result being that their was no significant amount of viruses. His chest x-ray, as well, came back negative with his heart size being normal and there being no signs of pulmonary vascular congestion, pneumothorax, pleural effusion, or focal pulmonary parenchymal consolidation.

Normal Growth and Development

Depending on the severity of the reactive airway disease, a child's growth and development can skew off the normal path. Thirty percent of infants who wheeze go on to develop asthma (Chin, 2011). It is important to do a follow up on children who might develop asthma. Stress reduction and rest promotion are needed for these children as labored breathing and low oxygenation can leave the child exhausted (Ball et al., 2010, p. 888). These children can also go on to develop exercise-induced asthma, which can stop them from participating in activities (Ball et al., 2010, p. 888).

For B.M., the aspect of main important is whether his reactive airway disease could become asthma. When the doctor was making rounds, he said that many children seem like they might be developing an allergy to something for the first years of life and then it just goes away, so that might be the case for B.M. The doctor also set up for B.M. to complete an "asthma-like" treatment course. B.M. should be able to resume normal functions and if he has another flare up, the doctor prescribed Ventolin HFA for him.

Data Grouping, Interpretation, and Nursing Diagnoses

Nursing Diagnosis #1

My primary nursing diagnosis is ineffective airway clearance related to airway compromise as evidenced by wheezing and intercostal and suprasternal retractions (Ball et al., 2010. p. 885). My first piece of evidence is B.M.'s wheezing. Wheezing is a sign of breathing difficulty that is related to inflammation, which can cause inflammation. My second piece of evidence is B.M.'s cough. B.M. came into the emergency room with a loose nonproductive cough. Coughing is also a sign of inflammation, which can cause airway narrowing (Ball et al., 2010, p. 878-879). The third piece of evidence is intercostal and suprasternal retractions. These are also signs of breathing difficulty, which can be cause by ineffective airway clearance (Ball et al., 2010, p. 879).

Primary Nursing Diagnosis	Ineffective airway clearance related to airway compromise as evidenced by wheezing and intercostal and suprasternal retractions (Ball et al., 2010. p. 885).
Short Term Goal	Patient will maintain a patent airway with lung sound clearing during my shift.
Nursing Intervention #1	Administer medication, as indicated. *Rationale:* The medications, like corticosteroids and beta$_2$-agonists, help to relax the smooth muscles and diminish airway obstruction and inflammation (Ball et al., 2010. p. 886).

	Nursing Action: During the shift, respiratory therapy provided the patient with treatments of albuterol, while I did a follow-up on the treatment. I gave the patient prednisolone to help decrease airway inflammation. Both of these medication seemed to be helping the patient as he seemed to be more healthier as the day progressed.
Nursing Intervention #2	Auscultate breath sounds, using your stethoscope, noting any adventitious breathe sounds, anteriorly and posteriorly. *Rationale:* This will identify the child's respiratory status (Ball et al., 2010, p. 884) *Nursing Action:* During my assessments, I auscultated B.M.'s breath sounds. He had wheezing bilaterally, anteriorly, and posteriorly, which are indicative on compromised airways.
Evaluation of Short Term Goal	Goal was met. Patient's wheezing started to subside with every treatment of albuterol. His retractions were noticeable during the 0800 assessment, but at the end of the shift, they were barely noticeable.

Long Term Goal	The patient will demonstrate behaviors that help improve airway clearance.
Nursing Intervention #1	Teach the parents how to observe for signs of ineffective airway clearance, like persistent cough and changes in depth and rate of respirations through the use of text and face to face explanations. *Rationale:* When the patient is discharged, it is important to prevent further incidences of ineffective airway clearance from occurring. The parents and child need to be instructed about the signs to look for (Ball et al., 2010, p. 890). *Nursing Action:* During my care of the child, I gave the patients some information regarding reactive airway disease and what signs and symptoms to look for. Also, there was information about when the parents should take the child back to the emergency room.
Nursing Intervention # 2	Teach the parents how the medications, prescribed for home, work and how the child should use them through use of text and face to face explanations.

	Rationale: It is important for the parent to understand how to use a medication and when to use a medication, so the parents can properly administer a medication to the child when they need it (Ball et al., 2010, p. 891). *Nursing Action:* I provided the parents with informational text about Ventolin HFA and prednisolone. In the text was information about how to properly administer the medication and when to administer.
Evaluation of Long Term Goal	Goal was met. The parents of the patient were able to relay the information learned back to me.

Nursing Diagnosis # 2

The secondary nursing diagnosis that I picked for B.M. Was impaired gas exchanged related to airway obstruction as evidenced by increased respiratory rate, wheezing, retractions, and abnormal ABG's (Ball et al., 2010, p. 885). The first piece of evidence for impaired gas exchange is wheezing, which can be indicative of bronchospasm, which in turn can help cause impaired gas exchange (Ball et al., 2010, p. 878). The second piece of evidence is the abnormal ABG's. A low pCO_2 value is indicative of hyperventilation, which is a sign of impaired gas exchange (Ball et al., 2010, p. 782). The last piece of evidence for impaired gas exchange is intercostal and suprasternal retractions. These are signs of breathing difficulty, which can be

cause by ineffective airway clearance, which can be indicative of impaired gas exchange (Ball et al., 2010, p. 879)

Secondary Nursing Diagnosis	Impaired gas exchange related to airway obstruction as evidenced by increased respiratory rate, wheezing, retractions, and abnormal ABG's (Ball et al., 2010. p. 885).
Short term Goal	The patient will maintain will maintain a level of oxygen saturation at 92% or higher during my shift.
Nursing Intervention #1	Evaluate level of activity tolerance through watching B.M. in activities and seeing which activities he can handle and which ones he cannot. *Rationale:* Knowing the patient's activity tolerance will help the nurse understand what activities require extra oxygen consumption by the patient (Ball et al., p. 888-890) *Nursing Action:* For the time that I took care of B.M., I could see that he had a very high level of activity tolerance. It was not until the end of the shift that he slowed down and began to get tired. He did require extra oxygen consumption during some activities, as it was easy to see was out of breathe and hyperventilating.

Nursing Intervention # 2	Assess and monitor oxygen saturation through the use of the pulse oximeter. *Rationale:* This will help in evaluating respiratory distress in the patient as well as give the nurse an idea of if the patient is getting better or not (Ball et al., 2010, 916). *Nursing Action:* I checked B.M.'s oxygen saturation a few times during my shift. His readings kept on getting higher from his first reading in the morning of 0800, which was 92%
Evaluation of Short Term Goal	Goal was met. The patient did not go below 92% in oxygen saturation and as well kept on getting higher readings every time his oxygen saturation was checked.
<u>Long Term Goal</u>	The patient will demonstrate improved ventilation and adequate oxygenation by discharge
Nursing Intervention # 1	Monitor ABG's and report ABG's that deviate from the patient's baseline through the use of lab values reported. *Rationale:* ABG's measure the efficacy of your gas exchange (Ball et al., 2010, p. 779).

	Nursing Action: I was only able to monitor B.M.'s first ABG since he got in the hospital. The only value that deviated from the norm was the pCO_2. This in turn was probably due to the hyperventilation that B.M. was experiencing.
Nursing Intervention # 2	Auscultate breath sounds, using your stethoscope, noting any adventitious breathe sounds. *Rationale:* This will identify the child's respiratory status (Ball et al., 2010, p. 884) *Nursing Action:* During my assessments, I auscultated B.M.'s breath sounds. He had wheezing bilaterally, anteriorly, and posteriorly, which are indicative on compromised airways, which can lead to impaired gas exchange.
Evaluation of Long Term Goal	Goal was met. With the medication supplied and some teaching, B.M. had adequate ventilation for his oxygen consumption.

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