# Pediatric Clinical Assignment: Pediatric Nursing Case Study

Lillian Russo

Emory University, Nell Hodgson Woodruff School Nursing

This paper represents my own work in accordance with School and University regulations.

Lillian Russo 4/28/2019

Overview

My patient "J.S." was a 5 y/o female admitted on 1/1/19 and weighed 21.9 kg. J.S was admitted for a "Calculus of the Gallbladder without cholecystitis, without obstruction", meaning she was pre-operation for a cholecystectomy. The reason for the cholecystectomy was that her physician found gallstones present in her gallbladder, accompanied by pain in the right upper quadrant of her abdomen. Additional diagnosis included Sickle Cell Disease, which was a key factor in determining aspects of her care.

J.S. has a past medical history of Sickle Cell – Type SS, Sickle Cell anemia, acute chest syndrome, functional asplenia, pneumonia, seasonal allergies, treated constipation, right upper quadrant pain, and is on hydroxyurea therapy. She is allergic to Keflex (Cephalexin) and Fentanyl and appears with hives and atopic dermatitis when these medications are taken. J.S. is up to date on her immunizations and no relevant surgical history.

Physical Assessment: I assessed the patient post-operatively, and the information is provided below:

| | |
|---|---|
| **Comfort:** | Pain rating 6 out of 10 on the FACES scale. Pain present in Right Upper Quadrant, Epigastric area, incision sites along abdomen. Pain relieved by medication, position, and rest. No nausea or fever. |
| **Respiratory:** | Respiratory rate is irregular in rhythm, ranging between 15 and 23. Breath sounds are bilaterally diminished in lower lobes, clear & equal in upper lobes. O2 Saturation is 98% (goal: above 97%), with continuous pulse ox monitoring. Patient is breathing on room air but placed on 1 L NC if SPO2 is <97%. No cough or excessive secretions. No nasal flaring or retractions. |
| **Cardiovascular:** | Heart rate WNL for age at 100 bpm. Pulses present and equal. Skin is warm and dry. No murmur. No edema. Capillary refill <2 seconds. Blood pressure WNL for age at 89/48 (MAP: 58). |
| **Neurological:** | Patient is awake, alert, and oriented to surroundings except when asleep. Pupils are normal diameter, equal and react quickly to light. Affect and behavior appropriate for developmental age and situation. |
| **Head/Neck/ EENT:** | Head round & symmetrical, normocephalic; Neck full range of motion, trachea midline. Ears, eyes, and nose without drainage. Ears and eyes |

| | |
|---|---|
| | symmetrical. Eyes without swelling or discoloration. Teeth natural and white. Oral mucosa pink, moist, without swelling. Speech understandable. |
| **Musculoskeletal:** | Full range of movement with symmetrical muscle strength. Bones and joints able to move freely without discomfort. Mot muscle tremors, cramping or weakness. Pt. ambulates in hallway/room. Tolerates activity not super well due to pain from post-op. |
| **Genitourinary:** | Urinary output WNL, color is yellow and clear without odor. Pt. continent. Genitalia normal appearance w/o discharge. |
| **Gastrointestinal:** | Abdomen is nondistended, rigid, and tender. Active bowel sounds in all four quadrants. Pt. is passing flatus, last bowel movement 24 hrs. ago. Stool was soft and formed. Pt. tolerates diet, no emesis. |
| **Skin/Wound:** | Skin is dry and intact, color appropriate for ethnicity. Skin turgor recoils immediately. Wound site with without swelling, redness, separation or drainage. Dermabond over incision is secure. |

Psychosocial

The patient is 5 years old, and therefore falls under Erikson's phase of initiative vs. guilt. This psychosocial development was noted when the patient would try to take initiative with her free time - i.e. asked to play with playdough and blow bubbles while waiting for the doctors to return (Hockenberry & Wilson, 2015). The patient was exceedingly active before, and even after the surgery, always very curious about what the nurses or doctors were doing (i.e. putting in medication/taking out her IV). Although she was slightly worried about these medical procedures and showed hesitancy when discussing them, the patient always insisted on knowing everything that was going on. The patient interacted well with others, including her nurses, but was hesitant to people she hadn't seen before (an appropriate response). All of these signs show that she has accomplished developing a sense of initiative, as stated by Erikson (Hockenberry & Wilson, 2015). As discussed by Hockenberry and Wilson (2015), the patient is "in a stage of energetic learning", and continuously showed signs of taking initiative, but responded with slight guilt when she overstepped her boundaries when with her mother (Hockenberry & Wilson, 2015, p. 524-525).

Medications

| **Medication** | **Pharmacological Class** | **Reason for Use** |
|---|---|---|
| Hydroxyurea (DROXIA) | Antimetabolites | Hydroxyurea helps prevent sickle cell crises in those with SC anemia by destroying rapidly replicating immature/malformed RBCs. This helps reduce chance of the patient getting an SC crisis while undergoing treatment for her gallbladder. (Vallerand & Sanosko, 2019) |
| Folic Acid (FOLVITE) | Water Soluble Vitamins | Folic acid helps with the prevention/treatment of certain anemias by providing folic acid, a key ingredient in protein synthesis and RBC function, and stimulating the production of RBCs. (Vallerand & Sanosko, 2019) |
| Ranitidine (ZANTAC) | Histamine H2 Antagonist | ZANTAC works on relieving "sour stomachs" and is given for short term treatment of acid indigestion, sometimes brought on by gallstones. (Vallerand & Sanosko, 2019) |
| Hydrocodone-acetaminophen (NORCO) | Opioid agonist, nonopioid analgesic combinations | NORCO is a controlled substance (Schedule II), used to manage moderate to severe pain brought on by sickle cells disease. This drug does so by binding to opiate receptors in the CNS and altering the body's response to painful stimuli. (Vallerand & Sanosko, 2019) |
| Midazolam (VERSED) | Benzodiazepines | VERSED is used as a pre-procedural sedation and anti-anxiety medication. It also works by providing a generalized depression of the CNS, resulting in short-term sedation. (Vallerand & Sanosko, 2019) |

Lab Values and Diagnostic Tests

| | Value | Normal | Rationale |
|---|---|---|---|
| Hemoglobin (Hgb) Electrophoresis (HGB S Quantitative) | 83.3 | <0% | Hgb electrophoresis is a process in which the hemoglobin are separated and identified as normal or abnormal. Presence of Hgb S (sickle hemoglobin) results from abnormal substitutions during the formation of Hgb for red blood cells and are inherited forms of hemoglobinopathies. The presence of any Hgb S is abnormal and indicates presence of Sickle Cell Disease. (Van Leeuwen & Bladh, 2017) |
| RBC Count (Red Blood Cell Count) | 1.99 | 3.61-5.81 | RBC count assesses the number of red blood cells per cubic millimeter of whole blood. Because the role of RBCs is to transport oxygen throughout the body, a lack of them could mean the patient has a certain type of |

| | | | |
|---|---|---|---|
| | | | anemia or hematological disorder. Specifically, for our patient, her low RBC count confirms the presence of hemolytic anemia (the broad classification that Sickle Cell Anemia falls under). This means that the patient's RBCs don't live as long because they are damaged by the Hemoglobin S and cannot effectively transfer O2 to all the cells of the body.<br>(Van Leeuwen & Bladh, 2017) |
| Bilirubin Total | 2.3 | 0.3-1.6 | This laboratory value is used to assess the common bile ducts of the gallbladder for the presence of gallstones and inflammation of the gallbladder. There is a correlation between sickle cell disease and formation of gallstones because the hemolysis of the Sickle cells increases the bilirubin excretion, therefore increasing the risk of gallstone formation.<br>(Walker, Hambleton, & Serjeant, 2000),<br>(Van Leeuwen & Bladh, 2017)<br>(Hendricks-Ferguson & Nelson, 2003) |

Pathophysiology

Sickle Cell Disease is a genetic, autosomal recessive disorder, characterized by the production of Hemoglobin S (Hgb S) within red blood cells (RBCs) (pg. 1,669). This is an abnormal Hgb that causes the malformation of RBCs. RBCs with Hgb S react to dehydration and deoxygenation by hardening and elongating the cell itself, making it incapable of appropriately carrying oxygen or flowing easily through the bloodstream (Huether, McCance, Brashers, & Rote, 2017, p. 1,667). Meaning, HgbS cells have no problem carrying O2, but the problem arises if they're exposed to low levels of O2 because they react by hardening and "sickling". This alteration in the RBCs' synthesis results in decreased oxygen perfusion and increased risk of clotting (pg. 1,670). Additionally, HgbS causes RBCs to become hemolytic, causing them to dissociate and release cellular contents, including bilirubin (Huether, McCance, Brashers, & Rote, 2017, pg. 1668 & 1,501).

Gallstones, or cholelithiasis, are common in patients with SCD because the hemolytic response of RBCs causes an increase in bilirubin release into the system. This excessive bilirubin

build-up results in pigmented gallstone formation (Suell, et al., 2004). Pigmented stones are composed of calcium bilirubin, and develop hard, sharp stones in the common bile duct that leads to the gallbladder. This build-up of stones leads to in an infected bile duct, causing pain in the upper right quadrant of the abdomen (Hendricks-Ferguson & Nelson, 2003). For these reasons, one of the most common operations done on SCD patients is a cholecystectomy (Al-Mulhim & Alshehri, 2012).

Treatments

**1) Hydroxyurea therapy** – Hydroxyurea is the main treatment for sickle cell disease. It decreases the risk of SC crises by inhibiting the DNA synthesis in RBCs of a patient with SCD and increases the amount of fetal Hemoglobin (Hgb F) in the blood. Hgb F is the hemoglobin present at birth and lasts longer than Hgb S – the hemoglobin present in RBCs of SC patients (Huether, McCance, Brashers, & Rote, 2017, p. 1674). Hydroxyurea has been proven to decrease rates of acute chest syndrome and caused a significant reduction in hospitalizations related to hematological issues for SC patients (Colombatti, et al., 2018).

**2) Blood transfusion** – patients with SCD can receive blood transfusions to help replenish their systems with healthy, mature RBCs. Blood transfusions help prevent SC crises and significantly improve morbidity and mortality rates related to SCD (Josephson, Su, Hillyer, K., & Hillyer, C., 2007).

**3) Supplemental O2 and respiratory support (CPAP/PEP)** – The use of non-invasive ventilation treatments help improve oxygenation and decrease the metabolic work required for breathing. Take precautions with supplemental O2 and respiratory support will help decrease the risk of acute chest syndrome and chronic hypoxemia (Jain, Bakshi, & Krishnamurti, 2017).

Nursing Plan of Care

| **Diagnosis** | **Interventions** | **Evaluations/ Outcomes** | **Goals** |
|---|---|---|---|
| Ineffective breathing pattern related to pain from cholecystecto my as evidenced by changes in respiration rate and holding breath. | 1) Encourage sustained deep breaths by utilizing incentive spirometer q2hours or by providing patient with bubbles to blow while in bed.<br>>**rationale:** patient is holding her breath due to pain at incisions site from her surgery, therefore not breathing when she needs to. This will help force her lungs to expand widely and is a fun way to get her involved in her own treatment plan.<br><br>2) Maintain 1 L of supplemental O2 via NC by bedside.<br>>**rationale:** patient needs to maintain O2 sat over 97% in order to avoid a Sickle Cell Crisis of Acute Chest Syndrome.<br><br>3) Educate patient/family on proper splinting methods using pillow while deep breathing.<br>>**rationale:** help decrease surgical site pain when breathing, promoting deeper breaths, and preventing opening of surgical site. | All interventions were implemented, and patient successfully maintained a regular breathing pattern while blowing bubbles. | Short term: patient will demonstrate appropriate use of breathing techniques to use if experiencing pain or fatigue before discharge.<br><br>Long term: patient will report no pain while deep breathing as evidenced by maintaining effective breathing pattern, absence of shallow breathing/holding breath, and feeling comfortable when breathing one-week post-discharge. |
| Risk for infection related to an invasive procedure and chronic disease. | 1) Educate proper hand washing technique between meals and before/after contact with individuals who have infections or colds.<br>>**rationale:** other people can spread infections or colds to susceptible patients through contaminated objects or air currents, especially while in surgical setting. Additionally, because the patient has SCD, she has a weakened immune system.<br><br>2) Maintain asepsis technique when changing dressing and removing peripheral IVs. | During my shift, the patient exhibited appropriate handwashing skills between eating and going to the bathroom. Additionally, I observed no signs of infection around the peripheral IV and a family member who | Short term: Patient demonstrates meticulous handwashing technique after eating and going to the bathroom.<br><br>Long term:<br>Patient remains free of infection for 2 weeks post-surgery, as evidenced by normal vital signs and absence of signs/symptoms of infection. |

| | | | |
|---|---|---|---|
| | >**rationale:** aseptic technique decreases risk of transmitting pathogens, especially when handling site of open skin.<br><br>3) Provide surgical masks to visitors or staff members who are coughing and provide an explanation why.<br>>**rationale:** avoid the risk of transmitting infections via droplet transmission. | had a cough was asked to wear a mask. | |
| Impaired gas exchange related to Sickle Cell Anemia as evidenced by O2 saturation below 97% and fatigue. | 1) Evaluated patient's tolerance to activity and limit activities within patient's tolerance.<br>>**rationale:** reducing metabolic requirements of the body would reduce the oxygen requirements.<br><br>2) Administer packed RBCs or exchange transfusion as ordered.<br>>**rationale:** increases number of O2-carrying cells, dilutes the percentage of HgbS to prevent sickling, and improves circulation by decreasing number of sickled cells.<br><br>3) Teach/educate patient/family members on signs of ineffective gas exchange, such as S/Sx of dizziness, fatigue, headache, etc.<br>>**rationale:** if patient experiences low O2 saturation at home, the caregivers should know when is appropriate to intervene. | Patient maintained her oxygen saturation above goal of 97% and was able to participate in activities held in the lobby with other children, without feeling fatigued or dizzy. | <u>Short term:</u> display improved ventilation/oxygenation as evidenced by SPO2 maintaining within normal limits (>97%) within 4 hours after surgery.<br><u>Long term:</u> Patient participates in activities without fatigue and tolerates them well within 1-week post-discharge. |

References

Al-Mulhim, A. S., & Alshehri, M. H. (2012). Laparoscopic cholecystectomy in adult patients with sickle cell disease. *Surgical Laparoscopy, Endoscopy & Percutaneous Techniques*, *22*(5), 454–458. https://doi-org.proxy.library.emory.edu/10.1097/SLE.0b013e3182619408

Colombatti, R., Palazzi, G., Masera, N., Notarangelo, L. D., Bonetti, E., Samperi, P., … Sainati, L. (2018). Hydroxyurea prescription, availability and use for children with sickle cell disease in Italy: Results of a National Multicenter survey. *Pediatric Blood & Cancer*, *65*(2), n/a-1. https://doi-org.proxy.library.emory.edu/10.1002/pbc.26774

Hendricks-Ferguson, V., & Nelson, M.A. (2003). Home study program. Treatment of cholelithiasis in children with sickle cell disease. *AORN Journal, 77*(6), 1169–1178. https://doi-org.proxy.library.emory.edu/10.1016/S0001-2092(06)60979-4

Hockenberry, M. J., & Wilson, D. (2015). *Wong's Nursing Care of Infants and Children* (10th ed.). St. Louis, MO: Elsevier Mosby.

Huether, S. E., McCance, K. L., Brashers, V. L., & Rote, N. S. (2017). Understanding Pathophysiology (6th ed.) St. Louis, MO: Elsevier.

Josephson, C.D., Su, L.L., Hillyer, K.L., & Hillyer, C.D. (2007). Transfusion in the patient with sickle cell disease: A critical review of the literature and transfusion guidelines. *Transfusion Medicine Reviews, 21*(2), 118-133. https://doi.org/10.1016/j.tmrv.2006.11.003

Suell, M.N., Horton, T.M., Dishop, M.K., Mahoney, D.H., Olutoye, O.O., Mueller, B.U., … Mueller, B. U. (2004). Outcomes for children with gallbladder abnormalities and sickle cell disease. *Journal of Pediatrics, 145*(5), 617–621. Retrieved from

http://search.ebscohost.com.proxy.library.emory.edu/login.aspx?direct=true&db=cin20&AN=106535276&site=ehost-live&scope=site

Vallerand, A. H. & Sanosko, C. A. (2019). *Davis's Drug Guide for Nurses* (16th ed.) Retrieved from https://nursing.unboundmedicine.com/nursingcentral

Van Leeuwen, A. M. & Bladh, M. L. (2017). *Davis's Drug Guide for Nurses* (16th ed.) Retrieved from https://nursing.unboundmedicine.com/nursingcentral

Walker TM, Hambleton IR, & Serjeant GR. (2000). Gallstones in sickle cell disease: observations from the Jamaican Cohort Study. *Journal of Pediatrics*, *136*(1), 80–85. Retrieved from http://search.ebscohost.com.proxy.library.emory.edu/login.aspx?direct=true&db=cin20&AN=107100571&site=ehost-live&scope=site