Appendectomy in the Pediatric Patient

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Nursing Process for the Pediatric Patient

Client Profile

My patient J.M., was a 17 year old Caucasian male born December 14, 1993, who went to the emergency department in the morning for right lower quadrant pain. The patient was born premature at 36 weeks by vaginal birth but no complications. The ED sent him home and told him to come back if the pain worsened. The pain did eventually worsen and J.M. reported back to the emergency department later the same day and was admitted for appendicitis. J.M. had a CT scan of his abdomen and pelvis with contrast that revealed a dilated appendix without attendant inflammatory changes or complicating abscess, possibility of acute, no evidence for free air or ascites. He weighed 90 kg and was 178 in tall.

Admitting medical diagnosis and chief complaint. My patient's admitting medical diagnosis was appendicitis. And his chief complaint was that he had right lower quadrant pain.

Primary medical diagnosis. Appendicitis.

Description of the child/family. J.M. lives with his mother and step father. He doesn't get to see his father and step-mother as often. He has an older brother who is 23 and a younger brother who is 14. He also has two younger sisters who are 3 and 2 years old. His step-mother is also pregnant. Both his parents are seasonal workers. His family is Christian and they have health insurance. He says he gets along with his family very well and that he gets along with his step-mother and step-father. He doesn't get to see his father and step-mother very much just because they live farther away. He wouldn't really say where his father and step-mother live.

Developmental assessment. The patient J.M. was experiencing the developmental stage Identity vs. Role Confusion, a theory by Erikson. According to Erikson, the body matures and thought processes become more complex and this establishes a new sense of identity or self in adolescents. The adolescent tries different things and determines what fits best for them, family, friends, and society. This helps the adolescent establish values and roles as they enter adulthood (Ball, Bindler, & Cowen, 147). What I observed was that his personal/social ability was achieved by having a girlfriend and from what I saw having friends to talk to because he was constantly texting on his cell phone. His language ability was

developed adequately by him being able to communicate with me when he was in pain and describe his situation to me. His fine motor abilities were developed adequately by him being able to text on his phone and his gross motor skills were adequately developed by the patient being able to reposition in his bed, walk to the bathroom, and walk around the unit before being discharged. For J.M. weight he falls into 95th percentile, having a BMI of 28.4, normal weight is 18.5-24.9, overweight is 25- 29.9 and obese is a BMI of 30 or greater.. And he also fell into the 50th-75th for height.

Nutrition assessment. My patient seemed to have adequate nutrition. His family has a working stove, oven and refrigerator. There weren't any days last month when his family didn't have enough food to eat or enough money to buy food. Patient J.M. was not concerned about his weight but he was on a diet not to lose weight but to lose fat and gain muscle. In the past year he has tried a diet called the vinegar pill diet. He explained that you take one vinegar pill in the morning and eat a banana and a muffin. Then for dinner another vinegar pill and green beans and chicken and you are supposed to lose 4 lbs in a day. He does participate in physical activity by playing football and wrestling for his high school. He also lifts weights when he's not in season. He states that depending on the day, if he's sick or it's raining/snowing, that he does play video games, watch tv or play computer games. He drinks protein shakes about three times a week. He states he doesn't smoke or chew tobacco but he has used alcohol/beer/wine.

The meals that J.M. had prior to his admission to the hospital was only an evening snack because he had so much pain that day he stated he didn't have an appetite. Patient J.M. stated he does not skip breakfast, lunch or dinner 3 or more times a week. Also because of schedules he does not eat dinner with his family four or more times a week. He does not fix or buy the food for his family's meals. The patient stated that he does eat from a fast food restaurant but it's never a meal just a soda or a pie. He is not on a special diet for medical reasons. He is not a vegetarian. He also said he has no problems with his appetite, like not feeling hungry or feeling hungry all the time.

The patient seemed to have a good concept as to what an appropriate diet consist of. He said of all the drinks he drinks, chocolate milk, sport drinks and reduced fat (2% milk). The grains that the patient

usually eats are breads, cereals, noodles/pasta/rice and tortillas. The vegetables that he ate were corn, potatoes, French fries, green salad, green beans, asparagus, banana pepper, and black olives about five times a week. The fruits the patient ate were apples/juice, oranges, peaches, pears and bananas. The milk and other dairy products he consumed were yogurt, reduced fat (2%) milk, and flavored milk. The meat my patient consumed was beef/hamburger, pork chicken, turkey, cold cut, sausage/bacon and eggs. And the fats and sweets he ate were cake or cupcakes. He says he tries to keep eating sweets to a minimum like a snack a day.

Pathophysiology. The appendix is situated in the right lower quadrant (RLQ) of the abdomen. It is a blind-ended tube, with an average length of 10 cm, at the junction between the small intestine and the caecum. The tip of the appendix may sometimes lie behind the cecum or even as low as the pelvis. Problems may arise if there is a blockage of the lumen by a fecalith (calcified feces), inflammatory condition or occasionally parasites, such as thread worms. Bacteria proliferate and invade the wall of the appendix, which is damaged by pressure necrosis. Unless there is early intervention, blood vessels thrombose, gangrene occurs and perforation follows, leading to peritonitis and more serious complications. There are a host of other conditions that may present with acute abdominal pain, some of which are constipation, gastroenteritis, mesenteric adenitis, ectopic pregnancy, ovarian cysts, endometriosis, inflammatory bowel disease or Crohn's disease, gall stones/acute cholescystitis, urinary calculi, abdominal abscess, strangulated hernia, intussusceptions and pancreatitis. At onset, symptoms include periumbilical cramps, abdominal tenderness, and fever. As the inflammation progresses, pain in the right lower abdomen becomes constant. Pain is often most intense at McBurney's point, halfway between the anterior superior iliac crest and the umbilicus (Ball, Bindler, & Cowen, 1157)

Treatment. Appendectomy is the surgical removal of the appendix. An appendectomy is performed to treat appendicitis, thereby preventing rupture of the appendix and the possible resultant complication of peritonitis (i.e., inflammation of the serous membrane that lines the abdominal cavity and its viscera) (Buckley, & Schub, 2011). The appendix may be removed via laparoscopic appendectomy,

which involves smaller incisions and the use of a laparoscope, a tiny video camera, and an imaging system to visualize the area. Advantages of the laparoscopic approach include increased cosmetic satisfaction, reduced risk of complications, including postoperative wound infections, a shortened hospital stay, and faster recovery; disadvantages include increased cost and operating time (~ 20 minutes longer than open appendectomy) (Buckley, & Schub, 2011). Preoperatively the child is kept NPO. Intravenous fluids, electrolytes, and antibiotics are administered. Postoperatively the child has an abdominal incision, and intravenous antibiotics may be administered to avoid infection. (Ball, Bindler, & Cowen, 1158)

Medications.

Medication (Generic/or Trade)	**Classification & Action**	**Why is your patient taking this drug?**	**Nursing Implications**	**Side Effects/ Adverse Effects**
Morphine Patient's Dose: 2mg= 1 mL IV push q2h PRN. Recommended Dose: IM, IV, SUBQ (Adults ≥ 50kg): usual starting dose for moderate to severe pain in opioid-naïve patient—4-10 mg q 3-4 hr.	-Opioid Analgesics - For moderate to severe pain	Pain management	-Assess type, location, and intensity of pain prior to and 1 hr following, PO, subcut, IM and 20 min (Peak) following IV administration. When titrating opioid doses, increases of 25-50% should be administered until there is either a 50% reduction in the patient's pain rating on a numerical or visual analogue scale or the patient reports satisfactory pain relief. When titrating doses of short-acting morphine, a repeat dose can be safely administered at the time fo the peak if previous dose is ineffective and side effects are minimal. -HIGH ALERT: Assess level of consciousness, blood pressure, pulse and respirations before and periodically during administration. If respiratory rate is <10/min, assess level of sedation -Prolonged use may lead to physical and psychological dependence and tolerance. This should not prevent patient from receiving adequate analgesics. -Assess bowel function routinely.	CNS: confusion, sedation, dizziness, dysphoria, euphoria, floating feeling, hallucinations, headache, unusual dreams EENT: blurred vision, diplopia, miosis RESP: RESPIRATORY DEPRESSION CV: hypotension, bradycardia GI: constipation, nausea, vomiting GU: urinary retention DERM: flushing, itching, sweating MICS: physical dependence, psychological dependence, tolerance

			Institute prevention of constipation with increased intake of fluids and bulk and with laxatives to minimize constipating effects. -TOXICITY AND OVERDOSE: if an opioid antagonist is required to reverse respiratory depression or coma, (NARCAN) is the antidote.	
Zofran Patient's Dose: 4 mg=2 mL IV push q4h PRN N/V Recommended Dose: IV (children >40 kg): prevention of postoperative nausea/vomiting —4 mg	-Antiemetics -Treatment and prevention of postoperative nausea and vomiting	For nausea and vomiting	-Assess patient for nausea, vomiting and abdominal distention and bowel sounds before and after administration - Assess patient for extrapyramidal side effects periodically throughout course of therapy. -LAB TESTS: may cause transient increase serum bilirubin, AST, and ALT levels -IV push over at least 30 seconds preferably 2-5 minutes	CNS: headache, dizziness, drowsiness, fatigue, weakness GI: constipation, diarrhea, abdominal pain, dry mouth, Increase liver enzymes NEURO: extrapyramidal reactions
Metoclopramide Patient's Dose: 10mg = 2mL IV push q 6 hr PRN N/V Recommended Dose: IM, IV (Adults and children > 14 yr) : 10 mg at the end of surgical procedure, repeat in 6-8 hr if needed	-Antiemetics -Treatment and prevention of postoperative nausea and vomiting	For nausea and vomiting	-Assess patient for nausea, vomiting and abdominal distention and bowel sounds before and after administration - Assess patient for extrapyramidal side effects periodically throughout course of therapy. May occur weeks to months after initiation of therapy and are reversible on discontinuation - Monitor for tardive dyskinesia. Usually occurs after a year or more of continued therapy. Report immediately; may be reversible. - Monitor for neuroleptic malignant syndrome - Assess patient for signs of depression periodically throughout therapy LAB TEST: May alter hepatic function test results -May cause increase serum prolactin and aldosterone concentrations -Administer over 1 -2 mins	CNS: drowsiness, extrapyramidal reactions, restlessness, NEUROLEPTIC MALIGNANT SYNDROME, anxiety, depression, irritability tardive dyskinesia CV: arrhythmias (supraventricular tachycardia, bradycardia), hypertension, hypotension GI: constipation, diarrhea, dry mouth, nausea ENDO: gynecomastia HEMAT: methemoglobinemia, neutropenia, leukopenia, agranulocytosis
Ketorolac (Toradol) Patient's Dose: 30mg= 1mL IV push q6h Recommended Dose:	-Nonsteriodal anti-inflammatory agents, nonopioid analgesics - Short term management of pain	Pain management	-patients who have asthma, aspirin induced allergy, and nasal polyps are at increased risk for developing hypersensitivity reactions. Assess for rhinitis, asthma, and urticaria -PAIN: assess pain (note type, location and intensity) prior to and 1-2 hr following administration LAB TESTS: evaluate liver function test, especially ALT and AST, periodically in patients receiving	CNS: drowsiness, abnormal thinking, dizziness, euphoria, headache RESP: asthma, dyspnea CV: edma, pallor, vasodilation GI: GI bleeding, abnormal taste, diarrhea, dry mouth,

			prolonged therapy. May cause increase levels - may cause prolonged bleeding time that may persist for 24-48 hr following discontinuation of therapy - may cause increase BUN, serum creatinine, or potassium concentrations	dyspepsia, GI pain, nausea GU: oliguria, renal toxicity, urinary frequency DERM: EXFOLIATIVE DERMATITIS, STEVENS-JOHNSON SYNDROME, TOXIC EPIDERMAL NECROLYSIS, pruritus, purpura, sweating, urticaria HEMAT: prolonged bleeding time LOCAL: injection site pain NEURO: paresthesia MISC: allergic reaction including anaphylaxis
Hydromorphone (Dilaudid) Patient's Dose: 0.5 mg=0.5 mL IV push PRN (pain 4-8) Recommended Dose: IV,IM, SUBQ (adults ≥50kg): 1.5 mg q 3-4 hr PRN initially, may be increased	-Opioid Analgesics -Moderate to severe pain	Pain management	-Assess blood pressure, pulse, respirations before and periodically during administration. If respiratory rate is <10/min assess level of sedation -Prolonged use may lead to physical and psychological dependence and tolerance. This should not prevent patient from receiving adequate analgesics. -Assess bowel function routinely. Institute prevention of constipation with increased intake of fluids and bulk and with laxatives to minimize constipating effects. -TOXICITY AND OVERDOSE: if an opioid antagonist is required to reverse respiratory depression or coma, (NARCAN) is the antidote. -Assess type, location, and intensity of pain prior to and 1 hr following administration. When titrating opioid doses, increases of 25-50% should be administered until there is either a 50% reduction in the patient's pain rating on a numerical or visual analogue scale or the patient reports satisfactory pain relief. When titrating doses of short-acting morphine, a repeat dose can be safely administered at the time fo the peak if previous dose is ineffective and side effects are minimal.	CNS: confusion, sedation, dizziness, dysphoria, euphoria, floating feeling, hallucinations, headache, unusual dreams EENT: blurred vision, diplopia, miosis RESP: RESPIRATORY DEPRESSION CV: hypotension, bradycardia GI: constipation, nausea, vomiting, dry mouth GU: urinary retention DERM: flushing, sweating MICS: physical dependence, psychological dependence, tolerance
Acetaminophen-	-Opioid	Pain	-Assess blood pressure, pulse,	CNS: confusion,

Hydrocodone (Vicodin) Patient's Dose: 1-2 TABs q4h PRN pain Recommended Dose: PO (ADULTS): analgesics—2.5-10 mg q 3-6 hr as needed	Analgesics -Moderate to severe pain	managem ent	respirations before and periodically during administration. If respiratory rate is <10/min assess level of sedation -Prolonged use may lead to physical and psychological dependence and tolerance. This should not prevent patient from receiving adequate analgesics. -Assess bowel function routinely. Institute prevention of constipation with increased intake of fluids and bulk and with laxatives to minimize constipating effects. -TOXICITY AND OVERDOSE: if an opioid antagonist is required to reverse respiratory depression or coma, (NARCAN) is the antidote. -Assess type, location, and intensity of pain prior to and 1 hr following administration. When titrating opioid doses, increases of 25-50% should be administered until there is either a 50% reduction in the patient's pain rating on a numerical or visual analogue scale or the patient reports satisfactory pain relief. When titrating doses of short-acting morphine, a repeat dose can be safely administered at the time fo the peak if previous dose is ineffective and side effects are minimal.	dizziness, sedation, euphoria, hallucinations, headache, unusal dreams EENT: blurred vision, diplopia, miosis RESP: respiratory depression CV: hypotension, bradycardia GI: constipation, dyspepsia, nausea, vomiting GU: urinary retention DERM: sweating MISC: physical dependence, psychological dependence,tolerance

Deglin, J.H, & Vallerand, A.H. (2009). *Davis's drug guide for nurses*. Philadelphia, Pennsylvania: F. A. Davis Company.

Physical assessment. When I arrived o n the floor my patient was down in surgery. When he came up to the floor he was laying in bed with SCD's on. He was joined by his mother, girlfriend and his girlfriend's mother. To begin, his assessment, his airway, breathing and color were all normal. His airway was clear, his respiratory rate was 16, his lungs were clear and he was of normal color for his race. He had 2 L of oxygen via nasal cannula that was removed thirty minutes after arrival onto the floor. His pulse ox was checked every15 minutes for an hour to monitor his oxygen saturation. His SCD's were connected and turned on. Patient J.M. had an apical rate—88, temperature—36.4 Celsius, pulse—84, blood pressure—97/42 and oxygen saturation 91% room air. PERRLA—2mm. No glasses or contacts. No tenderness in ears/nose. Also no drainage was present. Mucus membranes were pink and moist.

Patient was A & O X 3. Hand grasps were strong and equal. IV heplock #18 right AC. Pedal pulses +2 strong and equal. Speech is clear. No seizure activity apparent. Chest is symmetrical. Respirations are unlabored. Lung sounds are clear in all fields. No cough present. Heart rate was regular. Capillary refill was <2. IV site was dry, intact and had no redness. Patient had no bowel sounds at 0930 but they started to return at 1200. BS were X4. Abdomen was flat, soft and non-distended. Some tenderness was present in the right lower quadrant. Incision sites located on the abdomen had no redness, swelling or drainage. Patient hadn't had a bowel movement since the day before. The patient was on I & O. His intake was 2406.50, output was 1877.00 and the balance was 529.50. Urine was yellow to a light yellow color, clear and of normal odor. All of the patient's skin was intact and dry. His IV maintenance rate was 130mL/hr.

Lab values/diagnostic tests.

Lab Interpretation and Other Diagnostic Tests

Lab Test	Result 1	Normal Range	Interpretation
K+	3.3	3.5-5.0	Possible diarrhea/ possible deficient intake of fluids
Platelets	138	150-450	Possible deficient intake of fluids
Lymphocytes	7.2	20-40	D/T appendicitis
Neutrophils	86.7	50-75	D/T appendicitis

Cavanaugh, B.M. (2003). *Nurse's manual of laboratory and diagnostic tests*. Philadelphia, Pennsylvania: F. A. Davis Company.

Normal growth and development. The appendectomy shouldn't hinder the young man's normal growth and development. The only set back this patient will possibly experience is not being able to lift weights and work out. His goal was this summer to lose fat and gain more muscle but having the appendectomy he has to refrain from sports/weight lifting while the incisions heals. He shouldn't not strain, as with most weight lifting there is squats and bench press which would cause the patient to strain and attempt to lift the weight. The appendectomy will not hinder the patient's growth but it may hinder development but the patient missing a little school and having to take it easy for a couple weeks.

Nursing Diagnosis I	**Nursing Diagnosis II**
Risk for Infection r/t bowel trauma and surgical incision (Ball, Bindler, & Cowen, 1159)	Acute pain r/t inflammation and surgery AEB….. (Ball, Bindler, & Cowen, 1159)
Supporting Data -Surgical Incision -Appendicitis -Appendectomy -Altered Peristalsis **RATIONALE:** Surgical intervention and many diagnostic procedures break normal skin integrity, greatly increasing the possibility of infection. (Craven, & Hirnle, 1039)	**Supporting Data** -pain rated 6 on a scale on 1 to 10, 10 being the worst pain ever felt -patient stated, " The sharp pain starts on the right side shoots towards my belly button and then goes down my penis -patient states, "The pain comes and goes but is a sharp shooting pain" -During incentive spirometer use the patient blew very hard and said he heard a popping noise around the general area of McBurney's Point. - Facial Grimacing when pain strikes **RATIONALE:** Pain may occur before surgery secondary to a disease process or to a traumatic injury and also after surgery secondary to the surgical incision or procedure (Craven, & Hirnle, 616) Nociception is the transmission of pain impulses from the injury site to the dorsal horn of the spinal cord and brain, making pain a conscious sensation. After sensory information reaches the substantia gelatinosa in the dorsal horn of the spinal cord, the pain signal may be modified depending on the presence of other stimuli, either from the brain or from the periphery. The pain signal is then transmitted to the thalamus of the brain primarily through the lateral spinothalamic tract and reticulospinal and spinomesoencephalic nerve pathways, where perception occurs. (Ball, Bindler, & Cowen, 524)
STG & LTG STG: The patient will remain aferible during the next ten hours. LTG: The patient will remain intact and free from infection within the next two weeks.	**STG & LTG** STG: The patient will report a pain level of 2 or less on a scale of 0-10 scale in a ten hour shift LTG: The patient will remain without pain on a scale of 0-10 within the next two weeks following his appendectomy.
Interventions (1) Assess and record temperature, heart rate, respiratory rate, blood pressure and any other signs/symptoms of infection every 2 hours. (STG) **RATIONALE:** If infection is present the temperature, heart rate and respiratory rate will be increased and the blood pressure may be decreased. Infection increases the body's	**Interventions** (1) Assess and record heart rate, respiratory rate, blood pressure and any other signs/symptoms of pain every 2 to 4 hours and PRN. Use appropriate pain assessment tool. (STG) **RATIONALE:** The increase in blood pressure that may accompany pain is due to overactivity of the sympathetic nervous system. The increase in heart

metabolic rate, which increases heart rate (Craven, & Hirnle, 1048) (2) Check and record results of WBC PRN. Notify physician if results are out of the acceptable range (STG) **RATIONALE:** The number of WBCs, or leukocytes, rises in response to infection, tissue necrosis, stress, or neoplastic changes in bone marrow (Craven, & Hirnle, 1050) (3) Teach child/family about characteristics of risk of further infection before leaving the hospital. Assess and record results (LTG) **RATIONALE:** increased knowledge will assist the child/family in recognizing and reporting changes in the child's condition (4) Maintain good hand washing technique daily (LTG) **RATIONALE:** good hand washing is the single most important measure in decreasing pathogens	rate reflects the body's attempt to increase available oxygen and circulating fluid volume to promote healing of damaged tissue. An increase in the respiratory rate is an effort to increase the amount of oxygen available to the heart and circulation (Craven, & Hirnle, 1186, 1187) (2) When indicated and PRN, administer analgesics on schedule. Assess and record effectiveness one hour after administration. (STG) **RATIONALE:** Opioids binds to opioid receptors in the peripheral and central nervous system and produce pain-relieving effects at mu, delta, and kappa receptors. Agonist drugs alter perception and response to pain, may produce CNS depression and usually decrease gastric motility. (Craven, & Hirnle, 1200) (3) Teach child/family about characteristics of pain before leaving the hospital. Assess and record results. (LTG) **RATIONALE:** Increased knowledge will assist the child/family in recognizing and reporting changes in the child's condition (4) Teach child/family about care, Assess and record child's/family's knowledge of and participation in care regarding medication administration, etc. before leaving the hospital (LTG) **RATIONALE:** Education of child/family will allow for accurate care.
EBP Citation Craven, R, & Hirnle, C. (2009). *Fundamentals of nursing*. Philadelphia, Pennsylvania: Lippincott Williams & Wilkins. Axton, S. & Fugate, T. (2009). *Pediatric Nursing Care Plans for the Hospitalized Child,* 3rd Edition. Upper Saddle River, New Jersery: Pearson Education.	**EBP Citation** Craven, R, & Hirnle, C. (2009). *Fundamentals of nursing*. Philadelphia, Pennsylvania: Lippincott Williams & Wilkins. Axton, S. & Fugate, T. (2009). *Pediatric Nursing Care Plans for the Hospitalized Child,* 3rd Edition. Upper Saddle River, New Jersery: Pearson Education.
Evaluation STG: The patient remained afebrile during the ten hour shift LTG: The patient will remain intact and free from infection within the next two weeks. Continue with interventions.	**Evaluation** STG: The patient will report a pain level of 2 or less on a scale of 0-10 scale in a ten hour shift LTG: The patient will remain without pain or pain below a 2 on a scale of 1-10 within the next two weeks following his appendectomy. Continue with interventions.

Nursing Action for ND #1	Nursing Action for ND #2
To help decrease this patient's risk for infection I followed good hand washing technique every time I went into my patient's room. I also wore gloves every time I was in the patient's room. Also I checked the incision site every 2 hours to check for the signs and symptoms of infection. I also taught my patient how to recognize the signs and symptoms of infection by looking for redness, swelling and any drainage. My patient's response was that he showed no signs of infection during my hospital shift. And also that he did not report any fever.	To help deal with this patient's acute pain I administered analgesics appropriately. I reassessed to see if the pain medications were allowing pain relief. Patient stated a pain of 4/10 that was tender and sore in his RLQ. @ 1015. At 1051 I pushed morphine over 5 minutes. Reassessment @ 1151 pain had gone to a 2/10 with the same description of his pain Assessment @ 1300 the patient stated a pain level of 0/10 I gave vicodin 1 TAB @1435 for a pain of 1-2/10 Reassessment @ 1535 the pain had been relieved. Patient stated a 0/10 pain rating. Also I gave Toradol @ 1519 to help with the inflammation process. Reassessment the patient's pain had stayed at 0/10 Also show the patient how to splint his incision with a pillow when he coughed. My patient's response to his pain medication was adequate with his pain being maintained below a 3 on the pain scale of 1-10, except for the occasional shooting pain my patient stated.

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