N431 Care Plan #3

Lakeview College of Nursing

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Demographics (3 points)

Date of Admission 11/15/20	**Patient Initials** M.K.	**Age** 27	**Gender** Female
Race/Ethnicity Caucasian	**Occupation** Elementary School Teacher	**Marital Status** Married	**Allergies** Sulfa
Code Status Full Code	**Height** 160 cm	**Weight** 72.8 kg	

Medical History (5 Points)

Past Medical History: Pregnancy-induced hypertension, rheumatoid arthritis, folic acid deficiency anemia.

Past Surgical History: Cesarean section, lithotripsy.

Family History: The client's mother and brother both have a history of diabetes. M.K.'s father has a history of myocardial infarction.

Social History (tobacco/alcohol/drugs): M.K. denies any smoking or drug use. However, she does consume alcohol 1-2 times each month. The quantity and type of alcohol consumed is not specified.

Assistive Devices: M.K. does not use any assistive devices.

Living Situation: This client lives with her husband and daughter at their family home.

Education Level: M.K. is a college graduate. Her education is unlikely to be a hurdle for patient teaching.

Admission Assessment

Chief Complaint (2 points): Not feeling well.

History of present Illness (10 points):.

M.K.'s symptoms began several hours before coming to the emergency department, where she reported to 3 days ago. The client notes her complaints were precipitated by extensive training

for a marathon. M.K. reports running more than 50 miles in the three days leading up to this encounter. Her feeling of malaise is not localized to any area and has been persistent since onset. She characterizes her experience as “not feeling well.” No aggravating or alleviating factors are identified. This hospitalization is the first time she has sought treatment for her complaints. Although M.K. is unable to quantify a severity of her malaise, she notes that it was unpleasant enough to bring her to the hospital and that it has improved over the course of her stay.

Primary Diagnosis

Primary Diagnosis on Admission (2 points): Rhabdomyolysis

Secondary Diagnosis (if applicable): N/A

Pathophysiology of the Disease, APA format (20 points):

Rhabdomyolysis refers to the release of intracellular skeletal muscle components, including myoglobin, creatine kinase (CK), aldolase, and lactate dehydrogenase into the extracellular space secondary to the dissolution of damaged skeletal muscle (Torres et al., 2015). Myoglobin, specifically, can have nephrotoxic effects and is associated with kidney damage (Case-Lo, 2019; Torre et al., 2015). About 33% of rhabdomyolysis patients develop acute kidney injury following the onset of symptoms (Torres et al., 2015). The precipitating cause for muscle injury can vary widely. Often, the condition results from muscular trauma such as crush injuries (Hinkle & Cheever, 2018). Other causes for rhabdomyolysis include drugs, toxins, infection, muscle ischemia, metabolic problems, exertion or prolonged bed rest, and neuroleptic malignant syndrome (Torres et al., 2015). Case-Lo (2019) notes intense exercise as a recognized cause of this condition. In M.K.’s case, the patient reports training for a marathon in the days leading up

to her admission at Sarah Bush Lincoln Health Center. The patient states that she ran over 50 miles in a three days before the onset of symptoms.

The diagnosis of rhabdomyolysis is made based on clinical presentation and laboratory tests (Case-Lo, 2019; Hinkle & Cheever, 2018). Providers can use several labs to detect muscle damage. Elevations in serum CK, serum or urine myoglobin, serum potassium, and serum or urine creatinine are associated with rhabdomyolysis (Case-Lo, 2019). CK monitoring is particularly useful; providers can diagnose rhabdomyolysis based on elevations in serum CK levels alone (Hinkle & Cheever, 2018; Torres et al., 2015). While the specific serum CK level considered diagnostic for rhabdomyolysis varies, proposed cutoffs range between 5000 and 6000 international units per liter (Torres et al., 2015; Muscal & DeGuzman, 2016, as cited in Hinkle & Cheever, 2018). M.K. had a serum CK level of 3568 Intl Unit/L, a serum creatinine level of 1.67 mg/dL, and a serum potassium of 5.5 mmol/L. Although M.K.'s serum CK falls below the proposed diagnostic cutoffs in the literature, the totality of her clinical presentation suggests rhabdomyolysis is likely. Suspicion of rhabdomyolysis is bolstered by a lack of evidence for competing causes of elevated total CK. Increased total CK indicates disease or injury to either skeletal muscle, heart muscle, or the brain (Pagana et al., 2019). The absence of observed abnormalities on M.K.'s electrocardiogram and lack of neurological symptoms suggests skeletal muscle damage (Pagana et al., 2019).

The classic presentation of rhabdomyolysis consists of a triad of symptoms and signs; myalgia, muscle weakness, and tea-colored myoglobinuria (Torres et al., 2015; Hinkle & Cheever, 2018). However, this complete set of symptoms is only observed in <10% of patients and should not be relied on as diagnostic criteria (Torres et al., 2015). Moreover, the severity of the condition can vary considerably. While some patients present with asymptomatic elevations

in CK, others experience grave complications like acute renal failure or disseminated intravascular coagulation (Torres et al., 2015). In the case of M.K., she experienced only a generalized malaise and has complained of general pains. Her pain has ranged from mild to moderate this shift, with reported “achy” and “dull” qualities at different points.

The treatment of rhabdomyolysis is primarily supportive and focuses on the prevention and treatment of complications secondary to the condition (Torres et al., 2015). As previously discussed, acute kidney injury is a common and concerning complication (Case-Lo, 2019; Torres et al., 2015). Accordingly, aggressive hydration, including IV fluids to prevent the accumulation of myoglobin in the kidneys, is a mainstay of rhabdomyolysis treatment (Case-Lo, 2019; Torres et al., 2015). Additional measures to mitigate kidney damage include the administration of bicarbonate and, if necessary, hemodialysis (Case-Lo, 2019). Torres et al. (2015) recommend discontinuing any drugs known to increase the risk of rhabdomyolysis, including statins. Other complications associated with rhabdomyolysis that may require treatment include disseminated intravascular coagulation, hyperkalemia, hyperphosphatemia, hypocalcemia, hypercalcemia, and compartment syndrome (Torres et al., 2015). M.K. is receiving intravenous normal saline at 250 mL per hour continuously to prevent kidney injury. She was also treated with a single dose of kayexalate during her stay to correct her hyperkalemia and sodium chloride tablets to correct hyponatremia.

Pathophysiology References (2) (APA):

Case-Lo, C. (2019, May 20). *Rhabdomyolysis: Causes, symptoms, and diagnosis*. Healthline. https://www.healthline.com/health/rhabdomyolysis

Hinkle, J. L., & Cheever, K. H. (2018). *Brunner & Suddarth’s textbook of medical-surgical nursing* (14th ed.). Wolters Kluwer

Pagana, K. D., Pagana, T. J., & Pagana, T. N. (2019). *Mosby's diagnostic & laboratory test reference* (14th ed.). Elsevier.

Torres, P. A., Helmstetter, J. A., Kaye, A. M., & Kaye A. D. (2015). Rhabdomyolysis: Pathogenesis, diagnosis, and treatment. *The Ochsner Journal, 15*(1), 58-69.

Laboratory Data (15 points)

CBC Highlight All Abnormal Labs—Explanations must be in complete sentences and contain in-text citations in APA format.

Lab	Normal Range	Admission Value	Today's Value	Reason for Abnormal Value
RBC (x10^6 cells/mcL)	3.8-5.41	N/A	N/A	N/A
Hgb (g/dL)	11.3-15.2	8.8	N/A	Decreased levels of hemoglobin are associated with anemia (Pagana et al., 2019). M.K. has a history of anemia.
Hct (%)	33.2-45.3%	N/A	N/A	N/A
Platelets (k/mcL)	149-393	N/A	N/A	N/A
WBC (k/mcL)	4-11.7	7.4	N/A	N/A
Neutrophils (%)	45.3-79	N/A	N/A	N/A
Lymphocytes (%)	11.8-45.9	N/A	N/A	N/A
Monocytes (%)	4.4-12.0	N/A	N/A	N/A
Eosinophils (%)	0.0-6.3%	N/A	N/A	N/A
Bands (%)	3-5	N/A	N/A	N/A

Chemistry Highlight All Abnormal Labs—Explanations must be in complete sentences and contain in-text citations in APA format.

Lab	Normal Range	Admission Value	Today's Value	Reason For Abnormal
Na- (mmol/L)	136-145	123	N/A	M.K. reports that she has been training for a marathon and has ran over 50 miles in a three-day period leading up to her hospitalization. Exercise associated hyponatremia has been observed in marathon runners and other athletes involved in endurance exercise, with females particularly at risk (Hew-Butler et al., 2017).
K+ (mmol/L)	3.5-5.1	5.5	N/A	M.K. has been diagnosed with rhabdomyolysis. As many as one third of rhabdomyolysis patients develop acute kidney injury as a complication of their condition (Khan, 2009, as cited in Torres et al., 2015). Acute kidney injury is associated with hyperkalemia (Pagana et al., 2019).
Cl- (mmol/L)	98-107	N/A	N/A	N/A
CO2 (mmol/L)	21-31	N/A	N/A	N/A
Glucose (mg/dL)	74-109	86	N/A	N/A
BUN (mg/dL)	7-25	10	N/A	N/A
Creatinine (mg/dL)	0.7-1.3	1.67	N/A	Elevated creatinine is associated with rhabdomyolysis (Pagana et al., 2019). M.K. is being treated for a diagnosis of rhabdomyolysis.
Albumin (g/dL)	3.5-5.2	N/A	N/A	N/A
Calcium (mg/dL)	8.6-10.3	N/A	N/A	N/A
Mag (mg/dL)	1.6-2.4	N/A	N/A	N/A
Phosphate	3.0-4.5	N/A	N/A	N/A

Bilirubin (mg/dL)	0.3-1.0	N/A	N/A	N/A
Alk Phos (unit/L)	34-104	N/A	N/A	N/A
AST (unit/L)	13-39	N/A	N/A	N/A
ALT (unit/L)	7-52	N/A	N/A	N/A
Amylase (unit/L)	30-220	N/A	N/A	N/A
Lipase (unit/L)	11-82	N/A	N/A	N/A
Lactic Acid (mmol/L)	0.5 - 2	N/A	N/A	N/A
Troponin (ng/mL)	0.0-0.03 ng/ mL	N/A	N/A	N/A
CK-MB (ng/mL)	0.6-6.3	N/A	N/A	N/A
Total CK (Intl Unit/L)	30-223	3568	N/A	Total CK levels are increased with disease affecting or injury of skeletal muscle (Pagana et al., 2019). Increased CK-MM specifically, which is included in total CK, is associated with rhabdomyolysis (Pagana et al., 2019). M.K. is being treated for a diagnosis of rhabdomyolysis.

Other Tests Highlight All Abnormal Labs—Explanations must be in complete sentences and contain in-text citations in APA format.

Lab Test	Normal Range	Value on Admission	Today's Value	Reason for Abnormal
INR	0.86-1.14	N/A	N/A	N/A
PT (seconds)	11.9-15.0	N/A	N/A	N/A
PTT (seconds)	22.6-35.3	N/A	N/A	N/A
D-Dimer (mcg/ mL)	0.0-0.62	N/A	N/A	N/A
BNP (pg/L)	0-100	N/A	N/A	N/A

HDL (mg/dL)	>55	N/A	N/A	N/A
LDL (mg/dL)	<130	N/A	N/A	N/A
Cholesterol (mg/dL)	<200	N/A	N/A	N/A
Triglycerides (mg/dL)	35-135	N/A	N/A	N/A
Hgb A1c (%)	4-5.9	N/A	N/A	N/A
TSH (mcIU/mL)	0.45-5.33	N/A	N/A	N/A

Urinalysis Highlight All Abnormal Labs—Explanations must be in complete sentences and contain in-text citations in APA format.

Lab Test	Normal Range	Value on Admission	Today's Value	Reason for Abnormal
Color & Clarity	"low-yellow"; "low-clear"	N/A	N/A	N/A
pH	5.0-8.0	N/A	N/A	N/A
Specific Gravity	1.005-1.034	N/A	N/A	N/A
Glucose	"Low-normal"	N/A	N/A	N/A
Protein	"Low-negative"	N/A	N/A	N/A
Ketones	"Low-negative"	N/A	N/A	N/A
WBC (per HPF)	< or = 5	N/A	N/A	N/A
RBC (per HPF)	0-3	N/A	N/A	N/A
Leukoesterase	Low-Negative	N/A	N/A	N/A

Arterial Blood Gas Highlight All Abnormal Labs—Explanations must be in complete sentences and contain in-text citations in APA format.

Test	Normal Range	Value on Admission	Today's Value	Explanation of Findings

pH	7.35-7.45	N/A	N/A	N/A
PaO2 (mm Hg)	80-100	N/A	N/A	N/A
PaCO2 (mm Hg)	33-45	N/A	N/A	N/A
HCO3 (mEq/L)	21-28	N/A	N/A	N/A
SaO2 (%)	95-100	N/A	N/A	N/A

Cultures Highlight All Abnormal Labs—Explanations must be in complete sentences and contain in-text citations in APA format.

Test	Normal Range	Value on Admission	Today's Value	Explanation of Findings
Urine Culture	Negative	N/A	N/A	N/A
Blood Culture	Negative	N/A	N/A	N/A
Sputum Culture	Negative	N/A	N/A	N/A
Stool Culture	Negative	N/A	N/A	N/A

Lab Correlations Reference (APA):

GlobalRPh. (2017). *Laboratory values*. https://globalrph.com/laboratory-values/

Hew-Butler, T., Loi, V., Pani, A., & Rosner, M. H. (2017). Exercise-associated hyponatremia: 2017 update. *Frontiers in Medicine*, *4*, 21. https://doi.org/10.3389/fmed.2017.00021

Pagana, K. D., Pagana, T. J., & Pagana, T. N. (2019). *Mosby's diagnostic & laboratory test reference* (14th ed.). Elsevier.

Sarah Bush Lincoln. (2020). Laboratory values. *Cerner PowerChart*. Cerner

Torres, P. A., Helmstetter, J. A., Kaye, A. M., & Kaye, A. D. (2015). Rhabdomyolysis: Pathogenesis, diagnosis, and treatment. *The Ochsner Journal*, *15*(1), 58-69.

Diagnostic Imaging

All Other Diagnostic Tests (5 points):

Chest X-ray

The Chest X-ray taken on M.K. was negative for any acute abnormalities.

Electrocardiogram

The client's electrocardiogram revealed a normal sinus rhythm with no abnormalities.

Diagnostic Test Correlation (5 points):

Chest X-ray

The chest x-ray (CXR) is a radiographic image of the structures of and within the thoracic cavity, including the cardiac and pulmonary systems (Pagana et al., 2019). Visualization of anomalies on this exam can reveal pathologic or traumatic conditions like pneumonia, tumors, pleural effusion, or irregularities of the heart (Pagana et al., 2019). In M.K.'s case, no acute abnormalities were detected on her CXR. However, given her generalized complaints of malaise, a CXR warranted to rule out cardiac or pulmonary etiology for her symptoms.

Electrocardiogram

The electrocardiogram (EKG) generates a graph of the heart's electrical activity with waveforms corresponding to associated stages of the cardiac cycle (Pagana et al., 2019). Irregularities on the EKG can indicate a variety of acute and chronic problems such as arrhythmias, myocardial infarction, conduction defects, pulmonary embolism, or electrolyte imbalances (Pagana et al., 2019). M.K.'s EKG revealed a normal sinus rhythm with no noted irregularities. However, given her sudden onset of generalized malaise and elevated total CK levels, an EKG was warranted to rule out a cardiac origin for her symptoms (Pagana et al., 2019). Furthermore, M.K. has an

elevated serum potassium level of 5.5 mmol/L. Although life-threatening arrhythmias tend to occur at higher concentrations, they are possible at any level of hyperkalemia (Lederer, 2020). On this basis, an EKG was warranted for M.K. not only to determine how physiologically significant her hyperkalemia is, but because clinical severity determines appropriate management (Lederer, 2020). In this patient, her potassium elevation was relatively mild and did not produce abnormalities on her EKG such as peaked T waves, a shortened QT interval, or ST-segment depression (Lederer, 2020). Thus, conservative treatment with cation exchange resin was appropriate; if EKG abnormalities were observed, more aggressive treatment such as IV calcium or emergency dialysis may have been indicated (Lederer, 2020).

Diagnostic Test Reference (APA):

Lederer, E. (2020, April 9). *Hyperkalemia*. Medscape. https://emedicine.medscape.com/article/240903-overview

Pagana, K. D., Pagana, T. J., & Pagana, T. N. (2019). *Mosby's diagnostic & laboratory test reference* (14th ed.). Elsevier.

Current Medications (10 points, 1 point per completed med)
10 <u>different</u> medications must be completed

Home Medications (5 required)

Brand/Generic	Claritin/ loratadine	One A Day Prenatal Gummies/ prenatal vitamin	Imuran/ azathioprine	Plaquenil/ Hydroxychloroquine sulfate	Folvite/ folic acid
Dose	10 mg	2 gummies	50 mg	200 mg	1 mg
Frequency	Daily	Daily	Daily	Daily	Daily
Route	PO	PO	PO	PO	PO
Classification	Antihistamine	Supplement	Immunosuppressant	Antirheumatic	Supplement
Mechanism of Action	Binds preferentially to peripheral nervous system histamine-1	Provides a variety of vitamins, minerals, and fatty acids to treat or	This drug is thought to interfere with purine and nucleic acid synthesis to	May mildly suppress immune system and inhibit production of rheumatoid factor and	Folic acid is used by the body to produce coenzymes needed for purine and pyrimidine synthesis, nucleoprotein synthesis, and

	receptors without significant entry into CNS. Through this binding action, the drug blocks histamine from binding to H1 receptors. Because it does not enter the CNS at usual doses, loratadine does not cause drowsiness.	prevent deficiencies before, during, or after pregnancy. Contents of formulations vary by manufacturer.	prevent the proliferation and differentiation of B and T cells.	acute phase reactants.	maintenance of erythropoiesis.
Reason Client Taking	Seasonal allergies.	Supplementation.	Treatment of rheumatoid arthritis.	Treatment of rheumatoid arthritis.	M.K. has a history of anemia. Folic acid is used to treat anemia associated with folic acid deficiency.
Contraindications (2)	(1) Hypersensitivity to loratadine or its components. (2) Concurrent use of erythromycin, cimetidine, or ketoconazole may increase the risk of adverse effects.	(1) Hypersensitivity to product or its components; some brands contain fish products, soy, or peanuts. (2) Formulations containing iron should not be used in patients with hemochromatosis or hemosiderosis.	(1) Hypersensitivity or azathioprine or its components. (2) Use with ACE inhibitors may result in severe leukopenia.	(1) Hypersensitivity to hydroxychloroquine or related compounds. (2) Use with tamoxifen increases the risk of irreversible retinal damage.	(1) Hypersensitivity to folic acid preparations. (2) Folic acid may increase the risk of adverse effects and toxicity of fluorouracil drugs.
Side Effects/Adverse Reactions (2)	(1) Headache (2) Dry mouth	(1) Constipation (2) Upset stomach	(1) Arthalgia (2) Infection	(1) Abnormal nerve conduction. (2) Atrioventricular blocks	(1) Skin flushing (2) Malaise
Nursing Considerations (2)	(1) Loratadine is extensively metabolized in the liver and should be used cautiously in patients with hepatic disease. (2) Loratadine should be used cautiously to those with renal failure or impairment.	(1) Clients should not take this medication with dairy products, calcium supplements, or antacids that contain calcium because they decrease absorption. (2) Store at room temperature away from moisture and heat.	(1) This drug increases the risk of bacterial, fungal, protozoal, and viral infection. Monitor for signs of infection, including fever, chills, sore throat, and mouth sores. (2) Expect to reduce dosage or discontinue this drug if WBC count decreases rapidly or stays significantly low consistently.	(1) Monitor patient's vision, particularly when using high dosages or undergoing long-term therapy. This drug has been associated with irreversible retinal damage. (2) In patients with rheumatoid arthritis, expect the drug to be stopped if no improvements are noted within 6 months of therapy.	(1) The recommended daily allowance of folate in adults is 400 mcg daily, although pregnant or lactating women may require more. (2) This drug is not appropriate as a monotherapy for pernicious, aplastic, and normocytic anemias if B12 deficiency is also present.
Key Nursing Assessment(s)/Lab(s) Prior to Administration	Because caution or dose adjustments may be necessary in clients with hepatic or renal impairment, prior to starting loratadine and throughout therapy liver enzymes and kidney function, including BUN, creatinine, and GFR should be monitored.	Throughout therapy, monitor patient for signs of vitamin overdose. Concerning symptoms include stomach pain, vomiting, diarrhea, constipation, anorexia, severe headache, muscle or joint pain, severe back pain, hematuria, pallor, and easy bruising or bleeding. Labs such as vitamin panels or iron studies may be indicated.	Pancytopenia and hepatotoxicity are known adverse reactions to this drug. Accordingly, CBC with diff, coagulation studies including prothrombin time, and liver enzymes should be monitored before and during treatment.	This drug is associated with agranulocytosis, anemia, bone marrow failure, leukopenia, and thrombocytopenia. It may also result in elevated liver enzymes. Therefore, before and throughout therapy, CBC with differential, coagulation studies, and liver enzymes should be monitored.	If this drug is taken for anemia, other causes for anemia should be investigated. Labs may include a CBC, iron studies, vitamin B levels, and a nutritional assessment.
Client Teaching	(1) While loratadine	(1) Advise the patient to	(1) The patient	(1) Advise mothers	(1) Folic acid should be taken with a

needs (2)	is generally non-sedating, patients should avoid driving or operating machinery until the CNS effects of the drugs are known. (2) Administration with food increases absorption of oral loratadine.	take only the recommended number of prenatal vitamins. Overdose of vitamins can harm the patient and/or their baby. (2) Teach the patient to take gummies on an empty stomach 1 hour before or 2 hours after meals with a full glass of water to prevent GI upset.	should be taught to recognize signs and symptoms of infection including fever and sore throat. (2) The patient should be advised to take this medication with food to minimize GI symptoms.	wishing to breastfeed that this drug is excreted in breast milk and that infants are very sensitive to it. Recommend discussing breastfeeding with provider while taking this drug before doing so. (2) Advise the patient that if she experiences visual changes such as blurred vision, halos around lights, or light flashes and streaks to notify her provider and that the drug will need to be stopped.	full glass of water. Protect this drug from light. (2) This drug should be stored at room temperature away from moisture and heat.

Hospital Medications (5 required)

Brand/Generic	BD Normal Saline/ 0.9% sodium chloride	Ocu-Disal/ sodium chloride	Kayexalate/ sodium polystyrene sulfonate	Tylenol/ acetaminophen	Colace/ Docusate sodium
Dose	250 mL/hr	1000 mg	30 mg	650 mg	100 mg
Frequency	continuous	1 tablet daily	once	Every 6 hours PRN	1 capsule BID PRN
Route	IV	PO	PO	PO	PO
Classification	Isotonic Fluid	Mineral Supplement	Antihyperkalemic	Nonopioid analgesic	Laxative
Mechanism of Action	0.9% sodium chloride solution is an isotonic fluid with an osmotic pressure roughly equivalent to serum. Thus, when administered, normal saline remains in the extracellular compartment, restores blood volume, and promotes peripheral	Sodium serves several important purposes in the body. These include the regulation of osmotic pressure and water balance, electrical conduction in nerves and muscles, the maintenance of electrolyte and acid base balance, regulation of cell membrane permeability and transport across the	This drug reduces serum potassium through an ion exchange chain. Sodium ions in the resin are released and exchanged for hydrogen ions. Hydrogen ions are then exchanged for potassium ions which are bound to the resin. The resin is then	This drug blocks prostaglandin production by inhibiting cyclooxygenase, which interferes with pain impulse generation in the peripheral nervous system.	This drug decreases the surface tension between oil and water in feces through its surfactant action. With surface tension decreased, water can enter the stool and soften it, making it easier to pass.

	perfusion.	cell membrane, and participation in a variety of intracellular chemical reactions.	excreted in feces, along with the potassium bound to it.		
Reason Client Taking	Prevention of acute kidney injury secondary to rhabdomyolysis	Treatment of hyponatremia	Treatment of hyperkalemia	Treatment of mild to moderate pain	Constipation
Contraindications (2)	(1) Use cautiously, if at all, in patients with heart failure. (2) In clients with compromised renal function, this drug may result in sodium retention.	(1) Taking this drug with didanosine may increase the risk of hypernatremia. (2) This drug might reduce the effects of lithium.	(1) Obstructive small bowel disease. (2) Hypersensitivity to sodium polystyrene sulfonate or its components.	(1) Hypersensitivity to acetaminophen or its components. (2) Severe active liver disease	(1) Hypersensitivity to docusate salts or their components. (2) Fecal impaction
Side Effects/Adverse Reactions (2)	(1) Hypertension (2) Edema	(1) Hypernatremia (2) Gastritis	(1) Colonic necrosis (2) Hypokalemia	(1) Hepatotoxicity (2) Abdominal pain	(1) Abdominal cramps (2) Dizziness
Nursing Considerations (2)	(1) Sodium chloride preparations should be stored at room temperature. (2) Monitor IV site for complications including infection, induration, infiltration, and extravasation.	(1) Monitor for signs and symptoms of hypernatremia including disorientation, dry skin and mucous membranes, fever, hyperactive reflexes, hypotension, muscle rigidity, tremors, irritability, cerebral hemorrhage, coma, oliguria, concentrated urine, and increased BUN. (2) This medication	(1) Be aware that this drug takes several hours to work and is thus not appropriate for the treatment of acute and life-threatening hypokalemia. (2) Monitor patients for signs of hypokalemia and hypocalcemia. Signs of hypokalemia include	(1) Monitor patient for signs of hepatotoxicity including abnormal bleeding, easy bruising, or malaise. (2) Be aware that although rare, serious skin reactions can occur both with first-time use and any time acetaminophen is used even if the patient has never had a skin rash with this drug before.	(1) Be aware that long-term use of docusate can cause laxative dependence, electrolyte imbalances, osteomalacia, steatorrhea, and vitamin or mineral deficiencies. (2) Monitor for signs of laxative abuse syndrome, particularly in women with anorexia, depression, or personality disorders.

		can be administered with or without food, but should be taken with 8 ounces of water.	abdominal cramps, acidic urine, anorexia, drowsiness, EKG changes, hypotension, hypoventilation, muscle weakness, and tachycardia. Signs of hypocalcemia include abdominal pain, agitation, anxiety, EKG changes, hypotension, muscle twitching, psychosis, seizures, and tetany.		
Key Nursing Assessment(s)/Lab(s) Prior to Administration	Patient should be assessed before and during therapy for signs of fluid volume overload, including vital signs and physical signs and symptoms. Monitor electrolytes and kidney function before and during treatment.	Patient should be assessed before and during therapy for signs of fluid volume overload, including vital signs and physical signs and symptoms. Monitor electrolytes and kidney function before and during treatment.	This drug can cause hypernatremia, hypokalemia, hypocalcemia, and hypomagnesemia. Therefore, serum electrolytes should be monitored before therapy is initiated and afterwards to assess effectiveness. Furthermore, the client should be assessed for constipation and fecal impaction prior to administration.	This medication is contraindicated in patients with severe hepatic impairment or active severe liver disease. Therefore, liver enzymes as well as bilirubin and creatinine should be monitored before and during therapy. If the patient is taking this drug long term, renal function should be additionally be monitored. In addition to BUN and creatinine, albumin in the urine may indicate nephritis.	Because long-term use of this drug can cause vitamin and electrolyte deficiencies, a vitamin panel and BMP may be indicated before and throughout therapy.
Client Teaching	(1) Advise patient to report	(1) Educate clients that they should	(1) Advise clients that	(1) Advise patient that many OTC	(1) Advise the patient to not use docusate if they have

needs (2)	signs of complications related to IV therapy including swelling, pain, redness, or added warmth at the IV catheter site immediately. (2) Advise patient to report feelings of a fast heartbeat, shortness of breath, joint pain, or rash.	check the labels of OTC medications to ensure that they do not contain sodium and consult their provider before taking them. (2) Advise client that they should stop taking this medication and call their provider if they experience stomach pain, nausea and vomiting, or swelling in their hands or feet.	they should not take the oral form of this medication with foods or liquids high in potassium, including orange juice or bananas. (2) The client should notify their provider immediately if they experience abdominal cramps, or nausea and vomiting.	products contain acetaminophen. Be sure to check the label of OTC medications or ask a pharmacist before using them to avoid overdose. (2) Advise patient to avoid drinking alcohol while taking this drug due to an increased risk of hepatotoxicity.	abdominal pain, nausea, or vomiting. (2) Teach the patient to take this drug with a full glass of water or milk.

Medications Reference (APA):

Drugs.com. (2019, January 4). *Folic acid*. https://www.drugs.com/folic_acid.html

Drugs.com. (2019, January 3). *Loratadine*. https://www.drugs.com/loratadine.html

Drugs.com. (2019, November 15). *Sodium chloride (oral)*. https://www.drugs.com/mtm/sodium-chloride-oral.html

Frandsen, G., & Pennington, S. S. (2018). *Abrams' clinical drug therapy: Rationales for nursing practice* (11th ed.). Wolters Kluwer.

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Assessment

Physical Exam (18 points)

GENERAL (1 point): **Alertness:** Alert **Orientation:** Oriented to time, place, person, and situation. **Distress:** M.K. is not under any apparent distress. **Overall appearance:** M.K. appears to be her stated age.	M.K. is A/O x4 with no signs of distress. Her demeanor is pleasant, and she appears to be her stated age.

INTEGUMENTARY (2 points): **Skin color:** pale pink **Character:** Intact and dry **Temperature:** Warm **Turgor:** Elastic **Rashes:** N/A **Bruises:** N/A **Wounds:** N.A **Braden Score: 23** **Drains present: Y☐ N ☒** **Type:** n/a	This client has pale-pink skin that is intact, dry, and warm to the touch. Her skin turgor is elastic. No rashes, bruises, or wounds are noted. No drains are present. M.K. has a Braden Score of 23, which places her at an average risk for pressure ulcers.
HEENT (1 point): **Head/Neck:** Trachea midline. Thyroid gland is non-palpable. Oral mucosa moist and intact. **Ears:** Tympanic membranes appear pearly gray bilaterally. **Eyes:** Sclera appear white. PERRLA**.** No conjunctival inflammation or drainage is noted bilaterally. **Nose:** Septum is midline. **Teeth:** Dentition is intact, and teeth appear off-white in color.	M.K.'s head is normocephalic. Her trachea is midline and her thyroid is non-palpable. PERRLA. The client's sclera appear white, with no conjunctival inflammation or drainage noted bilaterally. The tympanic membranes are visible and pearly gray bilaterally. Nasal septum is midline. No epistaxis noted. The client's oral mucosa is moist and intact. Dentition is intact with teeth appearing off-white in color. Tongue appears pink, with no cracks or discoloration noted. Uvula midline.
CARDIOVASCULAR (2 points): **Heart sounds:** S1, S2 **Cardiac rhythm (if applicable):** Regular **Peripheral Pulses:** Radial and pedal pulses 3+ bilaterally **Capillary refill:** <3 seconds **Neck Vein Distention: Y ☐ N ☒** **Edema Y ☐ N ☒** **Location of Edema:** n/a	Auscultated S1, S2 heart sounds. Apical pulse is 76 and regular. Radial and Pedal Pulses are 3+ bilaterally. No JVD is noted. Capillary refill is <3 seconds bilaterally as assessed on the nail bed of each thumb. No edema noted to the upper or lower extremities bilaterally.
RESPIRATORY (2 points): **Accessory muscle use: Y☐ N ☒** **Breath Sounds:** Lung sounds are clear throughout.	Lungs sounds are clear throughout all lobes, anterior and posterior. Respirations are even, non-labored, and regular with a rate of 16 respirations per minute. No use of accessory

	muscles is noted. M.K. denies any complaints of respiratory distress.
GASTROINTESTINAL (2 points): **Diet at home:** Regular **Current Diet:** Regular **Height:** 160 cm **Weight:** 72.8 kg **Auscultation Bowel sounds:** Bowel sounds active in all four quadrants. **Last BM:** 11/18/20 **Palpation: Pain, Mass etc.:** Denied pain on palpation of abdomen. Abdomen feels soft. No masses palpated. **Inspection:** **Distention:** non-distended **Incisions:** n/a **Scars:** n/a **Drains:** n/a **Wounds:** n/a **Ostomy: Y ☐ N ☒** **Nasogastric: Y ☐ N ☒** **Size:** **Feeding tubes/PEG tube Y ☐ N ☒** **Type:**	The client reports experiencing no decline in appetite. She eats 100% of food offered and is on a regular diet both at home and during this hospital stay. Abdomen is soft, and non-distended with no palpable masses. Bowel sounds are active in all four quadrants. M.K.'s last bowel movement was on the morning of 11/18/20, which she recalls being a formed stool. No scars, wounds, or drains are noted. This client does not have an ostomy, NG tube, or feeding tube present.
GENITOURINARY (2 Points): **Color:** Light yellow **Character:** Clear **Quantity of urine:** 1750 mL **Pain with urination: Y ☐ N ☒** **Dialysis: Y ☐ N ☒** **Inspection of genitals:** **Catheter: Y ☐ N ☒** **Type: N/A** **Size: N/A**	M.K.'s urine has consistently appeared light-yellow in color and clear this shift. Total urinary output recorded is 1750 mL. She denies any dysuria. The client is not receiving dialysis and has not had a catheter placed.
MUSCULOSKELETAL (2 points): **Neurovascular status:** Pedal and radial pulses 2+ bilaterally. No pain, tingling, or pallor noted in the extremities. Skin is warm to the touch to bilateral upper and lower extremities. **ROM:** Normal AROM in all extremities. **Supportive devices:** n/a **Strength:** 5/5 in all extremities. **ADL Assistance: Y☒ N ☒** **Fall Risk: Y ☒ N☒**	M.K. is up ad lib. She ambulates herself to the bathroom several times this shift and takes a walk around the unit hallway after breakfast. The client is independent with ADLs and does not require any assistive devices. The client demonstrates functional AROM and 5/5 strength in all extremities. Skin is warm to the touch bilaterally in the upper and lower extremities. Denies any pain or tingling sensation in all extremities. Color of skin is pale-pink in the extremities.

Fall Score: 35 **Activity/Mobility Status:** **Independent (up ad lib)** YES **Needs assistance with equipment:** NO **Needs support to stand and walk:** NO	M.K.'s Morse Fall Score is 35, which puts her in the low fall risk category. While she has no recent fall history, requires no ambulatory aid, has a normal gait, and is oriented to her own ability, she does have more than one diagnosis in her history and is receiving IV fluids.
NEUROLOGICAL (2 points): **MAEW: Y ☒ N☐** **PERLA: Y ☒ N☐** **Strength Equal: Y ☒ N ☐ if no - Legs ☐ Arms ☐ Both ☐** **Orientation:** Oriented to place, person, time, and situation. **Mental Status:** Appropriate. **Speech:** Clear **Sensory:** Sensorium is intact. **LOC:** Alert	PERRLA. Moves all extremities normally. Demonstrates equal grip strength, and equal strength in bilateral upper and lower extremities. M.K. is A/O x4. The client speaks in clear and coherent English. No obvious deficits in memory or cognition are apparent. Thinking is rational and organized. Sensorium is intact. Facial expressions are symmetrical.
PSYCHOSOCIAL/CULTURAL (2 points): **Coping method(s):** Meditation, prayer, talking with spouse. **Developmental level:** M.K. is at an appropriate developmental level for her age. **Religion & what it means to pt.:** Patient reports being a devout Baptist that derives strength from her church and its community. **Personal/Family Data (Think about home environment, family structure, and available family support):** The patient lives at home with her husband and child. She feels that her husband can give her any physical help or emotional support she needs.	M.K. is a devout Christian and attends a local Baptist church. She feels that her faith and spiritual community are sources of emotional strength. The client identifies meditation, prayer, and talking with her spouse as her primary coping methods, which she feels are adequate. M.K. seems to be at an appropriate developmental level for her age. The client lives at home with her husband and child and has no concerns with her spouse's ability to assist her with recovery and provide emotional support.

Vital Signs, 2 sets (5 points)

Time	Pulse	B/P	Resp Rate	Temp	Oxygen
0700	76 beats per minute	126/68 mmHg	16 respirations per minute	36.5 degrees Celsius	98% on room air.
1100	68 beats per	118/62	16	36.8 degrees	97% on room

	minute	mmHg	respirations per minute	Celsius	air.

Vital Sign Trends:

There were modest decreases in M.K.'s blood pressure and pulse between the two recorded vital signs measurements. These probably reflect the client's physiologic response to the generalized pain she reported at 0700, and a reduction in her pain level by the time 1100 vitals were taken. Physical and emotional stress are associated with increased blood pressure and pulse (Pietrangelo, 2020). Respirations remained stable at 16 respirations per minute. Variations in temperature and oxygen saturation were minor and remained within normal limits this shift.

References

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Pain Assessment, 2 sets (2 points)

Time	Scale	Location	Severity	Characteristics	Interventions
0700	Numeric	generalized	6/10	"Aching"	Administered PRN acetaminophen as ordered.
1100	Numeric	generalized	2/10	"Dull"	N/A

IV Assessment (2 Points)

IV Assessment	Fluid Type/Rate or Saline Lock
Size of IV: 20 gauge; 18 gauge **Location of IV:** Left antecubital (20G); Right hand (18G) **Date on IV:** 11/18/20 (both) **Patency of IV:** Patent **Signs of erythema, drainage, etc.:** N/A **IV dressing assessment:** Clean, dry, and intact.	The IV site at M.K.'s left AC presently has a saline lock. The IV catheter size at this site is 20 gauge. The site is patent, as verified by a normal saline flush. The dressing on the site is dated 11/18/20, and is clean, dry, and intact. No redness, added warmth, swelling, or drainage is noted at the site. There is an 18 gauge IV catheter placed in M.K.'s right hand. She is receiving normal saline at 250 mL per hour at this site. The site is patent. The dressing on the site is dated 11/18/20 and is clean, dry, and intact. No redness, added warmth, swelling, or drainage is noted at the site.

Intake and Output (2 points)

Intake (in mL)	Output (in mL)
1000 mL, intravenous normal saline 240 mL, tea 120 ml, apple juice **Total intake = 1360 mL**	1750 mL urine Stool, 2x, unknown fluid content. **Total (measured) = 1750 mL + unknown fluid content in stool.**

Nursing Care

Summary of Care (2 points)

Overview of care:

A head to toe assessment was performed on M.K. Assistance was given to the client with ordering meals and gathering supplies for a shower. Two sets of vital signs were obtained. All ordered medications were administered. The client's intake and output were recorded.

Procedures/testing done:

No diagnostic testing or procedures were performed this shift.

Complaints/Issues:

M.K. has had complaints of generalized pain throughout this shift. The pain was initially a 6/10 on the numeric scale but has been reduced to 2/10 after M.K. received PRN acetaminophen. The client voices no complaints with the nursing care she has received.

Vital signs (stable/unstable):

There were modest decreases in blood pressure and pulse over this shift. All other vitals were either stable or showed only minor variation. Apart from M.K.'s 0700 blood pressure reading, vitals remained within normal limits throughout the shift.

Tolerating diet, activity, etc.:

M.K. is tolerating a regular diet well and eats 100% of all meals offered. She remains up ad lib and independent with ADLs. She went on a walk around the unit after breakfast and reported no difficulty with ambulation.

Physician notifications:

No notifications were made to the physician this shift. No new orders from the physician were received.

Future plans for patient:

M.K. is ready to discharge to home this afternoon. However, this nurse anticipates that M.K.'s attending will want to order several labs prior to discharge. Expected labs include a CBC, BMP, and total CK.

Discharge Planning (2 points)

Discharge location:

This client plans to discharge to her family home with her husband and child. She believes that she has adequate support at home and that her husband can assist her with recovery. Case management has no concerns with this plan.

Home health needs (if applicable):

No home health needs are anticipated.

Equipment needs (if applicable):

No equipment needs are anticipated.

Follow up plan:

M.K. will need to follow up with her primary care provider in 1 week. This appointment has already been made for her.

Education needs:

The client has received education on her diagnosis of rhabdomyolysis and course of treatment. Prior to discharge, the client may benefit from discussion regarding how she can continue her athletic training in a safe and sustainable way.

Nursing Diagnosis (15 points)
Must be NANDA approved nursing diagnosis and listed in order of priority

Nursing Diagnosis • Include full nursing diagnosis with "related to" and "as evidenced by" components	**Rational** • Explain why the nursing diagnosis was chosen	**Intervention (2 per dx)**	**Evaluation** • How did the patient/family respond to the nurse's actions? • Client response, status of goals and outcomes, modifications to plan.
1. Acute pain related to muscle damage as evidenced by	M.K. has a diagnosis of rhabdomyolysis.	1.The nurse will administer PRN acetaminophen to the	The client tolerated this student's interventions well. M.K.'s pain level was reduced

patient rating of pain as 6/10 on numeric scale.	This diagnosis was ranked #1 because it is an actual problem the patient is experiencing rather than a potential problem.	client as prescribed. 2.The nurse will determine what pain level the client finds tolerable on the numeric pain scale.	from a 6/10 to a 2/10 after administration of acetaminophen. M.K. can understand and use the numeric pain scale and identifies pain levels of 3/10 or less as tolerable. Goal remains in progress. M.K.'s pain is controlled at a level she finds tolerable with her current PRN acetaminophen orders.
2. Risk for ineffective peripheral tissue perfusion related to folic-acid deficiency as evidenced by hemoglobin level of 8.8 g/dL on 11/15/20.	M.K. has a history of folic-acid deficiency anemia. Her most recent hemoglobin level was low at 8.8 g/dL. This diagnosis was ranked #2. While it is an actual problem for the patient and a potential threat to homeostasis, this is a known problem that is currently being treated. Moreover, the patient is presently asymptomatic. Her oxygen saturation is within normal limits on room air, and she has no complaints of dyspnea at rest or with exertion. Thus, while continued monitoring and treatment is warranted, the client's acute pain is a more immediate concern.	**1**. The nurse will monitor patient's hemoglobin level as ordered. **2.** The nurse will administer folic acid as ordered.	The patient tolerated this student's interventions well. While a new hemoglobin level was not drawn this shift, this student anticipates M.K.'s attending will order another draw prior to discharge. M.K. took all meds as prescribed without difficulty this shift, including her folic acid. Goal remains in progress with status unknown. The student will be unable to assess if M.K.'s hemoglobin has remained above 8.8 g/dL until the next time labs are drawn.
3. Risk for imbalanced nutrition related to increased nutritional demands as evidenced by patient	M.K. is presently breastfeeding. Women who are breastfeeding have increased nutritional needs (Holman et al., 2019).	1. The nurse will administer prenatal gummies as ordered. 2. The nurse will monitor M.K.'s oral intake of food each shift.	The patient tolerated this student's interventions well. M.K. took all medications as ordered. The client ate 100% of meals offered this shift. For breakfast, she had two pancakes, eggwhites, and mixed fruit. For lunch, she

confirmation that she is breastfeeding.	This was ranked #3 because it represents a potential problem rather than an actual problem, but is a more immediate concern than diagnosis #4.		consumed a turkey and cheese sandwich, french fries, and a cup of yogurt. Goal remains in progress. M.K. shows an appropriate appetite and is eating more than 75% of all meals offered.
4. Risk-prone health behavior related to excessive exercise as evidenced by total CK level of 3568 Intl Unit/L.	M.K. has a diagnosis of rhabdomyolysis. This condition is associated with excessive exercise (Case-Lo, 2019). While a recurrence of rhabdomyolysis in the future is a potential problem rather than an actual problem, the client could benefit from education on prevention by moderating the intensity of her marathon training.	1. The nurse will assess the client's current knowledge rhabdomyolysis risk factors. **2.** The nurse will assess M.K.'s willingness to moderate physical exercise to reduce the risk of rhabdomyolysis.	M.K. enjoys running and participating in races. The client does not want to compromise her ability to be competitive in these events. However, she understands that excessive exercise can cause rhabdomyolysis and is willing to spread out her training to allow for adequate recovery between sessions. M.K. was amenable to the suggestion of taking a day off between days where she will be running long distances. This goal is complete. The client has expressed a willingness to moderate the intensity of her physical exercise.

Other References (APA):

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Concept Map (20 Points):

Subjective Data

Patient complains of generalized "not feeling well."

Patient states that she ran over 50 miles in 3 days while training for a marathon.

Patient describes pain experienced as "achy", and later "dull."

M.K. expresses willingness to moderate the intensity of her training.

Patient reports breastfeeding at home.

Nursing Diagnosis/Outcomes

Diagnosis 1: Acute pain related to muscle damage as evidenced by patient rating of pain as 6/10 on numeric scale.
Outcome: The patient will maintain a pain level of 3/10 or less as assessed on the numeric scale with PRN acetaminophen this shift.

Diagnosis 2: Risk for ineffective peripheral tissue perfusion related to folic-acid deficiency as evidenced by hemoglobin level of 8.8 g/dL on 11/15/20.
Outcome: The patient will maintain a hemoglobin level of 8.8 g/dL or greater for the duration of this hospital stay.

Diagnosis 3: Risk for imbalanced nutrition related to increased nutritional demands as evidenced by patient confirmation that she is breastfeeding.
Outcome: The patient will consume 75% of more of all meals offered this shift.

Diagnosis 4: Risk-prone health behavior related to excessive exercise as evidenced by total CK level of 3568 Intl Unit/L.
Outcome: The patient will express a willingness to moderate her physical training by the end of this shift.

Objective Data

Patient has a diagnosis of rhabdomyolysis
Patient has a history of folic acid deficiency anemia
Patient is currently taking folic acid.
Patient ranks pain as 6/10 on numeric scale at 0700 and 2/10 at 1100 after receiving PRN acetaminophen.
Most recent labs: Hemoglobin 8.8 g/dL, Na- 123 mmol/L, K+ 5.5 mmol/L, glucose 86 mg/dL, BUN 10 mg/dL, creatinine 1.67 mg/dL, total CK 3568 Intl Unit/L.
Most recent VS: BP 118/62 mmHg, P 68 bpm, R 16 per min, T 36.8 C, O2 97% on room air.
Patient eats 100% of all meals offered.
Patient
No abnormalities noted during physical exam.

Patient Information

M.K. is a 27-year-old Caucasian female admitted to SBLHC on 11/15/20 with a diagnosis of rhabdomyolysis after reporting to the ED with complaints of generalized malaise, which she states began several hours before she arrived. She is a full code and is allergic to sulfa drugs. The patient is up ad lib and requires no assistive devices. She comes from home, where she lives with her husband and child. She is currently breastfeeding and takes a prenatal supplement currently. She has medical a history of pregnancy-induced hypertension, rheumatoid arthritis, and folic acid deficiency anemia. Her surgical history includes a cesarean section and lithotripsy. M.K. reports that she had been training for a marathon prior to this hospitalization and had ran over 50 miles in a three-day period. She has several recent abnormal labs. Hgb 8.8 g/dL, Na- 123 mmol/L, K+ 5.5 mmol/L, creatinine 1.67 mg/dL, and total CK 3568 Intl Unit/L. She is receiving sodium tablets for her hyponatremia, sodium polystyrene sulfonate for hyperkalemia, folic acid to treat anemia, and IV NS. She has an 18G IV in her R hand getting NS at 250mL/hr continuously and a 20G IV in her R antecubital with a saline lock. Dressings to both are clean, dry, and intact. Most recent VS: BP 118/62 mmHg, P 68 bpm, R 16/min, T 36.8 C, O2 97% on room air.

Nursing Interventions

Diagnosis 1 Interventions:
The nurse will administer PRN acetaminophen to the client as prescribed for mild to moderate pain.
The nurse will determine what pain level the client finds tolerable on the numeric pain scale.
Diagnosis 2 Interventions:
The nurse will monitor the patient's hemoglobin level as ordered.
The nurse will administer folic acid as ordered.
Diagnosis 3 Interventions:
The nurse will administer prenatal gummies as ordered.
The nurse will monitor M.K.'s oral intake of food each shift.
Diagnosis 4 Interventions:
The nurse will assess the client's current knowledge of rhabdomyolysis risk factors.
The nurse will assess M.K.'s willingness to moderate physical exercise to reduce the risk of rhabdomyolysis.