Medications

Normal saline

- Pharmacological: Crystalloid fluid
- Therapeutic: Isotonic colloid fluid
- Why client is taking: The client is taking this medication to flush out muscle protein and electrolytes to prevent dangerous heart rhythms and loss of kidney function.
- Key nursing assessments: The nurse needs to monitor electrolyte concentration during normal saline therapy. The nurse also needs to monitor volume status and acid-base balances.

NaCl:

- Pharmacological: Colloid
- Therapeutic: Mineral and electrolyte
- Why client is taking: Aggressive treatment with sodium chloride is vital to a patient with rhabdomyolysis to prevent associated renal failure.
- Key nursing assessments: The nurse needs to monitor electrolyte balance in a patient taking oral sodium chloride. The nurse also needs to monitor for weakness, neurological changes, neuromuscular irritability, and seizures that could indicate hypernatremia.

Kayexalate:

- Pharmacological: Beta 2 agonist
- Therapeutic: Potassium binder
- Why client is taking: The patient is taking this due to the increased levels of potassium caused by rhabdomyolysis.
- Key nursing assessments: The nurse needs to monitor serum potassium in a client taking this medication. The nurse should also monitor serum magnesium and calcium.

Acetaminophen:

- Pharmacological: Antipyretic
- Therapeutic: Non-opioid analgesic
- Why client is taking: The client is taking this medication due to the generalized body aches associated with rhabdomyolysis.
- Key nursing assessments: The nurse needs to monitor for acetaminophen toxicity symptoms such as nausea, vomiting, and abdominal pain. The nurse should also monitor ALT and AST labs in patients who are at risk for hepatotoxicity.

Lab Values/Diagnostics

Hgb: 8.8 (11.3-15.2)

- Decreased hemoglobin may be caused to possible intramuscular bleeding due to rhabdomyolysis (Yuan et al., 2021).

Na: 123 (135-145)

- A dysfunction of the sodium/calcium pump occurs in rhabdomyolysis which causes decreased levels of sodium in the body (Aguiar et al., 2018).

K: 5.5 (3.5-5.1)

- Rhabdomyolysis causes direct release of intracellular potassium into extracellular fluid which cause hyperkalemia (Wen et al., 2019).

Creatinine: 1.67 (0.6-1.2)

- Increased creatinine is caused by the massive release of muscle creatinine into the bloodstream during rhabdomyolysis (Walid, M., 2008).

Total CK: 3568 (22-198)

- Increased total CK is indicative of acute kidney injury in rhabdomyolysis **(**Hansrivijit et al., 2020).

Demographic Data

Date of Admission: 10/21/22
Admission Diagnosis/Chief Complaint: Generalized not feeling well/ Rhabdomyolysis
Age: 27 years old
Gender: Female
Race/Ethnicity: Caucasian
Allergies: Sulfa drugs
Code Status: Full code
Height in cm: 160 cm
Weight in kg: 79.83 kg
Psychosocial Developmental Stage: Intimacy vs isolation
Cognitive Developmental Stage: Formal operational
Braden Score: 20
Morse Fall Score:
Infection Control Precautions: Standard

Admission History

The patient is a runner that is training for a marathon and states that she has ran 50 miles in the past three days while trying to break a personal record. The patient complains of generalized not feeling well starting several hours prior to presenting to the emergency department. Patient states there is no aggravating factors, alleviating factors, or treatment initiated at home.

Medical History

Previous Medical History: Pregnancy induced hypertension, rheumatoid arthritis, folic acid deficiency anemia, allergic rhinitis.

Prior Hospitalizations: N/A

Previous Surgical History: Cesarean section, Lithotripsy

Social History: Never a smoker, casual drinker 1-2 per month, never a drug user.

Pathophysiology

Disease process:
Ion channels within the body, such as the sodium and potassium pump, are located on the plasma membrane (Torres et al., 2018). This pump maintains low sodium and calcium concentrations while maintaining high potassium concentrations within the muscle fiber (Torres et al., 2018). This process depends on the adenosine triphosphate's energy source (Torres et al., 2018). Any direct myocyte injury or disruption in the energy source damages the ion channels (Torres et al., 2018). The damage inflicted on the ion channels will disrupt the homeostasis within the intracellular space (Torres et al., 2018). When injuries occur, this causes the increase of intracellular sodium and calcium, which then draws extracellular water into the cell. (Torres et al., 2018). The prolonged increase of intracellular calcium and sodium promotes the lysis of the cell, which will then release the contents of the cell into the bloodstream (Torres et al., 2018). This action disrupts electrolyte imbalance within the bloodstream and causes rhabdomyolysis (Torres et al., 2018).

S/S of disease:
The signs and symptoms of rhabdomyolysis are generally such as malaise, fever, nausea, vomiting, and headache (Torres et al., 2018). The three primary symptoms specific to rhabdomyolysis are myalgia, weakness, and tea-colored urine (Torres et al., 2018). Myalgia and weakness are caused by muscle fiber breakdown and electrolyte imbalance (Torres et al., 2018). The tea-colored urine is caused by the damage done to the kidneys in rhabdomyolysis (Torres et al., 2018). The patient being cared for complained of general not feeling well and weakness.

Method of Diagnosis:
The diagnosing physician must have substantial evidence within the history and physical examination to diagnose rhabdomyolysis (Torres et al., 2018). This includes focusing on the extremity's pulse, sensation, muscle power, and size (Torres et al., 2018). The most reliable lab for diagnosing rhabdomyolysis is plasma CK (Torres et al., 2018). A client suffering from rhabdomyolysis will have around five times the normal range of plasma CK (Torres et al., 2018). The patient being cared for had a severely elevated plasma CK that led to the diagnosis of rhabdomyolysis.

Treatment of disease:
Treatment of rhabdomyolysis revolves around rehydrating the patient, flushing on necrotic cell fluid, and preventing acute kidney injury (Torres et al., 2018). Typical treatment of rhabdomyolysis includes continuous normal saline or fluid replacement and sodium chloride replacement (Torres et al., 2018). The patient being cared for is receiving continuous normal saline and oral sodium chloride replacement.

Active Orders

Normal saline running at 250 ml/hr continuously

Monitor intake and output

Physical Exam/Assessment

General: The patient was alert, awake, and oriented to person, place, time, and situation. The patient did not display any form of distress. The patient is well developed, hydrated, and nourished.

Integument: The patient's skin color was appropriate for ethnicity. The patient's skin was warm and dry upon palpitation. The patient had no rashes, bruises, or wounds present upon inspection. The patient's skin turgor was elastic. The patient's nails showed no cyanosis, and the capillary refill was less than 3 seconds in the fingers and toes bilaterally. The patient's Braden score was 20. The patient had no drains present upon inspection.

HEENT: The patients head and neck are symmetrical at midline. The patient's sclera was white bilaterally. The patient's conjunctiva was pink and moist bilaterally with no drainage present. PERRLA was intact bilaterally. The eyelids displayed no wounds or bruises bilaterally. Extraocular movement was intact bilaterally. The patient's septum was symmetrical at midline with no deviation. The auricles displayed no lesions, bruises, or wounds bilaterally. The nares show no signs of epistaxis bilaterally. The patient's uvula was at midline and the soft palate rose and fell symmetrically. The patient's oral mucosa was pink and moist. The hard palate was intact. The patient displayed well managed dentition, gums were intact and well cared for displaying no lesions, wounds, or ulcers in the mouth.

Cardiovascular: The patient had clear S1 and S2 heart sounds with a normal rate and rhythm. No murmurs, gallops, or rubs were present, and the patient does not complain of chest pain or syncopal episodes. The patient had palpable +2 pulses at the carotid, brachial, radial, popliteal, and dorsalis pedis locations bilaterally. The patient displayed no edema or neck vein distention. The patient had a capillary refill of less than 3 on upper and lower extremities bilaterally.

Respiratory: The patient had normal rate and rhythm of respirations with no use of accessory muscles. The patient had clear breath sounds in upper and lower lobes bilaterally that was auscultated anteriorly and posteriorly.

Genitourinary: The patient's urine is clear and yellow with no sediments. The patient does not complain of pain, frequency, or urgency with urination. The patient is not on dialysis. The genitals presented no abnormalities upon inspection. The genitals were clean and intact with no lesions, wounds, or scars present. The patient did not have a catheter placed.

Gastrointestinal: The patient is on a regular diet at home and at the hospital. The abdomen is soft and nontender upon palpitation in all four quadrants with no organomegaly present. Bowel sounds are active in all four quadrants. The patient has no abdominal wounds, scars, distention, incisions, or wounds present. The patient has no ostomy, nasogastric, or PEG tube present. The patient's last bowel movement is unknown. The patient is 79.83 kg and is 160 cm tall.

Musculoskeletal: All the patient's extremities have full range of motion with no motor deficits noted. The patient's muscle strength was 5/5 bilaterally in all extremities. Deep tendon reflexes are 2+ in all extremities bilaterally. The patient is up independently. The patient does not use any assistive devices, assistance with ADLs, and does not need support to stand or walk.

Neurological: All of the patient's extremities move well with PERLA intact bilaterally. The patient's strength is equal in all extremities bilaterally. The patient has clear speech. The patient is alert and oriented to person, place, time, and situation (x4). The patient felt sensation is all extremities bilaterally and was completely conscious.

Most recent VS (include date/time and highlight if abnormal): Vital signs taken 10/24/22 at 1100

Pulse- 68 beats per minute

Blood pressure- 126/68 mmHg

Respirations- 16 breaths per minute

Temperature- 36.5 Celsius

Oxygen saturation- 98% on room air

Pain and pain scale used: Taken at 1100 on 10/24/22 rated a 2/10 on a numeric scale

Nursing Diagnosis 1	**Nursing Diagnosis 2**	**Nursing Diagnosis 3**
Risk for acute febrile response related to the inflammatory response of rhabdomyolysis as evidenced by total CK lab value of 3568.	Acute pain related to the inflammatory process of rhabdomyolysis as evidenced by pain rating a 7/10.	Fatigue related to injury of skeletal muscles as evidenced by the complaint of generalized not feeling well.
Rationale	**Rationale**	**Rationale**
I chose this diagnosis due to the risk of an increased temperature because of the nature of rhabdomyolysis.	I chose this diagnosis due to the expected pain related to rhabdomyolysis and the importance of caring for this pain.	I chose this diagnosis due to the patient acute fatigue while stating that she is a marathon runner.
Interventions	**Interventions**	**Interventions**
Intervention 1: Assess the patients vital signs every 4 hours. **Intervention 2:** Remove excess clothing, blankets, or linens.	**Intervention 1:** Administer analgesic medications as prescribed. **Intervention 2:** Assess the patient's vital signs and educate the patient on relaxation techniques.	**Intervention 1:** Assess the patient's degree of fatigability by asking the patient to rate it on a numeric scale. **Intervention 2:** Encourage progressive activity in self-care and exercise as tolerated.
Evaluation of Interventions	**Evaluation of Interventions**	**Evaluation of Interventions**
The patient responded well to all interventions and maintained a normal body temperature.	The patient responded well to all interventions as well as reported a decreased pain rating of 2/10 on a numeric scale.	The patient responded well to all interventions and increased activity such as independent self-care.

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