Medications

Insulin lispro (Humalog) meal coverage subcutaneous 1unit for every 12g of carbohydrates – rapid acting insulin (Jones & Bartlett, 2021). The patient is on this medication to correct her blood glucose after meals. The nurse should calculate how many carbs the patient has eaten and then calculate the amount of insulin needed.

Insulin lispro (Humalog) correction subcutaneous TID daily after meals 1 unit for blood sugar every 50 > 120mg/dl – rapid acting insulin (Jones & Bartlett, 2021). The patient is on this medication for her type 1 diabetes mellitus. The nurse should test the patient's blood sugar levels after meals to determine the amount of insulin needed.

0.9 NaCl w/KCl 40mEq 128mL/hr. continuous IV – Crystalloid fluid. The patient is on this medication to help filter her kidneys and prophylaxis for hypokalemia. The nurse should assess the patient periodically for signs of hyperkalemia including chest pain, arrythmias, and muscle weakness.

Atorvastatin (Lipitor) 10mg oral at bedtime – Pharmacologic class: HMG-CoA reductase inhibitor. Therapeutic class: antihyperlipidemic (Jones & Bartlett, 2021). The patient is on this medication for her uncontrolled diabetes. The nurse should monitor the patient's liver function and creatinine kinase level.

Demographic Data

Admitting diagnosis: Uncontrolled type 1 diabetes mellitus with hyperglycemia

Age of client: 14 years old

Sex: Female

Weight in kgs: 47.8kgs

Allergies: Eggnog flavor (hives) and gluten (unknown)

Date of admission: 1/26/2023

Psychosocial Developmental Stage: Identity vs. role confusion

Cognitive Development Stage: Formal operational

Admission History

14-year-old female presented to ED due to hyperglycemia. The patient has a Dexcom insulin pump but has not been using it since Tuesday, January 24th, due to insufficient insulin. The patient and her mother reported that her blood sugars were generally in the 130-250 range, but since Tuesday, January 24th, they had been in the 300-400 range. The patient reported fatigue, anorexia, nausea, shortness of breath, headache, and malaise upon admission. She also had polyuria and polydipsia and vomited once. The patient's blood sugars were in the 400-500+ range upon admission. Her mother has had issues with insurance coverage and pharmacy shortages. The patient had been checking her blood sugars and supplementing insulin by giving injections with her insulin pen. The patient states that her current regimen is 1-2 units, correction, and 1 unit per 15 carbohydrates eaten.

Pathophysiology

Disease process: Type 1 diabetes mellitus is a disease that results in insufficient insulin within the body. The decreased insulin is due to T-cell-mediated autoimmune destruction of insulin-secreting beta cells of the pancreas (Capriotti, 2020). The rate of beta cell damage is different in children, rapid, and in adults, slower. Both genetic and environmental factors are known to cause type 1 diabetes mellitus, such as the immune system fighting an infection, genes passed down by one or both parents, and damage to the pancreas.

S/S of disease: Signs and symptoms of type 1 diabetes include polydipsia, polyuria, and polyphagia. Other symptoms that may present are visual disturbances, the inability to concentrate, fatigue, weakness, and malaise (Capriotti, 2020).

Method of Diagnosis: Most commonly, patients present with diabetic ketoacidosis before being diagnosed with type 1 diabetes mellitus (Capriotti, 2020). However, blood glucose parameters determine all diabetes diagnoses. Oral glucose tolerance tests determine how carbohydrates break down after ingestion. Blood glucose testing ensues two hours after the patient ingests a specific amount of carbohydrate-rich soda. If the measurement is greater than or equal to 200mg/dL, this indicates diabetes.

Treatment of disease: Treatment of type 1 diabetes mellitus includes diet modifications, exercise, blood glucose monitoring, and insulin therapy (Capriotti, 2022). Carbohydrate counting is one method advised for patients with type 1 diabetes. Counting carbs makes the patient aware of how many they consume and what insulin dose is needed to correct their glucose levels (Tascini et al., 2018).

Relevant Lab Values/Diagnostics

Venous blood gasses upon admission:

pH 7.28 (7.310-7.410), pCO2 24 (41-51), pO2 138.2 (35-45), and HCO3 10.7 (21.5-25.5) Abnormal VBG are due to metabolic acidosis (Pagana et al., 2021).

Blood glucose 400+ (74-100) Increased blood glucose is related to type 1 diabetes (Pagana et al., 2021).

BUN 25 (8-21) and Creatinine 1.06 (0.55-1.02) Increased BUN and creatinine are related to decreased kidney function in diabetes (Pagana et al., 2021).

Urine culture:

Trace protein (neg), glucose 50mg/dL (0), ketones large (negative), blood about 250Ery/uL (neg) Abnormal urine cultures are related to decreased kidney function in diabetes (Pagana et al., 2021).

Medical History

Previous Medical History: DKA (9/19) and Celiac (2020)

Prior Hospitalizations: DKA (2019, 4/21, 5/21, 8/21)

Past Surgical History: N/A

Social needs: The patient's mother has been able to take time off to accompany her during her hospital stay. Her father also joins after he gets off work.

Active Orders

Q2 blood sugars – This order is to monitor blood sugars for stabilization or increase.

Carbohydrate counting – This order determines the amount of insulin needed after meals.

Diet alert sign on the door – This order is to ensure the nurse knows what the patient eats.

Q4 vitals – This order monitors for maintained stabilization.

Q8 blood pressure while awake – This order monitors for stabilization of blood pressure.

Notify the provider if blood sugar is >300 with urine ketones – This order is in place due to the risk of DKA and repeat hyperglycemic episodes.

Assessment	
General	The patient appeared calm and cooperative. She was alert and oriented x4 and well groomed.
Integument	The patient's skin is dry and warm. Her skin turgor is within normal range. There are no rashes, lesions, or bruising present. There is a regular quantity, distribution, and texture of hair. Her nails are without clubbing or cyanosis. The patient has a 22g IV in her right hand that is clean, intact, and patent. Braden score: 3
HEENT	The patient's head is normocephalic, and her trachea and neck are midline with no deviations. PERRLA noted with EOM normal. Bilateral nares are equal with no deviation, drainage, or polyps. The patient's teeth are intact, and the oral mucosa is pink and moist.
Cardiovascular	S1 and S2 heart sounds are noted. Normal rate and rhythm. Radial and pedal pulses are 2+ bilaterally. Normal capillary refill bilaterally. No noted edema in extremities bilaterally.
Respiratory	The patient has clear breath sounds bilaterally, with no accessory muscle use noted. No adventitious breath sounds are noted.
Genitourinary	The patient's urine is yellow with some cloudiness. Ketones are present in the urine. She denies pain during urination. The patient is up to void on her own.
Gastrointestinal	Active bowel sounds are heard in all four quadrants. Her last bowel movement was yesterday (1/26/2023) around 1600. No pain or masses were noted upon palpation. No incisions, scars, drains, or wounds are noted upon examining the abdomen.
Musculoskeletal	ROM is active bilaterally in all extremities. No assistive devices are used. The patient does not require assistance to ambulate and has a Cummings fall score of 2.
Neurological	The patient is A&O x4. PERRLA. Glasgow coma scale: 15
Most recent VS (highlight if abnormal)	Time: 0810 Temperature: 97.5 F Route: Oral RR: 20 HR: 92 bpm BP and MAP: 112/66 and 82mmHg Oxygen saturation: 99%

	Oxygen needs: Room air
Pain and Pain Scale Used	FLACC score: 0

Nursing Diagnosis 1 Impaired gas exchange related to metabolic acidosis as evidenced by venous blood gasses on admission.	**Nursing Diagnosis 2** Ineffective renal perfusion related to diabetes mellitus as evidenced by ketones in the urine, elevated BUN, and elevated creatinine.	**Nursing Diagnosis 3** Risk for unstable blood glucose related to type 1 diabetes mellitus as evidenced by hyperglycemia.
Rationale This diagnosis was chosen because the patient was experiencing metabolic acidosis when admitted to the hospital.	**Rationale** This diagnosis was chosen because the patient had large ketones present in her urine. She also had elevated BUN and creatinine levels.	**Rationale** This diagnosis was chosen because the patient has experienced repeat episodes of hyperglycemia due to her type 1 diabetes mellitus.
Interventions **Intervention 1:** Monitor the patient's VBG levels. **Intervention 2:** Place the patient in a position that best facilitates chest expansion to enhance gas exchange.	**Interventions** **Intervention 1:** Test for ketones in the patient's urine. **Intervention 2:** Monitor the patient's BUN and creatinine levels.	**Interventions** **Intervention 1:** Monitor the patients glucose levels every 2 hours and after every meal. **Intervention 2:** Educate the patient on early signs and symptoms of hyperglycemia.
Evaluation of Interventions The patient was cooperative in staying in an upright position to enhance oxygenation. The patient's VBG levels have stabilized during her hospital stay.	**Evaluation of Interventions** The patient went from having large ketones to small ones in her urine. Her BUN and creatinine levels have also stabilized during her stay in the hospital.	**Evaluation of Interventions** The patient is aware of the signs and symptoms of hyperglycemia. She is compliant with checking her blood sugars every two hours and after each meal and calculating the amount of insulin needed for correction.

References (3):

Jones & Bartlett Learning, LLC. (2021). *2021 Nurse's Drug Handbook* (20th ed.).

Pagana, K.D., Pagana, T.J., & Pagana, T.N. (2020). *Mosby's Diagnostic and Laboratory Test Reference* (15th ed.). Mosby.

Phelps, L. L. (2020). In *Sparks & Taylor's nursing diagnosis reference manual* (11th ed.). essay, Wolters Kluwer.

Tascini, G., Berioli, M., Cerquiglini, L., Santi, E., Mancini, G., Rogari, F., Toni, G., & Esposito, S. (2018). Carbohydrate counting in children and adolescents with type 1 diabetes. *Nutrients*, *10*(1), 109. https://doi.org/10.3390/nu10010109