

Medications

insulin aspart (Novolog) subcutaneous

- 1 unit for every BG 100 mg/dl over 150 mg/dl
- PRN Before meals 3 times daily
- Pharmacological class: Exogenous insulin
- Therapeutic class: Antidiabetic
- This is rapid-acting insulin with an onset of 10-20 minutes that the patient would use if their BG were high to improve glycemic control, especially before eating a meal.
- Key nursing assessment prior to administration would be serum glucose level and signs of hyperglycemia or hypoglycemia

insulin glargine (Lantus) subcutaneous

- 3 units
- Q24H
- Pharmacological class: Exogenous insulin
- Therapeutic class: Antidiabetic
- This is long-acting insulin with a 3-4 hr onset and duration of 24 hrs. The patient takes this medication to have a baseline level of insulin to control BG from food intake daily.
- Key nursing assessment prior to administration would be serum glucose level and signs of hyperglycemia or hypoglycemia

glucagon intramuscular

- 1 mg
- PRN for severe hypoglycemia with no IV access and strict NPO
- Pharmacological class: Pancreatic hormone
- Therapeutic class: Antihypoglycemic
- The patient is prescribed this medication to provide emergency treatment for severe hypoglycemia
- Nursing assessments include blood glucose levels and signs of severe hypoglycemia such as confusion, pale skin, and abnormal heartbeat before administration

Demographic Data

Admitting diagnosis: Type I Diabetes Mellitus

Age of client: 3 years old

Sex: Male

Weight in kgs: 14.8

Allergies: NKA

Date of admission: 9/1/22

Psychosocial Developmental Stage: Early childhood (Autonomy vs. shame & doubt)

Cognitive Development Stage: Preoperational stage

Admission History

Patient presented to the emergency room after showing polydipsia and polyuria for a week prior and a recent high BG reading using a test strip from a family member. Parents sought care after an elevated blood glucose level of 216 was found at 0630 on 9/1 with the patient's last meal being at 2000 the night before admission. No other physical complaints were reported at this time. Neither parent has diabetes but there are other family members with it. No interventions were made to manage symptoms before admission.

Pathophysiology

Disease process: Type I diabetes mellitus is an autoimmune disease, which is believed to be caused by genetics, that targets and destroys pancreatic beta cells that make insulin. Insulin is needed to bring glucose into muscle and adipose tissue so it can be used as a source of energy. It is also needed to produce fatty acids and store glycogen (Lucier & Weinstock, 2022). When there is no insulin, the body becomes hyperglycemic and breaks down fat into ketones as a source of fuel in the absence of sugar. Excess levels of ketones cause a medical emergency called diabetic ketoacidosis (DKA) that puts the body in a state of metabolic acidosis (Lizzo et al., 2022).

S/S of disease: Three common signs of hyperglycemia associated with T1DM are polydipsia, polyphagia, and polyuria. The patient reportedly was exhibiting polydipsia and polyuria for a week before admission. Effects of hypoglycemia include fast heart rate, confusion, sweating, visual changes, and tremors (Lucier & Weinstock, 2022).

Method of Diagnosis: T1DM could be diagnosed with a fasting glucose level greater than 125 mg/dl or a hemoglobin A1c that is greater than or equal to 6.5% (Lucier & Weinstock, 2022). The patient had a fasting glucose level of 216 mg/dl before admission and 133 mg/dl the following day. The patient's Hb A1c was 8.3%.

Treatment of disease: Patients with T1DM need insulin therapy to control their glucose levels. The patient was prescribed both rapid-acting and long-acting insulin to treat their condition. Rapid-acting insulin could be given before meals if the patient is hyperglycemic as it has a fast onset to decrease glucose levels. Glucagon is for emergency use to treat severe hypoglycemia, which has also been prescribed for the patient. Diet and physical activity are factors in controlling glucose levels and routine glucose monitoring should be done to determine whether the patient is hyperglycemic, hypoglycemic, or within normal limits to decide what interventions need to be done to protect the patient from health risks. Fast-acting carbohydrates (15 g) can be given if BG is below 70 mg/dl.

Relevant Lab Values/Diagnostics

Lab	Normal Range	Today's Value
Lactic acid	0.3-0.8 mg/dL	1.3
Blood glucose	70-110 mg/dL	96
CO2	20-28 mEq/L	20
Urinalysis protein	0-8 mg/dL	8
Urinalysis ketones	Negative (0)	15
Hb A1c	<7%	8.3%

The CBC and CMP of the patient showed that components of the blood and electrolytes were in the desired ranges. However, CO2 content is on the lower side of the normal range. Decreased CO2 levels are associated with uncontrolled DM due to ketone formation and could put the patient at risk of DKA (Pagana, 2018). This also relates to the urinalysis that was performed on the patient that showed the presence of protein and ketones caused by the breakdown of fat due to a lack of insulin. Blood glucose was within range for the most recent reading but was at a low of 57 thirty minutes before in which juice was given to the patient. BG was as high as 380 on 9/1 and indicates a need for insulin therapy. The patient had 2 consecutive fasting glucose levels above 125 with 216 and 133 that are evidence of DM. An Hb A1c test was taken to analyze the average blood sugar levels of the past 3 months and to also diagnose DM. The patient's reading was well above the normal 6.5% range at 8.3% which indicates T1DM. A lactic acid test showed an elevated value of 1.3 mg/dl that is associated with DM (Pagana, 2018).

Medical History

Previous Medical History: N/A

Prior Hospitalizations: N/A

Past Surgical History: N/A

Social needs: Education for parents about insulin administration and monitoring for signs and symptoms of diabetes mellitus, distraction for patient when checking blood glucose with glucometer or giving insulin to relieve distress, case management about cost of medications

Active Orders

Vitals signs Q4H to assess respirations, blood pressure, pulse, and elevated temperatures outside of normal parameters to report to the physician

Strict I&O per protocol to monitor hydration status that can be affected by hyperglycemia

Bedside urine test strip if BG is >300 to check for the presence of ketones

Regular diet to assess and respond to the patient's reaction while teaching the parents about caring for pediatric diabetes

BG level AC/HS and at 0300 to monitor blood glucose levels to evaluate whether insulin needs to be administered to the patient before meals or if they are hypoglycemic and need fast-acting carbohydrates

Assessment

General	Patient is alert and oriented. Appears well-groomed. No acute distress.
Integument	Skin color is pink and clear. Skin is warm and dry upon palpation. No wounds, bruising, or rashes present.
HEENT	Head and neck are symmetrical. Sclera and conjunctiva are normal bilaterally. PERRLA. EOMS intact. External ears appear normal. Nose appears normal and without rhinorrhea. Mucosa of the mouth and nares are pink and moist.
Cardiovascular	Normal S1 and S2 sounds. Normal heart rate and rhythm without murmurs, gallops, or rub. No neck vein distention.
Respiratory	Normal rate and pattern of respirations. Respirations are symmetrical and nonlabored. Lung sounds are clear throughout with no wheezes, crackles, or rhonchi.
Genitourinary	Urinalysis shows clear, yellow urine with normal pH and specific gravity. Ketones present in urine, which is related to previously hyperglycemic levels of glucose in the blood due to lack of insulin from T1DM.
Gastrointestinal	Bowel sounds present and normal throughout. No distention or masses present.
Musculoskeletal	Normal ROM. Normal gait.
Neurological	Alert and oriented with age-appropriate behavior. No neurological deficits.
Most recent VS (highlight if abnormal)	<p>Time: 1600</p> <p>Temperature: 97.7 °F (36.5 °C)</p> <p>Route: Axillary</p> <p>RR: 18</p> <p>HR: 92</p> <p>BP and MAP: N/A (99/66 was last reading)</p> <p>Oxygen saturation: 99%</p> <p>Oxygen needs: None (Room air)</p>
Pain and Pain	0 on FLACC pain scale

<p>Nursing Diagnosis 1 Risk for unstable blood glucose level related to new onset of type I diabetes mellitus as evidenced by blood glucose level reading of 57 mg/dL</p>	<p>Nursing Diagnosis 2 Risk for deficient fluid volume related to hyperglycemia caused by type I diabetes mellitus as evidenced by polyuria</p>	<p>Nursing Diagnosis 3 Readiness for enhanced knowledge related to new onset of pediatric diabetes mellitus as evidenced by parents' desire to learn about patient's condition and insulin therapy</p>
<p>Rationale The patient has been newly diagnosed with T1DM and is at risk for abnormal levels of blood glucose that has ranged from as low as 57 to as high as 380. It is important to monitor the patient's glucose to avoid adverse health risks that are associated with hyperglycemia or hypoglycemia.</p>	<p>Rationale A reason for the patient seeking care is polyuria, a sign of hyperglycemia and possibly DKA that comes from a lack of insulin. The patient reportedly urinated multiple times every hour and this puts them at risk for dehydration, so fluid status is worth monitoring to prevent complications and determine improvement in the patient's condition.</p>	<p>Rationale The patient is only three years old, which means it is the responsibility of the parents to continue monitoring and caring for their T1DM after discharge. It is a priority to educate the parents on signs and symptoms to monitor that could indicate blood glucose levels outside of healthy parameters so that they could act accordingly with the patient's diet and medication.</p>
<p>Interventions Intervention 1: Monitor the patient's glucose levels at regular intervals and before meals to identify and respond early to fluctuations in glucose levels that are outside of normal parameters. Intervention 2: Provide the patient with glucose tablets or 15 g of fast-acting carbohydrates if they are hypoglycemic. Then assess blood sugar after 15 minutes.</p>	<p>Interventions Intervention 1: Record intake and output to monitor the fluid balance of the patient. Assess vitals every 4 hours for signs of dehydration. Intervention 2: Monitor serum electrolyte levels because fluid loss could cause an imbalance. Report abnormal findings.</p>	<p>Interventions Intervention 1: Assess the parents' knowledge of hypoglycemia and hyperglycemia to ensure adequate management and prevent future episodes. Intervention 2: Assess the parents' understanding of prescribed insulin therapy to ensure proper administration.</p>
<p>Evaluation of Interventions The patient will not show signs or symptoms of hypoglycemia or hyperglycemia. Blood glucose levels will be within the normal range.</p>	<p>Evaluation of Interventions Patient will have stable vital signs and electrolyte values with no signs of dehydration. Patient will also have a regular fluid intake and urine output.</p>	<p>Evaluation of Interventions The parents of the patient will be able to verbalize their understanding of prescribed insulin medications and signs/symptoms of hyperglycemia/hypoglycemia. They will also demonstrate how to administer insulin and check the blood glucose of the patient with a glucometer.</p>

--	--	--

References (3):

Kizior, R. J. (2021). *Saunders Nursing Drug Handbook 2021*. Elsevier.

Lizzo JM, Goyal A, Gupta V. Adult Diabetic Ketoacidosis. [Updated 2022 Jul 12]. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560723/>

Lucier J, Weinstock RS. Diabetes Mellitus Type 1. [Updated 2022 May 11]. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK507713/>

Pagana, K.D., Pagana, T.J., & Pagana, T.N. (2018). *Mosby's Diagnostic and Laboratory Test Reference* (14th ed.). Mosby.

Phelps, L.L. (2020). *Sparks and Taylor's Nursing Diagnosis Reference Manual* (11 th ed.). Wolters Kluwer.