

Protocol

Target Group: All Physicians and Nursing Caregivers treating DKA Patients	Original Date of Issue: 14/06/2015	Date of Last Review: 17/01/2023	Publication Date: 11/06/2017
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Purpose

To provide physicians and nurses at CCAD with a protocol for using intravenous insulin infusion to treat patients with diabetic ketoacidosis (DKA)

Protocol

1. Ordering
 - 1.1. This protocol will be initiated by a physician order.
 - 1.2. Subsequent orders specified by the protocol will be entered by a nurse as 'per protocol'.
 - 1.3. Subsequent orders not specified in the protocol will require a physician order.
2. Insulin protocol
 - 2.1. Discontinue all previous orders for insulin and other glucose lowering agents.
 - 2.2. Intravenous (IV) insulin solution.
 - 2.2.1. Regular insulin in 0.9% NaCl (1 unit per 1mL).
 - 2.2.2. Must use infusion pump and run with maintenance fluid.
 - 2.3. Monitor blood glucose every hour.
 - 2.4. Record all blood glucose measurements in Epic.
 - 2.5. Contact physician prior to starting insulin drip if K < 3.5 mmol/L.
 - 2.6. Patient must be NPO while drip is infusing.
 - 2.7. Patient is to remain on nursing unit while IV insulin is infusing unless accompanied by RN or physician.
 - 2.8. Administer a bolus insulin of 0.1 unit/kg and start infusion at a rate of 0.1 unit/kg/hour: The initial goal of insulin therapy is to decrease blood glucose slowly by 2.8-4.2 mmol/L/hour (50-75 mg/dL/hour).
 - 2.9. Adjust the insulin infusion according to the following table until the blood glucose reaches 11.1 mmol/L (200 mg/dL):

	Blood
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Insulin Diabetic Ketoacidosis Protocol

BLOOD Glucose CHANGE Direction			Glucose Change Range	Adjustment in insulin infusion
↓	DECLINING	If DECLINES in 1 HOUR by	0-2.7 mmol/L/hour	Increase rate by 20%
			2.8-4.2 mmol/L/hour	No change in insulin drip
			>4.3 mmol/L/hour	Hold insulin drip for 15 minutes and then restart at 50% of most recent rate
↑	INCREASING	If INCREASES in 1 HOUR by	0-2.7 mmol/L/hour	Increase infusion rate By 50%
			>2.8 mmol/L/hour	Bolus 0.05 unit/kg and increase infusion rate By 50%

3. When the blood glucose drops to less than 11.1 mmol/L from a previous value of >11.1 mmol/L, adjust regular insulin infusion to 0.05 unit/kg/hr and, if not done earlier, change IV fluids to a dextrose containing solution per physicians' orders. The goal is now to close the anion gap and maintain blood glucose between 8.3 and 11.1 mmol/L. If either current or previous blood glucose remains less than 11.1 mmol/L, follow the adjustment rules below:
 - 3.1 If blood glucose decreases in 1 hour by ≥ 1.6 mmol/L (≥ 30 mg/dL) since previous level, decrease insulin infusion rate by 50%.
 - 3.2 If blood glucose increases in 1 hour by ≥ 1.6 mmol/L (≥ 30 mg/dL) since previous level, increase insulin infusion rate by 25%.
4. Stop insulin infusion if blood glucose < 3.8 mmol/L (70 mg/dl), notify physician, and initiate hypoglycemia protocol. Restart insulin infusion at half of the last rate when blood glucose is > 5.6 mmol/L (> 100 mg/dL).
5. Subcutaneous insulin should be started when blood glucose is < 11.1 mmol/L (200 mg/dL), anion gap normalized, and oral intake tolerated. Contact physician for orders.
6. Stop intravenous insulin 60 minutes after injection of a short-acting insulin (like aspart or regular) or 90 minutes after injection of a long-acting insulin (like glargine).
7. After stopping the insulin infusion, monitor blood glucose 1 hour after stopping and then at frequency ordered by the physician.

Definitions

1. None

External References

1. Abbas E. Kitabchi et al. Diabetes Care 2009; 32:1335-1343.
2. www.UptoDate.com
3. L. Loriaux. Endocrine Emergencies: Recognition and Treatment, Contemporary Endocrinology. Chapter 2, pages 15-32.

Institute / Department / Committee Involved in Protocol Development / Revision

1. Quality and Patient Safety Institute
2. Department of Pharmacy
3. Medical Subspecialties Institute, Endocrinology, Diabetes, and Metabolism
4. Respiratory and Critical Care Institute

Insulin Diabetic Ketoacidosis Protocol

CCAD Related or Supporting Documents

1. None

Abbreviation:

1. None