

### OBJECTIVE

Alberta clinicians optimize laboratory tests for investigation of suspected hypoglycemia

### TARGET POPULATION

Patients exhibiting clinical features of hypoglycemia

### EXCLUSIONS

None

## RECOMMENDATIONS

- ✓ Test serum glucose and look for clinical features. Hypoglycemia is defined as a serum glucose < 2.5 mmol/L with concurrent clinical features (see [Table 1](#))

Clinical Features of Hypoglycemia
<ul style="list-style-type: none"> <li>• Adrenergic excess:               <ul style="list-style-type: none"> <li>○ Sweating</li> <li>○ Palpitations</li> <li>○ Anxiety</li> <li>○ Tremor</li> </ul> </li> <li>• Neuroglycopenic (e.g., altered consciousness and seizures, behavioral changes)</li> </ul>

*Table 1 Clinical Features of Hypoglycemia*

- ✓ Provide oral glucose – this should rapidly reverse symptoms – see [Table 2](#) on page 2
- ✓ Measure simultaneous fasting serum insulin and glucose, i.e., occurring > five hours after a meal
- ✓ Refer patients with fasting hypoglycemia to endocrinologists
- X Do not use capillary reagent strip testing to diagnose hypoglycemia
- ✓ Consider gastrointestinal (GI) motility problems with post prandial hypoglycemia (< five hours after a meal)
  - Post-prandial hypoglycemia is usually not associated with any serious disorders but may be associated with GI motility problems
- ✓ If hypoglycemia is confirmed, specialist referral is indicated for further testing

## BACKGROUND

Hypoglycemia is a clinical syndrome and should only be considered in the presence of clinical features. Typical symptoms occur simultaneous to a serum glucose level equal to or less than 2.5 mmol/L. Symptoms are relieved by providing treatment. Evidence suggests that 15 g of glucose (monosaccharide) is required to produce an increase in blood glucose of approximately 2.1 mmol/L, within 20 minutes and should provide adequate symptom relief for most people (see [Table 2](#)).<sup>1-5</sup>

Capillary glucose measurement strips cannot provide a definitive diagnosis of hypoglycemia because of the inaccurate technology for reading blood glucose in the hypoglycemic range.

Fasting hypoglycemia has greater pathogenic significance. If the patient appears well in other respects, consideration should be given to drug-induced hypoglycemia (including sulphonylureas and ethanol) or an insulinoma. Patients with other medical disorders may also experience hypoglycemia and investigation of adrenal or pituitary insufficiency, liver failure or renal impairment may be indicated.<sup>6-8</sup>

Examples of 15 g carbohydrate for treatment of mild to moderate hypoglycemia
<ul style="list-style-type: none"> <li>• 15 g glucose in the form of glucose tablets</li> <li>• 15 mL (three teaspoons) or three packets of table sugar dissolved in water</li> <li>• 175 mL (3/4 cup) of juice or regular soft drink</li> <li>• Six LifeSavers® (1 = 2.5 g carbohydrate)</li> <li>• 15 mL (one tablespoon) of honey</li> </ul>

Table 2 Examples of 15 g carbohydrate

## REFERENCES

1. Slama G, Traynard PY, Desplanque N et al. The search for an optimized treatment of hypoglycemia. Carbohydrates in tablets, solution, or gel for the correction of insulin reactions. *Arch Intern Med.* 1990;150:589-93.
2. Wiethop BV, Cryer PE. Alanine and terbutaline in treatment of hypoglycemia in IDDM. *Diabetes Care.* 1993;16:1131-36.
3. Brodows RG, Williams C, Amatruda JM. Treatment of insulin reactions in diabetics. *JAMA.* 1984;252(24):3378-81
4. Special problems. In: Skyler JS, ed. *Medical management of type 1 diabetes.* 3rd ed. 1998 American Diabetes Association. Alexandria, VA. 134-43.
5. Canadian Diabetes Association. The role of dietary sugars in diabetes mellitus. *Beta Release.* 1991;15:117-23.
6. Service FJ. Clinical review 42: Hypoglycemias. *J Clin Endocrinol Metab.* 1993 Feb;76(2):269-72.
7. Service FJ. Hypoglycemic disorders. *N Eng J Med.* 1995;332:1144-52.
8. Marks V, Teale JT. Investigation of hypoglycemia. *Clin Endocrinol (Oxf).* 1996;44:133-6.

***SUGGESTED CITATION***

Toward Optimized Practice (TOP) Endocrine Working Group. 2008 January. Laboratory endocrine testing: hypoglycemia clinical practice guideline. Edmonton, AB: Toward Optimized Practice. Available from: <http://www.topalbertadoctors.org>

For more information see [www.topalbertadoctors.org](http://www.topalbertadoctors.org)

***GUIDELINE COMMITTEE***

The committee consisted of representatives of family medicine, general medicine, medical biochemistry, pathology, internal medicine, endocrinology, laboratory technologists and the public.

April 1998

Reviewed January 2008

Reviewed May 2014