72 hour Fast for Insulinoma Investigations

Prolonged fasting is a sensitive procedure for detection of endogenous hyperinsulinism (sensitivity >90 %) and is routinely employed as the initial test to detect inappropriately elevated insulin secretion as the cause for recurrent hypoglycaemia.

Indications

Used to demonstrate fasting hypoglycaemia and diagnosis of insulinoma if not observed spontaneously or after an overnight fast.

Requirements

- Yellow top fluoride EDTA sample tubes for glucose
- Brown top serum sample tubes for insulin and C-peptide
- Iced slurry for transportation of samples.
- Indwelling cannula
- Perform test under close supervision
- 10% dextrose (250ml) or glucagon 1mg available for immediate administration for hypoglycaemia.
- Orange juice or Gluco juice available for treatment of hypoglycaemia

Procedure

PATIENT PREPARATION

- The onset of the fast is classed as the last intake of calories.
- Calorie free, caffeine free beverages only may be consumed.
- Prescribed medication can be continued**.**
- **Smoking is not permitted during the test.**
- The patient should remain physically active during waking hours, but not leave the ward.

TEST

- Cannulate patient and commence prolonged fast.
- Bedside capillary blood glucose monitoring must be performed every 4 hours or when clinical symptoms are reported and signs of hypoglycaemia are observed (sweating, palpitations, anxiety, faintness) to assess the degree of hypoglycaemia.
- Each time blood glucose is checked a blood ketone level should be measured and recorded in the patient notes.
- If the **bedside capillary blood glucose result is found to be <3mmol/L or there are symptoms of hypoglycaemia** then samples must be taken immediately to send to the laboratory for plasma glucose sample (yellow top fluoride EDTA tube) accompanied by insulin and c-peptide samples (2 x brown top serum tubes on ice). **Send to the laboratory immediately after collection as urgent samples.**
- If the laboratory glucose level is found to be <2.2 mmol/L or the patient shows severe symptoms/ signs of hypoglycaemia then carbohydrate should be given or 250ml 10% dextrose IV or 1mg Glucagon IM/IV/SC, see Trust policy on treatment of hypoglycaemia in adults, and the fast should be stopped.

NB Insulin and c-peptide samples will only be analysed when laboratory glucose <2.5mmol/L.

Tests set up in EPIC

Sample 1 (Admission)	Sample type	Samples 2 – 18 *
Glucose	Yellow top fluoride EDTA tube	Glucose
Insulin	Brown top serum tube	Insulin
C-peptide	Brown top serum tube	C-peptide
FFA	Brown top serum tube Send to laboratory on ice, must be received within 20 mins of collection	FFA
B-OHB	Brown top serum tube	B-OHB
Cortisol	Brown top serum tube	
Sulfonylurea screen	Brown top serum tube	
Exogenous Insulin	Brown top serum tube	

***Note** should the patient become hypoglycaemic (glucose <2.5 mmol/L) then additional samples for sulfonylurea screen and exogenous insulin at that time point should be taken and requested in EPIC.

Interpretation of results

ORC In normal individuals plasma glucose should not fall below 2.2mmol/L, with serum insulin and c-peptide levels appropriate for glucose level.
The diagnosis of insulinoma rests on the demonstration of hypoglycaemia by laboratory plasma glucose ≤2.2mmol/L

Glucose ≤2.2 mmol/L:

Insulin <3 pmol/L	No evidence of inappropriate insulin secretion
Insulin 3-12 pmol/L	Inappropriate insulin secretion NOT excluded. Interpret results alongside other biochemical and clinical parameters.
Insulin >12 pmol/L	Results suggestive of insulin secretion

Sensitivity and specificity

By 24 hrs, 66% insulinomas develop hypoglycaemia and by 48 hrs, >95% insulinomas can be diagnosed.
After 72 hrs fast plus exercise, if no hypoglycaemia, insulinoma is very unlikely.