

## 16 Hour Controlled Fast

Test Name: 16 hour controlled fast DFT

**Please discuss with Metabolic/Endocrine Team before carrying out this test. This fast is designed primarily for the use of the Metabolic and Endocrine teams at RMCH. All patients, prior to any fasting studies, should have been assessed and fat oxidation disorders, such as MCAD deficiency, excluded by appropriate investigations.**

### Management of hypoglycaemia

If at any time during the fast the child becomes hypoglycaemic with bedside finger prick glucometer reading  $\leq 2.6$  mmol/L (but remember blood glucose [BG] levels are inaccurate at low levels) or if symptomatic, do the following without delay:

- **take blood samples as listed as for the end of the fast (16 hours)** and
- stop the fast immediately after the blood has been taken.
  - If symptomatic, give glucose (3 mL/kg of i.v. 10% glucose) - **INFORM DOCTOR**
  - Give feed if able to tolerate, if not intravenous maintenance fluids, 10% glucose + sodium chloride (e.g. 10% glucose/0.45% sodium chloride)
  - Recheck finger prick BG every 15 min until glucose  $>4.0$ mmol/L
  - If BG remains low consider further bolus and increase glucose concentration/ fluid rate (INFORM DOCTOR)
  - **CONTACT METABOLIC/ENDOCRINE CONSULTANT ON CALL IF ANY CONCERNS**

### Protocol

Duration:

AGE	<6 mo	6-8 mo	8-12 mo	1-2 yr	2-7 yr	>7 yr
DURATION	8 hr	12 hr	<b>16 hr</b>	18 hr	20 hr	24 hr

- Note: These times are for guidance only; hypoglycaemia may develop earlier, particularly if there is an underlying disorder. Please confirm the length of fast with either the metabolic/endocrine team. Careful monitoring of blood glucose is essential throughout the fast. Please record the patient's clinical condition during the fast in his/her notes. This protocol is for a **16 hour fast** (other protocols are available for fasts of different lengths).
- The child should be admitted at around **12 noon** on a weekday (not Friday). The child should be clerked in by a member of the endocrine/metabolic team and all blood and urine forms should be printed off at the start of the fast.
- The fast should normally start at **6 pm** (after dinner) and aim to end at **10 am** on the following day. This minimises the risk of hypoglycaemia during the night and allows the collection of the majority of samples when the endocrine/metabolic team is present and when the laboratories are open. Adequate handover should be given to the on call team for the risk of hypoglycaemia and if inadvertently the fast ends after 5 pm. The timing of the fast may need to be reviewed if children are usually unable to go through the night without additional food.
- The patient should stay for 4-6 hours after fast is completed to ensure they remain well and there are no hypoglycaemic episodes. If necessary, an additional overnight stay may be needed to ensure clinical stability.
- Finger prick blood glucose should be monitored by a ward bedside monitor hourly throughout the duration of the fast. If  $BG < 3.0$  mmol/L, check again in 15 minutes. If  $BG < 2.6$ mmol/L or if the child is symptomatic of hypoglycaemia (feels hot, sweaty, flushed, tachycardia, decreasing consciousness), a venous sample for glucose and other hypoglycaemic screen bloods should be taken immediately and hypoglycaemia treated as above. At the same time ketones should be measured on the ward blood glucose meter.

**Samples**

Arrange bottles prior to test. Check the nearest source of ice and ensure availability at the time of hypoglycaemia. Insert the largest possible venous cannula at the start of the fast. Collect blood samples as shown below. All bottles must have the date and time of sample collection recorded.

The samples are listed in order of priority, the most important being Glucose/Lactate, Insulin/C-peptide and FFAs.

Blood Samples		Time (hr)							
		0	4	8	10	12	14	16+	1 hr post fast
	Bedside Blood Glucose/ketones	1 hourly monitoring from time of stopping feeds, when/if hypoglycaemia occurs and at end of fast							
1.2 mL fluoride oxalate (yellow)	Glucose/Lactate	✓	✓	✓	✓	✓	✓	✓	✓
1.2 mL heparinised (orange), to biochemistry lab immediately	Insulin/ C-peptide							✓	
1.2 mL heparinised (orange), to biochemistry lab immediately on ice	3 OH butyrate/FFA	✓				✓		✓	
Blood spot cards (or 1.2 mL heparinised sample) to Willink Lab	Acylcarnitines,	✓						✓	
1.2 mL EDTA (pink) (to biochemistry lab immediately, on ice)	Ammonia							✓	✓
Capillary tube	Venous Gas							✓	
1.2 mL clotted (white top) to biochemistry lab	Growth hormone/ Cortisol							✓	

+at end of fast or at time of hypoglycaemia

**Urine samples:**

5-10 ml in a sterile container	Organic acids & amino acids	Collect aliquots of all urine passed from beginning of fast till 4 hours after end of fast
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**Glucagon Test**

***Only To Be Performed If Requested By The Endocrine Team.***

- Once fast is completed and there is no evidence of hypoglycaemia: administer 0.03 mg/kg (maximum 1 mg) of Glucagon i.m.
- Blood glucose should be measured at 0, 5, 15, 30, 45, 60 and 90 minutes; Blood lactate should be measured at 0, 30, 60 and 90 minutes

**Interpretation of glucagon test**

Normal children will exhibit a rise in BG of 2 mmol/L. There is an exaggerated response in children with hyperinsulinism.

**References**

Diagnostics of endocrine function in children and adolescents. Third Edition, Ranke, M.B.; page 308

