

**Please read this bit first**

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

## **December 2006**

### **Hyperglycaemia**

#### **Case Study:**

A 56-year-old man with no previous episodes of cardiac disease was admitted to the coronary care unit with severe chest pain. An EDG indicated the presence of a myocardial infarct and his laboratory results on admission and one day later revealed the following:

<b>Plasma</b>	<b>Day 1 (0700 h)</b>	<b>Day 2 (0700 h)</b>	<b>Ref. range</b>
Na	139 mmol/L	136 mmol/L	(132-144)
K	3.8 mmol/L	3.7 mmol/L	(3.2-4.8)
Cl	100 mmol/L	98 mmol/L	(98-108)
Creat	70 µmol/L	80 µmol/L	(0.06-0.12)
Glu	-	11.9 mmol/L	(3.5-5.5)
CK	205 U/L	968 U/L	(<140)
LD	329 U/L	1008 U/L	(<250)

#### **Differential diagnosis**

*Myocardial infarction with hyperglycaemia of stress*

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## **Evaluation of hyperglycaemia**

Hyperglycaemia is a common finding, particularly in the postprandial period. The main clinical concern is fasting hyperglycaemia and the possibility of diabetes mellitus.

Diabetes mellitus is defined as a 'state of chronic hyperglycaemia' (WHO Expert Committee on Diabetes, 1979). It may be primary (requiring lifelong therapy) or secondary to treatable causes (e.g. pheochromocytoma, Cushing's disease).

There are also a number of 'temporary' causes of hyperglycaemia (Table 11.1) which may not only be confusing but also have sinister connotations; e.g. about 60% of the 'stress' hyperglycaemias (5% of all admissions for myocardial infarction) associated with myocardial infarction have subsequently been shown to be due to primary diabetes mellitus (Husband D. J. et al, 1983). Thus, in cases of 'stress' and drug-induced hyperglycaemia it is wise to re-investigate the patient after the stress has resolved or the drug ceased.

Besides the oral glucose tolerance test (OGTT) there are a number of other laboratory investigations which may be useful in the assessment of hyperglycaemia: urine: glucose, ketones; plasma: insulin, C-peptide, lactate, ketones, glycosylated haemoglobins.

In addition, depending on the clinical circumstances, tests of endocrine function may be indicated.

### **Table 11.1 Causes of hyperglycaemia**

*Carbohydrate intake:* oral/intravenous

#### **Fasting**

*Diabetes mellitus:* insulin-dependent diabetes (IDDM)  
Non-insulin-dependent diabetes (NIDDM)

*Pancreatic disorders:* pancreatectomy, haemochromatosis, chronic pancreatitis,  
carcinoma of pancreas

Endocrine causes: Cushing's syndrome, pheochromocytoma, acromegaly, thyrotoxicosis

*Stress reaction (temporary hyperglycaemia):* trauma/shock/infection,  
cerebrovascular accident, myocardial infarction,  
burns

*Drugs (emporary hyperglycaemia):* salicylates, steroids, thiazides, oral contraceptives/oestrogens

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### **Case discussion:**

This patient was not obese, was not on any drug therapy, and had no family history of diabetes mellitus, nor did he have any past history suggestive of diabetes.

An oral glucose tolerance test (75 g dose) performed one month later showed the following:

Time (min)	0	30	90	120
Plasma glucose (mmol/L)	6.2	10.7	12.7	14.0

### **Final diagnosis:**

*Diabetes mellitus (mature onset)*

As pointed out in the article by Husband D. J. et al, 1983, hyperglycaemia commonly occurs during the stress of myocardial infarction and a large proportion of these patients (around 60%) will have diabetes mellitus.

### **CPD QUESTIONS**

1. What further tests could have been done on Day 1 and Day 2 to investigate the patient's condition?
2. Consider the system of performing OGTTs in your laboratory with regards to the carbohydrate dose and timing of sample collection. What criteria does your laboratory use to diagnose diabetes from OGTTs?

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