

THIS CPD/CEU EXERCISE IS PRESENTED UNDER THE THISTLE QA SERVICE PROVIDER NO : MT00025. IT IS DESIGNED TO TAKE PLACE WITHIN YOUR OWN LABORATORY AS A SMALL GROUP ACTIVITY LASTING APPROXIMATELY ONE HOUR. PLEASE ENSURE THAT YOU KEEP A REGISTER OF THOSE TAKING PART IN THIS EXERCISE AND SUBMIT YOUR APPLICATION FOR 1 CEU POINT ON THE APPROPRIATE HPCSA FORM, ALONG WITH THE RELEVANT THISTLE QA PARTICIPATION CERTIFICATE SENT TO YOUR LAB WITH YOUR EQA KIT AND INSTRUCTIONS.

January 2006

HIGH ANION GAP METABOLIC ACIDOSIS
(HAGMA)

Case Study.

A 34 year-old woman, who was 32-weeks pregnant, was admitted to hospital because of severe vomiting over the previous two days. The patient had a long history of alcohol abuse and admitted to a heavy alcohol intake prior to the onset of vomiting, but did not take any after the vomiting started.

Her admission biochemistry values were :

<u>Plasma</u>				<u>Blood</u>			
Na	132	mmol/L	(132-144)	pH	7.17		(7.35-7.45)
K	4.8	mmol/L	(3.2-4.8)	Pco ₂	14	mm Hg	(35-45)
Cl	102	mmol/L	(98-108)	Pco ₂	14	mm Hg	(35-45)
HCO ₃	7	mmol/L	(23-33)	PO ₂	114	mm Hg	(80-110)
Creat	130	mmol/L	(60-120)	HCO ₃	5	mmol/L	(23-33)
Urea	4.9	mmol/L	(3.0-8.0)	<u>Urine</u>			
AGap	28	mEq/L	(7-17)	Glucose	- ve		(-ve)
				Ketones	+ ve		(-ve)

Comment : The HAGMA in this patient suggested diabetic ketoacidosis; however, her blood glucose level was 6.8 mmol/L, and a qualitative test for plasma ketones revealed only a slight trace. Quantitative estimations of her plasma lactate and ketone bodies were ordered and revealed :

Beta-hydroxybutyrate	11.6	mmol/L	(<0.3)
Acetoacetate	1.7	mmol/L	(<0.2)

Lactate 3.0 mmol/L (<2.0)

The patient did not admit to any medication and there was no past or family history of diabetes mellitus.

Her treatment after admission was IV saline and glucose. Twenty-four hours later her plasma biochemistry values had normalized.

The diagnosis arrived at was alcoholic ketosis. This was based on the following factors and events :

- Patient not hyperglycaemic and had no past or family history of diabetes mellitus
- Starvation ketosis unlikely as severe ketosis in this disorder takes one to two weeks to develop (Cahill G.F. 1970)
- History of alcoholism and a recent large intake of ethanol
- No alcohol nor food intake after vomiting started
- The beta-hydroxybutyrate : acetoacetate ratio of 6.8
- The ketosis responded to dehydration and IV dextrose infusion

These six factors have been described in a number of similar cases reported in the literature (Fulop M. and Hoberman H.DI., 1975) Cooperman M.T. et al, 1974). Of particular interest is the beta-hydroxybutyrate : acetoacetate ratio. In diabetic ketoacidosis this ratio varies from 3:1 to 5:1, in alcoholic ketosis the ratio is 2:1 to 9:1; i.e., ratios greater than 5:1 suggest alcoholic ketoacidosis.

Service Provider Number : MT - 00025

CPD QUESTIONS.

1. Consider the admission biochemistry values. Could any further tests have usefully been performed to confirm alcohol abuse ?
2. Therapy will be aimed at increasing the bicarbonate concentration. Why and what are the possible complications associated with the therapy ?