

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.

April 2007

Blood Gases

The blood gas values shown below were those of a 45-year-old man who had a long history of alcoholic liver disease. On admission he was jaundiced, had a 'flapping' tremor of the upper extremities, and appeared short of breath.

Blood

pH	7.40	(7.35 – 7.45)
H ⁺	40 nmol/L	(35 – 45)
P _{CO₂}	22 mm Hg	(35 – 45)
P _{O₂}	83 mm Hg	(80 – 110)
HCO ₃	13 mmol/L	(23 – 33)

Comment:

The blood gas values (normal pH, low P_{CO₂}, low {HCO₃}) suggest that the primary problem could be (a) a compensated respiratory alkalosis, (b) a mixed respiratory alkalosis and metabolic acidosis, or (c) a compensated metabolic acidosis. However, the latter is unlikely because:

- simple metabolic acidosis does not fully compensate
- if this patient had a simple metabolic acidosis then his P_{CO₂} should be approximately 27 mm Hg

Therefore, the patient could have either a mixed disorder or a chronic respiratory alkalosis. Other laboratory investigations on this patient revealed:

Plasma			
AGap	14	mEq/L	(7 – 17)
Bili	730	μmol/L	(<20)
ALP	308	U/L	(30 – 120)
ALT	72	U/L	(<35)
Alb	25	g/L	(30 – 50)
Ammonia	135	μmol/L	(<50)

A mixed respiratory alkalosis and metabolic acidosis can not be ruled out from the available data; however, his clinical condition, liver failure, is a well documented cause of chronic respiratory alkalosis and this is the most likely diagnosis in this patient (Vanamee P. et al, 1956). Other causes of respiratory alkalosis are listed in Table 4.6.

Table 4.6. Causes of respiratory alkalosis

Increased respiratory exchange due to:

CNS disturbances

Psychogenic: anxiety/hysteria

Physiological: pregnancy

Pathological: hypoxaemia, infections/trauma/tumour of brain, hepatic encephalopathy, salicylate overdose

Pulmonary disturbances

Embolus

Oedema e.g. congestive cardiac failure

Asthma

Pneumonia

Mechanical ventilation

CPD Questions:

1. What is meant by the word 'compensated' in 'compensated respiratory alkalosis' and how does this take place?
2. What further tests would be useful in investigating the liver failures?