**VAQ 2011.1.8 (ABG)**

An 84 year old man is brought to your emergency department following a high speed car accident.
He has signs of multiple left rib fractures.
Two hours after arriving in the emergency department he becomes more breathless and distressed.
Arterial blood gases are performed
His observations are:

| | | |
|---|---|---|
| GCS | 14 | |
| HR | 75 | /min |
| BP | 100/60 | mmHg |
| RR | 24 | /min |

| | | | Reference Range |
|---|---|---|---|
| pH | 7.14 | | (7.35-7.45) |
| $pCO_2$ | 60 | mmHg | (35-45) |
| $pO_2$ | 114 | | |
| $HCO_3^-$ | 17 | mmol/L | (21-28) |
| Lactate | 1.4 | mmol/L | (< 2.0) |
| $FiO_2$ | 50 | % | |
| $Na^+$ | 139 | mmol/L | (135-145) |
| $K^+$ | 4.8 | mmol/L | (3.2-4.3) |
| $Cl^-$ | 116 | mmol/L | (99-109) |
| Glucose | 11.3 | mmol/L | (3.0-6.0) |

Describe and interpret his results (100%)

He has impending respiratory arrest most likely due to chest trauma with mixed respiratory and non AG metabolic acidosis. He requires immediate treatment, most likely with ventilatory support.

mild hyperkalaemia and hyperglycaemia noted
A – acidosis
R – pCO2 high, resp acidosis
M – bicarb low, coexisting metabolic acidosis
A – anion gap 139-116-17 = 6 = Non AG acidosis, supported by hyperchloraemia
D – n/a
A – expected bic = acutely Bic rises 1 for each 10 rise in pCO2 = 24->26 but markedly lower (17) measured supporting diagnosis of additional metabolic acidosis
Uncompensated respiratory acidosis
Metabolic acidosis – non AG

**NAGMA**
bicarb loss (not supported by history)
saline resuscitation (likely from clinical context)
A-a gap: FiO2 0.5
expected pO2 = 713 *0.5 – (60*1.25) = 356-75 = approx 280, measured 114
huge A-a gradient

Overall likely resuscitatory saline acidosis with hypercapoeic/hypoxic respiratory failure due to chest trauma
flail segment
pulmonary contusion
tension pneumothorax (relative hypotension noted)
haemothorax
overanalgesia with narcotics and sedation