BLOOD GAS INTERPRETATION

Aims:

To foster understanding of gas diffusion amongst students and junior nurses including strategies on how to optimise ventilatory settings. Secondarily to introduce some concepts related to acid-base.

For senior nurses this talk may supplement some ventilator knowledge and increase understanding of acid-base physiology.

Structure

Find a blood gas. Talk through each parameter and what they mean. Take this opportunity to slot in some evidence (ARDSnet and lung protection, OXYGEN-ICU and IOTA and hyperoxia). Talk about ways to manipulate gases. Then it's time to talk acid-base.

Content:

Blood gas is one of our most frequently used diagnostic modalities.

Mention its advantages as some disadvantages (costs blood and money, haemoglobin and electrolyte results may lack accuracy, overly frequent sampling will risk interpreting normal fluctuation as a trend and risk overintervention).

Talk about oxygen

- Alveolar gas equation
- A-a gradient
- Ways of fostering improved oxygenation
    o Treat underlying illness
    o V/Q matching, West's zones
    o Higher FiO_2
    o Higher mean airway pressure

Talk about CO_2

- Metabolic origin, physiological effects
- Talk about ways to minimise CO_2 production, and improve removal
- Frequency and tidal volume contributing to MV

Now indoctrinate the nurses with the caveat of safe ventilation

- 6-8mL/kg IBW (6mL/kg in ARDSnet intervention arm)

- Increased mortality with hyperoxia (IOTA and OXYGEN-ICU)

- Dynamic hyperinflation

Now it's acid-base time

Explain the effects on acid-base disturbance on physiology, and more importantly the diagnostic importance of interpretation of acid-base disorders

For this session it would be best just to furnish the audience with the jargon

- Acidaemia/alkalaemia

- Acidosis/alkalosis

- Primary respiratory disturbance

  o Common causes

- Metabolic disturbance

  o Anion gap

    ▪ HAGMA causes

    ▪ NAGMA causes

- Rough guides on expected compensation

Finish the session by going through a couple of interesting examples from the unit!