Arterial blood gases interpretation

Assessment of competences for ANP

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Please note: Practitioners can add DOPS, PBAs and CEXs as evidence.**

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|  | | **NOT competent** | **Competent** | **Signature and date** |
| ABG interpretation | | | | |
| 1 | Data   * Descriptive data * Name, date, time * Inspired oxygen * Ventilation * pH * pO2 * pCO2 * Bicarbonate * Base excess * Lactate |  |  |  |
| 2 | Clinical presentation   * pH – acidosis (low)/alkalosis (high) * pO2 – hypoxia? * Gas exchange depending on inspired oxygen * pCO2 – high = respiratory acidosis, low = respiratory alkalosis * HCO3 and BXS – low = metabolic acidosis, high = metabolic alkalosis * Lactate? Perfusion problem |  |  |  |
| 3 | Normal values   * pH (7.35–7.45) * pO2 (12–13 kPa) * pCO2 (5.3–6.5 kPa) * HCO3 (20–24 mmol/l) * BXS (± 2) * Lactate (<1) |  |  |  |
| 4 | Analysis   * Acidosis – respiratory (high CO2)/metabolic (low bicarbonate and BXS) * Alkalosis – respiratory (low CO2)/metabolic (high bicarbonate and BXS) * Compensation? – Mixed respiratory and metabolic |  |  |  |
| 5 | Pathophysiology (pH, pCO2 and HCO3 relationships)   * CO2+H2O = H2CO3 = H+ + HCO3-   Lungs Kidneys   * Basis of compensation: * Lungs blow out CO2 * Kidneys retain bicarbonate and excrete hydrogen ions * pH = -log10 [H+] |  |  |  |
| 6 | pO2   * If this is low, treat this first * Give more oxygen * eg increase FiO2 to 100% * Assist ventilation if required * Review ventilator parameters * Consider increasing PEEP/CPAP |  |  |  |
| 7 | Case 1   * pH 7.30 low * pCO2 6.6 kPa, high * pO2 12 kPa, ok * HCO3 19 mmol/l, low * BXS -3, low * Lactate 1, ok * Mixed respiratory and metabolic acidosis * Typical picture seen on wards (e.g. chest infection with slight dehydration) needing diagnosis, fluids, antibiotics, oxygen etc |  |  |  |
| 8 | Case 2   * pH 7.20, low * pCO2 9.0 kPa, high * pO2 14 kPa, ok * HCO3 22 mmol/l, ok * BXS -2, ok * Lactate 1, ok * Uncompensated respiratory acidosis: drugs (opioids), stroke, incorrect ventilator settings |  |  |  |
| 9 | Case 3   * pH 7.36, normal * pCO2 3.0 kPa, low * pO2 9 kPa, low * HCO3 16 mmol/l, low * BXS - 9, low * Lactate 2, raised * Compensated metabolic acidosis (poor perfusion, e.g. guts, renal failure) |  |  |  |
| 10 | Case 4   * pH 7.25, low * pCO2 5.0 kPa, ok * pO2 14 kPa, ok * HCO3 16 mmol/l, low * BXS - 8, low * Lactate 2, raised * Uncompensated metabolic acidosis. NB: If this is a follow-up gas of patient 3, you need to be concerned because he is now developing respiratory failure because he is failing to compensate. |  |  |  |
| 11 | Case 5   * pH 7.21, low * pCO2 4.0 kPa, low * pO2 14 kPa, low * HCO3 17 mmol/l, low * BXS - 7, low * Lactate 8, low * Uncompensated metabolic acidosis (lactic acidosis); look for abdominal signs and symptoms |  |  |  |
| 12 | Case 6   * pH 7.56, high * pCO2 5.0 kPa, ok * pO2 12 kPa, ok * HCO3 34 mmol/l, high * BXS 7, high * Lactate 1, ok * Uncompensated metabolic alkalosis (diuretics) * Rarely, this could be a picture of a COPD patient who is being ‘overventilated’. The pCO2 for such a patient should normally be a lot higher. |  |  |  |
| 13 | Case 7   * pH 7.50, high * pCO2 3.0 kPa, low * pO2 12 kPa, ok * HCO3 24 mmol/l, ok * BXS 0, ok * Lactate 1, ok * Uncompensated respiratory alkalosis. Ventilator settings too high. Occasionally, pain stimulating hyperventilation when doing arterial stab. |  |  |  |
| **Assessor’s comments** – Describes the indication for ABG, physiology and analysis. Works through example cases and discusses management.  Practitioner should comment on communication with the multidisciplinary team and the documentation according to the practitioner’s professional body and code of conduct: | | | | |
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| **This practitioner has completed these outcomes to the appropriate standard.**  **Assessor’s name:**  **Signature and date:** | | **Practitioner’s signature:**  **Date:** | | |