Please note – this learning resource has been produced by the GUMS Academic Team. It is possible that there are some minor errors in the questions/answers, and other possible answers that are not included below. Make sure to check with other resources.

1. **Which of the following is the PRIMARY stimulator of respiratory drive in a healthy adult?**
2. O2
3. CO2
4. H+
5. Noradrenaline
6. **In which of the following scenarios would you expect a patient’s SpO2 to be below normal?**
7. In a healthy adult after strenuous exercise for 30 minutes
8. In a patient with anaemia
9. In a patient with a pulmonary embolism (PE)
10. In a patient with carbon monoxide (CO) poisoning
11. **Which of the following statements is INCORRECT?**
12. 2,3 DPG aids in offloading oxygen from red blood cells, causing a left shift in the Hb dissociation curve
13. Increased temperature destabilises the heme group within Hb, causing a right shift in the Hb dissociation curve
14. Carbon monoxide poisoning results in a left shift in the Hb dissociation curve
15. Exercise induces a right shift in the Hb dissociation curve
16. **List some of the most important diagnoses that you must rule out in a person presenting with acute shortness of breath (SOB) AND chest pain? (i.e. what diagnoses are potentially deadly)**
17. **Differentiate between metabolic and respiratory acidosis and alkalosis, giving some examples of what can cause each.**
18. **You are a 1st year medical student lost in the depths of the hospital ED, you see your friendly neighbourhood intern talking to a patient. All clammy hands and weak knees forgotten you go and talk to the intern, who gives you the following details (they are really quite bored).**

 **The patient (Dia Betus) presented to the ED 30 minutes ago looking to be confused and disoriented with a distinct ‘fruity’ smell to her breath. The patient’s vitals are as follows.**

|  |  |
| --- | --- |
| **Body Weight** | **53kg** |
| **Height** | **160cm** |
| **Temperature** | **36.5℃ (normal 36.1 – 37.9℃)** |
| **Heart Rate** | **112 (normal 60-100)** |
| **SpO2** | **97% on room air** |
| **Respiratory Rate** | **28 breaths/min (normal 12-20)** |
| **Chest Sounds** | **Chest is clear bilaterally, vesicular breath sounds, no added sounds** |
| **Blood Pressure** | **160/98 mmHg (normal 100/60-140/90)** |

**a) What are the differential diagnoses at this point?**

**b) Dia Betes presented with fruity breath, what are some other key symptoms she might also present with for DKA?**

**c) What are the principles of DKA management?**

**d) What are some other causes of shortness of breath in a patient with clear lung sounds?**

Following your initial examination, you decide to take an arterial blood gas (ABG). The results are as follows.

|  |  |  |
| --- | --- | --- |
|  | **Result** | **Ref. Range (Arterial Blood)\*** |
| **PO2** | **112 mm Hg** | **80-100 mm Hg** |
| **PCO2** | **22 mm Hg** | **35-45 mm Hg** |
| **Bicarbonate HCO3-** | **12 mmol/L** | **22-32 mmol/L** |
| **pH** | **7.23** | **7.35-7.45** |
| **BE** | **-3.7** | **-2–+2 mmol/L** |
| **Total Haemoglobin** | **130 g/L** | **130-180 g/L (M)(115-165 g/L (F))** |

1. **Report the findings of this ABG**
2. **What is the physiological explanation for the decreased levels of CO2?**
3. **After a healthy lunch of gravy and chips, you see another patient (Steph Ococcus), an 89-year-old man with a 3-day history of shortness of breath, shivering and a productive cough of rust coloured sputum. His vitals are as follows:**

|  |  |
| --- | --- |
| **Temperature** | **39.1℃ (normal 36.1 – 37.9℃)** |
| **Heart Rate** | **118 (normal 60-100)** |
| **SpO2** | **91% on room air** |
| **Respiratory Rate** | **32 breaths/min (normal 12-20)** |
| **Chest Sounds** | **Bronchial breath sounds with right middle zone and coarse crackles.** **Right pleural friction rub evident**  |
| **Blood Pressure** | **133/72 mmHg (normal 100/60-140/90)** |

1. **List some differentials based on the above findings**
2. **List some of the common presenting signs and symptoms of pneumonia and provide their physiological basis**
3. **What are the most common typical and atypical organisms for pneumonia?**
4. **Provide a basic treatment plan for his management**

**Please provide feedback for this case at:** [**https://gums2020.typeform.com/to/e0h7US**](https://gums2020.typeform.com/to/e0h7US)