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. You go and talk to the intern, who gives you the following details about their patient, Leslie Knope. Leslie 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) What are some other key symptoms aside from fruity breath would you expect a patient with DKA to present with??**

**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 Ron Swanson, 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://forms.gle/R64a83Cf7UgRYc168**](https://forms.gle/R64a83Cf7UgRYc168)