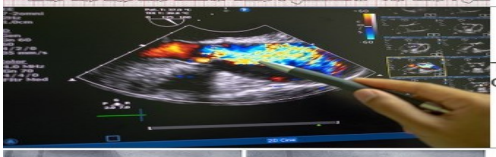
Week 7 Edapt Notes

Gas Exchange

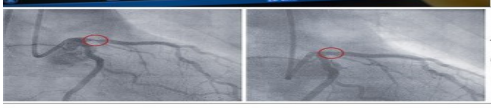
- A person who stops breathing will begin to experience permanent brain damage only 4 minutes after they stop breathing and death will occur in as soon as 8-10 minutes (MedlinePlus, n.d.).
- An oximeter measures the saturation of hemoglobin with oxygen.
- When gas exchange is impaired, both the lungs and heart can **compensate** for a limited time by altering the respiratory rate, heart rate, or both, allowing the body to return to **homeostasis** (not disequilibrium). When compensatory mechanisms fail, the result may lead to tissue and organ **damage** or death.

Type of Test: Lab Testing
Cardiac Function Tested: Myocardial infarction

Type of Test: Electrocardiogram
Cardiac Function Tested: Dysrhythmia



Type of Test: Echocardiogram
Cardiac Function Tested: Dysfunctional valves



Type of Test: Cardiac Catheterization
Cardiac Function Tested: Blood flow

Oxygen saturation 78% - oxygen
Cannot take a deep breath – ventilation device
Asthmatic wheezing – inhaled medication
Stopped breathing – ventilation device

With an abnormal lung assessment and a normal heart assessment, the best recommendation to consider would be a chest x-ray for impaired gas exchange diagnosis. The abnormal blood pressure and heart rate are compensation for the hypoxia.

The respirations are increased in response to the low serum oxygen saturation (hypoxemia) caused by pneumonia interfering with gas exchange in the alveoli.

Administering supplemental oxygen to increase the oxygen saturation is the priority action for hypoxemia.

Based on the assessment findings, the client's impaired gas exchange is most likely a result of a cardiac abnormality (hypotension, tachycardia, and systolic murmur).

The most likely pathophysiological condition causing this impaired gas exchange is a myocardial infarction. The echocardiogram showed normal valve function, the electrocardiogram did not show dysrhythmia, and none of the tests done would show a pulmonary embolus. However, blockage of the artery, elevated Troponin level, and ST elevation on the electrocardiogram all show myocardial infarction.

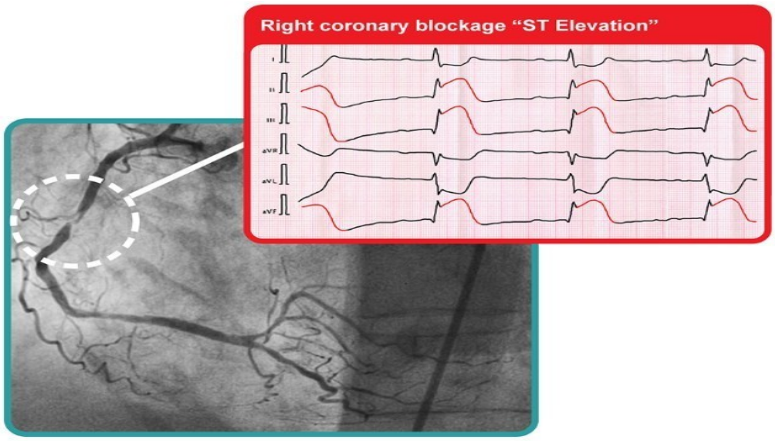


Image Transcript

Right coronary blockage "ST Elevation"

Oxygen Devices

Oxygen cylinder colors in U.S.:

- Green is the U.S. designation for oxygen in a cylinder.
- Blue is the U.S. designation for nitrous oxide.
- Yellow is the U.S. designation for medical air.
- Gray is the U.S. designation for carbon dioxide.

- A regulator is necessary to determine the flow of oxygen.
- Oxygen is a medication and requires a provider's order to administer.

Flow Rate (L/min)	FiO_2
Room air	0.21 (21%)
1 L/min	0.24 (24%)
2 L/min	0.28 (28%)
3 L/min	0.32 (32%)
4 L/min	0.36 (36%)
5 L/min	0.4 (40%)
6 L/min	0.44 (44%)

Oxygen Delivery	Flow Rate Setting	Oxygen Percentage
Room air	N/A	21%
Nasal cannula	1-4 L/min	24-40%
Simple face mask	6-12 L/min	35-50%
Venturi mask	15 L/min	24-50%
Partial non-rebreather	10-15 L/min	60-80%
Full non-rebreather	15 L/min	100%

- When using nasal cannulas, the flow of oxygen can dry the nasal mucosa. Contacting the healthcare provider to request adding humidification is the best option.

Mask Type	Flow Rate Setting	Oxygen Delivery
Simple face mask	6-12 L/min	35-50%
Venturi mask	15 L/min	24-50%
Partial non-rebreather	10-15 L/min	60-80%
Full non-rebreather	15 L/min	100%