

Assignment

by Anatomy Anat

Submission date: 26-Oct-2020 10:56AM (UTC-0400)

Submission ID: 1427023234

File name: ANAT_260_Signature_Assignment.docx (26.85K)

Word count: 1778

Character count: 10515

ANAT 260 Signature Assignments

Name

Institution of Affiliation

Course Name

Course Code

Professor

Date

ANAT 260 Signature Assignment

Instructions: Address each question below as it relates to the case study given.

A patient was brought to the Emergency Department by ambulance with two arrow wounds. One arrow is still in the patient on the left side, entering anteriorly between the 7th and 8th ribs at a 15-degree angle, the arrowhead protruding posteriorly. The second wound is located in the posterior cervical triangle.

Answer the following questions using a minimum of five (5) academic references (you may not use Wikipedia, blogs, or other informal sources.) Use APA format in-text citations in your answers and include a reference page.

Question 1

What serosal cavities have been penetrated by the first arrow?

The first arrow penetrated at 15° angles. Considering the gravity laws, the arrow most likely penetrated downwards, affecting mainly two serosal membranes in the penetration process. Serosal membranes cover internal organs or internal body cavities. These membranes do not open to the outside or have any physical connection with the outside of the body. The membranes most likely affected by the first arrow were the pleural membrane, the pericardial membrane, and the peritoneal membrane. The pleural membrane has two layers: the parietal and visceral pleura (Grouthamel & Mytilinaios, 2020).

Explain the location, the microscopic cellular components of the serous membrane, and the serous membrane's purpose.

All serous membranes are made of epithelium consist of a single layer of cells. When the serous epithelial membrane covers the internal body cavities, it is termed mesothelium. The serosal membranes are made of flat and cuboidal epithelial cells overlying the basal lamina attached to the connective tissues below (Hiriart et al., 2019). The microscopic structures consist of the collagenous basement membrane and epithelia and connective structures between the epithelial cells and the basal structures (Chen & Borges, 2017). The pleural membrane covers the thoracic cavity, including its visceral. The two layers contain the pleural fluid in between for lubrication as the lung expands and deflates. The serosal membranes perform more or less similar functions in their respective locations. These membranes form mechanical protective barriers to the internal organs against chemical and physical injuries (Kawanishi, 2016). Their primary role is seen in states of disease and inflammation (Hussain & Burns, 2020). They maintain the balance between coagulation and anticoagulation in injuries states, thereby providing adhesion to prevent inflammation's spread to internal organs.

1

Question 2

Describe the Autonomic Nervous System and explain how the patient's ANS reacts to the arrow attack and how it will affect the patient's vital signs; P, BP, R, and T.

6

The autonomic nervous system is a part of the nervous system that controls involuntary functions of the body. This system is part of the peripheral nervous system that deals with responses to derangements and regulation of heart function, respiration, sexual function, and gastroenteric functions. They control heart rates, breathing rates, sexual arousal, and blood pressure. This system functions without conscious awareness. The arrow caused physical injuries to the cells of the organs it penetrated through. Injuries to the lung tissue and mesothelium induce inflammation and stress response from the Autonomic Nervous System

(ANS). The ANS has three main subsystems: the sympathetic system, the parasympathetic nervous system, and the enteric nervous system. Under normal physiologic circumstances, the sympathetic and parasympathetic nervous systems are in balance. In injury, inflammation, and stress, the sympathetic nervous system predominates over the parasympathetic nervous system. In this case study, the sympathetic nervous system will shift the ANS towards sympathetic dominance. The sympathetic nervous system causes an elevation in heart rates, blood pressure, and respiration to facilitate adequate perfusion to injured tissues and organs (Liu et al., 2017). The sympathetic nervous system also raises the core temperature of the body. Therefore, in the case study, the temperature, blood pressure, heart rate/pulse, and respiration rate will increase.

2 Question 3

Describe the trajectory of the first arrow using directional terms and anatomical planes.

The first arrow most likely penetrated through the organs moving inferiorly due to the impact of gravity. The arrow's direction concerning the anatomy was anteroposterior along the axial plane cutting through the 7th intercostal plane. The detailed description of the longitudinal plane cannot be deduced from the provided information. The 7th rib is the last true rib. Therefore the 7th intercostal space will fall outside the sagittal plane or median plane. Therefore, the arrow most likely hit the chest wall along the parasagittal planes.

Identify and describe the organs and any other membranes that may have been affected by the first arrow.

The first organ the arrow affected was the skin of the chest wall. It pierced through the intercostal muscles and fascia under the skin, including the neurovascular bundles below the 7th

rib. The arrow also hit the lung tissue (the left lower lobe of the lung), the spleen, and the back's skin and muscles.

2

Question 4

Describe the cardiovascular system and explain how both the pulmonary and systemic circuits will be affected by both arrows. Include the effect on the Hematocrit and Hemoglobin values.

The cardiovascular system consists of the heart, the pericardium, and blood vessels. The Cardiovascular System (CVS) is responsible for all body tissues' perfusion, including the CVS itself. Regulation of its functions is majorly autonomic in control. When the blood volume is low, the ANS will increase heart rates and pressure to compensate for the inadequate perfusion (Liu et al., 2017). The pulmonary and cardiovascular systems are coordinated such that they work together to achieve appropriate perfusion to the tissues. The injury caused by the first arrow to the lungs caused hemorrhage into the lungs, resulting in inflammation response. The resulting deficiency may cause hypoxemia due to hypovolemia and compromised lung function in the left lung. The second arrow might have caused significant bleeding because the posterior neck triangle has many significant blood vessels, including part of the common carotid artery, external jugular vein, and the supply to neck muscles (Casale & Geiger, 2020). The acute result of the hemorrhage would be a fall in hematocrit. The fall in hemoglobin would occur later if the patient's hypovolemia was not corrected. An injury to the external jugular vein in this patient would be fatal because of the risk of gas embolism that would paralyze blood flow to the right atrium (Jones, 2020). The result would be systemic cyanosis.

2

Question 5

Identify the possible neuromuscular effects of the second arrow and explain your reasoning.

The posterior triangle of the neck has nerves and muscles of great significance. The muscles that might have been affected by the second arrow are the sternocleidomastoid, the trapezius, the omohyoid, and the platysma muscles. The region's significant nerves are the accessory nerves and cervical spinal roots, roots to the phrenic nerve. Nerve involvement would have caused shoulder syndrome and paralysis of the neck muscles, including trapezius and sternocleidomastoid due to accessory nerve injury. The injury to the phrenic nerve's roots would have caused breathing problems due to inadequate neuromuscular stimulation of the diaphragm.

2
Describe the components of a neuromuscular junction, including key organelles.

The neuromuscular junction is formed by the connection between the nerve fibers and the muscles, involving the muscle's motor endplate and the synaptic end bulbs. There is a space between the motor neuron end and the muscle called a synaptic cleft. Therefore, the main components are the synaptic cleft, the muscle fiber cell's membrane, and the presynaptic terminal. Important organelles in the presynaptic neuron include the mitochondria and the Golgi vesicles forming the synaptic vesicles with acetylcholine. The muscle cell forming the junction has a mitochondrion, the actin and myosin fibers, and the sarcolemma.

2
Question 6

Identify and describe the three labeled tissue types found in the tracheal slide (Slide 2) below. Include the subcategories and cellular components for each tissue type. How will the injuries affect this area?

The trachea histologically constitutes various tissue types such as cartilages, epithelial tissue, muscular tissue, and glandular tissues. The tissue marked 1 is a cartilage. The subtype is a hyaline type. The tissue consists of a homogeneous pink appearance with definite boundaries. The tracheal cartilage is responsible for providing structural support to the trachea to maintain a patent upper airway. Injuries can result from blunt force trauma or penetrating traumatic injuries. These tissues have a limited ability to regenerate after maturity (Wang & Grodzinsky, 2015). Mature cartilaginous cells degenerate following an injury through chemical and inflammatory processes.

The tissue marked 2 is an epithelial tissue. The tissue subtype is a pseudostratified columnar epithelium. Injury to this tissue causes inflammation that causes edema and luminal narrowing, and, consequently, difficulty breathing. The causes of these injuries can be inhalational, iatrogenic, penetrating trauma, or due to aspiration of gastric contents (Sinha et al., 2018). The resulting cell death paves the way for epithelial regeneration.

The tissue marked 3 is a muscular tissue. The trachea is made up of smooth muscle cells that make up the trachealis muscle. During coughing or sneezing, this muscle contracts to reduce the luminal diameter and enhance the expulsion of air and irritating particles. This muscle tissue can be injured through traumatic external forces. The cells respond through inflammation.

References

- Braun, U., & Krüger, S. (2013). Ultrasonography of the spleen, liver, gallbladder, caudal vena cava, and portal vein in healthy calves from birth to 104 days of age. *Acta Veterinaria Scandinavica*, 55(1). <https://doi.org/10.1186/1751-0147-55-68>
- Casale, J., & Geiger, Z. (2020). *Anatomy, Head and Neck, Posterior Neck Triangle*. Ncbi.nlm.nih.gov. Retrieved 26 October 2020, from <https://www.ncbi.nlm.nih.gov/books/NBK537289/>.
- Chen, J., & Borges, M. (2017). Histopathology and enhanced detection of tumor invasion of peritoneal membranes. *PLOS ONE*, 12(3), e0173833. <https://doi.org/10.1371/journal.pone.0173833>
- Grouthamel, M., & Mytilinaios, D. (2020). *Intercostal spaces*. Kenhub. Retrieved 26 October 2020, from <https://www.kenhub.com/en/library/anatomy/intercostal-spaces>.
- Hiriart, E., Deepe, R., & Wessels, A. (2019). Mesothelium and Malignant Mesothelioma. *Journal of Developmental Biology*, 7(2), 7. <https://doi.org/10.3390/jdb7020007>
- Hussain, A., & Burns, B. (2020). *Anatomy, Thorax, Wall*. Ncbi.nlm.nih.gov. Retrieved 26 October 2020, from <https://www.ncbi.nlm.nih.gov/books/NBK535414/>.
- Jones, O. (2020). *Posterior Triangle of the Neck - Subdivisions - TeachMeAnatomy*. Teachmeanatomy.info. Retrieved 26 October 2020, from <https://teachmeanatomy.info/neck/areas/posterior-triangle/>.
- Kawanishi, K. (2016). Diverse properties of the mesothelial cells in health and disease. *Pleura and Peritoneum*, 1(2), 79-89. <https://doi.org/10.1515/pp-2016-0009>

- Liu, Y., Tao, T., Li, W., & Bo, Y. (2017). Regulating the autonomic nervous system homeostasis improves pulmonary function in rabbits with acute lung injury. *BMC Pulmonary Medicine*, 17(1). <https://doi.org/10.1186/s12890-017-0436-0>
- Sinha, R., Correia, R., Gardner, D., Grau-Roma, L., de Brot, S., & Hardman, J. et al. (2018). Mucosal injury following short-term tracheal intubation: A novel animal model and composite tracheal injury score. *Laryngoscope Investigative Otolaryngology*, 3(4), 257-262. <https://doi.org/10.1002/liv2.168>
- Wang, Y., & Grodzinsky, A. (2015). The Response of Cartilage to Injury. *Post-Traumatic Arthritis*, 121-133. https://doi.org/10.1007/978-1-4899-7606-2_11

Assignment

ORIGINALITY REPORT

25%

SIMILARITY INDEX

20%

INTERNET SOURCES

1%

PUBLICATIONS

20%

STUDENT PAPERS

PRIMARY SOURCES

1

www.coursehero.com

Internet Source

10%

2

Submitted to El Camino Community College

Student Paper

9%

3

Submitted to West Coast University

Student Paper

2%

4

J D Schipke. "Effect of immersion, submersion, and scuba diving on heart rate variability",
British Journal of Sports Medicine, 2001

Publication

1%

5

Submitted to Baton Rouge Community College

Student Paper

1%

6

Submitted to kingswaynz

Student Paper

1%

7

www.slideshare.net

Internet Source

1%

8

www.zora.uzh.ch

Internet Source

1%

Exclude quotes Off

Exclude matches Off

Exclude bibliography On

Assignment

GRADEMARK REPORT

FINAL GRADE

/100

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

RUBRIC: 6TH-8TH SCIENCE ARGUMENT (CER)

CLAIM

Take an arguable position on the scientific topic and develop the essay around that stance.

ADVANCED	The essay introduces a precise, qualitative and/or quantitative claim based on the scientific topic or text(s), regarding the relationship between dependent and independent variables. The essay develops the claim and counterclaim fairly, distinguishing the claim from alternate or opposing claims.
PROFICIENT	The essay introduces a clear, qualitative and/or quantitative claim based on the scientific topic or text(s), regarding the relationship between dependent and independent variables. The essay effectively acknowledges and distinguishes the claim from alternate or opposing claims.
DEVELOPING	The essay attempts to introduce a qualitative and/or quantitative claim, based on the scientific topic or text(s), but it may be somewhat unclear or not maintained throughout the essay. The essay may not clearly acknowledge or distinguish the claim from alternate or opposing claims.
EMERGING	The essay does not clearly make a claim based on the scientific topic or text(s), or the claim is overly simplistic or vague. The essay does not acknowledge or distinguish counterclaims.

EVIDENCE

Include relevant facts, definitions, and examples to back up the claim.

ADVANCED	The essay supplies sufficient relevant, accurate qualitative and/or quantitative data and evidence related to the scientific topic or text(s) to support its claim and counterclaim.
PROFICIENT	The essay supplies relevant, accurate qualitative and/or quantitative data and evidence related to the scientific topic or text(s) to support its claim and counterclaim.
DEVELOPING	The essay supplies some qualitative and/or quantitative data and evidence, but it may not be closely related to the scientific topic or text(s), or the support that is offered relies mostly on summary of the source(s), thereby not effectively supporting the essay's claim and counterclaim.
EMERGING	The essay supplies very little or no data and evidence to support its claim and counterclaim, or the evidence that is provided is not clear or relevant.

REASONING

Explain how or why each piece of evidence supports the claim.

ADVANCED	The essay effectively applies scientific ideas and principles in order to explain how or why the cited evidence supports the claim. The essay demonstrates consistently logical reasoning and understanding of the scientific topic and/or text(s). The essay's explanations anticipate the audience's knowledge level and concerns about this scientific topic.
----------	--

PROFICIENT	The essay applies scientific reasoning in order to explain how or why the cited evidence supports the claim. The essay demonstrates logical reasoning and understanding of the scientific topic and/or text(s). The essay's explanations attempt to anticipate the audience's knowledge level and concerns about this scientific topic.
DEVELOPING	The essay includes some reasoning and understanding of the scientific topic and/or text(s), but it does not effectively apply scientific ideas or principles to explain how or why the evidence supports the claim.
EMERGING	The essay does not demonstrate clear or relevant reasoning to support the claim or to demonstrate an understanding of the scientific topic and/or text(s).

FOCUS

Focus your writing on the prompt and task.

ADVANCED	The essay maintains strong focus on the purpose and task, using the whole essay to support and develop the claim and counterclaims evenly while thoroughly addressing the demands of the prompt.
PROFICIENT	The essay addresses the demands of the prompt and is mostly focused on the purpose and task. The essay may not acknowledge the claim and counterclaims evenly throughout.
DEVELOPING	The essay may not fully address the demands of the prompt or stay focused on the purpose and task. The writing may stray significantly off topic at times, and introduce the writer's bias occasionally, making it difficult to follow the central claim at times.
EMERGING	The essay does not maintain focus on purpose or task.

ORGANIZATION

Organize your writing in a logical sequence.

ADVANCED	The essay incorporates an organizational structure throughout that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. Effective transitional words and phrases are included to clarify the relationships between and among ideas (i.e. claim and reasons, reasons and evidence, claim and counterclaim) in a way that strengthens the argument. The essay includes an introduction and conclusion that effectively follows from and supports the argument presented.
PROFICIENT	The essay incorporates an organizational structure with clear transitional words and phrases that show the relationship between and among ideas. The essay includes a progression of ideas from beginning to end, including an introduction and concluding statement or section that follows from and supports the argument presented.
DEVELOPING	The essay uses a basic organizational structure and minimal transitional words and phrases, though relationships between and among ideas are not consistently clear. The essay moves from beginning to end; however, an introduction and/or conclusion may not be clearly evident.
EMERGING	The essay does not have an organizational structure and may simply offer a series of

ideas without any clear transitions or connections. An introduction and conclusion are not evident.

LANGUAGE

Pay close attention to your tone, style, word choice, and sentence structure when writing.

ADVANCED	The essay effectively establishes and maintains a formal style and objective tone and incorporates language that anticipates the reader's knowledge level and concerns. The essay consistently demonstrates a clear command of conventions, while also employing discipline-specific word choices and varied sentence structure.
PROFICIENT	The essay generally establishes and maintains a formal style with few possible exceptions and incorporates language that anticipates the reader's knowledge level and concerns. The essay demonstrates a general command of conventions, while also employing discipline-specific word choices and some variety in sentence structure.
DEVELOPING	The essay does not maintain a formal style consistently and incorporates language that may not show an awareness of the reader's knowledge or concerns. The essay may contain errors in conventions that interfere with meaning. Some attempts at discipline-specific word choices are made, and sentence structure may not vary often.
EMERGING	The essay employs language that is inappropriate for the audience and is not formal in style. The essay may contain pervasive errors in conventions that interfere with meaning, word choice is not discipline-specific, and sentence structures are simplistic and unvaried.