

Note to Teachers about *The Virtual Stroke Lab* *Student Handout*



**THE MIND
PROJECT**

This document contains a handout that can be distributed for students to fill out as they complete The Virtual Stroke Lab, a free online Virtual Lab made available from The Mind Project (<http://www.mind.ilstu.edu>).

This file contains both the student handout as well as the answer key. This handout is only meant as a supplement for students who are completing the lab outside of class time or with an adult who has never completed the lab. Its purpose is to make sure students walk away from the lab, with the important big ideas.

However, the lab was designed to stand on its own, without any additional “paper work” for students to complete. If your students are completing the lab during class time, this handout is not necessary since you can focus their learning and help them to stay on task.

The teacher answer key includes not only the answers, but also where in the answers can be found; either within the introductory “Overview” tutorial or within The Virtual Stroke Lab itself. These are referenced in parentheses with each answer.

Good luck, Have Fun, and Enjoy!

The Mind Project Team
<http://www.mind.ilstu.edu>



Name _____ **Teacher Answer Key** _____



The Virtual Stroke Lab Student Handout

You will find answers to these questions in the Overview Tutorial and within The Virtual Stroke Lab itself.

Define the following vocabulary:

stroke: **sudden lack of function of a person's peripheral nervous system**

ischemic stroke: **stroke caused by a blood clot (thrombus) which cuts off blood to parts of the brain.**

hemorrhagic stroke: **stroke caused by bleeding (hemorrhaging)**

thrombus: **blood clot**

emolization: **also called "coiling" where platinum coils are inserted into an aneurysm to stabilize it.**

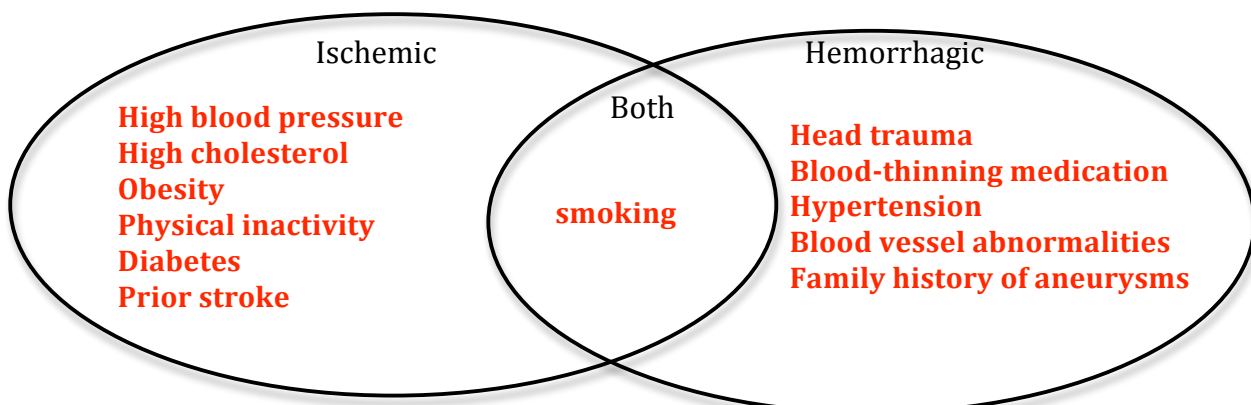
aneurysm: **a permanent ballooning in the wall of an artery**

digital road mapping: **the process by which wires and catheters are navigated through blood vessels. Digital Subtraction Angiography (DSA) images are superimposed on a live fluoroscopic x-ray image.**

1. Why is it so important to call 911 if you suspect someone has had a stroke?

Strokes cause brain cells to die. If left untreated, they can lead to severe and irreplaceable damage; in many cases death. If treatment occurs within hours of the symptoms, there are drugs that can reduce/repair damage. (EMR: Chapter 1; #1 What is a Stroke? & Overview; Introduction)

2. Create a Venn Diagram of the risk factors of Ischemic and Hemorrhagic strokes. (What factors do both types of strokes share (middle), and what symptoms are associated with only one?) **(EMR: Chapter 1: #3 Stroke Risk Factors)**



3. What are the various stroke symptoms? (EMR: Chapter 1: #4 Stroke Symptoms)

Sudden numbness or weakness of face, leg, or arm, especially on one side of the body; Sudden confusion or trouble speaking and/or understanding speech; sudden dimness or loss of vision in one or both eyes; Sudden severe headache with no known cause; sudden dizziness, loss of balance or unsteadiness.

4. What are the three main causes of strokes? (Overview Tutorial: Section 1 Overview; EMR: Chapter 1: #2 Types of Strokes)

- a) **Blocked blood vessel caused by a blood clot (thrombus), called an Ischemic stroke**
- b) **Bleeding in the brain, called a Hemorrhagic stroke**
- c) **Ballooned blood vessel, often how hemorrhagic strokes occur**

5. Why is iodinated contrast not used in the original Head CT scan? (EMR: Chapter 2; #3 What is iodinated contrast?)

Iodinated contrast shows up as white on CT scans, and might prevent doctors from detecting a brain bleed, since blood also appears white on CT!

6. What treatment options are available for Ischemic Strokes? (Overview tutorial: Section 1)

Clot Busting drugs, but must be given to patient within hours of the stroke.

7. How are clipping and coiling procedures similar? How are they different? (EMR: Chapter 3; #5 Aneurysm treatment options)

The purpose of both is to stabilize or block off an aneurysm from (further) bleeding. In both procedures the ballooned area is obstructed so that blood can no longer flow into the weakened portion of the vessel. Clipping is an invasive surgery where a window is cut into the skull, and the brain is retracted to locate the aneurysm. A permanent clip is placed across the neck of the aneurysm. Coiling is a less invasive surgery using catheters to navigate through a vessel in the groin using fluoroscopy. Platinum coils are delivered into the aneurysm and remain within the aneurysm. A number of coils, of differing diameters are needed to fill the space. The Coiling surgery requires less recovery time.

8. Why does the shape of an aneurysm matter when deciding whether to clip or coil? (EMR: Chapter 3; #8 Importance of aneurysm neck size)

The size of the aneurysm in relation to the neck size (where the ballooned portion meets the vessel itself) is important because neck must be large enough for the coils to be inserted, but not so large that the coils loop out into the brain blood vessels. If the coils loop out into the vessel it is likely it cause blood clots to form resulting in a stroke. A neck greater than 4 mm is too large for coiling.

9. Explain the role of imaging during the coiling procedure. (EMR: Chapter 3; #1, 3,& 4 What is Digital Road Mapping?)

Imaging is important because it allows radiologists to create a digital road map so that they can view the damaged blood vessel. This process uses wires and catheters and iodinated contrast to navigate through blood vessels. Digital Subtraction Angiography (DSA) images are superimposed on a live fluoroscopic x-ray image.

10. What behaviors can you change to reduce your chance of having a stroke? (EMR: Chapter 1: #3 Stroke Risk Factors)

Avoid high blood pressure by eating a balanced diet and exercising regularly and avoid smoking.



Name _____



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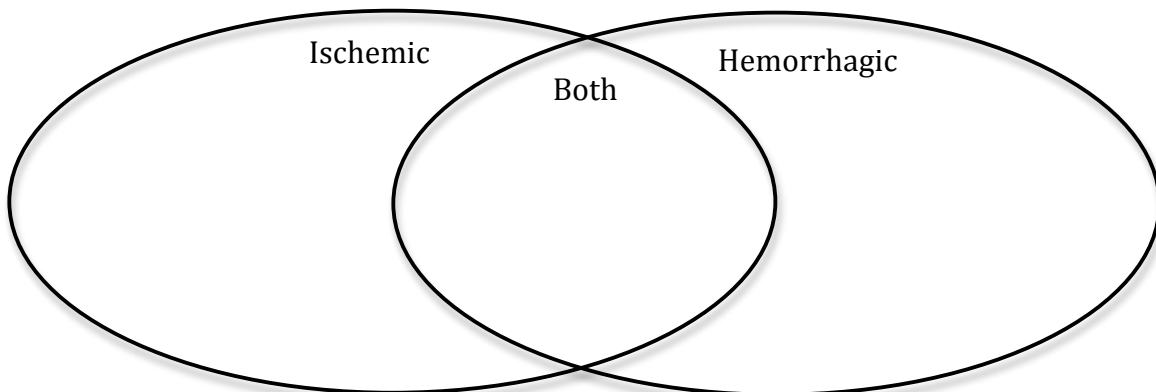
embolization

aneurysm

digital road mapping

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