Ischemia

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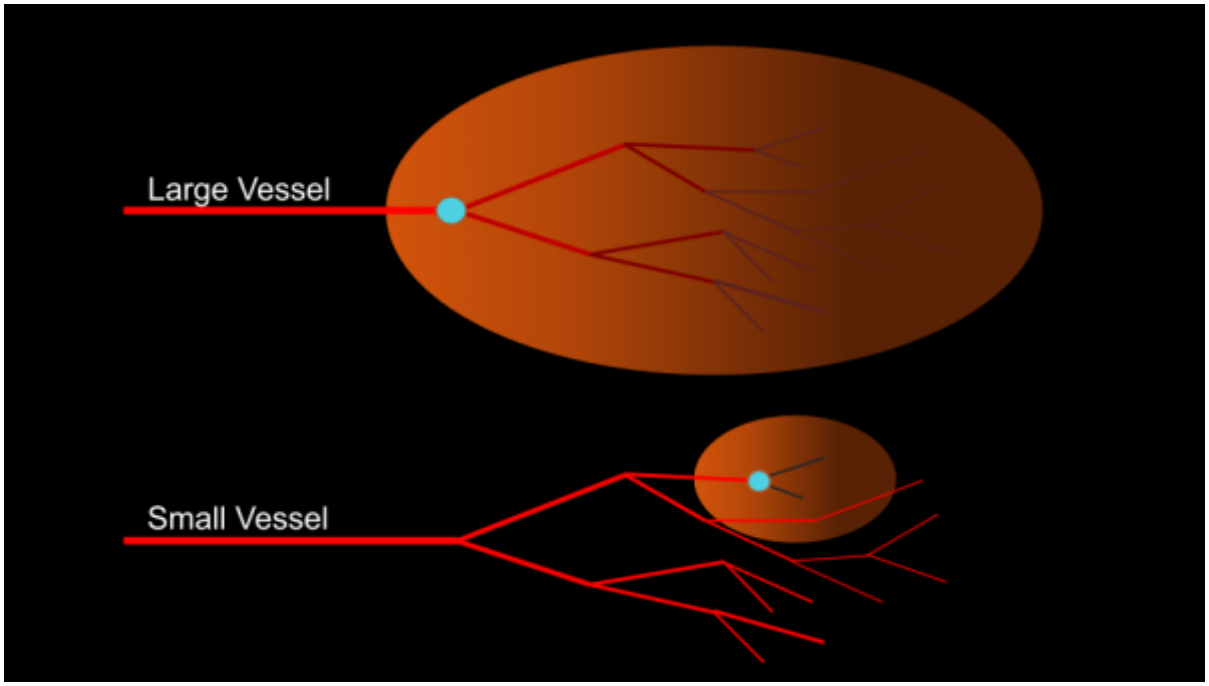
Ischemia is reduced perfusion to an area of tissue due to an occlusion of a vessel. The occlusion of a vessel reduces or prevents downstream cells from getting fresh oxygenated blood resulting in a state of hypoxia. If severe enough, cell death and infarction can occur. Most occlusions are due to a thrombus, embolism, or thromboembolism.

Any area downstream from the occlusion will be affected, so the location and area of effect will be determined by the location of the occlusion. If a proximal/large vessel is occluded, an entire vascular territory may be involved.

Symptoms of ischemia typically present as acute and non-progressive, and will vary depending on the location of the occlusion.



Important Sequences for Identifying Ischemia

Diffusion Weighted Imaging (DWI)

DWI sequences are critical for identifying ischemia, and virtually the only sequence that can directly demonstrate the pathophysiologic changes due to hypoxia. While the mechanisms are not fully understood, when neural tissues experience hypoxia they tend to swell and water tends to move from extracellular to intracellular spaces, reducing the overall free diffusion of water. This physiologic change can be seen with DWI ONLY.

The DWI sequence will produce 3 image series: a b0, b1000, and an Apparent Diffusion Coefficient (ADC) map. The 'b' represents a parameter known as the 'b value' which controls the strength and duration of the diffusion weighting gradients; higher b values means diffusion effects will have a

stronger influence on image contrast.

True ischemia will have this imaging relationship: BRIGHT b1000 and DARK ADC