



## NVS Examination Study Guide: Transcranial Doppler

Created: August 2025

<b>1) Neuroanatomy + Bmode Landmarks</b>	<ul style="list-style-type: none"> <li>a. Acoustic windows and associated structural anatomy</li> <li>b. Intracranial bony landmarks</li> <li>c. Basic functional neuroanatomy</li> </ul>
<b>2) Intracranial Arterial Vascular Anatomy</b>	<ul style="list-style-type: none"> <li>a. Basal segments of the Circle of Willis</li> <li>b. Collateral pathways</li> <li>c. Extracranial tributaries</li> <li>d. Common aberrant cerebrovascular anatomy</li> </ul>
<b>3) Sonographic Technique and Vessel Identification</b>	<ul style="list-style-type: none"> <li>a. Vessel identification</li> </ul> <p>Vessel depth, flow directionality, spatial orientation</p>
<b>4) Hemodynamics</b>	<ul style="list-style-type: none"> <li>a. Normal intracranial waveform morphology</li> <li>b. Abnormal intracranial waveform morphology</li> <li>c. Effects of extracranial / intracranial disease on intracranial waveforms</li> <li>d. Physiologic factors impacting intracranial waveforms (e.g. hematocrit, CO<sub>2</sub>, BP, ICP, systemic factors)</li> <li>e. Hemodynamic influence of cardiac support / assistive devices</li> </ul>
<b>5) Equipment Optimization &amp; Safety</b>	<ul style="list-style-type: none"> <li>a. TCDI: 2D, Color Doppler, PW Doppler</li> <li>b. TCD: Power M-mode, PW Doppler</li> <li>c. ALARA Principles (e.g. Power output / intensity)</li> <li>d. Patient safety (e.g. Post-operative considerations, presence of EVD, staples, bandages, craniectomy)</li> <li>f. Scanning ergonomics</li> </ul>
<b>6) Diagnostic TCD / TCCI</b>	<ul style="list-style-type: none"> <li>a. Criteria for intracranial stenosis / occlusion</li> <li>b. Criteria for intracranial collateralization (e.g. in presence of extracranial or intracranial pathology)</li> </ul>
<b>7) Cerebral Vasospasm</b>	<ul style="list-style-type: none"> <li>a. Mechanisms and timeline of cerebral vasospasm</li> </ul>

	<ul style="list-style-type: none"> <li>b. Velocity criteria for determination of cerebral vasospasm</li> <li>c. Lindegaard / Sviri ratios</li> </ul>
<b>8) Emboli Monitoring</b>	<ul style="list-style-type: none"> <li>a. Equipment setup</li> <li>b. Identifying appropriate vessels for monitoring</li> <li>c. Consensus criteria, Spencer classification, for identification of cerebral emboli</li> <li>d. Understanding impact of mechanical cardiac valves</li> <li>e. Recognizing artifacts</li> </ul>
<b>9) Right to Left Cardiopulmonary Shunt Assessment (RLS) - (Bubble Study)</b>	<ul style="list-style-type: none"> <li>a. Basic cardiac anatomy</li> <li>b. Contraindications</li> <li>c. Equipment / exam setup</li> <li>d. Patient positioning and preparation</li> <li>e. Preparation of contrast and intravenous access</li> <li>f. Assessment for RLS at rest</li> <li>g. Assessment for RLS during Valsalva strain</li> <li>h. Spencer classification</li> </ul>
<b>10) Cerebral Circulatory Arrest (CCA)</b>	<ul style="list-style-type: none"> <li>a. Mechanisms of CCA</li> <li>b. Assessment of intracranial vessels</li> <li>c. Waveform morphology</li> <li>d. Contraindications</li> </ul>
<b>11) Vertebral Artery Compression with Head Rotation</b>	<ul style="list-style-type: none"> <li>a. Clinical indications</li> <li>b. Patient and equipment setup</li> <li>c. Anatomical contraindications</li> <li>d. Dynamic assessment</li> <li>e. Interpreting positive and negative findings</li> </ul>
<b>12) Vasomotor Reactivity (VMR) / Breath Holding (BHI)</b>	<ul style="list-style-type: none"> <li>a. Clinical Indications</li> <li>b. Contraindications</li> <li>c. Patient and equipment setup</li> <li>d. Intracranial effects of normocapnia, hypocapnia, and hypercapnia</li> <li>e. Normal and abnormal findings</li> </ul>
<b>13) Sickle Cell Assessment</b>	<ul style="list-style-type: none"> <li>a. STOP Trial</li> <li>b. Set up and preparation</li> </ul>

	<ul style="list-style-type: none"> <li>c. Normal and abnormal findings</li> <li>d. Velocity criteria</li> </ul>
<b>14) Superficial Temporal Arteritis (STA) / Giant Cell Arteritis (GCA)</b>	<ul style="list-style-type: none"> <li>a. Impacted arterial anatomy</li> <li>b. Exam timing relative to treatment</li> <li>c. Sonographic hallmarks of STA / GCA</li> </ul>
<b>15) Peri/Intraoperative TCD Monitoring</b>	<ul style="list-style-type: none"> <li>a. Environmental considerations</li> <li>b. Communication of critical hemodynamic findings</li> <li>c. Hyperperfusion syndrome</li> <li>d. Carotid Endarterectomy (CEA)</li> <li>e. Carotid Artery Stenting (CAS)</li> <li>f. EC-IC / STA-MCA bypass assessment</li> </ul>
<b>16) Reporting</b>	<ul style="list-style-type: none"> <li>a. Written understanding of findings</li> <li>b. IAC Examination interpretation and report standards</li> </ul>