

Course Competency

SON 2161C Neurosonography

Course Description

A comprehensive course designed to examine sonographic imaging of the neonatal and infant brain, with an introduction to intra-operative brain and spinal cord imaging. Emphasis is placed on normal brain anatomy, congenital malformations and acquired pathologic conditions.

Course Competency	Learning Outcomes
<p>Competency 1:The student will demonstrate knowledge about the advantages of Neurosonography by:</p> <ul style="list-style-type: none"> a. Listing the advantages and disadvantages of real-time scanning. b. Listing and comparing the advantages and disadvantages of ultrasound and CT. c. Describing the role ultrasound currently plays as a diagnostic tool. d. Identifying and describing the advantages and disadvantages of the various types of transducers and frequencies used for neurosonography. 	<ul style="list-style-type: none"> 1. Communication 2. Information Literacy
<ul style="list-style-type: none"> a. Competency 2:The student will demonstrate knowledge and comprehension about the scanning protocol in Neurosonography by: b. Listing patient preparation and positioning. c. Outlining a basic protocol and major landmarks of each section. d. identifying the various forms of hard copy image storage and describing the advantages and disadvantages of each. e. Describing proper patient care of both full-term and premature infants. f. Discussing the special requirements of premature infants. g. Discussing infant positioning. h. Identifying the monitors and special equipment of neonates. i. Discussing proper methods of infection control and equipment cleaning. 	<ul style="list-style-type: none"> 1. Communication 2. Critical thinking 3. Information Literacy
<ul style="list-style-type: none"> j. Describing the necessary precautions necessary for diseases and infections unique to infants. 	

Competency 3: The student will demonstrate knowledge and comprehension of the normal brain anatomy findings by:

- a. Discussing the difference between the central, peripheral, somatic and autonomic nervous systems.
- b. Describing the bones and sutures of the cranium and vertebral column.
- c. Identifying the meninges of the brain and spinal cord.
- d. Describing the three major reflections of the dura mater and what they divide.
- e. Describing the formation of venous sinuses and cisterns.
- f. Describing the macro and microscopic anatomy of the spinal cord.
- g. Understanding the configuration of white and gray matter of the brain and spine, and what it is composed of.
- h. Listing the major functions of the spinal cord.
- i. Identifying the six major divisions of the brain and the major functions of each.
- j. Identifying the difference between sulci and gyri and be able to identify some of the major ones.
- k. Identifying the five lobes of the cerebrum, which fissures separate them, and their major functions.
- l. Describing the limbic system.
- m. Identifying the basal ganglia and the three types of axon tracts of the brain.
- n. Identifying the structures seen on a mid-sagittal section of the brain.
- o. Describing the ventricular system.
- p. Discussing the composition, formation, flow and reabsorption of cerebrospinal fluid.
- q. Labeling a diagram of the cranial vascular system, arterial and venous.
- r. Listing the structures seen on each standard cross-sectional anatomical section.
- s. Identifying modified coronal (transverse), sagittal (longitudinal), axial and posterior fossa views.
- t. Identifying normal anatomy on all standard images.

1. Communication
2. Critical thinking
3. Information Literacy

Competency 4: Demonstrate knowledge, comprehension, and application of brain pathologies diagnosed with Neurosonography by:

- a. Discussing and identifying the various types of intracranial hemorrhages, their causes, location, and sequelae.
- b. Describing and identifying cerebral infarcts and ischemia.
- c. Describing and identifying hydrocephalus, its causes, sequelae and treatment
- d. Describing and identifying holoprosencephaly.
- e. Describing and identifying hydranencephaly.
- f. Describing and identifying Dandy Walker Syndrome.

1. Communication
2. Critical thinking
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- f. Describing and identifying meningeal hematomas and grading of bleeds.
- g. Describing and identifying effusions and normal extra-axial fluid.
- h. Describing and identifying the Chiari malformations, especially Chiari II- Arnold Chiari.
- i. Describing and identifying A-V malformations especially Vein of Galen aneurysms, their cause and treatment.
- j. Describing and identifying agenesis of the corpus callosum.
- k. Describing and identifying cysts of the brain, including porencephalic, periventricular leukomalacia, encephalomalacia, adrigeminal and arachnoid cysts.
- l. Describing the neonatal infections that affect the brain and their sonographic manifestation.
- m. Describing and identifying cerebral abscesses and empyema's.
- n. Describing and identifying congenital and acquired brain tumors.
- o. Describing and identifying spinal tumors and cysts.
- p. Describing and identifying spinal trauma and intraoperative sonographic foreign body localization.
- q. Describing the role intraoperative sonography plays in disk herniation and vertebral dislocation.

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