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SIMTICS Medical Professional: Ultrasound Module Outlines

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Basic Ultrasound Scan Techniques for Medical Professionals

Description

This introductory module teaches you the basic principles and techniques required to begin general ultrasound scanning and guides you step-by-step through some basic scans.

Learning objectives

- Define and explain related ultrasound terminology
- Identify orientation on the ultrasound image
- Identify and obtain cross-sectional anatomy on ultrasound images
- Identify vascular landmarks used in abdominal imaging
- Describe and explain the significance of obtaining a relevant patient history
- Describe and explain the reason for patient preparation for ultrasound examinations
- Describe and demonstrate the reason for patient positioning for ultrasound examinations
- Manipulate the transducer in sagittal, transverse, and oblique planes
- Demonstrate different transducer approaches and manipulations used to obtain optimum images on different body types
- Describe and explain the reason for patient breathing techniques in order to obtain optimum images
- Identify and utilize acoustic windows in order to obtain optimum ultrasound images
- Describe and explain the requirements for annotation of ultrasound images
- Describe the technique for measuring structures on ultrasound images
- Using a standard format, write a technical impression

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Step 1 - Overview

Step 1.1 - Orientation

Step 1.1.1 - Anatomical directions

Step 1.1.2 - Planes or body sections

Step 1.1.3 - On-screen orientation

Step 1.1.4 - Abdominal quadrants and regions

Step 1.2 - Cross sectional anatomy

Step 1.3 - Abdominal vascular landmarks

Step 2 - Preprocedure considerations

Step 2.1 - Patient preparation

Step 2.2 - History

Step 2.3 - Patient position

Step 3 - Procedure

Step 3.1 - Image optimization

Step 3.2 - Transducer manipulation

Step 3.3 - Approaches

Step 3.4 - Breathing

Step 3.5 - Windows

Step 3.6 - Survey scan

Step 3.7 - Protocol

Step 3.8 - Annotation

Step 3.9 - Measurement

- Step 4 - Postprocedure considerations
 - Step 4.1 - Patient
 - Step 4.2 - Preliminary report

Ultrasound of the Aorta for Medical Professionals

Description

This module teaches you how to perform an ultrasound examination of the abdominal aorta.

Learning objectives

- Indications for ultrasound of the abdominal blood vessels
- Identify abdominal vascular anatomy on diagrams and sonograms
- Abdominal vascular protocol
- Equipment preparation - transducer and preset selection
- Patient preparation
- Patient positioning
- Transducer positions
- Scan planes
- Identify and obtain sonographic images of the aorta, abdominal aortic branches, and common iliac arteries
- Obtain Doppler spectral traces of the aorta
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the blood vessels
- Differentiate normal and abnormal sonographic appearances of the vascular system
- Identify and describe common pathology of the abdominal vasculature
- Explain the important ultrasound characteristics when evaluating an abdominal aortic aneurysm
- Describe the normal and abnormal Doppler patterns of the vascular structures

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Introduction

Principles of Doppler ultrasound

Step 1 - Select the appropriate transducer and obtain images of the abdominal aorta

Step 2 - Begin scanning procedure of the abdominal aorta

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Images to be obtained for a complete abdominal aorta scan

Step 2.4 - Common Image Labeling

Step 2.5 - Sonographic features of normal abdominal aorta

Step 2.5.1 - Sonographic features of the normal celiac axis

Step 2.5.2 - Sonographic features of the normal common hepatic artery

Step 2.5.3 - Sonographic features of the normal splenic artery

Step 2.5.4 - Sonographic features of the normal superior mesenteric artery (SMA)

Step 2.5.5 - Sonographic features of the normal renal arteries

Step 2.5.6 - Sonographic features of the normal inferior mesenteric artery (IMA)

Step 2.6 - Variants

Step 2.7 - Troubleshooting

Step 3 - Scan the aorta

Step 3.1 - Scan the proximal aorta in the longitudinal plane

- Step 3.2 - Scan the mid aorta in the longitudinal plane
- Step 3.3 - Scan the distal aorta in the longitudinal plane
- Step 3.4 - With the patient in the supine position scan the aorta in the transverse plane
- Step 3.5 - Obtain a Doppler spectral trace of the aorta
- Step 3.6 - Scan celiac artery in the longitudinal plane
- Step 3.7 - Scan the celiac artery in the transverse plane
- Step 3.8 - Pathology of the celiac axis
- Step 3.9 - Scan the SMA in the longitudinal plane
- Step 3.10 - Scan the SMA in the transverse plane
- Step 3.11 - Pathology of the SMA

Ultrasound of the Gallbladder for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the gallbladder.

Learning objectives

- Indications for ultrasound of the gallbladder
- Identify gallbladder anatomy
- Gallbladder protocol
 - Transducer positions
 - Scan planes
 - Identify and obtain sonographic images of the gallbladder, bile ducts, and portal triad
 - Identify and obtain sonographic images of the extrahepatic biliary system
 - Obtain measurements of the gallbladder and related structures
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the gallbladder
- Differentiate normal and abnormal sonographic appearances of the gallbladder
- List and identify common neoplasms of the gallbladder

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Introduction

Step 1 - Begin Scanning Procedure of the Gallbladder

Step 2 - Commence the biliary system scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard biliary protocol image requirements

Step 2.4 - Common Image Labeling

Step 2.5 - Sonographic features of a normal gallbladder

Step 2.5.1 - Sonographic features of a prominent gallbladder

Step 2.5.2 - Sonographic features of a contracted gallbladder

Step 2.6 - Sonographic features of gallbladder variants

Step 2.7 - Troubleshooting

Step 3 - Scan the gallbladder in the longitudinal and transverse planes

Step 3.1 - Scan the body and fundus of the gallbladder in the longitudinal plane

Step 3.2 - Scan the body and neck of the gallbladder in the transverse plane

Step 4 - Measure the gallbladder wall in the transverse plane

Step 5 - Assess the bile ducts and measure the common hepatic duct (CHD) and common bile duct (CBD)

Ultrasound of the Liver for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the liver.

Learning objectives

- Indications for ultrasound of the liver
- Identify the liver anatomy
- Identify and demonstrate the liver ultrasound scan protocol
- Identify and obtain sonographic images of liver, vascular structures, ligaments, and fissures of the liver
- Obtain measurements of the liver
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the liver
- Differentiate normal and abnormal sonographic appearances of the liver
- Differentiate and describe common pathologies of the liver on sonographic images
- Identify and obtain images in hepatic trauma
- Identify and obtain images in hepatic transplantation
- Identify and obtain images of vascular flow abnormalities

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Introduction

Step 1 - Select the transducer and obtain images of the liver

Step 2 - Begin scanning procedure of the liver system

Step 2.1 - Patient Position

Step 2.2 - Scan Plane

Step 2.3 - Standard liver protocol image requirements and observations

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of the normal liver

Step 2.6 - Sonographic features of liver variants

Step 2.7 - Troubleshooting

Step 3 - Scan the liver in the longitudinal and transverse planes

Step 3.1 - Scan the liver in the longitudinal plane

Step 3.2 - Measure the liver in the longitudinal plane

Step 3.3 - Scan the liver in the transverse plane

Step 3.4 - Describe any findings from the longitudinal and transverse images

Step 4 - Hepatic vascular imaging and Doppler

Step 4.1 - Hepatic veins

Step 4.2 - Portal veins

Step 4.3 - Hepatic arteries

Ultrasound of the Pancreas for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the pancreas.

Learning objectives

- Identify pancreas anatomy
- Pancreas protocol
 - Patient preparation
 - Transducer and preset selection
 - Patient positioning
 - Transducer positions
 - Scan planes
 - Identify and obtain sonographic images of the pancreas
 - Identify and obtain sonographic images of the vascular and ductal landmarks of the pancreas
 - Obtain measurements of the pancreas and related structures
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the pancreas
- Differentiate normal and abnormal sonographic appearances of the pancreas
- List and identify common neoplasms of the pancreas

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Introduction

Step 1 - Begin scanning procedure of the pancreas

Step 2 - Commence the pancreas system scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan Plane

Step 2.3 - Standard pancreas protocol image requirements

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of a normal pancreas

Step 2.6 - Trouble shooting

Step 3 - Scan the pancreas in the transverse and longitudinal planes

Step 3.1 - Scan the head, neck, body, and tail of the pancreas in the transverse plane

Step 3.2 - Scan the head, neck, body, and tail of the pancreas in the longitudinal plane

Step 3.3 - Pathology of the parenchyma of the pancreas

Step 4 - Assess and measure the pancreatic duct

Step 4.1 - Measure the pancreatic duct in its long axis

Ultrasound Assessment of the Gastrointestinal (GI) Tract for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the gastrointestinal tract.

Learning objectives

- Indications for ultrasound of the gastrointestinal tract
- Identify the gastrointestinal tract anatomy
- Explain gastrointestinal physiology
- List clinical symptoms of gastrointestinal tract disease
- Gastrointestinal tract protocol:
 - Patient preparation
 - Transducer and preset selection
 - Patient positioning
 - Transducer positions
 - Scan planes
- Identify and obtain sonographic images of the gastrointestinal tract
- Explain and demonstrate the use of breathing techniques and graded compression to obtain optimal sonographic images of the gastrointestinal tract
- Differentiate normal and abnormal sonographic appearances of the gastrointestinal tract
- Describe and identify pathologies of the gastrointestinal tract
- Describe and identify abnormalities of the gastrointestinal tract
- Explain the Patient's Bill of Rights, HIPAA Privacy Rule, and Patient Safety Act (see reference)

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Introduction

Step 1 - Begin scanning procedure of the gastrointestinal tract

Step 2 - Commence the gastrointestinal tract scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard gastrointestinal tract protocol image requirements

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of a normal gastrointestinal tract

Step 2.6 - Troubleshooting

Step 3 - Scan gastrointestinal tract in longitudinal and transverse planes

Step 3.1 - Scan the segment of bowel in the longitudinal plane

Step 3.2 - Scan the segment of bowel in the transverse plane

Step 3.3 - Scan the segment of bowel using color or spectral Doppler

Ultrasound Assessment of the Urinary Tract & Adrenal Glands for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the urinary tract and adrenal glands.

Learning objectives

- Indications for ultrasound of the urinary tract and adrenal glands
- Identify the anatomy of the urinary tract and adrenal glands
- Urinary tract protocol
- Transducer positions
- Scan planes
- Identify and obtain sonographic images of the urinary tract
- Identify and obtain sonographic images of the adrenal gland
- Obtain measurements of the kidneys and related structures
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the urinary tract and adrenal glands
- Differentiate normal and abnormal sonographic appearances of the urinary tract and adrenal glands

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Introduction

Step 1 - Begin scanning procedure of the kidneys, bladder, and adrenal glands

Step 2 - Commence the urinary tract and adrenal gland scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard urinary tract and adrenal gland protocol image requirements

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of the normal urinary tract and adrenal glands

Step 2.6 - Sonographic features of renal variants

Step 2.7 - Troubleshooting

Step 3 - Scan the kidneys in the longitudinal and transverse planes

Step 3.1 - Scan the right kidney in the longitudinal plane

Step 3.2 - Scan the right kidney in the transverse plane

Step 3.3 - Scan the left kidney in the longitudinal and transverse planes

Step 4 - Scan the urinary bladder in the longitudinal and transverse planes

Step 4.1 - Scan the urinary bladder in the longitudinal plane

Step 4.2 - Scan the urinary bladder in the transverse plane

Step 4.3 - Scan the ureteric jets using color Doppler

Step 4.4 - Measure the post void volume of the urinary bladder

Step 5 - Scan the renal arteries and veins

Step 5.1 - Scan the renal arteries

Step 5.2 - Scan the renal veins

Step 5.3 - Scan the renal segmental arteries in the longitudinal plane

Step 6 - Scan the adrenal glands in the longitudinal and transverse planes

Step 6.1 - Scan the right adrenal gland in the longitudinal and transverse planes

Step 6.2 - Scan the left adrenal gland in the longitudinal and transverse planes

Ultrasound of the Retroperitoneum, Peritoneal Cavity, and Abdominal Wall for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the retroperitoneum, peritoneal cavity, and abdominal Wall.

Learning objectives

- Indications for ultrasound of the retroperitoneum, peritoneal cavity, and abdominal wall
- Identify the anatomy of the retroperitoneum, peritoneal cavity, and abdominal wall
- Distinguish potential spaces for fluid collections in the abdominal and pelvic retroperitoneum
 - Retroperitoneum, peritoneal cavity, and abdominal wall protocol
 - Transducer positions and scan planes
 - Identify and obtain sonographic images of the retroperitoneum, peritoneal cavity, and abdominal wall
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the retroperitoneum, peritoneal cavity, and abdominal wall
- Identify and obtain images of the retroperitoneum, peritoneal cavity, and abdominal wall
- Describe and identify pathologies of the retroperitoneum
- Describe and identify abnormalities of the peritoneal cavity and abdominal wall
- Explain sonography occupational health and safety issues (see references)

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Introduction

Step 1 - Begin scanning procedure of the abdomen

Step 2 - Commence retroperitoneum and peritoneal cavity scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Retroperitoneum and peritoneal cavity image requirements

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of a normal retroperitoneum

Step 2.6 - Sonographic features of a normal peritoneal cavity

Step 2.7 - Troubleshooting

Step 3 - Scan the retroperitoneum and peritoneal cavity

Step 3.1 - Scan the subphrenic space

Step 3.2 - Scan the perirenal space (also called the perinephric space) and pararenal spaces

Step 3.3 - Scan the lesser sac

Step 3.4 - Scan the right and left lower quadrants

Step 3.5 - Scan the pelvic cul-de-sac (Pouch of Douglas)

Step 4 - Commence the abdominal wall scanning protocol

Step 4.1 - Patient position

Step 4.2 - Scan Plane

Step 4.3 - Abdominal wall image requirements

Step 4.4 - Common image labeling

Step 4.5 - Sonographic features of the normal abdominal wall

Step 4.6 - Troubleshooting

Step 5 - Scan the abdominal wall

Step 5.1 - Scan the anterior abdominal wall in the transverse plane

Step 5.2 - Scan the anterior abdominal wall in the longitudinal plane

Step 5.3 - Scan the inguinal canal/groin

Ultrasound of the Spleen for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the spleen.

Learning objectives

- Indications for ultrasound of the spleen
- Identify spleen anatomy
- Spleen protocol
 - Transducer positions
 - Scan planes
 - Identify and obtain sonographic images of the spleen and vascular structures
 - Obtain measurements of the spleen
- Explain and demonstrate the use of breathing techniques to obtain optimal sonographic images of the spleen
- Differentiate normal and abnormal sonographic appearances of the spleen
- Differentiate and describe common pathologies of the spleen on sonographic images
- Identify and obtain images of vascular flow of the splenic artery and vein
- Identify and discuss the physiology of congestion of the spleen
- Compare and contrast focal and diffuse disease of the spleen

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Introduction

Step 1 - Select the transducer and obtain images of the spleen

Step 2 - Begin scanning procedure of the spleen

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard spleen protocol image requirements

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of the normal spleen

Step 2.6 - Sonographic features of spleen variants

Step 2.6.1 - Accessory spleen or splenunculus

Step 2.6.2 - Ectopic or wandering spleen

Step 2.6.3 - Agenesis of the spleen

Step 2.7 - Troubleshooting

Step 3 - Scan the spleen in the longitudinal and transverse planes

Step 3.1 - Scan the spleen in the longitudinal plane

Step 3.2 - Assess the direction of flow in splenic vessels with color Doppler

Step 3.3 - Scan the spleen in the transverse plane

Ultrasound Assessment During the First Trimester for Medical Professionals

Description

This module teaches you how to prepare for and perform a first trimester ultrasound examination.

Learning objectives

- Identify the anatomy of early intrauterine pregnancy on diagrams and sonograms.
- Recognize and differentiate between intrauterine, ectopic, heterotopic, and multiple pregnancies, including signs, symptoms, and locations.
- Describe and demonstrate methods for calculating gestational age during the first trimester of pregnancy.
- Describe and recognize on images the features of various types of failed pregnancy in the first trimester.
- Describe and recognize on images embryonic abnormalities in the first trimester.
- Describe and recognize on images normal and abnormal amniotic fluid in the first trimester.
- Describe and recognize on images normal and abnormal placental anatomy in the first trimester.
- Explain the sonographic features of fetal demise of the first trimester.
- Describe and recognize on images first trimester abnormalities of the uterus and adnexae.
- Describe a nuchal translucency measurement.
- Follow relevant protocols when scanning.
- Define and use related medical terminology.

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Introduction

Step 1 - Select the transducer

Step 2 - Begin scanning procedure of the first trimester pregnancy

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.2.1 - Transabdominal scan plane

Step 2.2.2 - Endovaginal scan plane

Step 2.3 - Standard first trimester protocol image requirements

Step 2.3.1 - Maternal uterus, ovaries, and adnexae

Step 2.3.2 - Gestation sac

Step 2.3.3 - Embryo

Step 2.3.4 - Placenta

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

Step 3 - Scan the pregnant pelvis transabdominally

Step 3.1 - Scan the uterus in longitudinal and transverse planes

Step 3.1.1 - Scan the uterus in the longitudinal plane

Step 3.1.2 - Scan the uterus in the transverse plane

Step 3.2 - Scan the ovaries and adnexae in longitudinal and transverse planes

Step 3.3 - Scan the gestation sac and yolk sac

Step 3.3.1 - Scan the gestation sac

Step 3.3.2 - Scan the yolk sac

Step 3.3.3 - Multiple pregnancy and chorionicity

Step 3.4 - Scan the embryo in longitudinal and transverse planes

Step 3.4.1 - Scan for crown-rump length and gestational age

- Step 3.4.2 - Scan the embryonic heart
- Step 3.4.3 - Scan the embryonic abdomen and pelvis
- Step 3.4.4 - Scan the fetal cranium
- Step 3.4.5 - Scan the embryonic spinal column
- Step 3.4.6 - Multiple pregnancy: scan for chorionicity
- Step 4 - Scan the pregnant pelvis endovaginally
 - Step 4.1 - Scan the uterus in longitudinal and coronal planes
 - Step 4.1.1 - Scan the uterus in the longitudinal planes
 - Step 4.1.2 - Scan the uterus in the coronal plane
 - Step 4.1.3 - Relation of findings to gestational age
 - Step 4.2 - Scan the adnexae and ovaries in coronal and longitudinal planes
 - Step 4.3 - Scan the gestation sac and yolk sac in longitudinal and coronal planes
 - Step 4.3.1 - Scan the gestation sac
 - Step 4.3.2 - Scan the yolk sac
 - Step 4.4 - Scan the embryo/fetus in longitudinal and transverse planes
 - Step 4.4.1 - Scan for crown-rump length and gestational age
 - Step 4.4.2 - Scan the embryonic heart
 - Step 4.4.3 - Scan the embryonic abdomen and pelvis
 - Step 4.4.4 - Scan the fetal cranium
 - Step 4.4.5 - Scan the embryonic spinal column
 - Step 4.4.6 - Multiple pregnancy

Ultrasound Assessment During the 2nd/3rd Trimesters for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination during the second and third trimesters.

Learning objectives

- Identify on diagrams and sonograms normal fetal anatomy of the second and third trimesters.
- Describe and demonstrate gestational age assessment in the second and third trimesters, including multiple pregnancies.
- Describe fetal presentation and position.
- Identify on diagrams and sonograms normal fetoplacental anatomy of the second and third trimesters.
- Compare and contrast the advantages of 3D/4D imaging with those of conventional 2D imaging.
- Follow relevant protocols when scanning.
- Define and use related medical terminology.

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Introduction

Step 1 - Select the transducer

Step 2 - Begin scanning procedure of the second and third trimester pregnancy

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard second and third trimester protocol image requirements

Step 2.3.1 - Fetal lie, life, number, presentation and situs

- Step 2.3.2 - Maternal uterus and adnexae
- Step 2.3.3 - Amniotic fluid and placental location
- Step 2.3.4 - Fetal biometry
- Step 2.3.5 - Fetal anatomy
- Step 2.4 - Common image labeling
- Step 2.5 - Troubleshooting
- Step 3 - Scan for fetal viability, number, presentation, and situs
 - Step 3.1 - Determine fetal lie and presentation
 - Step 3.2 - Scan the fetus for fetal viability
 - Step 3.3 - Determine fetal number
 - Step 3.4 - Determine fetal organ situs
- Step 4 - Scan the maternal uterus and adnexae
- Step 5 - Scan for amniotic fluid and placental location
 - Step 5.1 - Scan for amniotic fluid
 - Step 5.1.1 - Calculate amniotic fluid volume
 - Step 5.2 - Determine placental location
- Step 6 - Assess fetal biometry
 - Step 6.1 - Calculate the biparietal diameter
 - Step 6.2 - Head circumference
 - Step 6.3 - Abdominal circumference
 - Step 6.4 - Femur length
 - Step 6.5 - Transcerebellar diameter
 - Step 6.6 - Cephalic index
- Step 7 - Scan fetal anatomy relevant to gestational age
 - Step 7.1 - Scan the fetal head and face
 - Step 7.1.1 - Cranium
 - Step 7.1.2 - Orbits
 - Step 7.1.3 - Lips and nostrils
 - Step 7.1.4 - Fetal profile
 - Step 7.2 - Scan the fetal spine
 - Step 7.3 - Scan the fetal thorax
 - Step 7.3.1 - Diaphragm
 - Step 7.3.2 - Fetal heart four-chamber view
 - Step 7.3.3 - Fetal heart left ventricular outflow tract, or aortic outflow tract
 - Step 7.3.4 - Fetal heart right ventricular outflow tract or pulmonary outflow tract.
 - Step 7.3.5 - Fetal ductal arch and aortic arch views
 - Step 7.4 - Scan the fetal abdomen
 - Step 7.4.1 - Fetal stomach
 - Step 7.4.2 - Fetal liver, spleen, and gallbladder
 - Step 7.4.3 - Fetal kidneys and adrenals
 - Step 7.4.4 - Fetal bowel
 - Step 7.4.5 - Fetal cord insertion and umbilical cord
 - Step 7.4.6 - Fetal bladder
 - Step 7.4.7 - Fetal umbilical vein, aorta, and inferior vena cava
 - Step 7.5 - Scan the fetal limbs/extremities
 - Step 7.5.1 - Fetal lower limbs
 - Step 7.5.2 - Fetal upper limbs
 - Step 7.6 - Scan fetal gender
- Step 8 - Sonographic examination of the fetus in 2D, 3D, and 4D

Ultrasound Assessment of Fetal Growth and High-Risk Pregnancies for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound assessment of fetal growth and high-risk pregnancies.

Learning objectives

- Describe and demonstrate how to evaluate normal and abnormal findings relating to the amniotic fluid, placenta, and umbilical cord.
- Describe the use of Doppler in evaluating fetoplacental circulation.
- Give the criteria and demonstrate the testing of fetal well-being, including the biophysical profile.
- Describe techniques for the sonographic evaluation of high-risk pregnancies including multiple gestations.
- List and describe peri- and post-pregnancy maternal diseases and complications and be able to compare immune and non immune hydrops.
- Explain how intrauterine growth restriction is evaluated by ultrasound.
- Describe and recognize on images abnormalities that may occur with multiple pregnancies.
- Define and use related medical terminology.

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Introduction

Step 1 - Select the transducer

Step 2 - Begin scanning procedure of growth and high-risk pregnancy

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.2.1 - Transabdominal scan plane

Step 2.2.2 - Endovaginal scan plane

Step 2.3 - Standard second and third trimester protocol image requirements

Step 2.3.1 - Fetal lie, life, number, presentation, and situs

Step 2.3.2 - Maternal uterus and adnexae

Step 2.3.3 - Amniotic fluid and placental location

Step 2.3.4 - Fetal biometry

Step 2.3.5 - Fetal anatomy

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

Step 3 - Overview of second and third trimester routine ultrasound examination

Step 4 - Perform targeted scan relevant to clinical condition of fetus and/or mother

Step 4.1 - Scan for multiple pregnancy

Step 5 - Scan for intrauterine growth restriction

Step 5.1 - Fetal biometry, growth, and weight

Step 5.2 - Doppler studies

Step 6 - Scan for amniotic fluid and membranes

Step 6.1 - Calculate the amniotic fluid volume

Step 7 - Scan for placenta and umbilical cord abnormalities

Step 7.1 - Placenta

Step 7.2 - Umbilical cord

Step 8 - Scan for fetal biophysical profile

- Step 9 - Scan for fetal complications of maternal disease
 - Step 9.1 - Fetal hydrops
 - Step 9.2 - Maternal diabetes
 - Step 9.3 - Maternal hypertension and pre-eclampsia
 - Step 9.4 - Other maternal diseases
- Step 10 - Scan for premature labor
 - Step 10.1 - Cervical assessment

Ultrasound of Fetal Anomalies for Medical Professionals

Description

This module teaches you how to prepare for and perform a targeted fetal anomaly ultrasound evaluation, and how to identify various fetal anomalies.

Learning objectives

- Describe and recognize on images abnormalities of the following: cranium, face, neck, vertebral column, thorax, lungs, anterior abdominal wall, hepatobiliary system, gastrointestinal tract, abdomen, urinary tract, genitalia, extremities, skeleton, umbilical cord, circulatory system.
- Describe congenital heart abnormalities and fetal abnormalities associated with the fetal thorax.
- Discuss the use of genetic testing in pregnancy, including amniocentesis, chorionic villus sampling (CVS), and nuchal translucency.
- Explain procedures related to fetal therapies.
- Describe and recognize on images abnormalities of chromosomes.

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- Introduction
- Step 1 - Select the transducer
- Step 2 - Commence the targeted fetal anomaly scanning protocol
 - Step 2.1 - Patient position
 - Step 2.2 - Scan plane
 - Step 2.3 - Targeted fetal anomaly protocol image requirements
 - Step 2.3.1 - Fetal lie, life, number, presentation, and situs
 - Step 2.3.2 - Maternal uterus and adnexae
 - Step 2.3.3 - Amniotic fluid and placental location
 - Step 2.3.4 - Fetal biometry
 - Step 2.3.5 - Fetal anatomy
 - Step 2.4 - Common image labeling
 - Step 2.5 - Troubleshooting
- Step 3 - Perform targeted fetal anomaly evaluation
 - Step 3.1 - Scan the fetal head and face
 - Step 3.2 - Scan the fetal spine
 - Step 3.3 - Scan the fetal thorax and heart
 - Step 3.4 - Scan the abdomen and pelvis
 - Step 3.5 - Scan the fetal limbs and extremities

- Step 4 - Genetic testing techniques and common genetic conditions identified by ultrasound
 - Step 4.1 - Maternal serum markers
 - Step 4.2 - Nuchal translucency
 - Step 4.3 - Chorionic villus sampling
 - Step 4.4 - Amniocentesis
- Step 5 - Fetal therapies under ultrasound guidance
 - Step 5.1 - Cordocentesis
 - Step 5.2 - Umbilical cord therapies
 - Step 5.3 - Fetal shunting procedures
 - Step 5.4 - Embryo reduction and selective fetocide

Ultrasound of Female Reproductive Organs for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the female reproductive system.

Learning objectives

- Describe and demonstrate the protocol for sonographic scanning of the female pelvis, including transabdominal and endovaginal scanning.
- Identify and explain the anatomy and physiology of the female pelvis on diagrams and sonograms.
- Describe and demonstrate Doppler evaluation of the female pelvis, including uterus and ovaries.
- Identify on images, common abnormalities and pathologies of the uterus and adnexa, including fallopian tubes, ovaries, and the appearance and locations of the various types of intrauterine contraceptive devices.
- Describe the sonographic evaluation and follow-up of the infertile patient.
- Describe the interventional and post-operative uses of ultrasound.
- Differentiate the sonographic appearances of the female reproductive organs in relation to the menstrual cycle, the use of contraceptives and hormone replacement, and following chemotherapy.

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Introduction

Step 1 - Select transducer

Step 2 - Begin scanning procedure of the female reproductive system

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.2.1 - Scan plane transabdominal

Step 2.2.2 - Scan plane endovaginal

Step 2.3 - Standard female pelvis image requirements

Step 2.3.1 - Transabdominal protocol

Step 2.3.2 - Endovaginal protocol

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

- Step 3 - Scan the uterus with the transabdominal approach
 - Step 3.1 - Scan the uterus in the longitudinal plane
 - Step 3.2 - Scan the uterus in the transverse plane
 - Step 3.3 - Sonographic features of the normal uterus
 - Step 3.4 - Sonographic features of uterine variants
- Step 4 - Scan the ovaries and adnexa with the transabdominal approach
 - Step 4.1 - Scan the ovaries and adnexae in the longitudinal and transverse planes
 - Step 4.2 - Sonographic features of the normal ovaries and adnexa
 - Step 4.3 - Sonographic features of variants of the ovaries and adnexa
- Step 5 - Scan the uterus with the endovaginal approach
 - Step 5.1 - Scan the uterus in the longitudinal plane
 - Step 5.2 - Scan the uterus in the coronal plane
- Step 6 - Scan the ovaries and adnexae with the endovaginal approach
 - Step 6.1 - Scan the ovaries and adnexae in the coronal and longitudinal planes

Ultrasound of the Female Breast for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the breast.

Learning objectives

- Describe and demonstrate the protocol for sonographic scanning of the breast, including the clock and quadrant methods, and targeted examinations based on mammographic findings.
- Describe the various diagnostic pathways that may lead to a sonographic breast examination, and explain how the ultrasound findings are correlated with other imaging modalities.
- Identify and describe sonographic images of benign and malignant features and common breast pathologies.
- Explain biopsy techniques for breast tumors.
- Define and use related medical terminology.

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Introduction

Step 1 - Select the transducer

Step 2 - Begin scanning procedure of the breast

Step 2.1 - Patient position

Step 2.2 - Scan planes

Step 2.2.1 - Radial scan plane

Step 2.2.2 - Anti-radial scan plane

Step 2.2.3 - Transverse scan plane

Step 2.2.4 - Longitudinal (sagittal) scan plane

Step 2.3 - Standard breast protocol image requirements

Step 2.3.1 - Clock method

Step 2.3.2 - Quadrant method

Step 2.3.3 - Targeted breast examination

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

- Step 3 - Scan the breast
 - Step 3.1 - Clock method
 - Step 3.1.1 - Scan the breast in the radial plane
 - Step 3.1.2 - Scan the breast in the anti-radial plane
 - Step 3.2 - Quadrant method
 - Step 3.2.1 - Scan the breast in the longitudinal plane
 - Step 3.2.2 - Scan the breast in the transverse plane
 - Step 3.2.3 - Obtain representative images from each quadrant
 - Step 3.3 - Targeted examination
 - Step 3.3.1 - Scan the quadrant in the longitudinal plane
 - Step 3.3.2 - Scan the quadrant in the transverse plane
 - Step 3.4 - Sonographic features of a normal breast
 - Step 3.5 - Sonographic features of breast variants
- Step 4 - Scan the nipple and sub-areolar tissue
 - Step 4.1 - Scan the nipple and areola in the longitudinal and transverse planes
 - Step 4.2 - Sonographic features of the nipple and sub-areolar tissue
- Step 5 - Scan the axilla
 - Step 5.1 - Scan the axilla in the longitudinal plane
 - Step 5.2 - Scan the axilla in the transverse plane
- Step 6 - Biopsy techniques
 - Step 6.1 - Preparation
 - Step 6.1.1 - Equipment
 - Step 6.1.2 - Patient
 - Step 6.1.3 - Operator
 - Step 6.2 - Techniques
 - Step 6.2.1 - Aspiration of cysts
 - Step 6.2.2 - Fine-needle aspiration cytology
 - Step 6.2.3 - Drainage procedures
 - Step 6.2.4 - Large-core needle biopsy
 - Step 6.2.5 - Vacuum-assisted needle biopsy
 - Step 6.2.6 - Pre-operative needle (wire) localization
 - Step 6.2.7 - Open (surgical) biopsy
 - Step 6.2.8 - Sentinel node biopsy

Ultrasound of the Carotid, Subclavian and Vertebral Arteries for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the common carotid, internal carotid, external carotid, vertebral, and subclavian arteries.

Learning objectives

- Describe the principles of Doppler ultrasound
- Perform ultrasound scans of the carotid, vertebral, and subclavian arteries to include 2D anatomy, color flow, and Doppler analysis
- Scan and identify:
 - Common carotid artery
 - Internal carotid artery
 - External carotid artery

- Vertebral artery
- Subclavian artery
- Describe various methods of carotid interpretation
- Differentiate normal and abnormal sonographic appearances of the carotid, vertebral, and subclavian arteries
- Differentiate and describe common pathologies of the carotid, vertebral, and subclavian arteries on sonographic images

Table of contents

Introduction

Step 1 - Begin scanning procedure of the carotid arteries

Step 2 - Commence the carotid, subclavian, and vertebral vessel scanning protocol

Step 2.1 - Patient Position

Step 2.2 - Scan Plane

Step 2.3 - Images required

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of the normal neck vessels

Step 2.6 - Variants

Step 2.7 - Troubleshooting

Step 3 - Scan and identify the branches of the carotid artery in the longitudinal and transverse planes

Step 3.1 - Perform a survey scan

Step 3.2 - Identify the branches of the CCA

Step 3.3 - Pathology of the carotid arteries

Step 4 - Scan the vertebral arteries

Step 4.1 - Evaluate vertebral artery flow

Step 4.2 - Pathology of vertebral arteries

Step 5 - Scan the subclavian arteries

Step 5.1 - Pathology of subclavian arteries

Step 6 - Carotid interpretation

Ultrasound of the Lower Limb Arteries for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the lower limb arteries.

Learning objectives

- Discuss color duplex imaging of the lower limb arteries:
 - Aorto-iliac segment
 - Femoral-popliteal arterial segment
 - Popliteal artery
 - Tibial artery

Table of contents

Introduction

Step 1 - Begin scanning procedure of the lower limb arteries

- Step 2 - Commence the lower limb arterial scanning protocol
 - Step 2.1 - Patient position
 - Step 2.2 - Scan plane
 - Step 2.3 - Images required
 - Step 2.4 - Common image labeling
 - Step 2.5 - Sonographic features of the normal lower limb arteries
 - Step 2.6 - Variants
 - Step 2.7 - Troubleshooting
- Step 3 - Scan the femoropopliteal segment in the longitudinal and transverse planes
 - Step 3.1 - Interrogate the distal external iliac and common femoral artery
 - Step 3.2 - Interrogate the length of the femoral artery
 - Step 3.3 - Pathology of the femoral artery
- Step 4 - Scan the popliteal arteries in the longitudinal and transverse planes
 - Step 4.1 - Pathology of the popliteal artery
- Step 5 - Scan the tibial arteries in the longitudinal and transverse planes
 - Step 5.1 - Obtain images of the posterior tibial and peroneal arteries
 - Step 5.2 - Obtain images of the anterior tibial artery
 - Step 5.3 - Pathology of the tibial arteries
- Step 6 - Scan the aorto-iliac segment in the longitudinal and transverse planes
 - Step 6.1 - Obtain images of the distal abdominal aorta
 - Step 6.2 - Obtain images of the common iliac arteries
 - Step 6.3 - Obtain images of the external iliac arteries
 - Step 6.4 - Pathology of the aorto-iliac segment
- Step 7 - Scan arterial bypass grafts and stents
 - Step 7.1 - Obtain images of grafts or stents
 - Step 7.2 - Pathology of bypass grafts and stents

Ultrasound of the Lower Limb Veins for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the lower limb veins.

Learning objectives

- Discuss venous anatomy and hemodynamics
- Perform an ultrasound scan of the lower extremity venous vessels to include 2D anatomy, color flow, and Doppler analysis (valve competency and vessel patency)
 - Scan and identify
 - Common femoral vein (CFV)
 - Saphenofemoral junction (SFJ)
 - Superficial femoral vein (SFV)
 - Saphenous vein, popliteal vein
 - Compress with probe frequently to determine compressibility
 - Evaluate for thrombus
 - Evaluate for flow with distal augmentation
 - Evaluate valve competence with proximal compression
 - Continue the evaluation for posterior tibial and peroneal veins

Table of contents

Introduction

Step 1 - Select the transducer and obtain images of the lower limb veins

Step 2 - Commence the lower limb venous scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Images required

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of normal lower limb veins

Step 2.6 - Variants

Step 2.7 - Troubleshooting

Step 3 - Scan and identify the common femoral vein, femoral vein, and popliteal vein

Step 4 - Compress with probe frequently to determine compressibility

Step 5 - Evaluate for thrombus

Step 5.1 - Pathology of venous thrombosis

Step 6 - Valve competence with Valsalva, augmentation, and photoplethysmography (PPG)

Step 6.1 - Pathology of venous incompetence

Step 7 - Continue evaluation of posterior tibial and peroneal veins

Vessel Mapping for Medical Professionals

Description

This module teaches you how to prepare for and perform preoperative vein-artery ultrasound mapping, and how to scan for signs of upper limb venous thrombosis.

Learning objectives

- Discuss preoperative vein-artery mapping for the following procedures:
 - Sclerotherapy
 - Perforator veins and varicosities
 - Radial artery harvest
 - Arteriovenous fistula for dialysis
 - Suitability for venous bypass graft and harvest
- Discuss venous imaging of the upper extremity for deep venous thrombosis

Table of contents

Introduction

Step 1 - Begin scanning procedure of the upper or lower limb vessels as required

Step 2 - Commence the scanning protocol for upper limb veins, or the appropriate mapping procedure

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Images required

Step 2.4 - Common image labeling

Step 2.5 - Sonographic features of normal veins

Step 2.6 - Variants

Step 2.7 - Troubleshooting

Step 3 - Scan the upper limb veins in the longitudinal and transverse planes to exclude deep venous thrombosis

Step 3.1 - Pathology of upper limb venous thrombosis

- Step 4 - Upper limb mapping procedure for arteriovenous fistula (AVF)
- Step 5 - Sclerotherapy mapping
- Step 6 - Perforator veins and varicosity marking
- Step 7 - Radial artery harvest
- Step 8 - Venous bypass graft suitability and harvest

Ultrasound of Pediatric Abdomen for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the pediatric abdomen, and to assess the common pediatric pathologies.

Learning objectives

- Identify and describe sonographic images of common pediatric pathologies, including hypertrophic pyloric stenosis, appendicitis, and intussusception.
- Identify the anatomy of the neonatal kidney and adrenal gland on diagrams and sonograms.
- Identify and describe sonographic images of pathologies of the kidney and adrenal gland.
- Describe and demonstrate the protocols for sonographic scanning of the pediatric abdomen.

Table of contents

Introduction

Step 1 - Begin scanning procedure of the pediatric abdomen

Step 2 - Commence the pediatric abdomen scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard pediatric abdomen protocol image requirements

Step 2.3.1 - Pylorus protocol

Step 2.3.2 - Appendix protocol

Step 2.3.3 - Bowel protocol

Step 2.3.4 - Kidney protocol

Step 2.3.5 - Adrenal glands protocol

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

Step 3 - Scan the pylorus in longitudinal and transverse planes

Step 3.1 - Scan the pylorus in the transverse plane

Step 3.2 - Scan the pylorus in the longitudinal plane

Step 4 - Scan the appendix in transverse and longitudinal planes

Step 4.1 - Scan the appendix in the transverse plane

Step 4.2 - Scan the appendix in the longitudinal plane

Step 5 - Scan the bowels in longitudinal and transverse planes

Step 5.1 - Scan the segment of bowel in the longitudinal plane

Step 5.2 - Scan the segment of bowel in the transverse plane

Step 6 - Scan the kidneys in longitudinal and transverse planes

Step 6.1 - Scan the right kidney

Step 6.1.1 - Scan the right kidney in the longitudinal plane

Step 6.1.2 - Scan the right kidney in the transverse plane

Step 6.2 - Scan the left kidney

- Step 7 - Scan the adrenal glands in longitudinal and transverse planes
 - Step 7.1 - Scan the right adrenal gland
 - Step 7.1.1 - Scan the right adrenal gland in the longitudinal plane
 - Step 7.1.2 - Scan the right adrenal gland in the transverse plane
 - Step 7.2 - Scan the left adrenal gland

Ultrasound of the Pediatric Brain for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the pediatric brain, and to assess the common developmental defects.

Learning objectives

- Identify the anatomy of the neonatal brain.
- Describe the protocol for ultrasound evaluation of the neonatal brain.
- Describe developmental defects in the neonatal brain.
- Describe and recognize on images neural tube defects of the neonate.
- Describe and recognize on images neonatal brain lesions.
- Define and use related medical terminology.

Table of contents

Introduction

- Step 1 - Begin scanning procedure of the pediatric head
- Step 2 - Commence the neonatal head scanning protocol
 - Step 2.1 - Patient position
 - Step 2.2 - Scan plane
 - Step 2.3 - Standard neonatal head protocol image requirements
 - Step 2.4 - Common image labeling
 - Step 2.5 - Troubleshooting
- Step 3 - Scan the neonatal head in the coronal and sagittal planes
 - Step 3.1 - Scan the neonatal head in the coronal plane
 - Step 3.1.1 - Obtain the first anterior coronal view
 - Step 3.1.2 - Obtain the second anterior coronal view
 - Step 3.1.3 - Obtain the first midcoronal view
 - Step 3.1.4 - Obtain the second midcoronal view
 - Step 3.1.5 - Obtain the first occipital coronal view
 - Step 3.1.6 - Obtain the second occipital coronal view
 - Step 3.2 - Scan the neonatal head in the sagittal and parasagittal planes
 - Step 3.2.1 - Obtain a midline view
 - Step 3.2.2 - Obtain the first parasagittal view on the right
 - Step 3.2.3 - Obtain the second parasagittal view on the right
 - Step 3.2.4 - Obtain the third parasagittal view on the right
 - Step 3.2.5 - Obtain the left parasagittal views
 - Step 3.3 - Scan the superficial aspect of the neonatal head in the coronal and sagittal planes
 - Step 3.3.1 - Scan the superficial aspect of the neonatal head in the coronal plane
 - Step 3.3.2 - Scan the superficial aspect of the neonatal head in the sagittal plane

Ultrasound of the Pediatric Hip and Spine for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the pediatric spine and hip.

Learning objectives

- Identify on diagrams and sonograms the anatomy of the neonatal hip and spine.
- Describe the protocol for ultrasound evaluation of the neonatal hip and spine.
- Describe developmental defects in the neonatal hip and spine.
- Describe and recognize on images defects of the neonatal spine.
- Describe and recognize on images neonatal hip anomalies.
- Identify steps for relevant protocols.
- Define and use related medical terminology.

Table of contents

Introduction

Step 1 - Begin scanning procedure of the hip or spine

Step 2 - Commence the hip and spine scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard hip and spine protocol image requirements

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

Step 3 - Scan the hips in coronal and transverse planes

Step 3.1 - Scan the right neonatal hip in the coronal plane

Step 3.1.1 - Neutral view

Step 3.1.2 - Flexion view

Step 3.2 - Scan the right neonatal hip in the transverse plane

Step 3.2.1 - Neutral view

Step 3.2.2 - Flexion view

Step 3.3 - Scan the left neonatal hip in the coronal and transverse planes

Step 3.4 - Scan the pediatric hip with an anterior approach

Step 3.4.1 - Scan the pediatric hip in the longitudinal plane

Step 3.4.2 - Scan the pediatric hip in the transverse plane

Step 4 - Scan the neonatal spine in sagittal and axial planes

Step 4.1 - Scan the neonatal spine in the sagittal plane

Step 4.2 - Scan the neonatal spine in the axial plane

Ultrasound of Male Reproductive Organs for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the male reproductive system.

Learning objectives

- Describe and demonstrate the protocol for sonographic scanning of the scrotum.
- Identify and describe sonographic images of congenital abnormalities of the scrotum.
- Identify and describe sonographic images of pathologies of the scrotum.
- Identify and describe sonographic images of extratesticular disease processes.
- Identify the anatomy and explain the physiology of the prostate on diagrams and sonograms.
- Describe and demonstrate the protocol for transabdominal and endorectal sonographic scanning of the prostate.
- Identify and describe sonographic images of benign and malignant pathologies of the prostate, including benign hyperplasia, prostatitis, carcinoma, and calculi.
- Explain the technique for prostate biopsy.
- Define the criteria for an ultrasound appearance of prostate tumor staging.
- Explain the technique for radiation seed implantation.

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Introduction

Step 1 - Select the transducer

Step 2 - Begin scanning procedure of the male reproductive system

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.2.1 - Scan plane of the scrotum and testes

Step 2.2.2 - Scan plane of the transabdominal prostate

Step 2.2.3 - Scan plane of the endorectal prostate

Step 2.3 - Standard male reproductive system protocol image requirements

Step 2.3.1 - Scrotum and testes protocol

Step 2.3.2 - Transabdominal prostate protocol

Step 2.3.3 - Endorectal prostate protocol

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

Step 3 - Scan the scrotum and testes in longitudinal and transverse planes

Step 3.1 - Scan the scrotum and testes in the longitudinal plane

Step 3.2 - Scan the scrotum and testes in the transverse plane

Step 3.3 - Sonographic features of a normal scrotum

Step 3.4 - Sonographic features of scrotum variants

Step 4 - Scan the prostate in longitudinal and transverse planes

Step 4.1 - Scan the prostate, using the transabdominal protocol

Step 4.1.1 - Scan the prostate in the longitudinal plane

Step 4.1.2 - Scan the prostate in the transverse plane

Step 4.2 - Scan the prostate using the endorectal protocol

Step 4.2.1 - Scan the prostate in the longitudinal plane

Step 4.2.2 - Scan the prostate in the axial plane

Step 4.3 - Sonographic features of a normal prostate

Step 4.4 - Sonographic appearance of prostate variants

- Step 5 - Biopsy technique
 - Step 5.1 - Technique for prostate biopsy
 - Step 5.2 - Technique for radiation seed implantation

Ultrasound of the Thyroid and Parathyroid for Medical Professionals

Description

This module teaches you how to prepare for and perform an ultrasound examination of the thyroid and parathyroid glands, and includes normal and pathological findings.

Learning objectives

- Define and use related medical terminology.
- Describe and demonstrate techniques for imaging the thyroid gland.
- Describe, and recognize on images, pathologies of the thyroid gland.
- Identify the anatomy of the parathyroid glands on diagrams and sonograms.
- Describe and demonstrate techniques for imaging the parathyroid glands.
- Describe, and recognize on images, pathologies of the parathyroid glands.
- List and describe other neck masses.
- Follow relevant protocols when scanning.

Table of contents

Introduction

Step 1 - Begin scanning procedure of the thyroid and parathyroid

Step 2 - Commence the thyroid and parathyroid scanning protocol

Step 2.1 - Patient position

Step 2.2 - Scan plane

Step 2.3 - Standard thyroid and parathyroid protocol image requirements

Step 2.4 - Common image labeling

Step 2.5 - Troubleshooting

Step 3 - Scan and measure the thyroid in the transverse and longitudinal planes

Step 3.1 - Scan and measure the thyroid in the transverse plane

Step 3.2 - Scan and measure the thyroid in the longitudinal plane

Step 4 - Scan and measure the parathyroid glands in the transverse and longitudinal planes

Step 5 - Scan the neck region in the longitudinal and transverse plans

Basic Echocardiography Techniques for Medical Professionals

Description

This module provides an introduction to echocardiography and teaches you the basic techniques required to begin echocardiographic examination of the heart.

Learning objectives

- Define and explain ultrasound terminology
- Identify orientation on the ultrasound image
- Identify and obtain echocardiographic views
- Identify cardiac landmarks
- Describe the reason for, and demonstrate, patient positioning for cardiac ultrasound examinations
- Manipulate the transducer in various planes
- Describe patient breathing techniques in order to obtain optimum images and explain the reason for the techniques
- Describe the technique for measuring structures on ultrasound images
- Write a technical impression using a standard format
- Demonstrate and describe methods for preventing musculoskeletal injury
- Explain the importance of belonging to a professional organization

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- Step 1 - Anatomical overview
 - Step 1.1 - Orientation
 - Step 1.1.1 - Anatomic directions
 - Step 1.1.2 - Scanning planes
 - Step 1.1.3 - On-screen orientation
 - Step 1.2 - Cross-sectional anatomy of the heart
 - Step 1.3 - Anatomical landmarks
 - Step 1.3.1 - Thoracic landmarks
 - Step 1.3.2 - Cardiac landmarks
 - Step 1.4 - Scanning windows
- Step 2 - Introduction to echocardiography
 - Step 2.1 - Basic cardiac physiology
 - Step 2.2 - Signs and symptoms of cardiac disease
 - Step 2.3 - Types of echocardiography (TTE, TEE, Stress echo)
 - Step 2.3.1 - Transthoracic echocardiography
 - Step 2.3.2 - Transesophageal echocardiography
 - Step 2.3.3 - Stress echocardiography
- Step 3 - Preprocedure considerations
 - Step 3.1 - Patient preparation
 - Step 3.2 - History
 - Step 3.3 - Patient position
 - Step 3.4 - Equipment
- Step 4 - Basic techniques
 - Step 4.1 - Transducer selection
 - Step 4.2 - Transducer manipulation
 - Step 4.2.1 - Sweeping
 - Step 4.2.2 - Rotating

- Step 4.2.3 - Rocking
- Step 4.3 - Transducer pressure
- Step 4.4 - Transmission gel
- Step 4.5 - Breathing
- Step 5 - Two-dimensional imaging
 - Step 5.1 - Image optimization
 - Step 5.1.1 - Sector size
 - Step 5.1.2 - Focal zones
 - Step 5.1.3 - Time gain compensation
 - Step 5.1.4 - Lateral gain compensation
 - Step 5.1.5 - Zoom
 - Step 5.1.6 - Gain
 - Step 5.1.7 - Dynamic range
 - Step 5.1.8 - Harmonics imaging
- Step 6 - M-mode
 - Step 6.1 - Image optimization
 - Step 6.1.1 - Cursor alignment
 - Step 6.1.2 - Sweep speed
 - Step 6.1.3 - Gain
- Step 7 - Doppler
 - Step 7.1 - Principles of Doppler ultrasound
 - Step 7.1.1 - Spectral Doppler
 - Step 7.1.2 - Color Doppler
- Step 8 - Standard echocardiography procedure
 - Step 8.1 - Protocol
 - Step 8.2 - Annotation
- Step 9 - 2D (B-mode) imaging
 - Step 9.1 - Parasternal long axis
 - Step 9.2 - Parasternal survey scan
 - Step 9.3 - Parasternal short axis views
 - Step 9.4 - Apical views
 - Step 9.4.1 - Apical four-chamber view
 - Step 9.4.2 - Apical five-chamber view
 - Step 9.4.3 - Apical two-chamber view
 - Step 9.4.4 - Apical long axis view
 - Step 9.5 - Subcostal views
 - Step 9.5.1 - Subcostal four-chamber view
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 - Step 9.7.1 - Example of 2D measurement in parasternal long axis view
- Step 10 - M-mode
 - Step 10.1 - M-mode parasternal long axis
 - Step 10.1.1 - M-mode images of the right and left ventricles
 - Step 10.1.2 - M-mode images of the mitral valve
 - Step 10.1.3 - M-mode images of the aortic root and the left atrium
 - Step 10.2 - Parasternal short axis M-mode
- Step 11 - Postprocedure considerations
 - Step 11.1 - Integration of test results with clinical findings
 - Step 11.2 - Patient
 - Step 11.3 - Preliminary report
- Step 10 - Secure the catheter

Basic Echocardiography Views for Medical Professionals

Description

This module follows on from Basic Echocardiography Techniques and teaches you how to obtain the views required to examine all the anatomy of the heart.

Learning objectives

- Describe and explain heart anatomy
- Describe and explain heart physiology
- List indications for ultrasound of the heart
- Echocardiography protocol:
 - Describe and explain the reason for patient preparation for echocardiography
 - Describe and explain transducer and preset selection
 - Describe and demonstrate the reason for patient positioning for echocardiography
 - Describe and demonstrate the use of scanning planes and the echocardiography protocol
 - Demonstrate different transducer positions to obtain optimal images
 - Describe and explain the reason for patient breathing techniques in order to obtain optimum images
- Identify and obtain images of heart, ascending aorta, main pulmonary arteries, and great veins
- Obtain measurements of various structures within the heart
- Differentiate normal and abnormal sonographic appearances of the heart
- Explain the Patient's Bill of Rights, HIPAA Privacy Rule, and Patient Safety Act (see reference)

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Introduction

Step 1 - Obtain left parasternal 2D views

Step 1.1 - Locate the parasternal window

Step 1.2 - Obtain measurements of the left ventricle

Step 1.2.1 - Obtain M-mode images of the right and left ventricles

Step 1.3 - Obtain images of the mitral valve

Step 1.3.1 - Obtain M-mode images of the mitral valve

Step 1.4 - Obtain images of the aortic valve

Step 1.4.1 - Obtain M-mode images of the aortic root and the left atrium

Step 1.5 - Obtain images of the right ventricular inflow tract

Step 1.6 - Obtain images of the right ventricular outflow tract

Step 2 - Obtain left parasternal short axis views

Step 2.1 - Obtain images at mitral valve level

Step 2.2 - Obtain images of the myocardium at the papillary muscles

Step 2.3 - Obtain images of the myocardium at the apex

Step 2.4 - Obtain images of the aortic valve

Step 2.5 - Obtain images of the tricuspid valve

Step 2.6 - Obtain images of the right ventricular outflow tract

Step 3 - Apical views

Step 3.1 - Locate the apical window

Step 3.2 - Apical four-chamber view

Step 3.2.1 - Obtain zoomed images of the mitral valve

Step 3.2.2 - Obtain zoomed images of the tricuspid valve

Step 3.3 - Apical five-chamber view

Step 3.3.1 - Obtain zoomed images of the aortic valve

Step 3.4 - Apical two-chamber view

- Step 3.5 - Apical long axis view
- Step 4 - Subcostal views
 - Step 4.1 - Locate the subcostal window
 - Step 4.2 - Subcostal four-chamber view
 - Step 4.3 - Subcostal interatrial septal view
 - Step 4.4 - Subcostal inferior vena cava and hepatic veins view
 - Step 4.5 - Subcostal descending aorta view
- Step 5 - Suprasternal views
 - Step 5.1 - Locate the suprasternal aortic arch window

Cardiovascular Pathology for Medical Professionals

Description

An introduction to pathology of the cardiovascular system, aimed at cardiovascular sonographers and other medical professionals who need an understanding of cardiac pathology.

Learning objectives

- Define and use medical terminology related to cardiovascular pathology
- Describe cell injury and repair
- Explain the mechanisms of inflammation
- Explain the importance of obtaining a full clinical history of the patient
- Describe cellular changes that result in neoplasia
- Differentiate between benign and malignant tumors, and give examples of each
- Describe mechanisms of fluid disorders, and give examples
- Describe mechanisms of hemodynamic disorders, and give examples
- Describe disorders and possible treatments of the venous system
- Describe disorders and possible treatments of the arterial system
- Differentiate between common signs and symptoms of cardiovascular and venous diseases
- Describe diagnostic tests that are used to diagnose cardiovascular disease, and their application to certain diseases
- Describe cardiac catheterization and interventional procedures for coronary artery disease
- Describe acute cardiac conditions and emergency procedures
- Discuss techniques and benefits of cardiac rehabilitation

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- Introduction
- Step 1 - Cell pathology
 - Step 1.1 - Normal cell function
 - Step 1.2 - Cell injury and repair
 - Step 1.3 - Inflammation
- Step 2 - Neoplasia
 - Step 2.1 - Benign neoplasms
 - Step 2.2 - Malignant neoplasms
 - Step 2.3 - Cardiac tumors
- Step 3 - Fluid and hemodynamic disorders
 - Step 3.1 - Body fluids
 - Step 3.2 - Edema
 - Step 3.3 - Hyperemia

- Step 3.4 - Hemorrhage
- Step 3.5 - Thrombosis
- Step 3.6 - Embolism
- Step 3.7 - Infarction
- Step 3.8 - Shock
- Step 4 - Diseases of the arterial system
 - Step 4.1 - Atherosclerosis
 - Step 4.2 - Coronary artery disease
 - Step 4.2.1 - Angina
 - Step 4.2.2 - Myocardial infarction or heart attack (MI)
 - Step 4.3 - Peripheral Vascular Disease
 - Step 4.4 - Arteritis
- Step 5 - Diseases of the venous system
 - Step 5.1 - Varicose veins
 - Step 5.2 - Deep vein thrombosis (DVT)
- Step 6 - Hypertension
- Step 7 - Congestive heart failure
- Step 8 - Cardiomyopathy
 - Step 8.1 - Dilated cardiomyopathy
 - Step 8.2 - Hypertrophic cardiomyopathy
 - Step 8.3 - Restrictive cardiomyopathy
- Step 9 - Inflammatory heart disease
 - Step 9.1 - Infective endocarditis
 - Step 9.2 - Myocarditis
 - Step 9.3 - Pericarditis
 - Step 9.4 - Rheumatic heart disease
- Step 10 - Heart valve disorders
 - Step 10.1 - Mitral valve
 - Step 10.1.1 - Mitral stenosis
 - Step 10.1.2 - Mitral regurgitation
 - Step 10.2 - Aortic Valve
 - Step 10.2.1 - Aortic stenosis
 - Step 10.2.2 - Aortic regurgitation
- Step 11 - Congenital heart disease

Doppler Techniques for Medical Professionals

Description

This module teaches you how to prepare for and perform spectral and color Doppler scans of the heart.

Learning objectives

- Review normal cardiac anatomy.
- Describe and demonstrate the use of spectral Doppler and color Doppler instrumentation.
- Identify and describe anatomy represented on spectral Doppler tracings.
- Differentiate between normal and abnormal anatomy represented on color images.
- Describe and demonstrate tissue Doppler.
- Describe and identify tissue Doppler wave forms.
- Define and use related medical terminology.
- Explain the Patient Privacy Rule (HIPAA) and Patient Safety Act.

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Introduction

- Step 1 - Obtain the left parasternal long axis view
 - Step 1.1 - Scan the mitral valve, using color
 - Step 1.2 - Scan the aortic valve, using color
- Step 2 - Obtain the left parasternal short axis view
 - Step 2.1 - Scan the aortic valve, using color
 - Step 2.2 - Scan the tricuspid valve, using color
 - Step 2.3 - Scan the tricuspid valve, using pulsed wave Doppler
 - Step 2.4 - Scan the tricuspid valve, using continuous wave Doppler
 - Step 2.5 - Scan the pulmonary valve, using color
 - Step 2.6 - Scan the pulmonary valve, using pulsed wave Doppler
 - Step 2.7 - Scan the pulmonary artery, using continuous wave Doppler
 - Step 2.8 - Scan the right ventricular outflow tract, using pulsed wave Doppler
 - Step 2.9 - Scan the right ventricular outflow tract, using continuous wave Doppler
- Step 3 - Obtain the apical four-chamber view
 - Step 3.1 - Scan the mitral valve, using color
 - Step 3.2 - Scan the mitral valve orifice, using pulsed wave Doppler
 - Step 3.3 - Scan the mitral valve, using continuous wave Doppler
 - Step 3.4 - Scan the tricuspid valve, using color
 - Step 3.5 - Scan the tricuspid valve orifice, using pulsed wave Doppler
 - Step 3.6 - Scan the tricuspid valve, using continuous wave Doppler
 - Step 3.7 - Scan the pulmonary vein, using pulsed wave Doppler
 - Step 3.8 - Perform tissue Doppler imaging of the septal annulus, using pulsed wave Doppler
 - Step 3.9 - Perform tissue Doppler imaging of the lateral annulus, using pulsed wave Doppler
- Step 4 - Obtain the apical five-chamber view
 - Step 4.1 - Scan the left ventricular outflow tract, using color
 - Step 4.2 - Scan the left ventricular outflow tract, using pulsed wave Doppler
 - Step 4.3 - Scan the aortic valve, using color
 - Step 4.4 - Scan the aortic valve, using continuous wave Doppler
- Step 5 - Obtain the subcostal view
 - Step 5.1 - Scan the inferior vena cava and hepatic veins, using color
 - Step 5.2 - Scan the abdominal aorta, using pulsed wave Doppler
 - Step 5.3 - Obtain a four-chamber view of the interatrial septum, using color
- Step 6 - Obtain the suprasternal view
 - Step 6.1 - Scan the aorta long axis, using color
 - Step 6.2 - Scan the aorta long axis, using pulsed wave Doppler
 - Step 6.3 - Scan the aorta long axis, using continuous wave Doppler
 - Step 6.4 - Scan the main pulmonary artery, using color
 - Step 6.5 - Continuous wave Doppler of the ascending aorta, with Pedoff probe
- Step 7 - Obtain the right parasternal long axis view
 - Step 7.1 - Scan the thoracic aorta, using continuous wave Doppler with Pedoff probe

Echocardiography Assessment of Cardiac Wall Motion for Medical Professionals

Description

This module teaches you how to how to assess cardiac wall motion and diastolic function.

Learning objectives

- Review cardiac anatomy.
- Describe the pathologies that may affect the cardiac chambers.
- Calculate linear and volume measurements of the cardiac chambers.
- Evaluate the wall motion of the left ventricle.
- Describe and demonstrate special measurements used in echocardiography.
- Define and use related medical terminology.

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Introduction

Step 1 - Obtain the parasternal long axis view in 2D

Step 1.1 - Scan the aorta

Step 1.2 - Scan the left ventricle and myocardium

Step 1.3 - Scan the left ventricle in M-mode

Step 1.4 - Scan the aortic root and left atrium in M-mode

Step 2 - Obtain the parasternal short axis view in 2D

Step 2.1 - Evaluate the basal left ventricle

Step 2.2 - Evaluate the mid left ventricle

Step 2.3 - Evaluate the left ventricular mass

Step 2.3.1 - Left ventricular mass measurements

Step 2.4 - Evaluate the apical left ventricle

Step 3 - Obtain the apical four-chamber view in 2D

Step 3.1 - Scan the ventricles and atria

Step 3.2 - Scan the mitral valve, using pulsed wave Doppler

Step 3.3 - Scan the mitral valve, using color M-mode Doppler

Step 3.3.1 - Color M-mode flow propagation velocity measurements

Step 3.4 - Perform tissue Doppler imaging of the lateral mitral annulus, using pulsed wave Doppler

Step 3.5 - Perform tissue Doppler imaging of the septal mitral annulus, using pulsed wave Doppler

Step 3.6 - Scan the pulmonary vein, using pulsed wave Doppler

Step 3.7 - Scan the left ventricle and obtain the volume

Step 3.7.1 - Biplane Simpson's method for left ventricle volume measurement

Step 3.8 - Scan the left atrium and obtain the volume

Step 3.8.1 - Biplane area-length measurements of the left atrium

Step 3.9 - Scan the right ventricle for dimension

Step 3.9.1 - Right ventricle basal diameter measurement

Step 3.10 - Scan the right atrium and obtain the volume

Step 3.10.1 - Biplane area-length of the right atrium

Step 4 - Obtain the apical two-chamber view

Step 4.1 - Scan the left ventricle to evaluate the myocardium

Step 4.2 - Scan the left ventricle to obtain the volume

Step 4.2.1 - Biplane Simpson's method for measuring left ventricle volume

Step 5 - Obtain the apical long axis view

Step 5.1 - Scan the left ventricle in apical long axis to evaluate the myocardium

Echocardiography Assessment of Endocarditis/Pericarditis for Medical Professionals

Description

This module teaches you how to set up and perform echocardiography assessment of endocarditis and pericarditis.

Learning objectives

- Describe and demonstrate the sonographic appearance of subacute bacterial endocarditis, common cardiac tumors, and thrombus.
- Describe and demonstrate the hemodynamics and pathophysiology associated with pericardial diseases, including tamponade.
- Define and use related medical terminology.

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Introduction

Step 1 - Obtain a parasternal long axis view

Step 1.1 - Scan the aortic valve, using 2D

Step 1.2 - Scan the mitral valve, using 2D

Step 1.3 - Scan the aortic valve, using color Doppler

Step 1.4 - Scan the mitral valve, using color Doppler

Step 2 - Obtain the apical four-chamber view

Step 2.1 - Scan the mitral valve, using 2D

Step 2.2 - Scan the tricuspid valve, using 2D

Step 2.3 - Scan the mitral valve, using pulsed wave Doppler

Step 2.4 - Scan the mitral valve, using continuous wave Doppler

Step 2.5 - Scan the tricuspid valve, using pulsed wave Doppler

Step 2.6 - Scan the tricuspid valve, using continuous wave Doppler

Step 2.7 - Scan the pulmonary vein, using pulsed wave Doppler

Step 2.8 - Perform tissue Doppler imaging of the lateral mitral annulus, using pulsed wave Doppler

Step 2.9 - Perform tissue Doppler imaging of the septal mitral annulus, using tissue Doppler

Step 2.10 - Scan the left ventricle and obtain the volume

Step 2.11 - Scan the left atrium and obtain the volume

Step 2.12 - Scan the right ventricle for dimension

Step 2.13 - Scan the right atrium and obtain the volume

Step 3 - Obtain the apical five-chamber view

Step 3.1 - Scan the aortic valve, using 2D

Step 3.2 - Scan the aortic valve, using continuous wave Doppler

Step 3.3 - Scan the left ventricular outflow tract, using pulsed wave Doppler

Step 4 - Obtain the apical two-chamber view

Step 4.1 - Scan the left ventricle to obtain the volume

Step 5 - Obtain the subcostal view

Step 5.1 - Obtain the four-chamber view, in 2D

Step 5.2 - Obtain the inferior vena cava and hepatic veins view, in 2D

Step 5.3 - Scan the inferior vena cava and hepatic veins, using color

Embryology and Echocardiography Assessment of Congenital Heart Disease for Medical Professionals

Description

This theory module teaches you about cardiac embryology and common fetal congenital abnormalities.

Learning objectives

- Define and use related medical terminology.
- Understand and discuss cardiac embryology.
- List and describe common congenital abnormalities.
- Identify and describe the sonographic appearance of common congenital abnormalities.

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Introduction

Step 1 - Fetal heart development

Step 1.1 - Early heart development

Step 1.2 - Completion of heart development

Step 1.2.1 - Sinus venosus remodeling

Step 1.2.2 - Atrial septation

Step 1.2.3 - Ventricular septation

Step 1.2.4 - Truncus arteriosus and bulbus cordis septation

Step 1.2.5 - Cardiac valve development

Step 1.2.6 - Development of the heart wall

Step 1.3 - Development of the conduction system

Step 1.4 - The primitive circulation

Step 1.5 - Fetal circulatory system

Step 1.5.1 - Vascular remodeling

Step 1.5.2 - Fetal circulation

Step 1.6 - Postnatal circulation

Step 2 - Congenital abnormalities

Step 2.1 - Atrial septal defect

Step 2.2 - Ventricular septal defect

Step 2.3 - Patent foramen ovale

Step 2.4 - Patent ductus arteriosus

Step 2.5 - Transposition of the great arteries

Step 2.6 - Marfan's syndrome

Step 2.7 - Coarctation of the aorta

Step 2.8 - Tetralogy of Fallot

Step 2.9 - Ebstein anomaly

Step 2.10 - Pulmonary stenosis

Transesophageal and Stress Echocardiography for Medical Professionals

Description

This SIMTICS module teaches you how to prepare for and assist with transesophageal echocardiography (TEE). It also covers how to perform stress echocardiography, where the heart is imaged under simulated exercise conditions.

Learning objectives

- Describe and discuss transesophageal echocardiography (TEE).
- Discuss the indications and protocols for TEE, and identify standard TEE views.
- Describe and discuss stress echocardiography.
- Evaluate normal and abnormal stress echocardiography images.
- Define and use related medical terminology.

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Introduction

Step 1 - Preparation

Step 1.1 - Equipment preparation

Step 1.2 - Patient preparation

Step 1.2.1 - Position the patient

Step 1.2.2 - Apply ECG electrodes

Step 1.3 - Operator preparation

Step 2 - Select the transducer and apply the gel

Step 3 - Obtain the four primary views

Step 3.1 - Obtain the 0 degree view

Step 3.2 - Obtain the 45 degree view

Step 3.3 - Obtain the 90 degree view

Step 3.4 - Obtain the 135 degree view

Step 4 - Obtain the longitudinal TEE views

Step 4.1 - Obtain the 90 degree counterclockwise (slight leftward tip placement) rotation view

Step 4.2 - Obtain the 90 degree clockwise (slight rightward tip placement) rotation view

Step 4.3 - Obtain the 100 degree view (neutral tip position)

Step 5 - Obtain the transgastric multiplane views

Step 5.1 - Obtain the 0 degree view

Step 5.2 - Obtain the 90 degree view

Step 5.3 - Obtain the 120 degree view

Step 6 - Obtain the pulmonary artery bifurcation views

Step 6.1 - Obtain the 0 degree view

Step 7 - Obtain the left atrial appendage views

Step 7.1 - Obtain the 90 degree view

Step 8 - Obtain the thoracic aorta views

Step 8.1 - Obtain the 0 degree view

Step 8.2 - Obtain the 90 degree view

Step 9 - Remove probe

Step 10 - Complete the procedure

Step 11 - Stress echocardiography

Step 11.1 - Types of stress echocardiography

Step 11.2 - Scanning protocol for stress echocardiography

Step 11.2.1 - Clinical indications

Step 11.2.2 - Protocol

Step 11.3 - Normal stress echocardiography

Step 11.4 - Abnormal stress echocardiography

Step 11.5 - Regional wall motion analysis

Step 11.6 - Comparison of stress echocardiography with nuclear imaging