

# Abdominopelvic Sonography

## Class

DMSO 1441

Normal anatomy and physiology of the abdominal and pelvic cavities as related to scanning techniques, transducer selection, and scanning protocols. (3-4-0)

## Course Learning Objectives

Identify the sonographic appearances of normal abdominal and pelvic structures; explain physiology of abdominal and pelvic organs; and describe the appropriate scanning techniques according to standard protocol guidelines.

## Required Textbooks

Textbook of Diagnostic Sonography Vol One and Two, 8<sup>th</sup> Edition Sandra L. Hagen-Ansert, Elsevier ISBN 978-0-323-35375-5

## Evaluation Standards

Exams (Objectives I-XII)	30%
Quizzes (Objectives I-XII)	15%
Homework: (Objectives I-XII)	5%
Scan Lab (Objectives I-XII)	30%
Final Exam (Objectives I-XII)	20%

## Grading Standards:

- A 92-100%
- B 85-91%
- C 78-84%
- F <78%

In the 2021 Fall Semester, this course will be presented in a flipped classroom format. Recorded lectures are to be viewed off campus (requiring 1.5 hours/week). Students will meet weekly on campus for 1.5 hours.

## Course Progression

- I. Introduction to abdominal scanning techniques and protocols.

(F1, 2, 4, 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Identify anatomic definitions in regard to directional terms, anatomic position, and anatomic planes
2. Demonstrate the sonographic examination to include patient position, transducer orientation, and image presentation and labeling
3. Define terms used to describe image quality
4. Describe the sonographic echo patterns to demonstrate how normal and pathologic conditions can be defined using image quality definitions
5. List and recognize the sonographic criteria for cystic, solid, and complex conditions
6. Describe the appropriate patient preparation for a sonographic evaluation
7. State what should and what should not be included in a preliminary report
8. Discuss other imaging modalities

- II. Describe the scanning methods for sonographic evaluation of the vascular system in the abdomen.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the vascular system
2. Identify the role of diagnostic medical Sonography in the assessment of vascular structures
3. Perform sonographic evaluation of the abdominal vascular system
4. Describe the patient preparation, equipment considerations, and scanning techniques and Doppler protocols for normal and abnormal abdominal vascular structures
5. Identify circulatory anatomy, name the layers of blood vessels, and distinguish the difference between arteries and veins
6. Recognize the sonographic appearance and relational anatomy of the abdominal vascular system
7. Discuss how to correlate the patient's clinical history, laboratory values, results of related diagnostic procedures, and the sonographic tissue characteristics
8. Identify technically satisfactory and unsatisfactory sonographic examinations of the vascular system.
9. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

- III. Describe the scanning methods for sonographic evaluation of the liver.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the liver
2. Illustrate the normal anatomy of the liver including the liver lobes and segments, fissures, ligaments, and hepatic vasculature
3. Describe the different methods used to classify lobar divisions of the liver including anatomical, segmental and Couinaud's anatomical division
4. List the functions of the liver and the laboratory values associated with liver function
5. Explain the patient preparation, scan technique, and sonographic appearance of the normal liver
6. Perform sonographic evaluations of the liver and hepatic system
7. Integrate the patient's clinical history, laboratory values, results of related diagnostic procedures, and the sonographic tissue characteristics
8. Identify technically satisfactory and unsatisfactory sonographic examinations of the liver.
9. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

- **IV. Describe the scanning methods for sonographic evaluation of the gallbladder and the biliary system.**

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the biliary system
2. Illustrate surface, relational, and internal anatomy of the normal gallbladder and biliary system
3. Discuss the embryologic development, common anatomic variants, and congenital anomalies of the gallbladder and biliary tree
4. Describe and physiology of the gallbladder and biliary tree and include the laboratory values associated with normal and abnormal function
5. Explain the sonographic evaluation of the gallbladder and biliary tree to include patient preparation, protocol, and demonstrate completing the examination procedure
6. Describe embryologic development, clinical signs and symptoms, and sonographic appearance for each of the following congenital anomalies: septate gallbladder, interposition of the gallbladder, biliary atresia, and choledochal cyst
7. Differentiate between the advantages and disadvantages of utilizing other gallbladder and biliary system imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

- V. Describe the scanning methods for sonographic evaluation of the spleen.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the spleen
2. Describe the normal anatomy and function of the spleen
3. Describe the normal vasculature of the spleen
4. Demonstrate the scanning techniques used to image the spleen
5. Discuss the technically satisfactory and unsatisfactory sonographic examinations of the spleen.
6. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

8.

- VI. Describe the scanning methods for sonographic evaluation of the pancreas.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the pancreas
2. Describe pancreatic surface anatomy, vascular supply, and the common relational landmarks
3. Discuss the most common pancreatic congenital anomalies
4. Identify the endocrine and exocrine functions of the pancreas
5. Correlate laboratory values and clinical indications associated with the pancreas
6. Explain the sonographic evaluation of the pancreas to include patient preparation, protocol, and demonstrate completing the examination procedure
7. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

- VII. Describe the scanning methods for sonographic evaluation of the gastrointestinal tract.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, - 15, 18, 19)

1. Describe embryologic development of the gastrointestinal tract
2. Illustrate the anatomy of the gastrointestinal tract
3. Define the process for sonographic evaluation of the gastrointestinal tract, including the transabdominal and endoluminal approaches
4. List the five sonographic layers of the bowel wall
5. Describe the normal sonographic appearance of the stomach, small bowel, appendix, and colon
6. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

8. Describe the scanning methods for sonographic evaluation of the urinary system.

(F1, 2, 4, 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the urinary system
2. Discuss the normal anatomy of the urinary system from embryologic development to adulthood and include vasculature, location, size, and relational anatomy with other abdominal structures and organs
3. Describe the microscopic internal renal anatomy to include the nephrons and juxtaglomerular apparatus
4. Discuss physiology of the urinary system
5. Demonstrate routine scanning procedure to include the patient preparation, patient instructions, patient positions, scanning techniques, technical considerations, and common scanning pitfalls
6. Analyze sonographic images of the urinary system
7. Identify technically satisfactory and unsatisfactory sonographic examinations of the urinary system
8. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.

- IX. Describe the scanning methods for sonographic evaluation of the adrenal glands.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe the normal anatomy and variants, function, sonographic technique, and

sonographic appearance of the adrenal glands

2. Correlate the clinical indications and laboratory values associated with adrenal

pathology

3. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.
- X. **Describe the scanning methods for sonographic evaluation of the retroperitoneum.**

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Identify the compartments of the retroperitoneum and fascia that divide them
  2. List the muscles, organs, and vessels normally found in each retroperitoneal compartment
  3. Differentiate between the location and function of the deep abdominal (parietal) nodes and superficial (visceral) nodes
  4. List the indications for the sonographic evaluation of the retroperitoneum
  5. Differentiate between the advantages and disadvantages of utilizing other imaging procedures to include radiography, nuclear medicine, computed tomography and magnetic resonance imaging.
- XI. Describe the scanning methods for sonographic evaluation of the male pelvis.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Identify the normal transabdominal sonographic appearance of the male bladder
  2. Identify the normal transabdominal sonographic appearance of the prostate.
- XII. Describe the scanning methods for sonographic evaluation of the female pelvis.

(F1, 2, 4 5, 7, 8, 9, 10, 11, C1, 3, 7, 10, 11, 12, 13, 14, 15, 18, 19)

1. Describe embryologic development of the female pelvis
2. Identify the sonographically significant muscles of the pelvic cavity
3. Describe the major ligaments of the uterus and ovaries
4. Describe the normal anatomy and physiology of the uterus, ovaries, and adnexa.

## Absences

Attendance is the biggest predictor of your success.

All quizzes and exams must be taken at their specified time. An exam missed may *not* be made up, and the student will receive a grade of zero (0) for that exam. Under certain circumstances, exceptions may be made by the instructor, this will be handled on a case-by-case basis. Quizzes may not be made up under any circumstances.

All assignments are due on their specified dates no later than the designated time. Failure to submit an assignment on time will result in a grade of "0." There will be no exceptions to this rule, unless you have previously contacted the instructor by email and have been given permission.

Attendance of every scanning lab session is expected as scheduled. You will be allowed to miss two days (exception for test days) without it adversely affecting your grade. Every one absence over the allotted days will result in your final grade being reduced by one letter grade. If you are more than 15 minutes late to lecture or lab, this will constitute an absence. Being late for lecture or lab less than 15 minutes is considered "tardy". Three tardy-s count as one day absent. You are required to notify the instructor prior to any absences. Failure to do so will result in an unexcused absence.

An exam missed because of an excused absence must be made up the day that you return to class. An exam missed because of an unexcused absence may *not* be made up, and you will receive a grade of zero (0) for that exam. Pop quizzes may not be made up under any circumstances.

## **Disabilities**

### **ADA Statement:**

Any student with a documented disability (e.g. learning, psychiatric, vision, hearing, etc.) may contact the Office on the Weatherford College Weatherford Campus to request reasonable accommodations. *Phone:* 817-598-6350  
*Office Location:* Office Number 118 in the Student Services Building, upper floor. *Physical Address:* Weatherford College 225 College Park Drive Weatherford, TX.

### **Academic Integrity**

Academic Integrity is fundamental to the educational mission of Weatherford College, and the College expects its students to maintain high standards of personal and scholarly conduct. Academic dishonesty of any kind will not be tolerated. Academic dishonesty includes, but is not limited to, cheating on an examination or other academic work, plagiarism, collusion, and the abuse of resource materials including unauthorized use of Generative AI. Departments may adopt discipline specific guidelines on Generative AI usage approved by the instructional dean. Any student who is demonstrated to have engaged in any of these activities will be subject to immediate disciplinary action in accordance with institutional procedures.

### **SCANS**

The Secretary's Commission on Achieving Necessary Skills (SCANS) identified Competencies in the area of Resources, Interpersonal, Information, Systems, and Technology; and foundation skills in the areas of Basic Skills, Thinking Skills, and Personal Qualities. This course is part of a program in which each of these Competencies and skills are integrated. The specific SCANS Competencies that are recognized throughout this course are noted at the end of the appropriate Competencies or task listed.