Midland College  
Syllabus  
Spring 2008  
DMSO 1405  
Sonography of Abdominopelvic Cavity  
(3-2-0)

Course Description  
Detailed study of normal and pathological abdominal structures related to scanning techniques, patient history and laboratory data, transducer selection and scanning protocols.

Text, References, and Supplies  

Course Goals/Objectives  
Upon successful completion of the course the student will:
1. Apply proper transducer orientation, image presentation and labeling.
2. Utilize proper medical terminology and statistics to relate findings to others.
3. Identify normal abdominal anatomy on diagrams, photographs, models, and images taken with ultrasound in three-dimensions, sagittal, coronal, transaxial and oblique planes.
4. Identify abnormal abdominal anatomy on diagrams, photographs, models, and images taken with ultrasound in three-dimensions, sagittal, coronal, transaxial and oblique planes.
5. Correlate anatomy seen on ultrasound with other imaging modalities such as Diagnostic X-ray, CT, MRI, and Nuclear Medicine.
6. Evaluate patient history and laboratory data as it relates to sonography.
7. Develop and implement appropriate scanning techniques using accepted protocols and additional scan planes and routines as indicated for each abdominal abnormality.
8. Utilize color flow Doppler and phase analysis to evaluate the blood flow of the abdominal organs.
9. Understand the pathogenesis and pathophysiology of common abdominal disease.
Objectives: The student will:

Apply proper transducer orientation, image presentation and labeling.

- Utilize various patient positions to image the abdominal organs and structures.
- Recognize the various transducer orientations with respect to patient position.
- Correctly label sonographic images with respect to patient position and orientation.
- List the three planes of the body found in the anatomic position.
- Implement proper image quality definitions when discussing sonographic images.
- Identify proper image orientation on sonographic images.

2.) Utilize proper medical terminology and statistics to relate exam findings to others.

- Compare and contrast the three internal echo patterns.
- Compare and contrast echogenic and anechoic.
- Compare and contrast homogenous and heterogeneous.
- Define through transmission and identify it on a sonographic image.
- Recognize and correlate statistical parameters with respect to efficacy of the Sonographic examination.
- Compare and contrast sensitivity and specificity.
- Compare and contrast true-positive and true-negative.
- Compare and contrast false-positive and false-negative.

3.) Identify normal abdominal anatomy on diagrams, photographs, models, and images taken with ultrasound in three-dimensions, sagittal, coronal, transaxial and oblique planes.

- Identify the aorta and its branches as it courses through the body on ultrasound.
- Identify the major contributaries of the IVC and their course through the body on ultrasound.
- Identify the portal venous system and its course through the body on ultrasound.
- Identify the location of the lymphatic system.
- List and describe the three layers of arterial vessels.
- Describe the sonographic appearance of the liver and its function.
- Compare and contrast the lobar anatomy of the liver with the
segmental anatomy.

- Identify the gallbladder and biliary tree on ultrasound images.
- Identify each portion of the pancreas on ultrasound images.
- Identify vascular anatomy as it relates to the pancreas on ultrasound.
- Identify the spleen on ultrasound images.
- Identify common areas for fluid accumulation on ultrasound images.
- Identify the kidneys and the sonographic anatomy of the kidneys on ultrasound images.
- Identify the location and orientation of the transplant kidney on ultrasound images.
- Identify the bladder, prostate and seminal vesicles on an ultrasound image.
- Identify the adrenal glands on ultrasound images.
- Identify normal pediatric anatomy on ultrasound images.
- Identify the structures of the abdominal wall on ultrasound.
- Identify the stomach, intestines and colon on ultrasound images.

4.) Identify abnormal abdominal anatomy on diagrams, photographs, models, and images taken with ultrasound in three-dimensions, sagittal, coronal, transaxial and oblique planes.

- Identify and describe abnormalities of the aorta and other vessels such as aneurysms, calcifications and thrombus on ultrasound images.
- Identify and describe vessel grafts and their abnormalities on ultrasound images.
- Identify and describe diffuse disease of the liver such as hepatitis, fatty infiltration, cirrhosis, portal hypertension and Budd-Chiari syndrome, glycogen storage disease and schistosomiasis on ultrasound images.
- Identify and describe focal abnormalities of the liver including cysts, abscesses, benign and malignant neoplasms and metastasis.
- Identify and describe the sonographic signs of liver rupture and/or trauma.
- Identify and describe cholelithiasis and sludge in the gallbladder and the associated sonographic criteria for gallstones.
- Discuss the implication of a contracted and/or non-visualization of the gallbladder.
- Identify and describe acute and chronic cholecystitis and hydrops of the gallbladder on ultrasound images.
- Identify and describe the benign neoplasms of the gallbladder: adenoma and adenomyomatosis on ultrasound images.
• Identify and describe primary carcinoma and metastatic disease of the gallbladder on ultrasound images.
• Identify and describe biliary dilatation, extra hepatic biliary obstruction, and choledocholithiasis on ultrasound images.
• Identify primary biliary neoplasms and cholangitis seen on ultrasound images.
• Identify and describe congenital biliary problems such as biliary atresia, choledochal cysts and Caroli’s disease seen on ultrasound images.
• Identify and describe the congenital anomalies of the pancreas such as annular pancreas, ectopic pancreas and pancreatic divisum as seen on ultrasound images.
• Identify and describe the four types of pancreatitis on ultrasound images: acute, chronic, hemorrhagic and phlegmonous pancreatitis.
• Identify and describe pancreatic pseudocyst and abscesses as seen on ultrasound images.
• Identify and describe pancreatic neoplasms such as cystadenoma, adenocarcinoma and islet cell tumors on ultrasound images.
• Identify and describe the appearance of cystic fibrosis of the pancreas as seen on ultrasound.
• Identify and describe congenital anomalies of the spleen such as accessory spleen and splenic agenesis as seen on ultrasound images.
• Identify and describe splenic enlargement, splenic abscess, splenic infarction and splenic rupture as seen on ultrasound images.
• Identify and describe the benign primary neoplasms of the spleen such as hamartoma, cavernous hemangioma and cystic lymphangiomyomatosis as seen on ultrasound images.
• Identify and describe malignant neoplasms of the spleen such as hemangiosarcoma, lymphoma and metastasis as seen on ultrasound images.
• Identify and describe abnormal fluid collections such as abscesses, hematomas, lymphomas, urinomas and bilomas as seen on ultrasound images.
• Identify and describe congenital anomalies of the kidneys such as supernumerary kidneys, renal ectopia and unilateral renal agenesis as seen on ultrasound images.
• Identify and describe the various degrees of obstructive uropathy as seen on ultrasound image.
• Identify and describe renal parenchymal disease as seen on ultrasound image.
• Identify and describe benign renal masses such as cysts and abscesses as seen on ultrasound images.
• Identify and describe benign solid renal masses such as angiomyolipoma, adenoma and connective tissue tumors as seen on ultrasound images.
• Identify and describe malignant solid renal masses such as hypernephroma, transitional cell carcinoma and Wilm’s tumor as seen on ultrasound images.
• Identify and describe cystic disease of the kidney such as multicystic dysplastic kidney, infantile polycystic kidney disease and adult polycystic kidney disease as seen on ultrasound images.
• Identify and describe other conditions that affect the kidney such as milk alkali syndrome, fibrolipomatosis, pyelonephritis, pyonephrosis, glomerulonephritis, nephrocalcinosis, nephrotic syndrome, tuberous sclerosis, acute tubular necrosis and HIV related renal problems as seen on ultrasound images.
• Identify and describe disease found in renal transplants such as rejection and acute tubular necrosis as seen on ultrasound images.
• Identify and describe renal complications associated with renal transplants such as fluid collections, hydronephrosis, transplant obstruction, graft rupture, and vascular problems as seen on ultrasound images.
• Identify and describe congenital malformations of the bladder such as extrophy, reduplication, and ureterocele as seen on ultrasound images.
• Identify and describe other conditions of the bladder such as calculi, infection and tumors as seen on ultrasound.
• Identify and describe abnormalities of the adrenal gland such as cysts, hyperplasia, metastases, aldosteronoma, and hemorrhage as seen on ultrasound images.
• Identify and describe abnormalities of the GI tract such as appendicitis, Crohn’s disease, intussusception, carcinoma and pyloric stenosis as seen on ultrasound images.
• Identify and describe abnormalities of the non-cardiac chest such as fluid, fibrosis and tumor as seen on ultrasound images.
• Identify and describe abnormalities of the abdominal wall such as hernias and hematomas as seen on ultrasound images.
• Identify and describe abnormalities found in pediatric patients such as sacromeningoceles, sacrococcygeal teratomas, peliosis hepatitis, mesenchymal sarcoma, meconium peritonitis, Hirschprung’s disease, posterior urethral valves, rhabdomyosarcomas, and congenital adrenal hyperplasia as seen on ultrasound.
5.) Correlate anatomy seen on ultrasound with other imaging modalities such as Diagnostic X-ray, CT, MRI, and Nuclear Medicine.

- Correlate anatomy and pathology of the aorta and vessels as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the liver and gallbladder as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the pancreas as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the spleen as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the kidneys and kidney transplants as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the male pelvis and bladder as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the adrenal gland as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the GI tract and abdominal wall as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.
- Correlate anatomy and pathology of the pediatric patient as seen on ultrasound with x-rays, CT, MRI and Nuclear Medicine.

6.) Evaluate patient history and laboratory data as it relates to Sonography.

- Identify pertinent clinical and laboratory data from patient records.
- Analyze pertinent clinical and laboratory data to aid in diagnosis.
- Utilize pertinent clinical and laboratory data to direct closer attention to specific organ system.
- Develop a plan of questioning to aid the patient in directing his/her plan of care in the ultrasound exam.
- Correlate pertinent clinical and laboratory data with findings of the ultrasound exam.

7.) Develop and implement appropriate scanning techniques using accepted protocols and additional scan planes and routines as indicated for each abdominal abnormality.

- Describe appropriate scanning techniques for each organ in the abdomen.
- Analyze the rationale for various scanning techniques.
- Analyze accepted scanning protocols for appropriateness.
- Implement the performance of additional scan planes and routines for each abdominal abnormality.
- Differentiate techniques for various age groups seen in the ultrasound suite.

8.) Utilize color flow Doppler and phase analysis to evaluate the blood flow of the abdominal organs.

- Define color flow Doppler and phase analysis.
- Identify normal color Doppler and phase analysis patterns of the vasculature found in the abdomen.
- Differentiate normal from abnormal Doppler flow patterns found in the abdomen.
- Describe techniques for evaluating blood flow in the major vessels of the abdomen.
- Describe techniques for evaluating blood flow to the kidneys and renal transplants.
- Describe techniques for evaluating blood flow in the portal venous system.
- Describe techniques for evaluating Transjugular Intrahepatic Portosystemic Shunts.
- Describe the various indexes and ratios used to quantify blood flow in the organs of the abdomen.

9.) Understand the pathogenesis and pathophysiology of common abdominal disease.

- Identify factors that lead to diseases of the liver, pancreas, kidneys, vessels, spleen, adrenal glands, bladder, gallbladder and gastrointestinal tract.
- Identify clinical symptoms associated with diseases of the liver, pancreas, kidneys, vessels, spleen, adrenal glands, bladder, gallbladder and gastrointestinal tract.
- Identify the pathophysiology associated with diseases of the liver, pancreas, kidneys, vessels, spleen, adrenal glands, bladder, gallbladder and gastrointestinal tract.
- Recognize symptoms and findings requiring immediate notification of physician or physician designate.
- Identify, when applicable, the social, cultural, racial, gender and ethnic factors related to disease and pathophysiology of the abdomen.
**Student Contributions and Class Policies**

Attendance is essential to your success and is required in compliance with the policies outlined in the Midland College Handbook. The student is expected to participate in class discussions. Reading assignments are also important and should be completed prior to lectures for each unit. Material from reading which is not covered in class may appear on tests. **Missed quizzes, exams and/or late assignments will need to be made up on the next scheduled class date. Alternate exams and/or exam format may be substituted.**

**Evaluation of Students**

Final grade will be a criterion-referenced standard percentage, not curved, composed as follows: 45% from three unit exams and lab assignments, 25% from class assignments, class participation and weekly quizzes, and 30% from the final examination.

- There will be three unit exams consisting of 50-80 questions. Each exam will be constructed from a random sample of the material presented prior to the exam date. Multiple formats will be used including short answer, diagram labeling and multiple-choice.

- The final comprehensive exam will consist of 100-150 multiple choice questions and will be similar to the format utilized by the registry. The exam will be constructed of a random sample of all the material presented during the semester.

- In the event that an exam/quiz is missed, it is the student’s responsibility to arrange for the **make-up exam within one week**. The student may also expect an alternate method of testing for the make-up exam. **If an exam is not made up, the student will receive a zero for that exam, and the grades will be averaged accordingly.**

- Class assignments may consist of tasks including online research, worksheets, and group projects, etc.

- Weekly quizzes will consist of 10-20 questions over the material covered in the previous week. Multiple quizzing formats will be utilized.

**Course Schedule**

Class will meet every Tuesday 1:00a.m. - 4:30p.m. except for scheduled Midland College holidays. See attached class schedule for topics to be covered each lecture, quiz and exam schedule.
The following SCANS skills will be taught and/or reinforced for this course:

**Foundation**

**Basic Skills:** Reading, writing, arithmetic/mathematics; listening, speaking

**Workplace Competencies**

**Technology:** Selects technology; applies technologies to task; maintains and troubleshoots equipment

Students receive annual training in the following: Blood and air borne pathogens, electrical safety, back safety, hazardous chemicals, latex allergies, fire and disaster procedures, security and personal safety procedures and safety requirements of clinical facilities. Students must maintain current CPR, immunizations, and health insurance during all clinical courses.

**Safety Training**

Students receive annual training in the following: Blood and air borne pathogens, electrical safety, back safety, hazardous chemicals, latex allergies, fire and disaster procedures, security and personal safety procedures and safety requirements of clinical facilities. Students must maintain current CPR, immunizations, and health insurance during all clinical courses.
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