**Instructional Design – Senior Capstone Review- Abdominal Unit**

Dana R. Eskins

Bowling Green State University

**Rationale**

The semester prior to graduation, the senior students of the sonography program make their final preparations to take the American Registry for Diagnostic Medical Sonography national test. The Senior Capstone Review course is a review of all sonography courses from five previous semesters. The course is divided into four large units. The abdominal unit of this course will prepare the student for the ARDMS Abdominal Registry which is a national test that all sonography students must pass in order to be considered a sonographer. This unit includes an abdominal overview of the spleen, pancreas, gallbladder/biliary ducts, urinary tract, liver, adrenal glands, abdominal vasculature, and the gastrointestinal tract. Each of these areas are identified and examined and then followed through a sequence of sub-units. The five sub-units allow the students to systematically form a sonographic impression of the information they are provided. If the students have the ability and knowledge to exercise sub-units one through five on all areas of the abdomen, then I am confident that they are prepared for the ARDMS Abdominal Registry.

The instructional design for the Senior Capstone Review Course was developed to encourage a learner-centered environment in order to increase student motivation and to facilitate assessment of the student’s deeper thinking skills at every cognitive level. In this course the students have the ability to construct new ideas from previously learned information and develop skills to use that information. In the active learning environment of the classroom, the students learn to increase their decision making and problem-solving skills with activities which promote independent thinking as well as peer-to-peer open dialog. The lessons for this course are presented using a 5E Learning Cycle Model Lesson Plan format as defined in Leigh Chiarelott’s book, “Designing Instruction For Contextual Teaching and Learning” (Chiarelott, 2006). This particular lesson plan model has five steps of learning behaviors which correspond closely to Bloom’s taxonomy. These steps are adaptable to contextual teaching strategies for a one-day lesson or for lessons covered over several days (Chiarelott, 2006).

The abdominal unit is taught over three, two-hour class periods for # of weeks. Each one-day lesson plan accommodates a week of review for the student and a two hour class for a group review. Each lesson follows the 5E Learning Model which includes engagement, exploration, explanation, extension, and evaluation. Delivering the unit content in these five steps will promote a higher level of thinking and prepare the senior students for the ARDMS Abdominal Registry.

**Unit Outcomes**

Unit 1: Abdominal Unit

* Identify and examine the spleen and follow sub-units 1-5 for the spleen.
* Identify and examine the pancreas and follow sub-units 1-5 for the pancreas.
* Identify and examine the gallbladder/biliary ducts and follow sub-units 1-5 for the gallbladder/biliary ducts.
* Identify and examine the urinary tract and follow sub-units 1-5 for the urinary tract.
* Identify and examine the liver and follow sub-units 1-5 for the liver.
* Identify and examine the adrenal glands and follow sub-units 1-5 for adrenal glands.
* Identify and examine the abdominal vasculature and follow sub-units 1-5 for the abdominal vasculature.
* Identify and examine the gastrointestinal tract and follow sub-units 1-5 for the gastrointestinal tract.

Sub-unit 1: Engagement (KNOWLEDGE)

* Examine clinical findings including clinical indications and patient’s medical history.
* Examine laboratory results.
* Examine sonographic findings.
* Examine anatomy and physiology including anatomical landmarks, normal variants, and anomalies.

Sub-unit 2: Exploration (COMPREHENSION)

* Compare and evaluate all findings and results from Sub-unit 1.

Sub-unit 3: Explanation (APPLICATION & ANALYSIS)

* Classify and establish possible results based on all findings from Sub-units 1 and 2.

Sub-unit 4: Extension (SYNTHESIS)

* Speculate and draw a conclusion of normal result or pathologic result based on all findings from Sub-units 1, 2, and 3. Formulate your sonographic impression based on all findings from Sub-units 1, 2, and 3.

Sub-unit 5: Evaluation (EVALUATE)

* Justify your sonographic impression based on all results and findings from Sub-units 1, 2, 3, and 4.

**Pre-assessment**

The week prior to the current lesson, the students will log onto their textbook website, thePoint (Penny, 2011), using the textbook code located on the inside cover of their textbook. They will answer 150 multiple choice questions based on the previously learned knowledge from five semesters of sonography courses. The practice questions for each chapter will challenge the student’s knowledge in anatomy, physiology, medical terminology, clinical history, clinical findings, sonographic findings, pathologic findings, and laboratory values. Their answer choices will reveal a correct answer or an incorrect answer which will prompt an explanation of the correct answer. The instructions for this post-assessment are displayed as exhibit A.

This type of pre-assessment was chosen for several reasons. First, the question format resembles the actual national registry test for which the students are preparing for. Second, the questions will reveal any weaknesses or misconceptions in the students’ previously learned knowledge. Third, it will allow the students to self-assess their knowledge before engaging in the active, group environment of the classroom. Finally, it allows the students to bring well rounded, thought out questions and topics to the classroom group discussion which will promote open dialog with their peers.

**Lesson Plan #1**

**Liver, Gallbladder/Biliary ducts, and Pancreas Review**

|  |
| --- |
| **Concept/Skill to be Learned:**  Demonstrate advanced knowledge in the liver, gallbladder, biliary ducts, and pancreas. |
| **Unit Outcomes:**  Identify and examine the liver and follow sub-units 1-5 for the liver.  Identify and examine the gallbladder/biliary ducts and follow sub-units 1-5 for the gallbladder/biliary ducts.  Identify and examine the pancreas and follow sub-units 1-5 for the pancreas. |
| **Lesson Objectives:**   * Examine clinical findings including clinical indications and patient’s medical history. * Examine laboratory results. * Examine sonographic findings. * Examine anatomy and physiology including anatomical landmarks, normal variants, and anomalies. * Compare and evaluate all findings. * Classify and establish possible results based on all findings. * Speculate and draw a conclusion of normal result or pathologic result based on all findings. * Justify your sonographic impression based on all results and findings. |
| **Time Allotment:** 120mins |
| **Procedures:**   1. Start each section review by asking if any of the students have specific areas, of a particular section, that they would like to review. *Were there any content areas that need more reviewing?* This will allow them to focus on the problem areas. This is where the review would begin. (5-10mins) 2. Review anatomy, physiology, lab values, and key terms for liver, gallbladder/biliary ducts and pancreas using individual dry erase boards. (20mins)   -Review by asking questions and the students to write their answers on their dry erase board at their own pace. Use exhibit D.- ***Engagement (Knowledge)***   1. Make a connection between reviewed materials and clinical and sonographic findings. Give examples of how and why this is important in the clinical setting. (10mins)- ***Exploration (Comprehension)*** 2. Using the pathology index cards, allow each student to pick a pathology, one student at a time. The student will pronounce their pathology to their classmates. Each classmate will ask a particular question about the pathology and the student holding the index card will answer their questions. This will serve as the major review for the lesson and will allow the students to discuss each pathology with open, peer dialog. The number of pathology index cards will allow for each student to pick several pathologies. Have each student take notes of the pathologies that were unfamiliar to them. Use exhibit E. (60mins)- ***Explanation/Extension. (Application/Analysis)*** |
| **Summary/Closure/Evaluation:**   1. Use the final class time for students to self-assess their week-long review preparation for class. Use open discussion to present problem areas and possible solutions to these problems. Use peer-to-peer conversations about test-taking strategies for problem areas and ways to remember problem area content. (20mins)- ***Evaluation (Evaluation)*** 2. Use the ultrasound image website and ultrasound cases website for reference of normal and abnormal pathology images. 3. Remind students to review the next two chapters on the urinary system and adrenal glands. Use exhibit B & C. |
| **Materials and Resources:**   * Textbook: Examination Review for Ultrasound by Steven M. Penny * Small dry erase boards * Pathology index cards * Exhibits B-E * Ultrasound image website 1: <http://www.ultrasound-images.com/> * Ultrasound image website 2: <http://www.ultrasoundcases.info/> |

**Lesson Plan #2**

**Urinary System and Adrenal Glands Review**

|  |
| --- |
| **Concept/Skill to be Learned:**  Demonstrate advanced knowledge in the urinary system and adrenal glands. |
| **Unit Outcomes:**  Identify and examine the urinary system and follow sub-units 1-5 for the urinary system.  Identify and examine the adrenal glands and follow sub-units 1-5 for the adrenal glands. |
| **Lesson Objectives:**   * Examine clinical findings including clinical indications and patient’s medical history. * Examine laboratory results. * Examine sonographic findings. * Examine anatomy and physiology including anatomical landmarks, normal variants, and anomalies. * Compare and evaluate all findings. * Classify and establish possible results based on all findings. * Speculate and draw a conclusion of normal result or pathologic result based on all findings. * Justify your sonographic impression based on all results and findings. |
| **Time Allotment:** 120mins |
| **Procedures:**   1. Start each section review by asking if any of the students have specific areas, of a particular section, that they would like to review. *Were there any content areas that need more reviewing?* This will allow them to focus on the problem areas. This is where the review would begin. (5-10mins) 2. Review anatomy, physiology, lab values, and key terms for urinary tract and adrenal glands using individual dry erase boards. (20mins)   -Review by asking questions and the students to write their answers on their dry erase board at their own pace. Use exhibit D.- ***Engagement (Knowledge)***   1. Make a connection between reviewed materials and clinical and sonographic findings. Give examples of how and why this is important in the clinical setting. (10mins)- ***Exploration (Comprehension)*** 2. Using the pathology index cards, allow each student to pick a pathology, one student at a time. The student will pronounce their pathology to their classmates. Each classmate will ask a particular question about the pathology and the student holding the index card will answer their questions. This will serve as the major review for the lesson and will allow the students to discuss each pathology with open, peer dialog. The number of pathology index cards will allow for each student to pick several pathologies. Have each student take notes of the pathologies they were unfamiliar to them. Use exhibit E. (60mins)- ***Explanation/Extension. (Application/Analysis)*** |
| **Summary/Closure/Evaluation:**   1. Use the final class time for students to self-assess their week long review preparation for class. Use open discussion to present problem areas and possible solutions to these problems. Use peer to peer conversations about test taking strategies for problem areas and ways to remember problem area content. (20mins)- ***Evaluation (Evaluation)*** 2. Use the ultrasound image website and ultrasound cases website for reference of normal and abnormal pathology images. 3. Remind students to review the next three chapters on spleen, abdominal vasculature, and gastrointestinal tract. Use exhibits B & C. |
| **Materials and Resources:**   * Textbook: Examination Review for Ultrasound by Steven M. Penny * Small dry erase boards * Pathology index cards * Exhibits B-E * Ultrasound image website 1: <http://www.ultrasound-images.com/> * Ultrasound image website 2: <http://www.ultrasoundcases.info/> |

**Lesson Plan #3**

**Spleen, Abdominal Vasculature, and Gastrointestinal Tract**

|  |
| --- |
| **Concept/Skill to be Learned:**  Demonstrate advanced knowledge in the spleen, abdominal vasculature, and gastrointestinal tract. |
| **Unit Outcomes:**  Identify and examine the spleen and follow sub-units 1-5 for the spleen.  Identify and examine the abdominal vasculature and follow sub-units 1-5 for the abdominal vasculature.  Identify and examine the gastrointestinal tract and follow sub-units 1-5 for the gastrointestinal tract. |
| **Lesson Objectives:**   * Examine clinical findings including clinical indications and patient’s medical history. * Examine laboratory results. * Examine sonographic findings. * Examine anatomy and physiology including anatomical landmarks, normal variants, and anomalies. * Compare and evaluate all findings. * Classify and establish possible results based on all findings. * Speculate and draw a conclusion of normal result or pathologic result based on all findings. * Justify your sonographic impression based on all results and findings. |
| **Time Allotment:** 120mins |
| **Procedures:**   1. Start each section review by asking if any of the students have specific areas, of a particular section, that they would like to review. *Were there any content areas that need more reviewing?* This will allow them to focus on the problem areas. This is where the review would begin. (5-10mins) 2. Review anatomy, physiology, lab values, and key terms for spleen, abdominal vasculature and gastrointestinal tract using individual dry erase boards. (20mins)   -Review by asking questions and the students to write their answers on their dry erase board at their own pace. Use exhibit D.- ***Engagement (Knowledge)***   1. Make a connection between reviewed materials and clinical and sonographic findings. Give examples of how and why this is important in the clinical setting. (10mins)- ***Exploration (Comprehension)*** 2. Using the pathology index cards, allow each student to pick a pathology, one student at a time. The student will pronounce their pathology to their classmates. Each classmate will ask a particular question about the pathology and the student holding the index card will answer their questions. This will serve as the major review for the lesson and will allow the students to discuss each pathology with open, peer dialog. The number of pathology index cards will allow for each student to pick several pathologies. Have each student take notes of the pathologies they were unfamiliar to them. Use exhibit E. (60mins)- ***Explanation/Extension. (Application/Analysis)*** |
| **Summary/Closure/Evaluation:**   1. Use the final class time for students to self-assess their week long review preparation for class. Use open discussion to present problem areas and possible solutions to these problems. Use peer to peer conversations about test taking strategies for problem areas and ways to remember problem area content. (20mins)- ***Evaluation (Evaluation)*** 2. Use the ultrasound image website and ultrasound cases website for reference of normal and abnormal pathology images. 3. Remind students to review for final Mock Abdominal Registry test. |
| **Materials and Resources:**   * Textbook: Examination Review for Ultrasound by Steven M. Penny * Small dry erase boards * Pathology index cards * Exhibits B-E * Ultrasound image website 1: <http://www.ultrasound-images.com/> * Ultrasound image website 2: <http://www.ultrasoundcases.info/> |

**Post-assessment**

The week following the Abdominal Unit, the students will prepare for their Final Mock Abdominal Registry. This final test is very similar to the ARDMS Abdominal Registry test. The students will log onto their textbook website, thePoint (Penny, 2011), using the textbook code located on the inside cover of their textbook. They will answer 110 multiple choice questions based on the previously learned knowledge from five semesters of sonography courses within two hours. The mock registry is to prepare the students for the actual registry test which is 170 questions in three hours. The instructions for this post-assessment are displayed as exhibit F. The practice questions from all six chapters will challenge the student’s knowledge in anatomy, physiology, medical terminology, clinical history, clinical findings, sonographic finding, pathologic findings, and laboratory values. The student will not know the grade of their test until they click the submit prompt at the end of the test. Their final score will display on the screen. As the facilitator of the test, I am able to log on and print out the questions that were incorrect for each student and log their final score.

This type of post-assessment was chosen for several reasons. First, the test format, question format and the time restraint resemble the actual national registry test for which the students are preparing for. Second, the incorrect answer log will pinpoint areas of weakness that will need to be addressed before the actual national registry. Third, the final grade will reflect the student’s readiness for the ARDMS Abdominal Registry.

I will use this abdominal mock registry as a formative evaluation of this course as well as a summative assessment for the other sonography courses which reviewed during this senior capstone course. The student’s score from the actual ARDMS Abdominal Registry are used as a summative assessment of Diagnostic Medical Sonography program as well as an outcome for our programmatic accreditation.

**Exhibit A: Pre-assessment instructions**

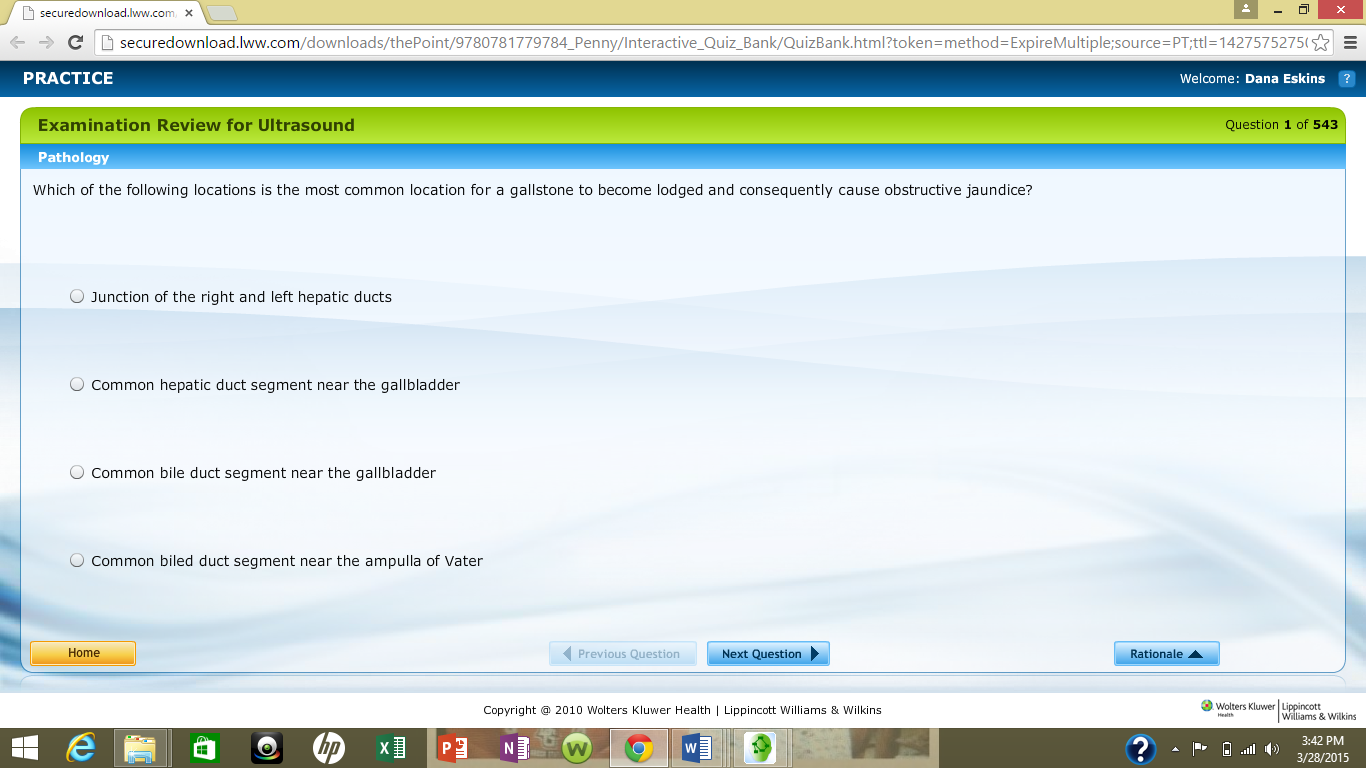
Pre-assessment Instructions for Week 2 (liver, gallbladder/biliary ducts, and pancreas)

PLEASE LOCATE THE LOG IN INFORMATION INSIDE THE FRONT COVER OF YOUR PENNY REVIEW BOOK:

<http://thepoint.lww.com/Penny_AbObGyn1e>

Log in:

* Student Resources
* General Ancillary Content: Supplementary Materials
* Student Ancillary Content
* Interactive Question Bank
* Select liver, gallbladder/biliary ducts, and pancreas
* Enter your name and email
* Start
* Click **“Practice Questions”** on the top right
* You will answer 150 questions over all three chapters. All questions are multiple choice which resemble registry questions.
* You will choose a correct answer for every question. If the answer you have chosen is not correct, the practice test will prompt and explanation of the correct answer. Read all incorrect answer explanations and take notes of any questions you might have. We will discuss all questions during the open discussion portion of our class.



\*\*Repeat the above instructions for Week 3 (urinary system and adrenal glands)

\*\*Repeat the above instructions for Week 4 (spleen, abdominal vasculature, and gastrointestinal tract)

**Exhibit B: Study Plan**

Weekly Study Plan for the students located on their Canvas Portal:

**Study Recommendations**

\*\*\***PLEASE ORGANIZE YOUR STUDY TIME!!!\*\*\***

All review chapters are assigned on Wednesdays (class day).  You will be assigned about 3 chapters to review in a 7-day period so please organize your week for review.

Suggested schedule:

* Wed.-take pre-assessment test for each chapter on thePoint.
* Thurs.-study 1st chapter and answer chapter questions.  Review images from [http://www.ultrasound-images.com/ (Links to an external site.)](http://www.ultrasound-images.com/) or [http://www.ultrasoundcases.info/ (Links to an external site.)](http://www.ultrasoundcases.info/) .
* Fri-study 2nd chapter and answer chapter questions.  Review images from [http://www.ultrasound-images.com/ (Links to an external site.)](http://www.ultrasound-images.com/) or [http://www.ultrasoundcases.info/ (Links to an external site.)](http://www.ultrasoundcases.info/) .
* Sat.-study 3rd chapter and answer chapter questions.  Review images from [http://www.ultrasound-images.com/ (Links to an external site.)](http://www.ultrasound-images.com/) or [http://www.ultrasoundcases.info/ (Links to an external site.)](http://www.ultrasoundcases.info/) .
* Mon-self-assess any problem areas and prepare questions and comments for open discussion.
* Tues.-go over any incorrect answers and be prepared to discuss with class.
* Wed.-Class review

As you can see, there is a lot of information to review and for you to get the most out of your class time, it is imperative that you do the work up front.

Please be prepared!!!

**Exhibit C: Study Objectives**

Examples of objectives for students to consider while they are reviewing independently during the week. Objectives are located in the modules on CANVAS.

|  |  |  |  |
| --- | --- | --- | --- |
| Ch. 2 Liver | Ch. 3 Gallbladder | Ch. 4 Biliary Ducts | Ch. 5 Pancreas |
| -Describe the physiology of the liver.  -List the functions of the liver  -Match pertinent Lab Tests with liver pathologies.  -Identify landmarks of the liver (ligaments, fissures, lobes, veins, porta hepatis, etc.)  -Match clinical indications, clinical findings, sonographic appearance of pathology benign, malignant & Normal variants.  -Recognize Pediatric Pathologies. | -Describe physiology of the gallbladder.  -Describe sources of gallbladder wall thickening.  -List risk factors and predisposing conditions of cholelithiasis.  - Match clinical indications, clinical findings, sonographic appearance of pathology benign, malignant & Normal variants. | -Name the parts of the biliary tree.  -- Match clinical indications, clinical findings, sonographic appearance of pathology benign, malignant & Normal variants.  -Recognize Pediatric Pathologies & congenital anomalies. | -Describe the physiology of the pancreas.  -List the functions of the pancreas. (endocrine & exocrine).  -Identify adjacent vasculature associated w/pancreas.  -Match clinical indications, clinical findings, sonographic appearance of pathology benign, malignant & Normal variants.  -Match pertinent Lab Tests with pancreas pathologies. |

**Exhibit D: Interactive Review Activities**

Interactive Review activity suggestions:

Pathology Index Card Review Exercise for all Chapters

* Great review for all students in the room. Students asking the questions must know the correct questions to ask. Student answering the questions must know how to answer. Great review of pronunciation of the medical terms.
* Student draws a pathology index card.
* Each classmate and instructor will ask a question about the pathology.
  + Clinical findings, sonographic findings, other names for the pathology, benign or malignant, age group, lab values to consider, etc.

Draw Normal Anatomy

* Great review of anatomy and orientation of the anatomy. Visual recall of images.
* Using the dry erase boards, student will draw normal anatomy with correct screen orientation.
* Anatomy can be in sagittal or transverse planes.

Draw Pathology

* Creates a visual for students to remember during the registry.
* Klatskins Tumor of the biliary tree
* Mirizzi of the biliary tree
* Caroli’s Disease of the hepatic ducts

**Exhibit E: Pathology Review Exercise**

Examples of pathologies from the index cards. Instructor can use this table to prompt additional open discussion about a pathology.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pathology | Clinical Findings | Sonographic Findings | Benign/Malignant | Age Group | Labs Associated |
| Cystadenoma of the Liver | Hepatomegaly  Palpable RUQ mass | Multiloculated cystic mass.  Well defined margins  This septated walls. Thick might suggest malignancy. | Benign | Middle-aged women | Maybe LFTs is obstructing. |
| Budd-Chiari Syndrome | Abdominal pain  Hepatomegaly  Lower extremity edema | Hypoechoic intraluminal echoes.  Dilated hepatic veins  Vein wall thickening  Absence of or altered hepatic venous flow.  Hepatomegaly  Enlarged caudate lobe  Ascites  Narrowing of the IVC  Thrombosis of portal veins | Benign in itself. Usually caused by hepatoma. |  | Elevated LFTs  Mild increase in alkaline phosphatase (ALP). |
| Candidiasis | RUQ Pain  Fever  Hepatomegaly | Multiple hyperechoic masses with hypoechoic halos (halo or bull’s eye lesion)  Target or wheel within wheel | Fungal infection | Immunosuppressed patients |  |
| Hepatoblastoma | Palpable abdominal mass.  Hepatomegaly, abd pain, wt. loss, anorexia, jaundice | Solid, hyperechoic, or heterogeneous mass.  Mass may contain calcifications. | Malignant | Children before 5 yrs. High risk children with Beckwith-Weidemann syndrome. | Elevated serum alpha-fetoprotein. |
| Cavernous Hemangioma | Asymptomatic | Small, hyperechoic mass | Benign | Common in women |  |
| Echinococcal Cyst  (hydatid liver cyst)  Moves from bowels to portal system. | Low grade fever  Nausea  Obstructive jaundice  RUQ tenderness | Anechoic cyst containing debris.  Water-lily sign  Mother cyst containing daughter cyst. | Parasite (tape worm) from infected feces sheep, cattle, etc | Travels to Middle East, Australia, Mediterranean | Elevated WBC |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pathology | Clinical Findings | Sonographic Findings | Benign/Malignant | Age Group | Labs Associated |
| Hepatoma  (hepatocellular carcinoma) | Palpable mass  Abdominal pain  Wt loss  Jaundice | Hepatomegaly  Ascites  Multiple nodules  Solid mass with variable echogencities. | Malignant | Often seen in men | Elevated alanine aminotransferase (ALT)  Aspartase aminotransferase (AST)  Alkaline phosphatase  Positive AFP (alpha-fetaprotein) |
| Adenoma of the GB  (polyp) | Asymptomatic  Dull RUQ pain  Intolerance to fatty food | Echogenic intraluminal foci  Immobile  Nonshadowing  Thicken GB wall | Benign |  |  |
| Cholelithiasis  (gallstones) | Asymptomatic  Biliary colic (RUQ pain)  Abd pain after fatty meal  Epigastric pain  Nausea and vomiting  Pain that radiated to shoulder or scapula | Echogenic  Mobile  Shadowing  WES sign  (wall, echo, shadow) | Benign | Fat Women in forties | Could have elevated LFTs |
| Adenomyomatosis | Asymptomatic  Dull RUQ pain  Intolerance to fatty food | Echogenic intraluminal focus  Diffuse comet tail reverberation artifact  Immobile | Benign |  |  |
| Emphysematous Cholecystitis | RUQ pain  Nausea and vomiting  Fever  Diabetes | Echogenic foci in GB wall or lumen.  Ill-defined posterior acoustic shadow.  Gas within the GB wall that leads to ring-down artifact. |  | Diabetics | Elevated WBC-leukocytosis |
| Mirizzi Syndrome | RUQ pain  Jaundice | Immobile calculus in the cystic duct or neck of the GB.  Dilatation of the intrahepatic and Common Hepatic Duct  Normal CBD. |  |  | Elevated bilirubin and alkaline phosphatase (ALP)  Increase AST and ALT |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pathology | Clinical Findings | Sonographic Findings | Benign/Malignant | Age Group | Labs Associated |
| Caroli Disease | Abdominal pain  Abdominal cramping  Fever  Intermittent jaundice | Segmental, saccular, or beaded appearance to the intrahepatic bile ducts.  Multiple cystic structures in the liver that communicate with the biliary tree. | Benign | Congenital disorder |  |
| Pneumobilia | Asymptomatic  RUQ pain | Hyperechoic foci in the intrahepatic ducts  Ring down reverb artifact. | Benign |  |  |
| Choledochal cyst | Jaundice  Pain  Fever | Cystic mass in the area of the porta hepatis separate from GB.  Biliary dilatation | Benign |  |  |
| Chronic Pancreatitis | Chronic RUQ pain or epigastric pain  Nausea and vomiting  Wt loss | Increased parenchymal echogenicity  Irregular borders calcifications  Pseudocyst formation  Atrophy  Prominent pancreatic duct |  |  | May have an elevated amylase or lipase.  Lipase stays elevated longer than amylase in acute. |
| Pancreatic abscess | Abdominal pain  N/V | Well defined homogeneous mass.  Cystic mass with debris  Fluid-debris levels. |  |  | Elevated amylase  Decrease in hematocrit |
| Islet Cell Tumor  2 types-insulinoma and gastrinoma | Insulinoma-low blood sugar.  Gastrinoma-Zollinger-Ellison syndrome-excessive secretion of acid by the stomach. | Hypoechoic mass that may contain calcification.  Visualization is hard because they are small. |  |  |  |
| Adenocarcinoma of the pancreas | Loss of appetite  Wt loss  Jaundice  Epigastric pain  Courvoisier GB-enlarged palpable GB | Hypoechoic mass in the head of the pancreas.  Dilated CBD and pancreatic duct. (double-duct sign)  Enlarged GB |  |  | Elevated amylase and lipase. |

**Exhibit F: Post-assessment instructions**

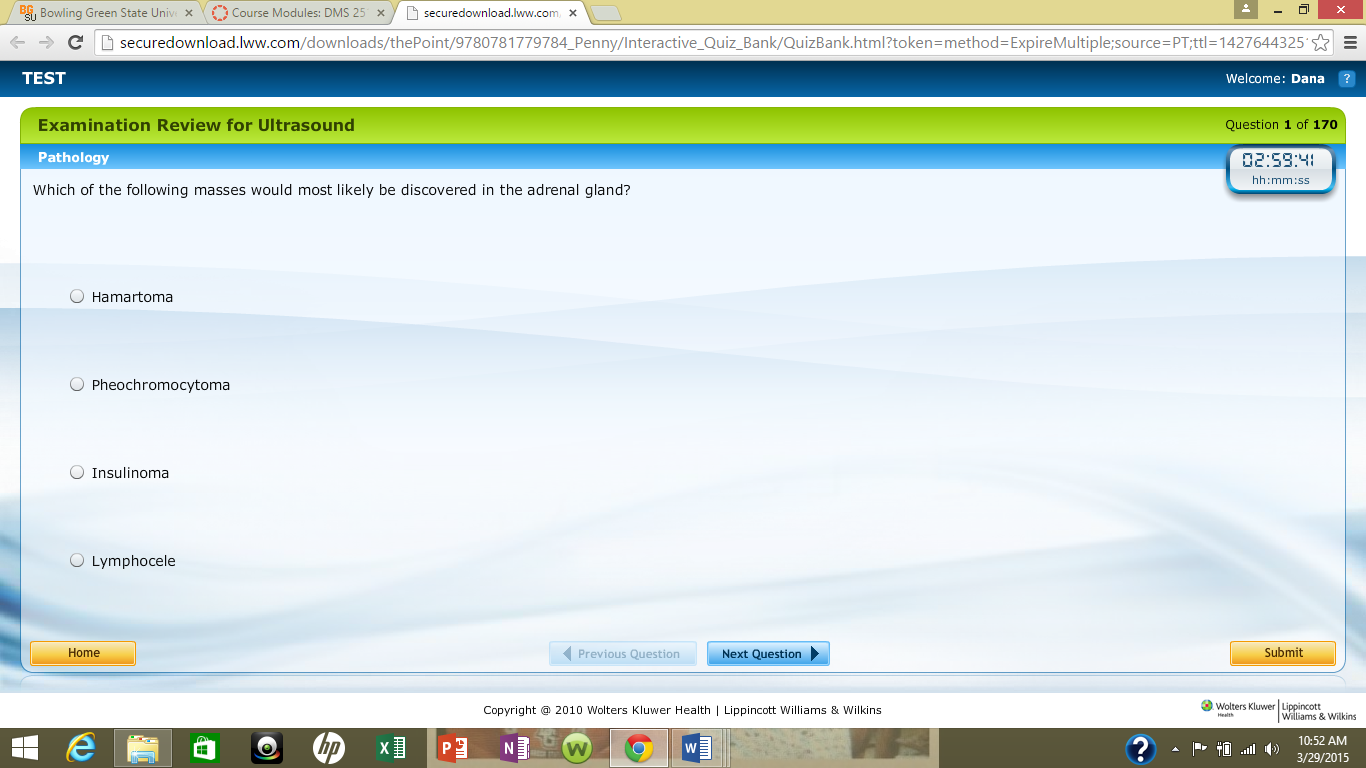
Instructions for Post-assessment Abdominal Mock Registry

PLEASE LOCATE THE LOG IN INFORMATION INSIDE THE FRONT COVER OF YOUR PENNY REVIEW BOOK:

<http://thepoint.lww.com/Penny_AbObGyn1e>

Log in:

* Student Resources
* General Ancillary Content: Supplementary Materials
* Student Ancillary Content
* Interactive Question Bank
* Enter your name and email
* Start
* Click **“ARDMS Abdomen Exam”** on the top right
* **“Test”** just below
* You will answer 110 questions in 2 hrs.
* Once you have completed your test your grade will be displayed on the screen**.**
* **I will log on and print any incorrect answers and we will meet to discuss any questions or concerns you might have prior to taking the ARDMS Abdominal Registry.**



# Bibliography

Chiarelott, L. (2006). *Designing Instruction For Contextual Teaching and Learning.* Belmont: Thomson Wadsworth.

Geertsma, T. (2005). *Ultrasound Cases*. Retrieved from Ultrasoundcases.info: http://www.ultrasoundcases.info/

Penny, S. (2011). *Examination Review for Ultrasound.* Baltimore: Lippincott Williams & Wilkins.

Penny, S. (2011). *thePoint*. Retrieved from Wolters Kluwer Health: http://securedownload.lww.com/downloads/thePoint/9780781779784\_Penny/Interactive\_Quiz\_Bank/QuizBank.html?token=method=ExpireMultiple;source=PT;ttl=1427576520999;hash=An5UF+kduI5g5XPdgxp2mw==&UserName=3fa28972-7b86-490d-8c9f-3728011dd280

*Ultrasound Image Gallery*. (2013). Retrieved from Ultrasound Images: http://www.ultrasound-images.com/