Introduction to Clinical Medicine 2
Lab Guide: Anatomy of the Urinary System
Spring 2019

Introduction:

There are two parts to this laboratory exercise - a pre-lab activity and a five-activity laboratory. During the assigned dry lab, small groups within each of the 18 teams will complete the five lab activities. An image from each activity (2, 3, and 4) per team will be inserted into identified OneDrive folders. A presentation of each team's effort will occur towards the end of the lab period.

I. Pre-Lab Activity (60 minutes)

Prior to the lab on 5/20/2019, review the "Urinary System" module in the WELLS Center Clinical Skills Lesson on your VHD software program. You can find this lesson in the VHD Lessons window under the "Online Lesson" banner. Click the red text throughout the module to view the anatomy highlighted on cross-section and in 3D. Be prepared to discuss the details of this module with your lab group during the lab session.

II. Lab Activities

A. Activity 1: Peer teaching- Urinary System, WELLS Center Clinical Skills (30 minutes)

Each lab group of eight into three smaller groups of 3-2 people. Assign one of the following sections to each small group: Group 1: Kidneys; Group 2: Ureters & urinary bladder; Group 3: Urethra

Organize into smaller groups based on Dr. Rarey's instructions. Each group will have **10 minutes** to go through their section in this module. Dr. Rarey will notify you when it is time to transition to the next section.

1. In the VHD Lessons window, navigate to and select the WELLS Center Clinical Skills lesson. Select the "Urinary System" module.
2. Given your designated section in the module:
    a. Discuss the anatomical relationships and vascular supply relevant to the urinary system.
    b. Interpret the clinical concepts highlighted in the blue text boxes.

B. Activity 2: Cross-sections (20 minutes)

1. One cross-section plane (transverse, sagittal, or coronal) will be assigned to each small group by Dr. Rarey.
2. Given your designated cross-section, find an image showing the following structures:
   (e.g. transverse #620; sagittal #1182; coronal #360)
   [T- 600-665; S- 1131-1194; S 634-762; C- 309-528]
    a. Perirenal fat capsule
    b. Pararenal fat body
    c. Renal fascia

3. Save the cross-section image. Add labels for the structures listed in #2a-c. Open OneDrive and insert the three cross-section images into the appropriate folders
4. Given the cross-sections:
    a. Identify and be prepared to discuss where blood would collect if the kidney or its associated vasculature were injured.
    b. Name the muscles present at the boundaries of the pararenal fat body and the perirenal fat capsule.

C. Activity 3: Dissect the 3D model (20 minutes)

Activity 3 Urinary System (Male) Bookmark

Activity 3 Urinary System (Female) Bookmark

1. Dissect structures from the 3D model to reveal the components of the male or female urinary system.
    a. Make sure you have selected "Full", "Classic", or "3D" from the list of "View" options.
    b. Click "Reset" to reset the 3D model.
    c. Click "Dataset" to select which dataset (male or female) you will use to create your model.
    d. Use the dissect tool under the cross-sections and 3D window, and the "Remove" function at the bottom of the Index, Regions, and Systems tabs to remove anatomy from the 3D model.
    e. Use the highlight tool under the cross-sections and 3D window, or the "Add & Highlight" function at the bottom of the Index, Regions, and Systems tabs to view anatomy in its highlighted coloring.
    f. Save the Dissection image.
2. Trace the course of the ureters from the renal pelvis to the muscular wall of the bladder and identify potential areas for constriction/reduced urine flow along this course.
3. Given your designated cross-section from Activity 2, find across-section image that shows the ureter(s) entering the urinary bladder. Save the cross-section image.
   (e.g. transverse #870; sagittal #954; coronal #408)
4. Then, add annotations to the 3D model indicating potential urinary constriction sites, as well as, to the cross-section showing the ureter(s) entering the bladder. Insert the image of the 3D model and the three cross-section images into OneDrive folder.

D. Activity 4: Build a 3D model highlighting vessels associated with the urinary system (20 minutes)

Activity 4 Urinary System including vascular supply and drainage Bookmark

1. Use the Index, Regions, and Systems tabs to build a 3D model (male) that shows the anatomical components of the urinary system, including the arterial supply and venous drainage of the kidneys.
    a. Use the highlight tool under the cross-sections and 3D window, or the "Add & Highlight" function at the bottom of the Index, Regions, and Systems tabs to view anatomy in its highlighted coloring.
2. Use the index tab and search for "accessory renal artery". "Add and highlight" the left and right arteries. Notice where these arteries originate and which portion of the kidney they supply.
    a. Discuss the embryological origins of the accessory renal arteries.
3. Notice the position of the left accessory renal artery with respect to the left ureter. Consider potential impacts to the kidney and ureter if this artery became occluded.
4. Save the dissection image. Open OneDrive and insert an image of the 3D model that illustrates the highlighted vessels associated with the urinary system.

E. Activity 5: **Complete the "Renal Cancer (Radical Nephrectomy)" module in "The Anatomy of Clinical Procedures" Lesson.** (20 minutes)

In small groups within your teams, find this lesson in the VHD Lessons window under the "Online Lessons" banner. This module reviews anatomical relationships relevant to the urinary system with respect to a posterior surgical approach to the kidney. Apply your knowledge of the anatomy relevant to the urinary system to answer questions and clinical concepts highlighted in the green text boxes.

F. Presentations of Lab Groups' Activities (40 minutes)

During the last 40 minutes of lab, each lab teams will present a cross-section or 3D model of their choice, from activity 2, 3, or 4. Identify labeled structures of the urinary system and show their structural relationships to surrounding organs and/or discuss clinical relevance of labeled urinary structures.

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