THE GENITOURINARY SYSTEM

BMP-218
December 9, 2014
RENAL SYSTEM FUNCTION

Blood homeostasis

• Fluid balance

• pH

• Salts

• Waste product removal (ammonia)
<table>
<thead>
<tr>
<th>Macroscopic components</th>
<th>Microscopic components</th>
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<tbody>
<tr>
<td>• Kidney(s)</td>
<td>• Glomerulus</td>
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<tr>
<td>• Ureter(s)</td>
<td>• Bowman’s capsule</td>
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<tr>
<td>• Bladder</td>
<td>• Nephron</td>
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<tr>
<td>• Urethra</td>
<td>• Loop of Henle</td>
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<td>• Renal cortex</td>
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<td>• Renal medulla</td>
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<td>• Renal artery</td>
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<td>• Renal vein</td>
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THE URINARY SYSTEM
KIDNEY ANATOMY
KIDNEY MICROANATOMY
Renal Functional Units

Glomerulus

- Filters all low molecular weight materials (water, salts, sugars, drugs, etc.) out of the blood

Nephron

- Reabsorbs materials the body needs
  - Water, salts, sugars
- Energetically wasteful, but highly selective
NEPHRON ANATOMY
NEPHRON ANATOMY
KIDNEY STONES
MAJOR ANATOMIC COMPONENTS OF THE REPRODUCTIVE SYSTEM(S)

Female

- Ovary
- Fimbriae
- Fallopian tubes (oviduct)
- Uterus
- Vagina

Male

- Testes
- Vas deferens
- Seminal vesicle
- Prostate gland
- Penis
- Urethra
MALE REPRODUCTIVE SYSTEM
TESTICULAR ANATOMY
MALE HORMONAL CYCLING
FEMALE AND MALE PELVIC ANATOMY
A new discovery; Gona, Ethiopia

~318 mm

Circumference of newborn's head
320-370 mm

~353 mm

Circumference of pelvic inlet
~385 mm

“Lucy”
Australopithecus afarensis
~3.2 Million Years Old

Homo erectus
~1.2 Million Years Old

Homo sapiens
Modern Day

EVOLUTIONARY
PELVIC ANATOMY
FEMALE REPRODUCTIVE SYSTEM
FEMALE REPRODUCTIVE ANATOMY
HORMONAL CYCLES (FEMALE)

Controlled by circulating hormones

- Estrogen
- Progesterone

Ovulatory cycle

Menstrual cycle

Both are interrupted by pregnancy

- Progesterone level stays high during pregnancy
- Prevents ovulation
- Maintains endometrial thickness
MENSTRUATION
EMBRYOGENESIS
Figure 14.55. Normal CT scan through the midkidneys obtained with IV contrast material. The renal pelvises and calices are brightly opacified.
E. Coronal reformation of the helical axial scans shows a stone in the proximal ureter (arrow). Note the ureteral dilatation between the left kidney (K) and the stone. L indicates the liver, S the spleen, and B the bladder. Again multiple calculi are visible in both kidneys.

F. Sagittal reformation through the left kidney (K) shows two left ureteral stones (arrow).
Figure 16.12. Normal hysterosalpingogram. Contrast material has been injected into a catheter placed within the cervix. The uterine cavity (U) is opacified as well as the uterine tubes (arrows). There is retrograde flow of contrast material into the endocervical canal (E); the injection catheter can be seen passing through the vagina. The free flow of contrast material into the peritoneal cavity shows that the patient's uterine tubes are patent. The ovaries are not seen.
PELVIC MRI
Figure 15.10. Normal CT scans of the female pelvis. A: Upper-level scan shows the dome of the muscular uterus (U). B: Slightly lower-level scan shows the mid-urethra (U) and its almost central, less dense, uterine cavity. The right (R) and left (L) ovaries (arrowed) are shown adjacent to the uterus. C: Lowest-level scan, taken below the uterus, shows a collapsed vagina (arrow) between the contrast-opacified bladder (B) and the air-containing rectum (R).
Figure 16.28. Longitudinal transabdominal ultrasound at 27 weeks menstrual age. The fetus is in a cephalic, face-up presentation. Note the relationship between the fetal head and cervix (C). Identify the head, face, and spine. The placenta (P) can be seen anterior to the fetus.

ULTRASOUND
ULTRASOUND RECONSTRUCTION