Renal Physiology

The Continuing Education Committee presents this self-evaluation quiz on renal physiology. Answers can be found on p. 56. References are listed at the end of the quiz to assist you in your review of this topic. Please select the BEST answer for each of the questions.

1. *The accuracy of glomerular filtration rate (GFR) measurements utilizing [^{99m}Tc]DTPA show systematic errors due to:*
   a. reabsorption by renal tubules.
   b. excretion by renal tubules.
   c. the 6-hr half-life of ^{99m}Tc.
   d. protein binding of the radiopharmaceutical.
   Ref. 1 pp. 236–237.

2. *The glomerulus is made up of:*
   a. nerves.
   b. arteries.
   c. veins.
   d. capillaries.
   Ref. 2 p. 430

3. *Glomerular filtrate flows into the:*
   a. ureters.
   b. renal pelvis.
   c. renal tubules.
   d. renal artery.
   Ref. 2 p. 431

4. *The renal blood flow during organ rejection episodes and post-renal transplant is:*
   a. reduced.
   b. unchanged.
   c. increased.
   Ref. 1 p. 128

5. *The main clinical application of renal perfusion studies is in the evaluation of:*
   a. glomerular filtration rate.
   b. effective renal plasma flow.
   c. patency of the renal arteries.
   d. inflammatory disease.
   Ref. 1 p. 236

6. *The radiopharmaceutical(s) which best demonstrates renal columns of Berlin is (are):*
   a. [^{99m}Tc]DSMA
   b. ^{99m}Tc-glucoheptonate
   c. [^{99m}Tc]DTPA
   d. a and b
   e. a and c
   Ref. 3 p. 79

7. *Prompt clearance of the radionuclide from the pelvis of the kidney is an abnormal reponse after the patient receives an injection of furosemide.*
   a. True
   b. False
   Ref. 3 p. 78

8. *Blood is directly supplied to the kidneys via:*
   a. the renal artery(ies).
   b. the superior mesentric artery.
   c. the descending aorta.
   d. the inferior mesentric artery.
   Ref. 4 p. 102

9. *Congenital abnormalities of the kidney include:*
   a. failure of one kidney to develop.
   b. pelvic kidney.
   c. horse-shoe kidney.
   d. polycystic kidney
   e. all of the above.
   Ref. 4 p. 105

10. *The functional unit of the kidney is the:*
    a. nephron.
    b. renal artery.
    c. Loop of Henle.
    d. major calyx.
    Ref. 5 p. 344

11. *The processes involved in urine formation are:*
    a. glomerular filtration and tubular reabsorption.
    b. tubular reabsorption and tubular excretion.
    c. glomerular filtration, tubular reabsorption, and tubular excretion.
    d. tubular reabsorption, tubular excretion, and plasma clearance.
    Ref. 5 p. 346

12. *Renal plasma flow may be determined theoretically by:*
    a. total excretion of the agents by the kidneys.
    b. complete clearance of agent during one circulation through the kidney.
    c. obstruction of agent in the renal pelvis.
    d. a and b
    e. a and c.
    Ref. 5 p. 350

13. *Normal renograms have three phases:*
    a. ascending limb, plateau, and initial rise.
    b. plateau, initial rise, and descending limb.
    c. initial rise, ascending limb, and descending limb.
    d. none of the above.
    Ref. 1 p. 350

14. *Renal imaging can be useful in:*
    a. determining the effects of angioplasty on renal function.
    b. evaluation of renovascular hypertension.
    c. detection of early rejection, post-transplant.
    d. a and b.
    e. all of the above.
    Ref. 3 pp. 79–80.

15. *A percentage of free iodide greater than _____ % will result in erroneous effective renal plasma flow (ERPF) measurement with [^{131}I]orthro-iodohippurate.*
    a. 2
    b. 4
    c. 6
    d. 8
    Ref. 1 p. 237.

References

1. O'Reilley PH, Shields RA, Testa HJ, eds. *Nuclear medicine in urology and nephrology*. London: Butterworth & Co.; 1979;236–237; 128; 350.

2. Early PJ, Razzak MA, Sodee DB, eds. *Textbook of nuclear medicine technology,* 2nd ed. St. Louis: CV Mosby: 1975:430–431.

3. Alazaraki NP, Mishkin FS, eds. Genitourinary tract. In: *Fundamentals of nuclear medicine*. New York: The Society of Nuclear Medicine; 1984:79; 78 and 80.

4. Ellis H. The abdomen and pelvis. In: Ellis H, ed. *Clinical anatomy,* 5th ed. Oxford: Blackwell Scientific Publications Ltd.; 1971:102 and 105.

5. The genitourinary system. In: Bernier DR, Langan JK, Wells LD, eds. *Nuclear medicine technology and techniques*. St. Louis, CV Mosby; 1981:344; 346 and 350.