Radiology Procedures in Pregnancy

Expires Tuesday, April 30, 2019 Nursing Craig V. Towers , M.D., FACOG

Examination

1. **X-ray exposure involves ionizing radiation, which is something that could adversely affect a pregnancy. In theory, x-ray exposure in pregnancy can lead to which of the following**
   a. premature rupture of the membranes
   b. an increased risk for a placental abruption
   c. pregnancy induced hypertension
   d. an increased risk for developing cancer in the future
   e. the development of a placenta previa

2. **Regarding the genetic risk, radiation exposure to germ cells (the egg and the sperm) has been shown to cause damage to chromosomes. The damage is such that the cells**
   a. become mutated and pass on genetic abnormalities to future offspring.
   b. become nonfunctional and therefore could not result in a successful conception or pregnancy.
   c. only pass on an increase risk for future leukemia.
   d. pass on neurologic and / or cardiac defects to future offspring.
   e. lead to limb reduction abnormalities in the fetus.

3. **It has been suggested that the development of cancer following radiation exposure may be higher in children when compared to adults; however, it is unlikely that this increase is any higher than**
   a. 1 in 100
   b. 1 in 500
   c. 1 in 1000
   d. 1 in 2000
   e. 1 in 3000

4. **_____ is defined as the amount of energy deposited per kilogram of tissue normalized for biological effectiveness, which is the relative effective dose.**
   a. The Gray unit
   b. The Sievert unit
   c. The roentgen (R)
   d. The rad
   e. The roentgen equivalent man (rem)

5. **Much of the data on radiation exposure during pregnancy comes from the atomic bomb survivors in Japan. High doses of radiation can cause damage to the central nervous system, especially between**
   a. 8 and 15 weeks gestation
   b. 15 and 25 weeks gestation
   c. 25 and 35 weeks gestation
   d. 1 and 8 weeks gestation
   e. 35 weeks gestation to term

6. **When examining the issue of radiation exposure during pregnancy, the first two weeks of gestation are not a concern because**
   a. the embryo is still in the fallopian tube.
   b. the placenta has not developed yet
   c. the brain and heart are the only organs that have started to form.

d. the woman is NOT pregnant yet.
e. the embryo only consists of 32 to 64 cells

7. **As the fetus begins to form, three main tissue types develop. The majority of the internal organs, such as the liver, kidneys, lungs, and intestines come from the**
   a. ectoderm
   b. mesoderm
   c. endoderm
   d. placental cells
   e. uterine cells

8. **The fetal central nervous system and heart are the first organ systems to develop starting at**
   a. 2 ½ weeks gestation and are basically finished by 6 weeks
   b. 4 ½ weeks gestation and are basically finished by 10 weeks
   c. 6 weeks gestation and are basically finished by 12 weeks
   d. 7 ½ weeks gestation and are basically finished by 13 weeks
   e. 8 weeks gestation and are basically finished by 15 weeks

9. **The risk of mental retardation from high-dose radiation appears to take at least a dose of 20 rads. This risk is _____ following a dose of 100 rads.**
   a. 20%
   b. 40%
   c. 60%
   d. 80%
   e. 90%

10. **The American College of Obstetricians and Gynecologists (ACOG) and the American College of Radiology (ACR) both state that exposures of _____ do not increase the risk for anomalies.**
    a. less than 1 rad
    b. less than 0.5 rads
    c. less than 10 rads
    d. less than 5 rads
    e. less than 20 rads

11. **Because radiation exposure has the potential for harm, the use of x-ray procedures during pregnancy should be closely evaluated. If a woman discovers that she was pregnant after she already underwent a procedure, she should be advised**
    a. to abort the pregnancy, because of the potential harm that occurred.
    b. that most likely she will miscarry the pregnancy.
    c. on the amount of fetal exposure that occurred and the gestational age of her pregnancy should be determined.
    d. that in the majority of cases, because x-rays are ionizing radiation, the potential risks will be significant.
    e. to stay at bedrest because of an increased risk for premature rupture of the membranes and early delivery.

12. **In 1996, the FDA lowered the upper limit for energy exposure with obstetrical ultrasound to**
    a. 84mW/cm^2
    b. 100mW/cm^2
    c. 75mW/ cm^2
    d. 104mW/cm^2
    e. 94mW/cm^2

13. **The thermal index or TI of an ultrasound machine output is**
    a. a calculation that is determined by the ratio of the total acoustic power to the acoustic power required to raise the tissue temperature by 1C.

b. unaffected by the tissue being examined.
c. a mathematical calculation of dividing the spatial peak value of the peak rarefractional pressure by the square root of the center frequency.
d. unaffected by the power output of the machine but is affected by the "gain".
e. the result of compression and decompression of tissue as the ultrasound beam passes through the tissue, which could produce cavitation.

14. **Of the following tissues, _____ has the highest amount of absorption of the ultrasound energy output.**
a. bone
b. blood
c. amniotic fluid
d. fetal brain tissue
e. urine

15. **The use of MRI in pregnancy was initially approached with caution because of uncertainty regarding fetal effects, however, its usage has been described in diagnosing all of the following fetal disorders EXCEPT**
a. CNS abnormalities
b. urinary tract abnormalities
c. chest disorders
d. neck masses
e. oligohydramnios

16. **Which of the following statements is true?**
a. Ultrasound imaging is not hampered by oligohydramnios.
b. MRI is affected by the amount of amniotic fluid that is present.
c. MRI usage in obstetrics is not affected by fetal movement.
d. MRI employs the use of magnets that alter the energy state of hydrogen protons and thus, is a form of ionizing radiation.
e. Ultrasound imaging is at its best when a good amount of amniotic fluid is present.

17. **Which of the following statements is true?**
a. The majority of studies that have utilized MRI in pregnancy have been performed during the first trimester, before the patient new she was pregnant.
b. Even though no adverse effects have been reported, the National Radiological Protection Board has arbitrarily advised that MRI not be performed in the first trimester if at all possible until further studies are performed.
c. A few recent reports have described Fast MRI imaging, which increases exposure but still obtains quality images.
d. Fast MRI imaging, because of its increased exposure, is not recommended for use in pregnancy.
e. It is the recommendation of the National Radiological Protection Board that MRI only be performed in the first trimester if at all possible.

18. **The most common nuclear medicine study performed on women of childbearing age is**
a. radioactive I^{131} treatment for hyperthyroidism.
b. a Technetium 99 bone scan.
c. the pulmonary ventilation-perfusion (VQ) scan.
d. a Technetium 99 brain scan.
e. a Technetium 99 liver scan.

19. **The amount of radiation exposure to the fetus with a typical pulmonary ventilation-perfusion (VQ) scan is**
a. about 5 millirads
b. about 500 millirads
c. about 5 rads

d. about 50 millirads
e. about 1 rad

20. **A common non-surgical treatment for significant hyperthyroidism is the radioactive isotope of iodine (Iodine 131 or I^{131}). Because iodine readily crosses the placenta, if I^{131} treatment is used during pregnancy, the woman can be reassured that the fetus was probably unaffected if used**
    a. prior to 10 weeks gestation.
    b. between 10 and 20 weeks gestation.
    c. between 20 and 30 weeks gestation.
    d. between 30 and 35 weeks gestation.
    e. after 36 weeks gestation.