

Clinical Guideline

PREGNANCY TEST

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I. Indications

- A. Pregnancy diagnosis and monitoring
- B. Tumor monitoring
 - 1. Nonseminomatous germ cell tumor monitoring
 - 2. Hydatiform mole diagnosis and monitoring
 - 3. Choriocarcinoma diagnosis and monitoring

II. Physiology

- A. HCG is a glycoprotein hormone with subunits a and b
 - 1. Composed of 65% polypeptides by molecular weight
 - 2. Composed of 35% large sugar side chains (8 chains)
 - a. Four are N-Linked (2 each on alpha and beta)
 - b. Four are O-Linked (all 4 are on beta subunit)
 - 3. Forms of HCG found in blood and urine
 - a. Intact HCG with alpha and beta subunits
 - b. Nicked HCG and nicked free beta subunit
 - c. Free beta subunit and free alpha subunit
 - d. Hyperglycosylated free beta and free alpha subunits
 - e. Beta core fragment (present only in urine)
- B. HCG shares the same alpha subunit with other hormones
 - 1. Luteinizing hormone (LH)
 - 2. Thyroid Stimulating Hormone (TSH)
- C. Urine and Blood HCG tests are specific for beta subunit
- D. Serum half life of HCG: 24 to 36 hours

III. Interpretation: Levels of bHCG in pregnancy

- A. Estimation in normal pregnancy for weeks 4 to 8
 - 1. Anticipate HCG doubling every 48 to 72 hours
- B. Chart of corresponding gestational age
 - 1. Day 23 (3.3 weeks): 100 mIU/ml
 - 2. Day 28 (4.0 weeks): 250 mIU/ml
 - 3. Day 35 (5.0 weeks): 1000 mIU/ml
 - a. bHCG 1800: [Gestational Sac](#) on Transvaginal U/S
 - b. bHCG 3500: [Gestational Sac](#) on Transabdominal U/S
 - 4. Day 42 (6.0 weeks): 4000 mIU/ml
 - 5. Day 49 (7.0 weeks): 15000 mIU/ml
 - a. bHCG 20,000: 5-10 mm [Embryo](#) with cardiac activity
 - 6. Day 56 (8.0 weeks): 65000 mIU/ml
 - 7. Decreases gradually after 8 weeks
 - 8. Plateaus after 20 weeks
- C. Ranges of bHCG over each Trimester
 - 1. First Trimester: 30,000 to 100,000 mIU/ml
 - 2. Second Trimester: 10,000 to 30,000 mIU/ml
 - 3. Third Trimester: 5,000 to 15,000 mIU/ml

IV. **Efficacy: Home pregnancy tests**

- A. Variable efficacy after missed [Menses](#)
 - 1. Wide discrepancy between brands
 - 2. [Cole \(2004\) Am J Obstet Gynecol 190:100-5](#)

V. **Causes: Elevated bHCG in non-pregnant state**

- A. HCG-producing tumors in women
 - 1. [Hydatidiform Mole](#) or [Choriocarcinoma](#)
- B. HCG-producing tumors in men
 - 1. HCG is usually undetectable in healthy males
 - 2. Nonseminomatous germ cell tumor ([Testicular Cancer](#))
 - a. Used with AFP for monitoring

VI. Causes: False positive increased serum hCG

A. Causes

1. Heterophilic antibody (most common)
2. Human anti-mouse antibody (HAMA)
3. Nonspecific protein-binding hCG-like substances
4. Red Blood Cell interference
5. Marijuana use
6. Hypogonadism

B. Confirmation methods in non-pregnant conditions

1. Qualitative urine hCG
2. Serum hCG by different immunoassay method
3. Serial dilutions of serum hCG sample

VII. HCG in Nonseminomatous germ cell tumor (Men)

A. Interpretation

1. Poor prognosis if bHCG >50,000 mIU/ml at diagnosis
2. Five year survival rate: 50%

B. Efficacy

1. High Specificity in men
2. Low Test Sensitivity
 - a. HCG or AFP increased in 85% of patients
 - b. HCG or AFP increased in only 20% of Stage 1 Cancer

C. Protocol

1. Initial: bHCG with AFP q1-2 months for 1 year
2. Later: bHCG with AFP q3 months for 1 year

VIII. References

- A. Bakerman, ABCs Interpretive Lab Data, p. 239-40
- B. (1997) *J Clin Oncol* 15:594-603
- C. Hay (1988) *J Clin Endocrinol Metab* 67:1322-4

Pregnancy Tests

Q: How do pregnancy tests work?

A: All pregnancy tests look for a special hormone in the urine or blood that is only present when a woman is pregnant. This hormone, human chorionic gonadotropin (hCG), is also called the pregnancy hormone.

Q: What's the difference between a urine and a blood pregnancy test? Is one better than the other?

A: There are two types of pregnancy tests—blood and urine tests. Both tests look for the presence of hCG, the pregnancy hormone. Today, many women use a urine test, or home pregnancy test (HPT), to find out if they are pregnant. HPTs do not cost a lot, are easy to use, can be done at home, and are private. When a woman has a positive result on an HPT, she needs to see her health care provider right away. The health care provider can confirm a positive HPT result with a blood test and a pelvic exam.

There are two types of blood tests you can get from a health care provider. A quantitative blood test (or the beta hCG test) measures the exact amount of hCG in the blood. This means it can pick up very small amounts of hCG, making it a very accurate test. A qualitative hCG blood test gives a simple yes or no answer to whether you are preg-

nant. This test is more like a urine test in terms of its accuracy.

Blood tests can pick up hCG earlier in a pregnancy than urine tests can. Blood tests can tell if you are pregnant about 6 to 8 days after you ovulate (or release an egg from an ovary). Urine tests can determine pregnancy about 2 weeks after ovulation. Some more sensitive urine tests can tell if you are pregnant as early as 6 days after you conceive, or one day after you miss a menstrual period.

Q: How is a home pregnancy test done?

A: There are many types of home pregnancy tests, or HPTs, that can be bought over-the-counter at drug or discount stores. Some involve collecting your urine in a cup and dipping a stick into the urine, or putting some of the urine into a special container with an eyedropper. Others are done by placing a stick into your urine stream. Tests vary in how long you have to wait for the stick or container to turn a certain color or have a symbol on it (like a plus or a minus). All tests come with written instructions. Most tests also have toll-free phone numbers to call if you have any questions about how to do the test or read the results.

Q: How accurate are home pregnancy tests?

A: Home pregnancy tests (HPTs) are very accurate. Most brands of HPTs say they are 97% to 99% accurate, but this can vary with actual use. Each brand varies in how sensitive it is in picking up the pregnancy hormone hCG. If a test is not done correctly, it will be less accu-

rate. And, always check the package to make sure it is not past its expiration date—if it is, it will not be accurate. Most brands of HPTs tell users to do the test again in a few days, no matter what the results.

If you use an HPT too early in your pregnancy, you may not have enough of the pregnancy hormone hCG in your urine to have a positive test result. Most HPTs will be accurate if you test yourself around the time your period is due (about 2 weeks after you ovulate, or release an egg from your ovary). You can get a negative test result if you are not pregnant or if you ovulated later than you thought you did. You may also have problems with the pregnancy, which affects the amount of hCG you have in your urine. If your HPT is negative, test yourself again within a few days to 1 week. If you keep getting a

negative result and think you are pregnant, talk with a health care provider right away.

Q: Can anything interfere with home pregnancy test results?

A: Most medications, both over-the-counter and prescription drugs, including birth control pills and antibiotics, should not affect the results of a home pregnancy test (such as Profasi, Pregnyl or Novarel). Only those drugs that have the pregnancy hormone hCG in them can give a false positive test result (where the test says you are pregnant when you actually are not). Drugs that have hCG in them can be used for treating infertility (not being able to get pregnant). Alcohol and illegal drugs do not affect HPT results, but you should not be using these substances if you are trying to get pregnant. ■