Alpha-1-fetoprotein measurement, serum

What is this test?

This test measures alpha-fetoprotein (AFP) in blood. This test may assess an unborn baby for certain problems. Since AFP is a tumor marker, this test may also assess for certain types of cancer[1].

What are other names for this test?

Serum alpha-fetoprotein

What are related tests?

Chorionic gonadotropin, beta-subunit measurement
Diagnostic ultrasound of gravid uterus
Serum lactate dehydrogenase measurement
Ultrasonography of liver

Why do I need this test?

Laboratory tests may be done for many reasons. Tests are performed for routine health screenings or if a disease or toxicity is suspected. Lab tests may be used to determine if a medical condition is improving or worsening. Lab tests may also be used to measure the success or failure of a medication or treatment plan. Lab tests may be ordered for professional or legal reasons. The following are possible reasons why this test may be done:

Liver carcinoma
Neural tube defect
Pregnancy complications
Testicular cancer

When and how often should I have this test?

When and how often laboratory tests are done may depend on many factors. The timing of laboratory tests may rely on the results or completion of other tests, procedures, or treatments. Lab tests may be performed immediately in an emergency, or tests may be delayed as a condition is treated or monitored. A test may be suggested or become necessary when certain signs or symptoms appear.

Due to changes in the way your body naturally functions through the course of a day, lab tests may need to be performed at a certain time of day. If you have prepared for a test by changing your food or fluid intake, lab tests may be timed in accordance with those changes. Timing of tests may be based on increased and decreased levels of medications, drugs or other substances in the body.

The age or gender of the person being tested may affect when and how often a lab test is required. Chronic or progressive conditions may need ongoing monitoring through the use of lab tests. Conditions that worsen and improve may also need frequent monitoring. Certain tests may be repeated to obtain a series of results, or tests may need to be repeated to confirm or disprove results. Timing and frequency of lab tests may vary if they are performed for professional or legal reasons.

How should I get ready for the test?

Venous blood:

Before having blood collected, tell the person drawing your blood if you are allergic to latex. Tell the healthcare worker if you have a medical condition or are using a medication or supplement that causes excessive bleeding. Also tell the healthcare worker if you have felt nauseated, lightheaded, or have fainted while having blood drawn in the past.

If the test is for prenatal screening, tell the healthcare worker what pregnancy trimester you are in at the time of the test[2].

Umbilical cord blood:

Ask the healthcare worker for information about how to prepare for this test.

How is the test done?

A sample of venous or umbilical cord blood may be collected for this test.

Venous blood:

When a blood sample from a vein is needed, a vein in your arm is usually selected. A tourniquet (large rubber strap) may be secured above the vein. The skin over the vein will be cleaned, and a needle will be inserted. You will be asked to hold very still while your blood is collected. Blood will be collected into one or more tubes, and the tourniquet will be removed. When enough blood has been collected, the healthcare worker will take the needle out.

Umbilical cord blood:

A method called percutaneous umbilical cord blood sampling may be used to collect an umbilical cord blood sample. For this method, a needle is inserted through the pregnant mother's abdomen and into the umbilical cord. Ultrasound is used to help guide the needle. Samples of the unborn baby s umbilical cord blood are drawn out for testing. When enough blood is collected, the needle is removed.

How will the test feel?

The amount of discomfort you feel will depend on many factors, including your sensitivity to pain. Communicate how you are feeling with the person doing the test. Inform the person doing the test if you feel that you cannot continue with the test.

Venous blood:

During a blood draw, you may feel mild discomfort at the location where the blood sample is being collected.

Umbilical cord blood:

There are several different ways that a cord blood sample may be collected. Depending on the procedure used to obtain the sample, the test may be uncomfortable. Ask the healthcare worker to explain how the test may feel.

What should I do after the test?

Venous blood:

After a blood sample is collected from your vein, a bandage, cotton ball, or gauze may be placed on the area where the needle was inserted. You may be asked to apply pressure to the area. Avoid strenuous exercise immediately after your blood draw. Contact your healthcare worker if you feel pain or see redness, swelling, or discharge from the puncture site.

Umbilical cord blood:

Depending on the procedure used to obtain a sample of cord blood, there may be special instructions for you to follow. Ask the healthcare worker for any special instructions following this procedure.

What are the risks?

Blood: During a blood draw, a hematoma (blood-filled bump under the skin) or slight bleeding from the puncture site may occur. After a blood draw, a bruise or infection may occur at the puncture site. The person doing this test may need to perform it more than once. Talk to your healthcare worker if you have any concerns about the risks of this test.

Umbilical cord blood: Before your baby is born, umbilical cord blood may be collected by a procedure called percutaneous umbilical cord blood sampling. This procedure is done by inserting a needle through the pregnant mother s abdomen and into the umbilical cord. Risks of this procedure include bleeding from the puncture site, fetal bradycardia (the baby s heart rate dropping abnormally low), infection, and thrombosis (blood clot) of the umbilical vein. Another risk of this procedure is an umbilical cord hematoma (a blood-filled pocket that puts pressure on the umbilical cord and can restrict flow of blood to the baby). If you have a medical condition, or are using a medication or supplement that causes excessive bleeding, you are at a higher risk of bleeding from the puncture site. There is a risk that your baby will not survive the procedure. The person doing this procedure may need to perform it more than once. Talk to your healthcare worker if you have any concerns about the risks of having percutaneous umbilical cord blood sampling.

What are normal results for this test?

Laboratory test results may vary depending on your age, gender, health history, the method used for the test, and many other factors. If your results are different from the results suggested below, this may not mean that you have a disease. Contact your healthcare worker if you have any questions. The following are considered to be normal results for this test:

Adults: <15 ng/mL (15 mcg/L) [3]

Fetal blood (first trimester): Peak 200-400 mg/dL (2-4 g/L) [4]
Pregnancy (2nd trimester): [4]
- 14 weeks' gestation: Median 25.6 ng/mL (25.6 mcg/L)
- 15 weeks' gestation: Median 29.9 ng/mL (29.9 mcg/L)
- 16 weeks' gestation: Median 34.8 ng/mL (34.8 mcg/L)
- 17 weeks' gestation: Median 40.6 ng/mL (40.6 mcg/L)
- 18 weeks' gestation: Median 47.3 ng/mL (47.3 mcg/L)
- 19 weeks' gestation: Median 55.1 ng/mL (55.1 mcg/L)
- 20 weeks' gestation: Median 64.3 ng/mL (64.3 mcg/L)
- 21 weeks' gestation: Median 74.9 ng/mL (74.9 mcg/L)

The multiple of the median (MoM) value is adjusted for maternal weight, race, diabetes mellitus, and twin pregnancy [2].

Normal values are approximately 15% higher for blacks or African Americans than for whites [2]

Normal values are approximately 200% higher in women with twin pregnancy [2].

What might affect my test results?

Results increased in (during pregnancy) [2]:
- Underestimation of gestational age, based on recall of the last menstrual period, is a common cause of false results. Whenever the adjusted maternal serum multiple of the mean (MoM) alpha-fetoprotein is 2 or higher, fetal ultrasonography (biparietal diameter) is indicated to confirm gestational age [2].[2]
- Comorbid hepatic disorder (eg, acute injury, fibrosis, chronic hepatitis) [4]
- Maternal blood sampled after insertion of amniocentesis needle [5]

Results decreased in (during pregnancy): Type 2 diabetes mellitus [2]

What follow up should I do after this test?

Ask your healthcare worker how you will be informed of the test results. You may be asked to call for results, schedule an appointment to discuss results, or notified of results by mail. Follow up care varies depending on many factors related to your test. Sometimes there is no follow up after you have been notified of test results. At other times follow up may be suggested or necessary. Some examples of follow up care include changes to medication or treatment plans, referral to a specialist, more or less frequent monitoring, and additional tests or procedures. Talk with your healthcare worker about any concerns or questions you have regarding follow up care or instructions.

Where can I get more information?

Related Companies

National Center on Birth Defects and Developmental Disabilities, CDC
American Cancer Society

References

1. Henry JB: Clinical Diagnosis and Management by Laboratory Methods, 20th ed. Saunders, 2001.
2. Canick JA, Kellner LH, & Bombard AT: Prenatal screening for open neural tube defects. Clin Lab Med 2003; 23:385-394.
3. Kratz A, Ferraro M, Sluss PM, et al: Case records of the Massachusetts General Hospital: laboratory values. N Engl J Med 2004; 351(15):1549-1563.
4. Tietz NW (Ed): Clinical Guide to Laboratory Tests, 3rd ed. W. B. Saunders, Philadelphia, PA, 1995.
5. Milunsky A, Jick SS, Bruell CL, et al: Predictive values, relative risks, and overall benefits of high and low maternal serum alpha-fetoprotein screening in singleton pregnancies: new epidemiologic data. Am J Obstet Gynecol 1989; 161(2):291-297.