A pregnant woman at 37 weeks' gestation notices fluid leaking from her vagina. She has no uterine contractions, fetal movement has not changed, and she experiences no fever, chills, or abdominal tenderness. Her physician asks her to come to the office to be evaluated.

Of the following, the test with the HIGHEST specificity and positive predictive value to evaluate for rupture of membranes is:

1. fern testing of vaginal fluid
2. nitrazine testing
3. placental alpha microglobulin-1
4. ultrasound evaluation
5. visualization of cervix

You selected 5, the correct answer is 3.

Rupture of membranes (ROM) before the onset of labor is called premature rupture of membranes and occurs in approximately 8% of term gestations. When ROM is suspected, maternal evaluation should include confirmation of membrane rupture, gestational age, and fetal well-being.

Whether ROM occurs with a gush of fluid followed by continuous leakage or by otherwise unexplained wetness in the vaginal area, sterile speculum examination may demonstrate amniotic fluid flowing from the cervical os. If amniotic fluid is not leaking spontaneously, flow may be observed following a Valsalva maneuver or cough. Direct observation of amniotic fluid coming from the cervical os and pooling in the vagina is the most sensitive method to test for ROM. If amniotic fluid is observed, no additional evaluation is required. On the other hand, amniotic fluid may not be visualized on speculum examination if there is considerable delay between loss of amniotic fluid and examination; in this circumstance, results may be falsely negative.

Several tests have been devised to detect amniotic fluid in the vagina. Because amniotic fluid has a pH between 7 and 7.7, and the normal vaginal secretions are acidic, with pH ranging from 3.8 to 4.2, testing vaginal fluid with nitrazine paper yielding a blue result (pH >6.5) suggests ROM. False-positive results may occur due to soap, blood, semen, urinary tract infection with Proteus species, or vaginal infections such as Trichomonas or bacterial vaginosis.
When an amniotic fluid swab is placed on a glass slide and allowed to dry (10 minutes), a delicate arborization pattern is seen on the slide, known as "ferning." On the other hand, dried cervical mucous usually results in a thick and wide arborization pattern; this pattern is seen with cervical mucous under the influence of estrogen.

A bedside slide test that uses immunochromatographic methods to detect trace amounts of placental alpha microglobulin-1 in the vagina is also useful for determining the presence of ruptured membranes. Although this test is as sensitive as other testing methods, its specificity is higher (ie, fewer false negatives) (Table).

<table>
<thead>
<tr>
<th>Nitrazine</th>
<th>Ferning</th>
<th>Placental alpha microglobulin-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity, %</td>
<td>97</td>
<td>96-99</td>
</tr>
<tr>
<td>Specificity, %</td>
<td>99</td>
<td>96-98</td>
</tr>
<tr>
<td>Positive predictive value, %</td>
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<td>98-99</td>
</tr>
<tr>
<td>Negative predictive value, %</td>
<td>96</td>
<td>90-99</td>
</tr>
</tbody>
</table>

Ultrasonographic determination of oligohydramnios or anhydramnios may be consistent with premature ROM, but is not sufficiently specific or sensitive to be considered diagnostic.

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References:


American Board of Pediatrics Content Specification(s):

Know the causes, complications, and management of premature rupture of membranes at greater than 36 weeks’ gestation

Know the causes, complications, and management of preterm premature rupture of membranes
A gravid woman presents for a routine prenatal visit. Her pregnancy has been uncomplicated, and is dated at 33 weeks' gestation based on last menstrual period and a first trimester ultrasound. However, at this visit her fundal height measurement falls short at 30 cm. Moderate hypertension is noted, and protein is found in her urine. She is referred for ultrasonographic evaluation of fetal well-being.

Of the following, the diagnosis of oligohydramnios for this patient is BEST supported by the ultrasonographic finding of:

1. a maximum vertical pocket measurement of less than 5 cm
2. a single vertical pocket measurement of less than 2 cm
3. an amniotic fluid index of less than 5 cm
4. an amniotic fluid index of less than 10 cm
5. "fetal crowding," as judged by the sonographer

You selected 5, the correct answer is 3.

Oligohydramnios refers to a deficiency of amniotic fluid, and occurs in up to 8% of all pregnancies. The presence of oligohydramnios denotes potential fetal compromise, and is associated with increased rates of nonreactive nonstress tests, fetal heart rate decelerations, meconium staining, cesarean sections for fetal distress, low Apgar scores, and perinatal mortality. In addition, reduced amniotic fluid may be a marker for congenital malformations, aneuploidy, and growth restriction.

Amniotic fluid volume (AFV) varies according to gestational age, reaches an average of approximately 800 mL between 32 and 35 weeks' gestation, and decreases thereafter (Figure).

Figure: Nomogram showing amniotic fluid volume as a function of gestational age (From Gilbert [2006]).
Particularly during the third trimester, large variations in AFV exist among pregnancies, and within the same pregnancy on serial measurements. Direct measurement of AFV can be accomplished by amniocentesis with dye instillation, followed by repeated amniocentesis and calculation of dye-dilution. Using this technique, normative values for AFV based on gestational age have been constructed. Oligohydramnios can be defined by an AFV more than 2 standard deviations below the mean for a given gestational age.

Although less precise than dye-dilution, semiquantitative ultrasonographic techniques have been used as noninvasive methods for obtaining AFV measurements. A subjective assessment of AFV made by the sonographer is commonly used. This technique is limited by the experience of the sonographer to obtain an overall sense of fetal crowding, and when oligohydramnios is suspected, objective measurements are subsequently ascertained. Assessment of the maximum vertical pocket is one such objective measurement. The sonographer identifies the largest pocket of amniotic fluid, void of fetal parts or umbilical cord, and the vertical depth of this pocket is measured. Oligohydramnios is suggested if the largest single pocket measures less than 2 cm.

The most reproducible and valid method for ultrasonographic measurement of AFV is the amniotic fluid index (AFI). The AFI is the sum of the maximum fluid pockets, void of fetal parts or umbilical cord, in 4 equal quadrants of the uterus. Although dependent on gestational age, an AFI measurement between 10 and 24 cm after 30 weeks' gestation is considered within the normal range. Oligohydramnios is suggested if the AFI is lower than the fifth percentile for gestational age, and generally considered present if the AFI is less than 5 cm, regardless of gestational age.

Oligohydramnios generally results from rupture of membranes, absence of functioning renal tissue (congenital or secondary to obstructive uropathy), or reduced fetal urine production as a consequence of impaired uteroplacental flow. Diminished AFV is a clinical hallmark for fetal growth restriction, and oligohydramnios is frequently identified with the postterm pregnancy. An increased incidence of adverse perinatal outcomes has been associated with oligohydramnios, because of umbilical cord compression, uteroplacental insufficiency, and an increased incidence of meconium-stained fluid. As a result, in
the face of oligohydramnios at a gestational age of more than 37 weeks, the recommendation for delivery is almost uniform. However, isolated oligohydramnios may occur, in which maternal disease is absent, and the fetus is appropriately grown and exhibits reassuring well-being. Under these circumstances, perinatal outcomes may not be worsened and expectant management may be indicated.

References:


American Board of Pediatrics Content Specification(s):

Know how to diagnose oligohydramnios, its significance, and the management of the pregnancy when it is diagnosed