The First Year of Life

H B VALMAN

AMNIOTIC FLUID INVESTIGATIONS

Amniotic fluid is removed for different reasons at different times of gestation. A needle is passed into the amniotic cavity through the mother's abdominal wall and uterus.

Amniocentesis yields amniotic fluid with cells, which can be cultured for chromosome and biochemical examination.

Early amniocentesis

Early amniocentesis, between the 14th and 16th week of gestation, is performed to establish the diagnosis and to terminate the pregnancy of an abnormal fetus. This investigation should be performed only if the mother is prepared to accept termination of pregnancy if the test shows that the fetus is abnormal.

An ultrasound examination should first be performed to confirm the gestational age, as an accurate gestational age is needed to interpret the results of some tests. An ultrasound examination will also show twins and fetal abnormalities such as myelomeningocele.

Fluid: indications for α -fetoprotein measurement

A raised concentration of α -fetoprotein is found in the amniotic fluid when the fetus has anencephaly or myelomeningocele.

The indications for measuring α -fetoprotein concentrations in amniotic fluid are: a raised maternal serum α -fetoprotein concentration during a routine screening test, or a previous infant with anencephaly, hydrocephalus, or myelomeningocele.

Cells: indications for culture

1. Mother aged over 40
2. Previous infant with -

The amniotic fluid also contains cells which have been shed from the skin of the fetus, and these cells can be cultured. Examination of the cultured cells can reveal the chromosome constitution of the fetus, including the sex, and specific enzyme defects can also be sought.

The indications for cell culture are: (a) a previous infant with Down's syndrome, (b) a mother aged over 40 years, (c) a sex-linked defect in a previous child, and (d) a previous infant affected by a specific enzyme defect, such as Tay-Sachs disease.

Late amniocentesis

When early induction of labour is being considered, usually after 32 weeks' gestation, the greatest risk to the fetus is death from the respiratory distress syndrome, which is associated with a deficiency of pulmonary surfactant. The concentration of lecithin in the amniotic fluid correlates well with the surfactant activity and the risk of subsequent respiratory distress syndrome.

As the concentration of another chemical, sphingomyelin, in the amniotic fluid remains constant throughout pregnancy it is technically easier to measure the lecithin: sphingomyelin ratio. When the ratio is above 2 the risk of respiratory distress syndrome is very small, whereas the risk is very high if the ratio is less than 1.5.

Preliminary ultrasound examination is necessary to avoid puncturing the placenta, cord, or fetus.

Serial amniocentesis

If a previous infant has been affected by rhesus incompatibility bilirubin concentrations in the amniotic fluid should be measured. Serial amniocentesis should be performed from the 6th month of gestation, and the bilirubin concentrations measured by optical density to determine whether intrauterine blood transfusion is needed and also the optimum time for delivery.

Risks

With early amniocentesis the risk of abortion is about 2%, which is about twice the spontaneous incidence in normal pregnancies. The incidence of orthopaedic problems, such as club foot, is probably also increased slightly in infants who have undergone early amniocentesis.

In late amniocentesis the risks of fetal or maternal bleeding can be reduced by ultrasound examination to control the procedure, but a slight risk of infection remains.

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