



Chorioamniotic Separation

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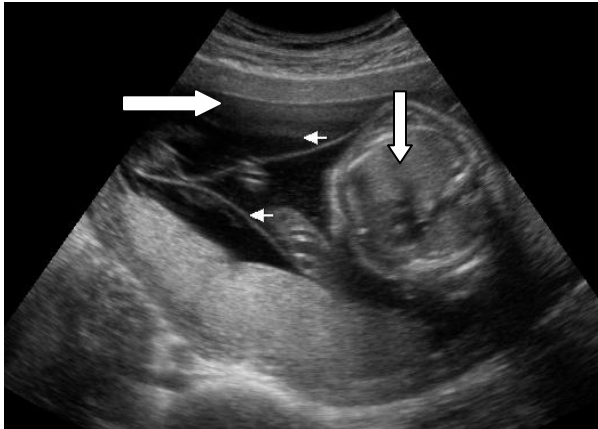
The “bag of waters” around the baby is composed of two layers, the *amnion*, which is a very thin membrane, similar in appearance to plastic wrap, and the *chorion*, which is a thicker membrane, similar to wax paper.

The amnion and chorion are seen as separate membranes early in pregnancy. The images below show the normal appearance of the membranes at 8 and 12 weeks. By about 18 weeks into the pregnancy, the membranes fuse together, against the wall of the uterus. Sometimes, however, the membranes do not fuse on schedule, and this persistent *chorioamniotic separation* has important implications for pregnancy outcomes.

Drs. Ulm and colleagues (Ulm: *Unfused Amnion and Chorion After 14 Weeks of Gestation: Associated Fetal Structural and Chromosomal Abnormalities*) have suggested that failure of the membranes to fuse after 14 weeks may flag pregnancies at increased risk for chromosomal aneuploidy and/or structural malformations. We typically expect the membranes to be fused by 16 to 17 weeks.

A key article regarding chorioamniotic separation is: Bromley: *Amnion-Chorion Separation After 17 Weeks Gestation*. *Obstetrics and Gynecology*, 1999; 99:1024-6. This is the largest single series of patients with chorioamniotic separation, and Drs. Bromley, Shipp, and Benacerraf drew the conclusion that “Complete amnion-chorion separation that persisted after 17 weeks gestation is associated with a variety of adverse perinatal outcomes, including aneuploidy.” Specifically, among the 15 reported pregnancies, 10 had membrane separation only after amniocentesis. Their conclusions were similar to what we see in other series. Among their 15 patients, 10 resulted in live newborns (1 with Down syndrome). Five of the ten delivered preterm, and there were two babies with IUGR.

Levine and colleagues reviewed the literature specifically regarding chorioamniotic separation after second trimester genetic amniocentesis (Levine, et al.: *Radiology*, 1998; 209:75-81). In cases reported prior to their study, and included in their literature review, there were 25 patients with complete separation, 8 of whom had term deliveries, 11 were born prematurely, and there were 5 fetal demises. Among the seven new cases reported by Dr. Levine and colleagues, there were three deaths, and two preterm deliveries.



The picture at the left shows the ultrasound appearance of chorioamniotic separation. The ultrasound picture shows a slice through the wall of the uterus. The small arrows indicate the *amnion*, the inner membrane. The larger arrows indicate the *chorion*, the outer membrane. (The arrow facing down is on the baby)

It is very difficult to make prognostications about any individual pregnancy with chorioamniotic separation because of the relatively small numbers of patients in the public series. There are individual cases that highlight potential concerns. For example, Barak (Journal of Ultrasound and Medicine, 2003; 22:1283-88) reported a case in which apparent chorioamniotic separation was due to a large clot between the membranes, and this differentiation vs chorioamniotic separation must be borne in mind-. Graf and colleagues (*Chorioamniotic Membrane Separation: A Potentially Lethal Finding*. Fetal Diagnosis and Therapy, 1997; 12:81-4) reported fetal demise in utero due to a twisting of the separated membranes about the cord, an observation that has been made in other reports and series as well. There is one case report of a serious fetal skin condition occurring in relation to chorioamniotic separation in two pregnancies of one woman (*Kim: Complete Chorioamniotic Membrane Separation with Fetal Restrictive Dermopathy in Two Consecutive Pregnancies*. Prenatal Diagnosis, 2007; 27:352-5).

What can we offer in terms of reducing the chance for an adverse perinatal outcome in a pregnancy affected with chorioamniotic separation?

1. First, there is, at least in theory, the potential for evolution of chorioamniotic separation to bands or limb entanglement by membrane. This can be monitored by ultrasound.
2. The association with preterm birth may be due to relative weakening of the membranes due to the separation. In this regard, we would recommend maternal education regarding signs and symptoms of preterm labor, and also consideration of monitoring of cervical length by scan.
3. Because of the possible association with IUGR, monthly scans to assess fetal growth would be recommended.
4. With respect to the association with fetal demise in utero, unfortunately, the mechanism seems to be due to twisting of the membranes around the base of the cord,

which would not necessarily be predictable/preventable. To reduce the risk of fetal demise we typically recommend:

- a. Scrupulous daily kick counts starting at 26 weeks gestation, and
- b. initiation of twice-weekly nonstress tests and fluid checks, possibly as early as 28 weeks gestation, for ongoing assurance regarding fetal health.

Maternal Fetal Medicine is a constantly changing field. The information given here may not be current. Please check with one of the Maternal Fetal Medicine Specialists for up to date information. Questions and comments are welcome. Please address these to:

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