

# A Case of Complete Chorioamniotic Membrane Separation after Amniocentesis Resulted with a Healthy Term Delivery

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## ABSTRACT

Separation between amniotic and chorionic membranes is a normal sonographic finding before 14th weeks of gestation. As pregnancy progresses, these membranes fuse and chorionic cavity becomes obliterated. Chorioamniotic membrane separation may occur spontaneously or as a complication of invasive intrauterine procedures. Following invasive fetal intervention, resulting in a condition referred to as chorioamniotic membrane separation (CMS) and it is reported to be associated with adverse perinatal fetal outcomes. Here we present a case of CMS that had occurred after a second trimester amniocentesis and resulted with the delivery of a term healthy baby. Complete post-interventional CMS may complicate pregnancy progression. Although there are no established guidelines to follow, close follow-up may CMS can be managed to be a morbid, rather than mortal condition.

**Keywords:** Chorion, Amnion, Membrane separation, Amniocentesis, Ultrasound

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## Introduction

During the second half of the first trimester, the amniotic membrane is easily seen sonographically as a thin echogenic band between the two spaces: amniotic cavity and the coelomic cavity. From the seventh week of gestation, by the expansion of the amniotic cavity, the amnion approaches to the chorion causing a progressive reduction of the chorionic cavity until the point of sonographic disappearance when physiological chorioamniotic fusion is completed usually at 12-14 gestational weeks (1).

Chorioamniotic membrane separation may occur spontaneously or as a complication of invasive intrauterine procedures. Persistence of chorioamniotic separation (CAS) without an invasive procedure in the early second trimester is rare and it is reported to be associated with fetal aneuploidy and other fetal abnormalities (2,3). Following invasive fetal intervention, the close attachment of these membranes can be disrupted, resulting in a condition referred to as chorioamniotic membrane separation (CMS). Previous reports have found this condition to be associated with adverse perinatal fetal outcomes such as

formation of amniotic bands, umbilical cord strangulation, preterm delivery, fetal distress and fetal demise (4).

Here we report a case of complete chorioamniotic membrane separation (CMS) after second trimester amniocentesis, which ended with a delivery of viable term fetus after close antenatal follow-up.

## Case Report

A 31-year-old gravida 1 para 0 woman presented for antenatal care. Her pregnancy had so far been normal she had no history of infertility, miscarriage and other medical conditions that may have any potential effects for complicating the pregnancy period. Her first outpatient examination was performed at the 10<sup>th</sup> week of gestation, and at that time her pregnancy was progressing well. The patient did not show up until 17<sup>th</sup> week of gestation and at that outpatient visit on the 17<sup>th</sup> gestational week, triple test was done for 2<sup>nd</sup> trimester aneuploidy screening. Triple test results indicated a high risk value for Trisomy 21 (calculated risk for Down syndrome, 1/114). Diagnostic tests that are more definitive are discussed with the patient to determine and confirm a diagnosis. After discussion of all the benefits and potential risks of complications of the invasive tests, she decided to undergo an amniocentesis procedure and signed the detailed informed consent.

Genetic amniocentesis was performed safely at the 18<sup>th</sup> week of gestation. Before the procedure, a detailed sonographic examination (Voluson Pro 730, General Electric, CT, USA) was performed; the amniotic fluid index was normal, fetal measurements were compatible with gestational age, no

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apparent fetal anomalies were detected, placenta was located at the posterior uterine wall and there were no signs of chorioamniotic separation. Amniocentesis was completed under direct sonographic guidance having no difficulties, with a single puncture using a 20-gauge needle and was uneventful. The sonographic examination after the procedure revealed a live fetus without any signs of chorioamniotic abruption or bleeding. The amniotic fluid analysis revealed a normal karyotype, 46, XX. After amniocentesis, regular checkups were performed every four weeks. At her routine checkup at 26th weeks of gestation, detailed sonographic examination revealed a floating membranous structure in the amniotic cavity (Figure 1). Therefore, CMS was diagnosed. At the time of diagnosis, the patient did not have any complaints such as abdominal pain, vaginal bleeding or fluid leakage. The detachment of the amniotic membrane was complete that extended to where the umbilical cord was inserted to the placenta. The fetal growth was estimated with the ultrasound measurement to be consistent with the gestational age and amniotic fluid was normal. Although the floating structure was detected throughout the uterine cavity, there was no evidence of band formation. Because of the poor clinical outcomes were reported in the similar cases, closer outpatient follow-up was performed until the fetus reached to term. When the gestational age became 35 weeks, the floating membranous structure became invisible and growth of the fetus was appropriate for the gestational age, the amniotic fluid volume was normal. At the 40th week of gestation the fetus was in the breech presentation, and elective cesarean delivery was performed under spinal anesthesia. A 3340 gr. healthy baby with Apgar scores of 8 at both 1 and 5 minutes was delivered. Macroscopic examination of the placenta showed that the amniotic membrane was separated from the chorionic membrane at some areas. Histologic examination of the placenta revealed essentially normal cotyledons, umbilical cord, and membranes.



Figure 1: In this sonographic view completely separated chorioamniotic membrane is easily distinguishable. Arrows indicate the separated membrane.

## Discussion

Amniocentesis has become a standard procedure for the diagnosis of fetal genetic abnormalities and is routinely performed at 15 to 20 weeks' gestation. Studies have established the potential risks of amniocentesis for both mother and fetus as prolonged amniotic fluid leakage, preterm premature rupture of membranes, bleeding or spontaneous abortion (5). Extensive CMS is a rare complication of amniocentesis procedure.<sup>4</sup> Although there is no grading system for CMS, ultrasonographic evaluation identifies a variety of degrees of separation. The membranes may be partially separated at one site (partial or focal), they may be completely separated to the insertion of the amnion on the umbilical cord (complete or circumferential). In mild cases, it usually remains subclinical and even unrecognizable on subsequent sonographic examinations (6). However, in cases of severe separation, it is associated with the most significant morbidity and mortality leading to amniotic band syndrome presenting with ligation of umbilical cord and impairment of umbilical blood flow (6,7).

The incidence of CMS by perinatal ultrasound has been reported as ranging between 1:187 and 1:4333 (8) The incidence rises to 10% following amniocentesis<sup>6</sup> and 12.5% following fetal surgery. Adverse sequel are more common when it occurs after invasive fetal interventions. In 25 cases of CMS documented by ultrasound or at delivery after following invasive procedures, 11 cases (44%) resulted in premature delivery and five (20%) in fetal demise, two of which having documented umbilical cord strangulation from amniotic entanglement (6).

In another review of the literature, it was reported that among the amniocentesis-related CMS pregnancies, only 5 neonates (36%) were born at term; 2 of them were reported as having fetal distress, and amniotic bands wrapped around the umbilical cords were discovered at the time of delivery. Four neonates were born prematurely. The rate of CAS-associated fetal loss was 43%, primarily before 26 weeks' gestation (9).

Although the potential risk factors for individual cases regarding to CMS are still not identified and it is hard to establish a current foresight in an uneventful procedure, some researchers reported that a posterior located placenta might be risk factor for therapeutic amniocentesis and fetal surgeries which was also consistent with our case (10). Also the mechanism underlying the high prevalence of pregnancy complications except amniotic band syndrome which is predictable is still unknown. It may be postulated that separation of chorion from amnion may serve as a mechanical irritant to increase rates of preterm labor and membrane rupture, and disruption may lead to a release of chemical mediators that lead to similar consequences.

In our case CMS was detected 8 weeks after amniocentesis and after weekly follow-up and close examination including detailed ultrasound for determination fetal growth, amni-

otic fluid volume and umbilical cord blood flow in order to reveal umbilical cord compression. Additionally, cardiotocography and biophysical profile score calculation was performed at each visit. Although hospitalization may be considered at the time of detection of CMS we believe that at least such close outpatient assessment should be considered for each asymptomatic patient with CMS. Hence a patient should be hospitalized whenever there is any concern about fetal morbidity. When any exacerbation is noticed, immediate delivery could be considered despite the gestational age.

Non-interventional CMS is a different entity, but worth's to refer under this topic as well. Pregnancies with non-interventional CMS are found to be more problematic as high prevalence of structural and chromosomal abnormalities are reported more commonly in these cases. Ulm et al reported aneuploidy in 46% of fetuses with non-interventional CMS and abnormal anatomic findings in 53% (3). The pathogenesis of these cases is still not clear.

Chorion-amnion separation in its severe forms has potential to jeopardize the natural progression of pregnancy. Management of these cases is problematic because there is no established guideline to follow. However, parents' informed consent, serial sonography, and delivery at the earliest signs of fetal distress seem to constitute an appropriate approach. Using this algorithm, CMS can be managed to be a morbid, rather than mortal condition and better pregnancy outcome can be achieved. More information about this potentially dangerous complication is needed to define evidence-based management.

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