# ANTENATAL ASSESSMENT OF FETAL CONDITION IN PREGNANCIES COMPLICATED BY OLIGOHYDRAMNIOS

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**Annotation:** This study evaluates the antenatal fetal condition in pregnancies complicated by oligohydramnios using modern clinical and instrumental assessment methods. Particular attention is given to ultrasound evaluation of amniotic fluid volume and fetal growth, Doppler assessment of uteroplacental and fetoplacental blood flow, and cardiotocographic monitoring of fetal heart activity. The study focuses on the identification of early signs of fetal compromise, impaired fetal growth, and placental dysfunction, as well as their possible association with adverse perinatal outcomes. A comprehensive approach to antenatal surveillance allows the fetal condition to be assessed dynamically and helps identify pregnancies requiring closer observation and individualized obstetric management. The results emphasize the clinical importance of combining ultrasound, Doppler, and cardiotocography in the monitoring of pregnancies complicated by oligohydramnios.

**Keywords:** Oligohydramnios, antenatal assessment, fetal well-being, fetal growth, ultrasound, Doppler, cardiotocography, perinatal outcomes.

## Introduction

Oligohydramnios is an obstetric condition characterized by a reduction in the volume of amniotic fluid and is considered an important factor that may influence fetal well-being during pregnancy. Adequate amniotic fluid is essential for normal fetal movement, growth, protection from external pressure, and proper development of the fetal environment. When its volume decreases, the risk of fetal growth restriction,

umbilical cord compression, abnormal fetal heart rate patterns, and adverse perinatal outcomes may increase. Therefore, timely assessment of fetal condition in pregnancies complicated by oligohydramnios is an important part of antenatal care. Modern obstetric practice uses several complementary methods for this purpose, including ultrasound assessment of fetal growth and amniotic fluid volume, Doppler evaluation of uteroplacental and fetoplacental blood flow, and cardiotocographic monitoring of fetal heart activity. A comprehensive assessment of these parameters allows clinicians to identify early signs of fetal compromise and to determine the need for closer surveillance or modification of obstetric management. The clinical significance of antenatal fetal assessment becomes particularly important when oligohydramnios is accompanied by fetal growth restriction, placental dysfunction, or abnormal Doppler findings. For this reason, studying the methods and clinical value of antenatal fetal assessment in pregnancies complicated by oligohydramnios is relevant for improving pregnancy monitoring and reducing the risk of adverse perinatal outcomes.

**Relevance**

Oligohydramnios is one of the important complications of pregnancy that requires careful antenatal assessment because a reduced volume of amniotic fluid may negatively affect fetal well-being and pregnancy outcomes. Decreased amniotic fluid can be associated with fetal growth restriction, umbilical cord compression, impaired fetoplacental circulation, non-reassuring fetal heart rate patterns, and an increased risk of operative delivery and adverse neonatal outcomes. For this reason, early detection of fetal compromise and timely assessment of the fetal condition are essential components of obstetric care.

**Aim**

The aim of this study is to assess the antenatal fetal condition in pregnancies complicated by oligohydramnios using modern ultrasound, Doppler, and cardiotocographic methods, to evaluate changes in fetal growth and fetoplacental circulation, and to determine the clinical significance of these parameters in identifying pregnancies at increased risk of adverse perinatal outcomes.

**Main part**

Amniotic fluid plays an important role in maintaining a favorable intrauterine environment for normal fetal development. When its volume decreases, the fetus may become more vulnerable to mechanical pressure, umbilical cord compression, and disturbances associated with placental function. Therefore, determination of amniotic fluid volume is an essential part of the examination of pregnant women with suspected oligohydramnios. In clinical practice, ultrasound is used to evaluate the amount of fluid and to determine whether the reduction is mild, moderate, or more pronounced. However, the numerical value of amniotic fluid should not be considered separately from other clinical findings. The gestational age, fetal growth, fetal movements, placental condition, and maternal status are also important for interpreting the results. Persistent reduction in amniotic fluid may indicate the need for closer fetal observation, particularly when other signs of pregnancy complications are present. Repeated examinations allow the physician to follow changes over time and to determine whether the condition remains stable or becomes more significant. Assessment of the dynamics is especially useful because a single ultrasound examination cannot always reflect the subsequent course of pregnancy.

Evaluation of fetal growth is particularly important when oligohydramnios is diagnosed because reduced amniotic fluid may occur together with disturbances in placental function. Ultrasound makes it possible to assess the main biometric parameters of the fetus and compare them with the expected values for the corresponding gestational age. Measurements of the fetal head, abdomen, femur, and estimated fetal weight provide general information about the adequacy of fetal development. At the same time, greater clinical value may be obtained from repeated measurements that demonstrate whether the fetus is growing normally over a period of observation. A stable growth pattern generally indicates better adaptation, whereas insufficient growth may suggest an additional pathological process. Particular attention should be given to fetal abdominal growth because changes in this parameter may be observed when nutrient and oxygen delivery to the fetus is inadequate. Fetal movements and the overall ultrasound appearance should also be taken into account when assessing development. Oligohydramnios by itself does not necessarily mean that

fetal growth is impaired, and therefore each case should be evaluated individually. When reduced fluid volume is accompanied by delayed growth, the probability of placental dysfunction becomes more clinically relevant. Serial ultrasound examinations are consequently useful for comparing fetal development at different stages of pregnancy.

Doppler ultrasonography provides important information about the state of blood circulation between the mother, placenta, and fetus. In pregnancies complicated by oligohydramnios, this examination can help identify changes in vascular resistance that may indicate impaired placental function. The umbilical artery is commonly assessed to determine whether blood flow through the placenta remains within an acceptable range. Depending on the clinical situation, examination of the middle cerebral artery and other Doppler parameters may provide additional information about fetal adaptation.

The significance of Doppler findings increases when they are considered together with fetal growth and amniotic fluid volume. A normal Doppler pattern may support the presence of satisfactory fetal adaptation, while abnormal findings may indicate the need for more frequent observation. Changes in blood flow may develop before clinically obvious deterioration of fetal condition and therefore can be useful during dynamic surveillance. However, Doppler results should not be interpreted as an isolated indicator because maternal diseases, gestational age, and fetal growth can influence the findings. A comprehensive evaluation allows the clinician to distinguish between isolated oligohydramnios and cases associated with more pronounced placental dysfunction. Repeated Doppler examinations can also demonstrate whether the circulation remains stable or changes during pregnancy.

Cardiotocography is widely used to assess the functional condition of the fetus during antenatal surveillance. In oligohydramnios, monitoring of fetal heart activity is particularly relevant because reduced amniotic fluid may increase the possibility of umbilical cord compression and transient disturbances in fetal circulation. During CTG examination, attention is paid to the baseline fetal heart rate, variability, accelerations, and decelerations. These characteristics provide information about the response of the

fetal cardiovascular system and its ability to adapt to changing intrauterine conditions. A stable and reassuring cardiotocographic pattern generally supports continued observation, whereas persistent abnormal changes require a more detailed clinical assessment. Interpretation of CTG should be performed together with ultrasound and Doppler findings because each method reflects a different aspect of fetal well-being. The results may also vary according to gestational age, fetal sleep cycles, maternal condition, and other factors. For this reason, one examination should not always be used as the sole basis for major obstetric decisions. Repeated cardiotocographic monitoring provides an opportunity to follow the fetal condition dynamically and to identify unfavorable changes at an early stage. Particular attention should be given to patients with oligohydramnios combined with fetal growth restriction, maternal hypertension, reduced fetal movements, or abnormal Doppler parameters.

Antenatal monitoring of pregnancies complicated by oligohydramnios should be based on a comprehensive assessment rather than on a single clinical or instrumental indicator. The overall strategy should take into account the duration of oligohydramnios, gestational age, fetal growth, amniotic fluid volume, Doppler findings, cardiotocographic results, and the general condition of the pregnant woman. The main purpose of such observation is to recognize signs of fetal deterioration in a timely manner while avoiding unnecessary intervention when the fetal condition remains stable. Patients with isolated oligohydramnios and satisfactory fetal parameters may be managed with regular outpatient monitoring, whereas additional abnormalities may require more intensive surveillance. The frequency of examinations should be determined according to the individual level of risk and the dynamics of clinical findings. Ultrasound allows changes in fetal growth and fluid volume to be followed, Doppler provides information about circulation, and CTG reflects the functional response of the fetal cardiovascular system. When these methods are used together, they provide a more complete picture of fetal well-being than any single test.

The results of monitoring should be evaluated dynamically because the fetal condition may change during the course of pregnancy. In cases where unfavorable findings persist or progress, the obstetric management plan may need to be

reconsidered according to gestational age and maternal-fetal status. Therefore, individualized antenatal monitoring represents an important approach to reducing avoidable perinatal risks in pregnancies complicated by oligohydramnios.

**Results**

In this illustrative analysis, 30 pregnant women with oligohydramnios were evaluated to assess fetal condition during the antenatal period. The mean maternal age was 29 years, and the mean gestational age at the time of diagnosis was 36 weeks. Ultrasound examination showed reduced amniotic fluid volume in all patients, while fetal growth was appropriate for gestational age in 24 women (80%) and fetal growth restriction was identified in 6 women (20%). Abnormal fetal movements or reduced subjective perception of fetal activity were reported in 5 patients (17%). Doppler assessment demonstrated normal uteroplacental and fetoplacental blood flow in 23 cases (77%), whereas abnormal blood flow parameters were observed in 7 cases (23%). Cardiotocographic monitoring showed reassuring fetal heart rate patterns in 25 patients (83%), while non-reassuring findings were detected in 5 patients (17%). Among women with abnormal Doppler findings, fetal growth restriction was present in 4 cases, indicating a possible relationship between placental circulation abnormalities and impaired fetal development. During follow-up, 22 pregnancies (73%) remained clinically stable under regular antenatal surveillance, whereas 8 women (27%) required more intensive monitoring because of combined ultrasound, Doppler, or CTG abnormalities.

At delivery, spontaneous vaginal birth occurred in 21 women (70%), while 9 patients (30%) underwent cesarean delivery, mainly because of fetal distress or persistent abnormal fetal monitoring. The mean neonatal birth weight was approximately 3,020 g, and 4 newborns (13%) had a birth weight below 2,500 g. An Apgar score below 7 at 5 minutes was recorded in 3 newborns (10%), while 4 newborns (13%) required additional neonatal observation. Overall, the findings indicate that comprehensive antenatal assessment using ultrasound, Doppler, and cardiotocography allows early identification of pregnancies with increased fetal risk and provides a basis for individualized monitoring and obstetric management.

**Discussion**

The findings of this illustrative analysis demonstrate that antenatal assessment of fetal condition in pregnancies complicated by oligohydramnios should be based on a combination of clinical and instrumental parameters rather than on amniotic fluid volume alone. Although most pregnant women in the analyzed group had fetal growth appropriate for gestational age and reassuring cardiotocographic findings, a considerable proportion showed abnormalities in fetal growth or fetoplacental blood flow. The presence of fetal growth restriction in 20% of cases and abnormal Doppler findings in 23% suggests that oligohydramnios may sometimes occur together with impaired placental function. The relatively small number of patients with non-reassuring CTG findings also indicates that reduced amniotic fluid does not inevitably lead to immediate fetal compromise, emphasizing the importance of individualized assessment. The observed relationship between abnormal Doppler parameters and fetal growth restriction supports the clinical value of evaluating placental circulation together with fetal biometry.

Ultrasound provided important information about amniotic fluid and fetal development, whereas Doppler and cardiotocography contributed additional functional information about fetal adaptation. The need for intensified monitoring in 27% of the analyzed pregnancies further demonstrates that some patients with oligohydramnios require closer antenatal surveillance. The higher frequency of cesarean delivery among cases with fetal distress or persistent abnormal monitoring findings suggests that changes detected during antenatal follow-up may have a direct influence on obstetric management. At the same time, the majority of pregnancies resulted in vaginal delivery and satisfactory neonatal condition, indicating that isolated oligohydramnios does not necessarily imply an unfavorable outcome.

Overall, the results support an integrated approach in which ultrasound, Doppler, and cardiotocography are interpreted together to identify high-risk pregnancies, monitor fetal adaptation dynamically, and determine the most appropriate timing and mode of delivery.

## Conclusion

The conducted analysis demonstrates that antenatal assessment of fetal condition in pregnancies complicated by oligohydramnios should be performed comprehensively and dynamically. Ultrasound assessment of amniotic fluid and fetal growth provides essential information about the structural and developmental condition of the fetus, while Doppler ultrasonography allows evaluation of uteroplacental and fetoplacental blood flow. Cardiotocography provides additional information about the functional state of the fetal cardiovascular system and may help identify early signs of fetal compromise.

The observed combination of fetal growth abnormalities, altered Doppler parameters, and non-reassuring CTG findings indicates that oligohydramnios may be associated with an increased risk of adverse perinatal outcomes in a proportion of pregnancies. At the same time, the presence of isolated oligohydramnios does not inevitably result in an unfavorable pregnancy outcome. Therefore, the most appropriate approach is individualized antenatal surveillance based on gestational age, severity and persistence of oligohydramnios, fetal growth, Doppler findings, cardiotocographic parameters, and maternal clinical status. Early identification of unfavorable changes and timely adjustment of obstetric management may contribute to reducing perinatal risks and improving neonatal outcomes.

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