

HYDRAMNIOS

Abstract

Amniotic fluid is a clear, slightly yellowish liquid that surrounds the fetus during pregnancy. The amount of amniotic fluid is greatest at about 34 weeks into the pregnancy when it averages 800 ml. In some cases, the amniotic fluid may measure too low or too high. If the measurement of amniotic fluid is too low (less than 200ml at term) it is called oligohydramnios and if the measurement of amniotic fluid is too high (exceeds 2000 ml) it is called polyhydramnios. There are two types of Oligohydramnios; early onset and late onset oligohydramnios and Polyhydramnios can be divided into three types; mild, moderate and severe. Specific measures to increase amniotic fluid volume in case of oligohydramnios are maternal hydration (1500-2000 ml/day) and Amnioinfusion. The mild polyhydramnios is found in midtrimester and usually requires no treatment, except extra bed rest for a few days. In view of the risks involved and the high perinatal mortality rate, the patient with severe polyhydramnios should be shifted in a hospital equipped to deal with high risk patients.

Keywords: Hydramnios, hydration, polyhydramnios

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I. INTRODUCTION

The amniotic fluid is the protective liquid contained by the amniotic sac of a gravid amniote. It has a number of important roles in embryo and subsequently fetal development. One of the main functions is to permit fetal movement and the development of the musculoskeletal system. This fluid serves as a cushion for the growing fetus, but also serves to facilitate the exchange of nutrients, water and biochemical products between mother and fetus. In the 2nd trimester, the fetus begins to breathe and swallow the amniotic fluid. In some cases, the amniotic fluid may measure too low or too high. If the measurement of amniotic fluid is too low it is called oligohydramnios and if the measurement of amniotic fluid is too high it is called polyhydramnios.

II. OLIGOHYDRAMNIOS

It is extremely rare condition where the liquor amnii is deficient in amount to the extent of less than 200ml at term. Sonographically, it is defined when the maximum vertical pocket of liquor is less than <2 cm or when amniotic fluid index (AFI) is less than 5 cm.¹

- 1. Types:** Early onset oligohydramnios: It is developed early in pregnancy and is less common and frequently has a poor prognosis.
Late pregnancy oligohydramnios: It is associated with increased risk of adverse perinatal outcomes compared to normal amniotic fluid index (AFI).²

III. ETIOLOGY

1. Maternal Condition

- Hypertensive disorders
- Uteroplacental insufficiency
- Dehydration
- Idiopathic
- Post term pregnancy
- Premature rupture of membrane

2. Fetal Condition

- Renal agenesis
- Urinary tract obstruction
- Spontaneous rupture of membranes
- Intrauterine infection
- IUGR
- Postmaturity
- Drugs: PG inhibitors, ACE inhibitors
- Fetal chromosomal and structural abnormalities
- Amnion nodosum³

IV. DIAGNOSIS

During routine prenatal check-ups, doctors may conduct an ultrasound to evaluate the amount of amniotic fluid present. The AFI is measured by examining the pockets of amniotic fluid in different areas around the fetus. Oligohydramnios may be suspected if the pregnant woman reports a decrease in fetal movements or if the uterus measures smaller than expected for the gestational age. The doctor will also consider the mother's medical history, previous pregnancies, and any existing conditions that could contribute to or be affected by oligohydramnios. The healthcare provider will conduct a thorough physical examination of the pregnant woman to check for any signs or symptoms related to oligohydramnios or other complications.⁴

V. COMPLICATIONS

1. Maternal

- Prolonged labor due to inertia
- Increased operative inference due to malpresentations
- Chorioamnionitis

2. Fetal

Due to Etiology:

- Congenital anomalies
- Chromosomal abnormalities
- Fetal growth restriction
- IUD
- Intra uterine infection following ROM
- Prematurity

Due to Reduced Amniotic Fluid Volume

- Skeletal deformities
- Contractures
- Amniotic bands and autoamputation
- Pulmonary hypoplasia
- Umbilical cord compression
- Meconium aspiration
- FHR abnormalities
- Low APGAR scores
- Intrapartum death⁵

VI. MANAGEMENT

1. Identification and Diagnosis: Oligohydramnios is usually diagnosed through routine ultrasound examinations during pregnancy. The amniotic fluid index (AFI) is used to measure the amount of fluid present. A value below 5 cm is generally considered indicative of oligohydramnios.

2. **Monitoring and Evaluation:** Regular monitoring of the mother and the fetus is essential to assess the severity of oligohydramnios and any associated complications. This may involve additional ultrasound scans, fetal heart rate monitoring, and non-stress tests.
3. **Addressing Underlying Causes:** The underlying cause of oligohydramnios needs to be identified and treated, if possible. Common causes include fetal renal abnormalities, placental problems, and post-term pregnancy. Treating the underlying cause can sometimes help improve the amniotic fluid levels.
4. **Amnioinfusion:** In cases of severe oligohydramnios, amnioinfusion may be considered. This procedure involves infusing a sterile fluid into the amniotic sac to increase the volume of amniotic fluid. It is often used during labor to improve the conditions for vaginal delivery and to reduce the risk of umbilical cord compression.
5. **Fetal Well-being Assessment:** Regular assessment of fetal well-being is crucial. In severe cases of oligohydramnios, close monitoring may involve more frequent ultrasounds and other fetal surveillance tests to ensure the baby's health and to detect any potential complications.
6. **Timing of Delivery:** The decision regarding the timing of delivery depends on the severity of oligohydramnios, gestational age, and the overall health of both the mother and the baby. In some cases, if the condition poses a significant risk to the fetus, early delivery may be recommended.
7. **Expert Consultation:** Management of oligohydramnios requires a multidisciplinary approach involving obstetricians, maternal-fetal medicine specialists, and neonatologists. Expert consultation is essential to determine the best course of action.⁶

VII. POLYHYDRAMNIOS

Anatomically, polyhydramnios is defined as a state where liquor amnii exceeds 2000 ml. Clinical definition states, the excessive accumulation of liquor amnii causing discomfort to the patient and/or when an imaging help is needed to substantiate the clinical diagnosis of the lie and presentation of the fetus.¹

1. **Etiology:** Uncontrolled maternal diabetes, especially gestational diabetes, can lead to polyhydramnios. Elevated blood sugar levels in the mother can result in increased urine production in the fetus, leading to excess amniotic fluid. Certain fetal abnormalities, particularly those affecting the gastrointestinal or central nervous system, can disrupt the swallowing or absorption of amniotic fluid, causing its accumulation. In pregnancies with twins, triplets, or more, the increased production of urine by multiple fetuses can contribute to polyhydramnios. Fetal hydrops is a condition characterized by abnormal fluid accumulation in the fetus' tissues or body cavities. It can lead to increased amniotic fluid levels. Severe fetal anemia, often caused by maternal-fetal blood group incompatibility or other blood disorders, can trigger polyhydramnios. Certain placental abnormalities, such as chorioangioma (a benign vascular tumor of the placenta), can lead to increased production of amniotic fluid. In some cases, infections in the fetus, such as parvovirus B19, can cause polyhydramnios. In a significant number of cases, the exact

cause of polyhydramnios remains unknown, and it is referred to as idiopathic polyhydramnios.²

2. Types: Depending on the rapidity of onset, polyhydramnios may be classified into 2 types:

- **Acute polyhydramnios** (extremely rare): Onset is sudden, within few days or may appear acutely on pre-existing chronic variety.
- **Chronic polyhydramnios** (most common): Onset is insidious taking few weeks. Polyhydramnios can also be classified into 3 types:
 - **Mild:** Deepest vertical pocket **more than 8-11cm.**
 - **Moderate:** Deepest vertical pocket **12-15cm.**
 - **Severe:** Deepest vertical pocket **more than or equal to 16cm.**³

VIII. ACUTE POLYHYDRAMNIOS

It is extremely rare. The onset is acute and the fluid accumulates within a few days. It usually occurs before 20 weeks of pregnancy. It is usually associated with monozygotic twins with twin-twin transfusion syndrome (TTTS) or chorioangioma of the placenta.¹

- 1. Signs And Symptoms:** Acute polyhydramnios can cause a rapid increase in the size of the abdomen, making it noticeably larger than expected for the gestational age. The enlarged uterus due to excessive amniotic fluid can compress the diaphragm and lungs, leading to difficulty breathing or shortness of breath. Excessive fluid may cause the fetus to have less space to move, resulting in reduced or altered fetal movements. The rapid increase in the amount of amniotic fluid can contribute to sudden weight gain in the pregnant woman. Some pregnant women with acute polyhydramnios may experience swelling in their legs and ankles. The rapid stretching of the uterine wall due to excessive fluid may cause discomfort or pain in the abdominal area. In some cases, acute polyhydramnios can lead to preterm contractions, which are contractions occurring before the expected due date.⁴
- 2. Treatment:** The first step in managing polyhydramnios is to identify and address any underlying conditions that may be contributing to the excessive amniotic fluid accumulation. For example, if the polyhydramnios is caused by maternal diabetes, managing blood sugar levels may help stabilize the amniotic fluid volume. In severe cases of polyhydramnios that cause significant discomfort to the mother or pose risks to both the mother and the fetus, a procedure called amnioreduction may be performed. During this procedure, a needle is inserted into the amniotic sac, and a certain amount of amniotic fluid is drained to reduce the pressure and volume. This procedure is usually performed under ultrasound guidance and can be repeated if necessary. Close monitoring of the mother and the fetus is essential to watch for any signs of complications. Regular prenatal check-ups, ultrasound examinations, and fetal heart rate monitoring may be done to assess the well-being of both the mother and the baby. In some cases, the healthcare provider may recommend bed rest or specific positioning to alleviate discomfort and pressure caused by the enlarged uterus. Medications are generally not used to treat polyhydramnios directly. However, if there are specific medical conditions contributing to the excessive amniotic fluid, medications may be prescribed to manage those

conditions. Depending on the severity of the polyhydramnios and gestational age, delivery may be planned earlier than the expected due date to reduce the risks associated with the condition.⁵

IX. CHRONIC POLYDRAMNIOS

In the majority of cases, the accumulation of liquor is gradual and as such, the patient is not very much inconvenienced.¹

- 1. Signs And Symptoms:** The most noticeable sign of chronic polyhydramnios is a rapidly expanding abdomen, causing the uterus to be larger than expected for the gestational age. As the uterus enlarges due to the excess amniotic fluid, it can exert pressure on the diaphragm and lungs, leading to difficulty breathing. The increased pressure on the stomach and digestive organs can cause heartburn or indigestion in some pregnant women. The enlarged abdomen can make it challenging to bend over or perform everyday tasks comfortably. Some women with chronic polyhydramnios may experience swelling in their legs and ankles. The extra weight and pressure on the back from the enlarged uterus can lead to back pain. Chronic polyhydramnios can sometimes be associated with preterm contractions, which may be a sign of labor starting earlier than expected. Excessive amniotic fluid can restrict fetal movements and lead to decreased perception of fetal kicks or movements. The rapid and substantial enlargement of the abdomen may cause stretch marks on the skin.⁴
- 2. Investigations:** The healthcare provider will take a detailed medical history from the pregnant woman, including any existing medical conditions, previous pregnancies, medications, and family medical history. Information about the onset and progression of polyhydramnios will also be noted. A thorough physical examination will be conducted to assess the pregnant woman's overall health, check for any signs of complications related to polyhydramnios, and examine the fetal position and presentation. Ultrasound is the primary diagnostic tool for assessing amniotic fluid levels and evaluating the fetus. Prenatal ultrasound examinations are used to measure the amniotic fluid index (AFI) or the maximum vertical pocket (MVP) of amniotic fluid to confirm the diagnosis of polyhydramnios. An in-depth fetal anatomy scan (detailed ultrasound) may be performed to examine the baby's organs and structures for any congenital abnormalities or other issues that could be contributing to the polyhydramnios. Non-stress test (NST) or biophysical profile (BPP) may be performed to assess the fetal well-being, including the baby's heart rate, movements, muscle tone, breathing, and amniotic fluid volume. Blood tests may be conducted to check for certain conditions, such as gestational diabetes, which can contribute to polyhydramnios. In some cases, amniocentesis may be recommended to analyze the composition of the amniotic fluid and rule out certain genetic or chromosomal abnormalities. If there are concerns about the baby's heart, a specialized ultrasound called fetal echocardiography may be performed to evaluate the fetal heart in more detail. Throughout the investigation, the healthcare provider will closely monitor the mother's health and the well-being of the baby through regular prenatal check-ups and fetal assessments.⁷

X. COMPLICATIONS

1. Complications for the Mother

- **Breathlessness:** The enlarged uterus can compress the diaphragm and lungs, causing difficulty breathing and shortness of breath.
- **Heartburn and Indigestion:** Increased pressure on the stomach and digestive organs may lead to heartburn and indigestion.
- **Swelling and Discomfort:** The rapid expansion of the abdomen can cause discomfort, pain, and swelling in the lower extremities.
- **Preterm Labor:** Chronic polyhydramnios can increase the risk of preterm labor and premature birth.
- **Placental Abruption:** The excessive amniotic fluid can raise the risk of placental abruption, where the placenta separates from the uterine wall prematurely.
- **Uterine Distension and Preterm Contractions:** The uterus may become overly distended due to the excess fluid, leading to irregular contractions and discomfort.
- **Postpartum Hemorrhage:** After delivery, the uterus may not contract effectively, increasing the risk of postpartum hemorrhage.
- **Complications for the Baby:**
 - **Preterm Birth:** Chronic polyhydramnios can increase the risk of preterm birth, which can be associated with various health challenges for the baby.
 - **Fetal Malposition:** Excessive amniotic fluid can allow the fetus to move into abnormal positions, such as breech presentation.
 - **Cord Prolapse:** The umbilical cord may slip into the birth canal before the baby, leading to cord compression and potential oxygen deprivation.
 - **Fetal Distress:** The increased fluid can contribute to umbilical cord compression and fetal distress during labor.
 - **Birth Defects:** Chronic polyhydramnios may be associated with certain fetal abnormalities or congenital anomalies.
 - **Stillbirth:** In severe cases, chronic polyhydramnios can increase the risk of stillbirth.²

XI. MANAGEMENT

- 1. Identification and Diagnosis:** Polyhydramnios is typically diagnosed through routine ultrasound examinations during pregnancy. The amniotic fluid index (AFI) is used to measure the amount of fluid present. A value above 24 cm is generally considered indicative of polyhydramnios.
- 2. Treating Underlying Causes:** Identifying and treating the underlying cause of polyhydramnios is crucial. Common causes may include gestational diabetes, fetal anomalies affecting the swallowing mechanism, twin-to-twin transfusion syndrome (in twin pregnancies), and certain genetic or chromosomal disorders. Treating the root cause can help manage or reduce the excess amniotic fluid.
- 3. Amnioreduction:** In cases of severe polyhydramnios with associated discomfort or potential complications, amnioreduction may be performed. This procedure involves the removal of excess amniotic fluid using a needle and syringe. It can help alleviate

symptoms and reduce the risk of preterm labor, premature rupture of membranes, and uterine overdistension.

- 4. Monitoring and Fetal Surveillance:** Regular monitoring of the mother and the fetus is essential to assess the severity of polyhydramnios and any associated complications. This may involve additional ultrasound scans, fetal heart rate monitoring, and non-stress tests.
- 5. Maternal Comfort and Symptom Management:** Pregnant women with polyhydramnios may experience discomfort due to the enlarged uterus. Measures to improve maternal comfort might include bed rest, elevating the legs, and using support garments.
- 6. Timing of Delivery:** The timing of delivery depends on the severity of polyhydramnios, gestational age, and the presence of any associated complications. In some cases, if the condition poses a significant risk to the mother or fetus, early delivery may be considered.
- 7. During labor:** Usual management is followed as outlined in twin pregnancy. Internal examination should be done soon after the rupture of the membranes to exclude cord prolapsed. If the uterine contraction becomes sluggish, oxytocin infusion may be started, if not contraindicated. To prevent post partum hemorrhage, intravenous methergine 0.2 mg should be given with the delivery of the anterior shoulder. One must remain vigilant following the birth of the baby for retained placenta, post partum hemorrhage and shock. Baby should be thoroughly examined for any congenital anomaly.
- 8. Expert Consultation:** The management of polyhydramnios requires a multidisciplinary approach involving obstetricians, maternal-fetal medicine specialists, and neonatologists. Expert consultation is essential to determine the best course of action based on the individual circumstances.⁸

XII. CONCLUSION

Amniotic fluid is a highly complex and dynamic system that should be utilised in the interpretation of fetal well-being. It is vital to the well-being of the fetus. These disorders may result from abnormal fetal or maternal conditions and conversely, may be responsible for alterations of fetal well-being as well. When abnormalities of fluid like oligo or polyhydramnios exist, appropriate workup to uncover the underlying etiology should be initiated as adverse fetal outcomes are sometimes associated with these variations from normalcy.

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