

Review article

Oligohydramnios - Incidence and perinatal outcome – Review

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Abstract:

Oligohydramnios is the condition in which the liquor amni is reduced in amount to the extent of less than 200 ml at term. Sonographically, it is defined as when the maximum vertical pocket of liquor is < 2 cm or when amniotic fluid index is less than 5cm (<10th percentile).²⁴ Oligohydramnios can be defined by an amniotic fluid index less than 5th percentile for gestational age or an amniotic fluid index <5.0 cm regardless of gestational age. Amniotic fluid volume decreases progressively during the last few weeks of pregnancy and during the postdate period, it is estimated that there is a 93 percent decline in amniotic fluid each week.³³ The normal decline in the amniotic fluid volume has an impact on fetal movement in potentially compromised fetus. Ahn et al demonstrated a 3 to 5 fold increase ultrasonographically detected oligohydramnios in patient with complaints of decreased fetal movements. This relationship becomes extremely important in the postdate pregnancy, where changes of amniotic fluid volume can occur quickly.

Keywords: Oligohydramnios, incidence , maternal outcome

Introduction:

Oligohydramnios is the condition in which the liquor amni is reduced in amount to the extent of less than 200 ml at term. ¹Sonographically, it is defined as when the maximum vertical pocket of liquor is < 2 cm or when amniotic fluid index is less than 5cm (<10th percentile).²⁴ Oligohydramnios can be defined by an amniotic fluid index less than 5th percentile for gestational age or an amniotic fluid index <5.0 cm regardless of gestational age.² Marks and Divon² found oligohydramnios (as defined by an amniotic fluid index of 5cm or less) in 12% of 511 pregnancies of 41 weeks or greater. Moore and cayne³ in 1990 described the normative data for amniotic fluid index (AFI) from 16 to 42 weeks gestation. They found that the amniotic fluid index changes significantly each week and therefore they recommended for the more appropriate definition of oligohydramnios. An index value of 5th percentile for the gestational age would provide an accurate definition of oligohydramnios. In 1981, Manning et al⁴ defined oligohydramnios as the presence of only one pocket of fluid within the amniotic cavity of <1cm. Subsequent studies have considered the utilization of a 1cm pocket or less, as too stringent.

Halperin et al⁵ used a single 3cm pocket of amniotic fluid as the dividing line between normal amniotic fluid and oligohydramnios. Manning et al²⁹ subsequently changed their criteria for oligohydramnios to a single pocket that measured less than 2cm in both vertical and horizontal plane. In an attempt to assess the fluid volume throughout the amniotic cavity, Phelan et al²² used a four quadrant technique. In this method, the largest pocket of amniotic fluid without umbilical cord within each quadrant of uterus is measured by ultrasonography. The sum of four measurements is taken as an amniotic fluid index (AFI). There is a close association between declining placental function in the later part of third trimester and amniotic fluid volume. The post term patients are at greater risk for development of oligohydramnios.⁶

Lagrew et al reported that after 41 weeks gestation, the chance of developing oligohydramnios within four days was 13.5% and 2.6% with amniotic fluid indices of 5.1-8.0 cm and 8.1-15.0 cm respectively. Crowley³² reported a non quantitative estimation of amniotic fluid volume in suspected prolonged pregnancies based on ultrasonographic evaluation. She described the quantity of amniotic fluid as normal, reduced or absent in 150 post term pregnancies.^{7,8}

Amniotic fluid and Oligohydramnios :

Amniotic fluid volume decreases progressively during the last few weeks of pregnancy and during the postdate period, it is estimated that there is a 93 percent decline in amniotic fluid each week.⁹ The normal decline in the amniotic fluid volume has an impact on fetal movement in potentially compromised fetus. Ahn et al¹⁰ demonstrated a 3 to 5 fold increase ultrasonographically detected oligohydramnios in patient with complaints of decreased fetal movements. This relationship becomes extremely important in the postdate pregnancy, where changes of amniotic fluid volume can occur quickly. Clement et al¹¹ described six post term pregnancies in which amniotic fluid volume diminished abruptly over 24 hours.

In a series of 150 patients, Crowley¹² found that the incidence of meconium stained fluid, fetal acidosis, caesarean section for fetal distress and low Apgar scores were increased in post term pregnancies that were complicated by reduced or absent amniotic fluid. Phelan et al¹³ found that the ultrasound estimation of adequate amniotic fluid volume in post-dated pregnancies was a reliable predictor of fetal wellbeing. Locatelli et al¹⁴ evaluated the effect of oligohydramnios on perinatal outcome in uncomplicated pregnancies at 40.0 to 41.6 weeks. Out of 3049 women, 341 had an amniotic fluid index = 5cm. Gestational age at delivery, rates of induction of labour were significantly different between cases with oligohydramnios and those with normal AFI (All p <0.001). Rates of caesarean delivery for non reassuring fetal testing (8.2% vs 3.9%, p <0.001) were significantly higher. No significant differences were identified between the 2 groups in relation to meconium stained amniotic fluid, 5 minute APGAR score less than 7 and umbilical artery ph less than 7.

Rayburn et al¹⁵ studied 147 post dated pregnancies and found that oligohydramnios was very predictive of post maturity. Ultrasound evaluation of post mature pregnancies was also examined by Moya and co-workers¹⁶ and the association of oligohydramnios and post maturity was noted in 82%. Marks et al¹⁷ and longitudinal study of amniotic fluid index in 511 post date pregnancies found measurements ranging from 1.7 to 24.6 cm with mean of 12.4 cm at 41 weeks of gestation. A mean 25% decrease in amniotic fluid index per week beyond 41 weeks of gestation was noted. The longitudinal change in amniotic fluid index was statistically significant (p<0.05)

Incidence of Oligohydramnios :

The incidence of pulmonary hypoplasia at birth ranges from 1.2 to 1.4 per 1000 infants (Moessinger and colleagues).¹⁸ First, thoracic compressions may prevent chest wall excursion and lung expansion. Second, lack of fetal breathing movements decreases lung inflow. Third and most widely accepted model involves a failure to retain intrapulmonary amniotic fluid or increased outflow with impaired growth and development. Albuquerque and colleagues⁴³ found the relationship between oligohydramnios and spinal flexion in human fetus that also may contribute to fetal pulmonary hypoplasia.

Oligohydramnios has long been recognized as a clinical hallmark of intrauterine growth restriction. Manning and associates¹⁹ postulated that the oligohydramnios was a result of decreased production of fetal urine and lung fluid as a result of hypoxemia induced redistribution of cardiac output. The basis for this

association has been derived from the animal model. Experimental hypoxia results in reflex distribution of fetal cardiac output, causing decrease in renal and pulmonary blood flow. Hence the urinary output and production of fluid by the lungs decreases, resulting in oligohydramnios. Deutinger et al³ have shown that hourly fetal urine production rate normally increases from 5.9 ml in 28th week of gestation to 26.8 ml in the 40th of week. Perinatal morbidity and mortality significantly increased when oligohydramnios is present. Manning et al²⁷ found that 26 of 31 growth retarded fetuses (84%) had ultrasound evidence of decreased amniotic fluid index as defined by less than a 1 cm fluid pocket. He suggested that qualitative estimation of amniotic fluid volume could be used to identify fetal growth restriction. Antenatal identification of the growth retarded fetus on the basis of historical risk factors and physical examination, although desirable, has been difficult and unsatisfactory, in fact, frequently, the diagnosis is only established in the nursery after the birth of a small for gestational age (SGA)¹⁹. A recent study suggests that oligohydramnios, as detected by ultrasonography, is an exceptionally accurate predictor of intrauterine growth in a correctly pre screened population.

Chamberlain²⁰ (1984) observed a direct relationship between decreased amniotic fluid volume and the prevalence of IUGR. When a single pocket of amniotic fluid volume and the prevalence of IUGR. When a single pocket of amniotic fluid is more than 2 cm, between 1 to 2 cm and less than 1 cm, the prevalence of IUGR. When a single pocket of amniotic fluid is more than 2 cm, between 1 to 2 cm and less than 1 cm, the prevalence of IUGR is 50%, 20% and 37% respectively. Elliot H, Phillipson MD, Robert J Sokol¹⁵ had done a survey of 2453 viable singleton pregnancies with intact membranes. Ninety-six (3.9%) pregnancies were found to be complicated by oligohydramnios. Of 96 infants from oligohydramnios complicated pregnancies, 38 (83%) were preceded by sonographically diagnosed oligohydramnios (p<0.0001).

Conclusion:

They also suggested that the detection of oligohydramnios is an insensitive test for intrauterine growth retardation, and therefore a poor screening method. Maternal hypovolemia from variety of causes can also result in oligohydramnios.

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