

Incidence of Oligohydramnios in Konaseema Area, EG-District.

Satyanarayana P^{1*}, Ramarao N², Parmar C³

¹Department of Physiology, Konaseema Institute of Medical Sciences, Amalapuram, East Godavari Dist, A.P, India.

²Department of OBG, Konaseema Institute of Medical Sciences, Amalapuram, East Godavari Dist, A.P, India.

³Department of Physiology, Konaseema Institute of Medical Sciences, Amalapuram, East Godavari Dist, A.P, India.

*Corresponding author: Satyanarayana Padmanabhuuni, Professor & HOD, Department of Physiology, Konaseema Institute of Medical Sciences, Amalapuram, East Godavari Dist, A.P, India, Tel: +919985722250; E-mail: psn9983@gmail.com

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Abstract

Background: Amniotic fluid plays a major role in fetal growth and development. Abnormalities of fluid volume can interfere directly with fetal development causing many structural anomalies.

Aim: To find out incidence of oligohydramnios and associated conditions.

Methods: This study compares the different parameters in oligohydramnios and normal pregnant women in the age group of 21-26 yrs.

Result: Oligohydramnios is secondary to either an excess loss of fluid or a decrease in fetal urine production. Oligohydramnios is related to one of the following conditions like preterm rupture of the membranes, intrauterine growth retardation, iatrogenic, maternal factors, role of amniotic fluid in embryo and fetal development.

Conclusion: The increase in the incidence of Oligohydramnios in the region of Konaseema, EG district is probably due to increased environmental temperature. Recommendation: Early detection of oligohydramnios by USG will be very helpful to prevent many fetal complications.

Keywords: Amniotic fluid; Oligohydramnios; AFI (Amniotic fluid index); Pregnant women

Introduction

Amniotic fluid plays a major role in fetal growth and development. Abnormalities of fluid volume can interfere directly with fetal development causing structural anomalies such as pulmonary hypoplasia, fetal hypoxia, neural tube defect and gastrointestinal obstruction. Amniotic fluid surrounds and protects the fetus in the amniotic cavity. It provides a cushion against the constricting gravid uterus allowing the fetus room for movement, growth and protecting it from external trauma. The space around the fetus is necessary for the normal development, maturation of fetal lungs, and development of limbs. Amniotic fluid plays a major role in the homeostasis of fluid and electrolytes and fetal body temperature. Early period of fetal development a clear fluid collects in the amniotic cavity surrounding the embryo. The amount increases rapidly with the growth of the fetal products, averaging 50 ml at 12 weeks of pregnancy, 400 ml at 20 weeks of pregnancy. During the last few week of pregnancy the volume of amniotic fluid usually decreases.

Composition Of Amniotic Fluid: Protein 0.5gm/100ml, Non protein nitrogen 24 mg/100ml, Uric acid 4.5 mg/100ml, Sugar 19 mg/100ml, Calcium 5.5 mg/100ml, Phosphorus 3.1mg/100ml.

Formation and reabsorption of amniotic fluid

The mechanism of amniotic fluid production, consumption, composition and the volume depends on gestational age. During the first trimester the major source of amniotic fluid is the amniotic membrane. The production of fluid in the amniotic cavity is most likely accomplished by active transport of electrolytes and other solutes by the amnion, with passive diffusion of water following in response to osmotic pressure changes. In general oligohydramnios is related to one of the following 5 conditions.

Preterm Rupture Of The Membranes (PROM): Preterm rupture of the membranes is defined as rupture of the membranes prior to 38 weeks gestation. Anuria and oliguria of the fetus lead to oligohydramnios.

Intrauterine Growth Retardation (IUGR): Intrauterine growth retardation particularly that resulting from placental insufficiency is associated with oligohydramnios. Placental insufficiency produces fetal hypoxia which in turn leads to reflex redistribution of fetal blood flow away from the kidneys resulting in oligohydramnios.

Maternal Factors: Alterations in maternal hydration lead to changes in net movement of fluid into or from the fetus. This in turn affects fetal urine production and hence amniotic fluid volume. Amniotic fluid index (AFI) of less than 5cm or less than the 5th percentile is considered as oligohydramnios. The lower the fluid volume, the worse is the prognosis [1,2]. Infantile polycystic kidney disease causes oligohydramnios when renal failure occurs prenatally [3,4]. Oligohydramnios may also occur in post-term pregnancy as a result of

decreased fetal urine production [5]. Umbilical cord compression which can cause fetal asphyxia is another potential complication of oligohydramnios. Cord accidents from oligohydramnios may be an important factor in the high morbidity and mortality of post-term fetuses [6]. Treatment of oligohydramnios can be achieved by infusion of a saline solution into the amniotic cavity. Although amnioinfusion does not treat the underlying cause of the oligohydramnios, it can potentially relieve or prevent cord compression.

Important Role of Amniotic Fluid in Embryo and Fetal Development: Amniotic fluid Permits fetal movement and the development of the musculoskeletal system. Swallowing of amniotic fluid enhances the growth and development of the gastrointestinal tract. The ingestion of amniotic fluid provides some fetal nutrition of essential nutrients. Amniotic fluid volume maintains amniotic fluid pressure thereby protects the umbilical cord compression. Its constant temperature helps to maintain the embryos body temperature. Its bacteriostatic properties reduce the infection.

Materials and Methods

Random 50 pregnant cases from outpatient were studied for AFI with the help of ultrasound scanning. In addition to AFI, the Blood pressure, Blood glucose, gestational age, fetal weight was also observed. The study protocol was ethically approved by the institutional ethical committee. An informed consent of the volunteers was taken on an approved proforma. Blood glucose is measured by (GOD) Glucose oxides peroxides method. BP recorded by Electronic Sphygmomanometer. Diagnostic ultrasound uses sound energy with wave frequencies that exceed 20,000Hz the audible range in humans. When a sound beam crosses an interface between objects of different densities some of the energy is reflected and some is transmitted according to the difference in density. Reflected waves are detected by a transducer that creates an image of the scanned object. The second and third trimester examination includes the documentation of fetal presentation, amniotic fluid volume, and location of the placenta, assessment of gestational age by using biparietal diameter, femur length, abdominal circumference and fetal anomaly. The particular equipment used for obstetric ultrasound generally a 3.5-5 MHZ transducer frequency should be used as these provide high resolution with adequate depth penetration in all.

Ultrasonography

It is a safe, reliable, and repeatable method of amniotic fluid volume. Assessment of amniotic fluid volume should be a component of every obstetric sonogram particularly in the second and third trimesters. In the clinical setting and the goal is to classify the fluid as normal, polyhydramnios or oligohydramnios rather than to measure the actual fluid volume. Several methods have been proposed for sonographic assessment of amniotic fluid volume includes Subjective assessment, Single Deepest-Pocket measurement, Four-Quadrant measurement, Amniotic Fluid Index (AFI), Plan metric Measurement of Total Intrauterine Volume.

Mathematical Formula For Volume Calculation: A variety of formula using sonographic measurements of approximate total intrauterine volume, fetal and placental volume. Amniotic fluid is equal to total intra uterine volume minus fetal and placental volume, [7] the four-quadrant amniotic fluid index is a reasonable choice for those with little experience at obstetric ultrasound evaluation. This method followed to study AFI in the present study.

50 pregnant cases were studied for AFI with the help of ultrasound scanning. In addition to AFI, the Blood pressure, Blood glucose, gestational age, fetal weight was also observed. The study was done during February to August 2013. The environment temperature during this period range between 26°-41° C. The selected women were of 1st and 2nd para between the age group of 21-26 yrs. In these women AFI was done during 2nd and 3rd trimester.

Results

The systolic Blood pressure had mean of 117.6 ± 6.63 mm of Hg, 118.6 ± 6.80 mm of Hg in oligohydramnios and normal pregnant women respectively. Diastolic Blood pressure had mean of 80 ± 4.43 mm of Hg, 80 ± 6.62 mm of Hg in oligohydramnios and normal pregnant women. Blood glucose level had mean of 146.6 ± 5.56 mg/100ml and 138.6 ± 9.14 mg/100ml in oligohydramnios and normal respectively. AFI 3.75 ± 0.68 cm and 15.95 ± 2.15 cm in oligohydramnios and normal respectively and result were significant with P value of 0.02. Gestational age mean of 25.7 ± 3.59 wks and 28.7 ± 5.01 wks in oligohydramnios and normal respectively and result were significant with P value of 0.02. Fetal weight 860.5 ± 492.33 grams and 1362.6 ± 793.22grms in oligohydramnios and normal respectively and the result were significant with P value of 0.02.

S.no	Parameters	Oligo Hydraminos – Mean ± SD	Normal – Mean ± SD	P Value
1	Systolic B.P.	117.6 ± 6.63 mm of Hg	118.6 ± 6.80 mm of Hg	0.02
2	Diastolic B.P.	80 ± 4.43 mm of Hg	80 ± 6.62 mm of Hg	0.02
3	Blood Glucose	146.6 ± 5.56 mg/100ml	138.6 ± 9.14 mg/100ml	0.02
4	AFI	3.75 ± 0.68 cm	15.95 ± 2.15 cm	0.02
5	Gestational age	25.7 ± 3.59 wks	28.7 ± 5.01 wks	0.02
6	Fetal Weight	860.5 ± 492.33grams	1362.6 ± 793.22grms	0.02

Table 1: Comparative Study of Different Parameters in Oligohydramnios and Normal Pregnant Women in the Age Group of 21-26 Yrs.

It has been observed that the fetal weight was comparatively less in women who had AFI less than 5 cm indicating oligohydramnios. AFI in these subjects ranged from as low as 2 cm to 21 cm. fetal weight

range from 367 to 2723 grams. None of the cases showed any fetal anomalies. Of the 50 case studied there were 10 cases between the age group of 21-26yrs with parity of I to II, AFI with mean of 3.75 ± 0.68

cm having oligohydramnios. Mean fetal weight 860 ± 492.33 . Oligohydramnios in the present studies account for 20%. AFI had mean of 3.75 ± 0.68 cm, 15.95 ± 2.15 cm in oligohydramnios and normal pregnant women respectively.

Discussion

It has been observed of the 50 cases observed for AFI showed that 20% of the cases had oligohydramnios. The most common causes for oligohydramnios are urinary tract anomalies like bilateral renal agenesis, posterior urethral valve, infantile polycystic kidney, and intra uterine growth retardation due to placental insufficiency, hypoxia or it may occur in post term pregnancy due to decreased fetal urine production. 20% of oligohydramnios are observed did not reveal any fetal cause of oligohydramnios (No fetal anomalies). There were no history and signs of placental insufficiency, premature rupture of membranes (PROM). Frequently the clinical diagnosis of oligohydramnios was made in pregnancy where alteration in maternal hydration is seen which leads to changes in net movement of fluid into or from the fetus resulting in decreased maternal hydration leads decreased fetal hydration and urine output resulting in amniotic fluid volume decreases. Maternal dehydration is associated with oligohydramnios because fetal hydration decreases and urine output also decreases.

Since the present study undertaken in the months of February to August during which time the temperature ranging from 26° - 41° C which can lead to dehydration mother causing the decreased hydration of fetus and decrease urine output which may be the cause for the increase frequency of oligohydramnios in Amalapuram EG District.

Conclusion

Of the 50 pregnant cases studied during the months February to August 2013, 20% cases showed AFI which was less than 5 cm indicating presence of Oligohydramnios. Since these 10 cases of Oligohydramnios did not show any fetal abnormality, signs of placental insufficiency or premature rupture of membranes. Therefore the increase in the incidence of Oligohydramnios in the region of Konaseema, EG district is probably due to increased environmental temperature, which can lead to maternal dehydration. This maternal dehydration can cause fetal dehydration and the urine output decreases, resulting in decreased amniotic fluid volume.

The maternal dehydration which is leading to oligohydramnios can be corrected simply

- By oral or intravenous rehydration when the dehydration is due to increased environmental temperature [8,9].

- By amnioinfusion of warm or room temperature NaCl in to amniotic cavity. Amnioinfusion does not treat the underlying cause of the Oligohydramnios but it can prevent complications like cord compression.
- Vasico-amniotic shunts may be used to divert fetal urine to the amniotic fluid cavity in patients with fetal obstructive uropathy.

To summarize the increased frequency of the oligohydramnios in this region of Konaseema, EG district may be due to the prevailing high environmental temperature. Since in these study fetal abnormalities, placental insufficiency and preterm rupture of membrane has not been observed, we can conclude the increase in the incidence of Oligohydramnios may be due to increase environmental temperature.

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