

Research Article

Perinatal Outcome and Congenital Anomalies in Polyhydramnios –A Prospective Study

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Abstract

Background: The amniotic fluid that envelops the fetus acts as a protective shroud. Fetal well-being is reflected by the amniotic fluid index. When the amniotic fluid index exceeds 25cms, it is called polyhydramnios and is associated with increased incidence of congenital malformations and perinatal mortality.

Objectives: To estimate the incidence of congenital malformations and to study the perinatal outcome in polyhydramnios.

Study Design: Prospective study.

Setting: Neonatal intensive care unit and the maternity wards of Father Muller Medical College Hospital, Mangalore. Study period was 2 years.

Methods: Amniotic fluid index was measured by ultrasound, 29 cases of polyhydramnios identified were evaluated and followed up. Congenital malformations were observed both by ante natal and post natal ultrasounds, other relevant investigations were also done when necessary. The perinatal outcome in terms of congenital anomalies, fetal distress and mortality were recorded.

Results: 29 cases of Polyhydramnios were detected. Congenital malformations were identified in seven neonates (24.1%). Diaphragmatic hernia and hydrops fetalis were the most common congenital malformations observed. Nine neonatal deaths were documented (31%). Six cases of fetal distress were observed (19%). Incidence of congenital malformations and mortality increased significantly when the amniotic fluid index was above 30cms.

Conclusion: There was a significant risk of congenital malformations, neonatal mortality and fetal distress in polyhydramnios, these risks rose exponentially with a further rise in amniotic fluid index over 30cms.

Keywords: Polyhydramnios; congenital anomalies; neonatal mortality

1. Introduction

Amniotic fluid or liquor amnii is the protective liquid contained by the amniotic sac during pregnancy. Amniotic fluid protects the fetus by a cushioning effect in the mother's abdomen, it allows for easier fetal movement and promotes skeletal development, it provides a barrier against infection, it also aids in the development of the lungs and formation of urine and meconium. Polyhydramnios is defined as amniotic fluid index more than 25 cm.¹The incidence of polyhydramnios ranges from 0.5-1.5% of all pregnancies.^{2,3} Congenital malformations are more likely in polyhydramnios and these malformations may occur in almost every organ system. But, commonly these malformations are associated with

systems that involve absorption of fluids and swallowing in the fetus.^{4,5} Anencephaly, duodenal or esophageal atresia and renal agenesis are the more frequent anomalies. In terms of amniotic fluid index, the more severe the polyhydramnios, greater is the incidence of congenital anomalies and poor perinatal outcome. The purpose of this study was to estimate the incidence of congenital malformations and to study the perinatal outcome in polyhydramnios.

2. Materials and Methods

This prospective study was conducted in the neonatal intensive care unit and the maternity wards of Father Muller medical college hospital, Mangalore. The study period was 2 years, 29 newborns were included in this study. Ultrasonography was used to quantitate the amniotic fluid index and confirm polyhydramnios. Following a detailed history and clinical examination, postnatal ultrasound, x rays, CT scans were obtained if the clinical situation warranted it. Chi square test, Gaussian test and Fischer's exact test were used to calculate the statistical significance of the data obtained.

3. Methodology

The Amniotic fluid index was assessed by placing the patient supine, the uterus was viewed as four equal quadrants. The ultrasound was transduced perpendicular to the plane of the floor and aligned longitudinally with the patients' spine, vertical depth of the largest amniotic fluid pocket was measured and the amniotic fluid index was calculated from the sum of four quadrant pocket depths. Congenital anomalies were identified by an antenatal ultrasound and recorded, if required other investigations were done post natal. The outcome was determined by following up the newborn in the neonatal period.

4. Results

During the study period of two years, there were 29 cases of polyhydramnios; congenital malformations were observed in 7 cases (24.1%). The new born mortality was 9 (31%).

In our study the congenital malformations observed were 2 cases each of diaphragmatic hernia and hydrops fetalis, one case each of micrognathia, duodenal atresia and anencephaly were also observed.

Six newborns (19%) had fetal distress. The mode of delivery was Caesarean in 9 (31%). When the total number of cases, were further classified on the basis of the amniotic fluid index as more than 30cms (12 cases) and between 25-30cms (17 cases), the corresponding incidence of congenital malformations was 50% and 5.9% and the corresponding mortality was 50% and 17.6%.

Table-1: Incidence of congenital malformations in polyhydramnios and relationship to AFI

Amniotic fluid index	Cases	Congenital malformations	Incidence
25-30	17	01	5.9%
>30	12	06	50%
Total	29	07	24.1%

Table-2: Incidence of neonatal mortality in polyhydramnios and relationship to AFI

Amniotic fluid index	Cases	Newborn mortality	Incidence
25-30	17	03	17.6%
>30	12	06	50%
Total	29	09	31%

Table-3: Congenital malformations in polyhydramnios

Congenital malformation	Number
Diaphragmatic Hernia	02
Hydrops Fetalis	02
Micrognathia	01
Duodenal Atresia	01
Anencephaly	01

5. Discussion

Congenital anomalies were identified in 7 newborns among the 29 cases of polyhydramnios included in this study, this corresponded to a significant high risk of 24.1%. This incidence was comparable to similar results in the studies conducted by Romero Gutierrez⁶ (24%), Ben-Chetrit A⁷ (21.8%), Lyndon M Hill⁸ (20%), R William Quinlan⁹ (18%) and Desmedt Els⁴ (17.8%). However the incidence of congenital anomalies were lower in the studies conducted by Shabnam¹⁰ (2.8%), Kaukab Tashfeen¹¹ (8.1%), Joseph R Biggo¹² (8.4%), Dashe¹³ (11%) and Lazebnik¹⁴ (14.5%).

In the study conducted by Desmedt Els,⁴ twenty percent of the congenital anomalies were not detected by an antenatal ultrasound, whereas in our study all seven congenital anomalies were detected by an antenatal ultrasound. There were 11 preterm deliveries (37%) in our study but only 7.7% preterm births in the study conducted by Shabnam.¹⁰ Fetal distress was observed in 6 deliveries (20.6%) in our study compared to only 4.1% in the study conducted by Baron.¹⁵ The mode of delivery was caesarean in nine newborns (31%) in our study and was similar to the 27.9% observed in the study by Shabnam.¹⁰

The perinatal mortality was a high 31% in our study, which was significantly higher than the perinatal mortality observed in the studies by Stoll⁵ (4.3%), Desmedt Els⁴ (4.9%) and Lyndon M Hill⁸ (7%).

6. Conclusion

It is very important to recognize polyhydramnios, because of its frequent association with fetal malformations and perinatal mortality. Antenatal ultrasound is an accurate tool to identify congenital anomalies. In severe polyhydramnios when the amniotic fluid index exceeded 30, the incidence of both congenital malformations and perinatal mortality was a significantly high 50%. The risk of fetal distress is also significant. The perinatal outcome may be influenced by frequent assessment of the amniotic fluid index and regular follow up of the identified cases of polyhydramnios.

References

1. Cunningham FG, Leveno KJ, Bloom SL, et al. Disorders of amniotic fluid volume. In: Cunningham FG, Leveno KL, Bloom SL, et al, eds. *Williams Obstetrics*. 23rd Ed. New York, NY: McGraw-Hill; 2010: chap 21.
2. Brace RA, Wolf EJ. Normal amniotic fluid volume changes throughout pregnancy. *Am J Obstet Gynecol*. 1989 Aug; 161(2):382-8.
3. Brady K, Polzin WJ, Kopelman JN, Read JA. Risk of chromosomal abnormalities in patients with idiopathic polyhydramnios. *Obstet Gynecol*. 1992 Feb; 79 (2):234-8.
4. Desmedt EJ, Henry OA, Beischer NA. Polyhydramnios and associated maternal and fetal complications in singleton pregnancies. *Br J Obstet Gynaecol* 1990; 97:1115-22.
5. Claude G. Stoll, Yves Alembik, Beatrice Dott, Study of 156 cases of polyhydramnios and congenital malformations in a series of 118,265 consecutive births. *Am J Obstet and Gynecol*. 1991 September; 165(3): Pg 586–90.
6. Romero Gutierrez G, Fuentes Paramo H, Membrilla Alfaro E, Vargas Huerta M. Ultrasonographic diagnosis of polyhydramnios and its association with congenital malformations. *Ginecol Obstet Mex*. 1996 Jan;64:1-5.
7. Ben-Chetrit A, Hochner-Celnikier D, Ron M, Yagel S. Hydramnios in the third trimester of pregnancy: a change in the distribution of accompanying fetal anomalies as a result of early ultrasonographic prenatal diagnosis. *Am J Obstet Gynecol*. 1990 May;162(5):1344-5.

8. Hill, Lyndon M, Breckle, R, Thomas Marion L, Fries, Joanne K Polyhydramnios: Ultrasonically Detected Prevalence and Neonatal Outcome. *Obstet Gynecol.* 1987;69:21–25.
9. Quinlan RW, Cruz AC, Martin M. Hydramnios: ultrasound diagnosis and its impact on perinatal management and pregnancy outcome. *Am J Obstet Gynecol.* 1983 Feb 1; 145(3):306-11..
10. Shabnam MM, Syed S, Rizvi G. Polyhydramnios: Risk factors and outcome. *Saudi Med J.* 2008; 29:256–60.
11. Kaukab Tashfeen and Ilham Moosa Hamdi Polyhydramnios as a Predictor of Adverse Pregnancy Outcomes *Sultan Qaboos Univ Med J.* 2013 February; 13(1): 57–62.
12. Biggo JR, Wenstrom KD, Dubard MB, Cliver SP. Hydramnios prediction of adverse perinatal outcome. *Obstet Gynecol.* 1999;94:773–7.
13. Dashe JS, McIntire DD, Ramus RM, Santos-Ramos R, Twickler DM. Hydramnios: Anomaly prevalence and sonographic detection. *Obstet Gynecol.* 2002; 100:134–9.
14. Lazebnik N, Many A. The severity of polyhydramnios, estimated fetal weight and preterm delivery are independent risk factors for the presence of congenital malformations. *Gynecol Obstet Invest.* 1999; 48(1):28-32.
15. Baron C, Morgan MA, Garite TJ. The impact of amniotic fluid volume assessed intrapartum on perinatal outcome. *Am J Obstet Gynecol.* 1995 Jul; 173(1):167-74.