Clinical Features of Babies Born to Mothers with Oligohydramnios: A Two Years’ Experience

Atiye Fedakâr1*, Selahattin Semiz2 and Nurcan Peker2

1Departments of Pediatrics, Afiyet Hospital Ümraniye, Istanbul, Turkey
2Departments of Radiology, Afiyet Hospital Ümraniye, Istanbul, Turkey

*Corresponding author: Atiye Fedakâr, Departments of Pediatrics, Afiyet Hospital, Ümraniye, Istanbul, Turkey, Tel:+900216 344 89 00; E-mail: atyfedakar@hotmail.com

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Abstract

Aim: Oligohydramnios or decreased amount of amniotic fluid volume is seen frequently with post-maturity and major abnormalities. It accompanies a wide range of reproductive disorders including anomalies of fetus and disorders of mother, fetus and placenta. Decreased amniotic fluid volume is associated with adverse perinatal outcome. The current study aimed to present the clinical features of babies born to mothers with Oligohydramnios who were admitted to the newborn intensive care unit (NICU) in a 2-year period and a literature review was also presented.

Materials and Method: Babies admitted to NICU of our hospital between July 31, 2012 and July 31, 2013 and born to mothers with a diagnosis of Oligohydramnios were included in the study. The diagnosis of Oligohydramnios was based on Phelan’s AFI index assessment. The diagnosis for hospitalization, birth weight, type of birth, 5th minute Apgar score, week of gestation, gender, and history of some diseases in mother that can predispose to oligohydramnios such as early membrane rupture (EMR), hypertension, diabetes, collagen tissue disease and drug use were analyzed. All patients underwent an abdominal ultrasonography and premature babies and babies born to mothers with gestational diabetes had routine echocardiography performed by a pediatric cardiologist.

Findings: A total of 963 patients were admitted to NICU between July 31, 2012 and July 31, 2013. Twenty-five (2, 5%) of those patients were born to mothers with oligohydramnios. Sixteen were premature babies (30-36 weeks) and nine were term patients with 13 boys and 12 girls. Twenty four (96%) of those patients were delivered by emergency cesarean section due to fetal distress. Mean birth weight was 2490 ± 1265 g (4120-1430) and mean duration of hospitalization was 11, 4 ± 0, 7 days. The fifth minute Apgar score was 7.28 ± 1. We applied antenatal corticosteroid therapy 13 cases under gestational ages 34 weeks. Pneumothorax developed in two patients and there was no mortality.

Result: Oligohydramnios is a very serious clinical condition affecting the perinatal mortality and morbidity. The cases should be evaluated multi-dimensionally since it causes intrauterine growth retardation (IUGR) and pulmonary hypoplasia, increased risk of caesarean delivery for fetal distress, low Apgar score in addition to creating grounds for many congenital abnormalities. Followed closely of fetal intrapartum monitoring and good neonatal care support is necessary for optimum perinatal outcome.

Keywords: Newborn; Mothers with oligohydramnios; Pregnancy

Introduction

Amniotic fluid surrounds the developing fetus. Its existence plays an essential role in fetal development [1,2]. Normal condition, amniotic fluid volume increases until about 36 weeks of pregnancy, which is average rate is 1000 ml and its volume decreases to less than at 42 weeks [3]. Measurements of amniotic fluid are reported as the deepest vertical pocket or as the summation of 4 quadrants to produce an amniotic fluid index (AFI). Values less than 5 cm according to Phelan’s amniotic fluid index (AFI) are accepted as oligohydramnios [4,5].

Oligohydramnios is the presence of less than the normal amount of amniotic fluid in pregnant women with intact or non-intact gestational membranes. Its incidence in pregnancy is 0, 5-5, 5%, although this percentage changes according to the diagnostic criteria used [6]. It is a very serious clinical condition affecting mortality and morbidity and its increasing effect on the rate of IUGR, and fetal abnormalities, especially the renal types emphasize its importance. Besides in multiple studies, oligohydramnios has been correlated with increased risk of abnormal fetal heart rate, pulmonary hypoplasia, increased risk of cesarean delivery, postdate pregnancy, meconium passage, lower Apgar scores, Infants admitted to NICU and neonatal death [7-10]. Thus, in high risk pregnancies, oligohydramnios is often used to identify fetuses at risk of an adverse outcome.

Materials and Method

Infants admitted to NICU of our hospital between July 31, 2012 and July 31, 2013 and were born to mothers with a diagnosis of oligohydramnios prior to gestation were included in the study. The diagnosis of oligohydramnios was based on Phelan’s AFI assessment.
The AFI was calculated by adding the widest measured vertical diameter of the sac in each of the four quarters of the abdominal area of the pregnant woman. The diagnosis for hospitalization, birth weight, type of birth, fifth minute Apgar score, week of gestation, gender, and history of some diseases in mother that can predispose to oligohydramnios such as EMR, hypertension, diabetes, collagen tissue disease, and drug use were analyzed and were prospectively recorded according to the admitting files of the patients. All patients underwent an abdominal ultrasonography to rule out any renal pathology. Premature babies and babies born to mothers with gestational diabetes had routine echocardiography performed by a pediatric cardiologist.

The National Institutes of Health Consensus Development Conference on the Effect of Corticosteroids for Fetal Maturation on Perinatal Outcomes concluded that antenatal corticosteroid therapy for fetal maturation reduces mortality, respiratory distress syndrome, and intraventricular hemorrhage in preterm infants. These benefits extend to a broad range of gestational ages (24 to 34 weeks) and are not limited by gender or race. Although the beneficial effects of corticosteroids are greatest more than 24 hours after beginning treatment (two doses of 12 mg betamethasone intramuscularly) treatment less than 24 hours in duration may also improve outcomes [1]. We applied antenatal corticosteroid therapy 13 cases under gestational ages 34 weeks.

Findings

A total of 963 patients were admitted to NICU between July 31, 2012 and July 31, 2013. Twenty-five (2.5%) of those patients were born to mothers with oligohydramnios. Sixteen were premature babies (30-36 weeks) and nine were term patients with 13 boys and 12 girls. Twenty four (96%) of those patients were delivered by emergency cesarean section due to fetal distress. Mean birth weight was 2490 ± 1265 g (4120-1430) and mean duration of hospitalization was 11.4 ± 0.7 days. The fifth minute Apgar score was 7.28 ± 1.4 (Characteristics of the study are shown in Table 1). Steroid treatment was administered to 13 patients. Ten out of 13 patients who received steroid treatments were followed-up by ventilator treatment and three were administered O2 by hood. Eleven patients were intubated and were on ventilator treatment, while one was treated with CPAP treatment. Mean days on ventilator was 9, 1 ± 3, 5 days. Patients were treated for TTN (n: 20), TTN+ sepsis (n: 3), and sepsis (n: 2). Renal pathology was present in 1265 g (4120-1430) and mean duration of hospitalization was 11.4 ± 0.7 days. The fifth minute Apgar score was 7.28 ± 1.4 (Characteristics of the study are shown in Table 1). Steroid treatment was administered to 13 patients. Ten out of 13 patients who received steroid treatments were followed-up by ventilator treatment and three were administered O2 by hood. Eleven patients were intubated and were on ventilator treatment, while one was treated with CPAP treatment. Mean days on ventilator was 9, 1 ± 3, 5 days. Patients were treated for TTN (n: 20), TTN+ sepsis (n: 3), and sepsis (n: 2). Renal pathology was present in 12 patients, bilateral choanal atresia in one patient, and convulsions in one patient. When the etiology of oligohydramnios in the mother was analyzed, gestational diabetes was detected in three mothers, hypothyroidism in two mothers, EMR in two mothers, hypertension in one mother, FMF in one mother, and Behcet's disease in one mother. When chronic drug use was questioned, two of the mothers were found to be using euthyrox. The patient with bilateral choanal atresia was operated on. Pneumothorax developed in two patients and chest tube was inserted. There was no mortality.

Discussion

Oligohydramnios is seen frequently with IUGR, post-maturity, and major abnormalities and commonly with poor perinatal prognosis [3,11]. Perinatal morbidity and mortality rates are increased due to pulmonary hypoplasia and fetal compression secondary to oligohydramnios produced during an early gestational week. Although the pathology causing pulmonary hypoplasia is still unknown, the absence of the necessary intrathoracic pressure, which is required for growth, has been blamed [12-14]. Amniotic fluid is essential for fetal lung growth. The amniotic fluid surrounded by amniotic and chorionic membranes plays a major role in the development of the respiratory, gastrointestinal, urinary and skeletal system of the fetus, heat transfer, the free motility of the umbilical cord, and prevention of the fetus from trauma and protects the fetus from microorganisms originating from the vagina. A greater part of the amniotic fluid consists of fetal urine and is reported to be 600-1200 ml/day in the period close to term [11,14].

| Total number of patients | 25 |
|--------------------------|----|
| Male/Female              | 13/12 |
| Mean birth weight        | 2490 ± 1265 (4120-1430) |
| Mean duration of hospitalization | 11.4 ± 0.7 days |
| Premature/term           | 16/9 |
| Mean duration on ventilator | 9.1 ± 3.5 days |
| Cardiac pathology        | 6 |
| Renal pathology          | 5 |
| Pes equinovarus          | 2 |
| Choanal atresia          | 1 |
| Gestational diabetes in mother | 3 |
| Hypothyroidism in mother | 2 |
| FMF in mother            | 1 |
| Behcet’s disease in mother | 1 |
| Hypertension in mother   | 1 |

Table 1: Clinical features of babies born to mothers with oligohydramnios.

Although the AF measurement used in the diagnosis of oligohydramnios is variable, it has been performed according to the evaluation of AF index developed by Phelan since 1987. According to this method, the AF index is calculated by adding the widest measured vertical diameter of the sac in each of the four quarters of the abdominal area of the pregnant woman [5]. The diagnosis of oligohydramnios in this study was based on Phelan’s AF1 evaluation.

The rate of cesarean sections were reported to increase, and the first and fifth minute Apgar scores were reported to decrease due to fetal distress in cases with AF<5 cm in complicated pregnancy in the literature [9,14]. In this study, all but one baby were delivered by cesarean section due to fetal distress and the mean fifth minute Apgar score was 7.28 ± 1.4. The rate of oligohydramnios was 2.5%, which is consistent with the literature findings. Eleven patients were intubated, one patient received nasal CPAP, and three patients received O2 by hood.

The most frequently encountered abnormality in cases with oligohydramnios is renal abnormality [14]. Five patients (20%) had renal pathology in our study, which were pelviectasia in 3 patients, left sided hydronephrosis in 1 and bilateral cystaluric in 1 patient.
Renal pathology was present in five patients; cardiac pathology was present in six patients (VSD in one patient, ASD+ pulmonary hypertension in one patient, thin PDA in two patients, foramen ovale in two patients. Bangal V et al. of 100 cases with oligohydramnios, found fetal heart rate abnormalities, (16%) low Apgar score and (8%) meconium aspiration syndrome [15].

In a study by Kimya et al. on 405 pregnant women, cesarean delivery was performed in 26 patients with AF index of ≤5 due to fetal distress and two patients were intubated and five required intensive care [15,16].

In addition, long-term fluid loss starting in the early periods is known to cause some skeletal and facial deformities [17,18]. Pes equinovarus was detected in two patients and bilateral choanal atresia was detected in one patient in our study. The patient with bilateral choanal atresia was operated on with no postoperative complications. The rates of neonatal and maternal infections have been reported to increase in cases with decreased amniotic fluid in the literature. Cases with severe oligohydramnios have also been accepted as the group with the highest infectious morbidity [15,16]. In a study by Karabulut et al., the risks of both chorioamnionitis and neonatal infection increased. The neonatal infection rate was reported to be 3.7% in that study [19]. We detected sepsis in five patients (20%).

Drug use of the mother, diabetes, hypertension, preeclampsia, vascular pathologies, and autoimmune diseases are among the maternal factors causing oligohydramnios. In particular, preeclampsia and hypertension cause IUGR and oligohydramnios by uteroplacental vasoconstriction and damage to the maternalfetal circulation [20,21]. Prostaglandin synthesis inhibitor indomethacin and non-steroidal anti-inflammatory drugs are effective by decreasing the urine volume through a decrease in the fetal glomerular filtration in addition to affecting the uteroplacental circulation [22]. Gestational diabetes was detected in three mothers, hypothyroidism in two mothers, EMR in two mothers, hypertension in one mother, FMF in one mother, and Behçet’s disease in one mother in this study. When chronic drug use was questioned, two of the mothers were found to be using eutryrox.

**Conclusion**

In conclusion, oligohydramnios is a serious clinical condition that increases the perinatal mortality and morbidity in the newborn period. It frequently creates grounds for the development of intrauterine growth retardation in addition to many pathological conditions including primarily renal conditions. Therefore, infants with oligohydramnios should be followed-up and evaluated multi-dimensionally, due to the accompanying abnormalities. In addition, the newborns should be followed-up in terms of infection since the incidence of infection is increased in cases with oligohydramnios.

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