Outcome of transabdominal amnioinfusion in pregnant patients with oligohydramnios and intact membrane

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April 28, 2020

Abstract

Abstract: Objective: The objective of this paper was to evaluate the outcome of transabdominal amnioinfusion in pregnant patients with oligohydramnios. Method: This is a prospective observational study involving 80 cases of oligohydramnios treated with transabdominal ultrasound, in the period between 2011 and 2016. The patients were treated in two centers; however, all the procedures were performed by the same operator. Results: The mean gestational age at the first treatment was 24 weeks. Some patients received more than one amnioinfusion. The mean interval between the first infusion and delivery was 31 days. Perinatal and neonatal mortalities were 45% and 35%, respectively. There were 5 cases of chorioamnioitis and in majority of the cases, the final diagnosis was made after amnioinfusion. Conclusion: The procedure has been proven to be very safe. The result showed a high perinatal mortality which was not surprising, as these pregnancies were complicated by a major fetal malformation. Significantly, this study showed that the diagnosis accuracy of the concomitant congenital fetal malformation was significantly improved. The diagnosis accuracy had a major impact on the management of patients, especially the mode of delivery.

Introduction:

Significant oligohydramnios is not a very common antenatal problem; however, the consequence of this condition can be very serious. Oligohydramnios can cause severe fetal problems such as cord compression, cord prolapse and limb deformity. Oligohydramnios is also associated with adverse perinatal outcomes which include intrauterine growth restriction, fetal distress, and low apgor score[1,2,3]. However, the most serious complication is fetal pulmonary hypoplasia leading to fetal and neonatal death. Fetal pulmonary hypoplasia which results from oligohydramnios in early gestation is well documented in the literature[4, 5,6,7,8,9]. However, the effect of oligohydramnios during the second and third trimesters on fetal lung maturity is debatable[10]. Amniotic fluid is also important for fetal movement and development of the musculoskeletal system, it protects the growing fetus from external forces and is critical for fetal lung development.

Amnioinfusion entails installation of normal saline or ringer lactate to restore the normal value of amniotic fluid. The purpose of this procedure is to improve visualization and diagnosis. The therapeutic benefit of this procedure is very debatable. However, it has been proven that intrapartum amnioinfusion to relieve fetal distress in labor due to cord compression is beneficial[11]. The National Institute of Clinical Excellence (NICE) recommends conservative treatment for pregnant women with oligohydramnios[12]. The aim of this study was to assess the benefit of amnioinfusion when used in this group of patients with oligohydramnios who present in the second and third trimesters.

Materials and Methods:

This study was conducted at two centers, 1) Women's Hospital in Doha – Qatar and 2) the Academy Hospital in Khartoum – Sudan. However, all the procedures (transabdominal amnioinfusion) were done by the same operator who has more than 20 years of experience in invasive intrauterine procedures. The procedure was

explained to the patients and verbal consent was obtained. All the patients received antibiotic prophylaxis. It was found that deepest vertical pool (DVP) of less than 3 centimeters was recorded for the entire study group, confirming the diagnosis of oligohydramnios. Prior to the procedure, all the patients were examined clinically to exclude spontaneous rupture of membrane (SROM). This was done by vaginal examination using a sterile speculum in search for liquor leaking from the cervical canal or the presence of a pool of liquor in the vagina. One patient experienced loss of fluid during the procedure which confirms SROM and was excluded from the study. Amnioinfusion was done using amniocentesis needle under direct US guidance. All the fetuses were examined in great details by a fetal medicine specialist. The examination was difficult and nonconclusive in majority of cases because of reduced liquor, high BMI and adhesion due to previous surgery (mainly caesarean section scars and liposuction).

We collected the following data: maternal age, parity, BMI, gestational age at presentation, deepest vertical pool for every patient, mode of delivery, fetal and neonatal outcome.

Result:

All the 80 cases received amnioinfusion under direct ultrasound guidance by the same operator. During amnioinfusion, no local anesthesia or tocolytics were administered. All cases included in the study had severe oligohydramnios with the average deepest pool being 1.8 cm. The incidence of overweight and obese patients in this study group was high, compromising almost 25% of the group (Table 1). All the cases in this cohort presented in the second and third trimesters (Table 2). The mean gestational age at the time of the procedure was 25.5 weeks (range 18 – 33). However, the gestational age at delivery was 28.5 weeks (range 20 – 39). No adverse events were encountered at the time of the procedure such as hemorrhage, uterine irritability, fetal organ trauma, and abruption (Table 2). Five cases developed chorioamnionitis at a later stage. Amniocentesis was performed only when there was no apparent fetal structural anomaly. We found 3 cases of trisomy 21 and one case of abnormal chromosome 4. The incidence of gestational diabetes mellitus in this group was about 22.5% (18 cases). There were four cases of high blood pressure during pregnancy all on medication in form of methyldopa. Hypertension was properly controlled in the patients and none developed preeclampsia. The procedure was uncomplicated and no case needed a second needle insertion. There were 5 cases which developed signs of chorioamnionitis within two weeks of the procedure, two of these five cases developed spontaneous rupture of membrane. In the study group, there were 52 cases of fetal structural malformation (Table 1). There were 25 cases diagnosed with bilateral renal agenesis and infantile polycystic kidney disease. The diagnosis was confirmed only after amnioinfusion in 18 cases. The diagnosis was impossible before amnioinfusion because the patients had high BMI and surgical scarring mainly from previous caesarean delivery and liposuction (Figure 1). There were 26 cases of intrauterine fetal death mostly fetuses with fetal structural malformation. Majority of patients in this group delivered vaginally (68 cases). Three cases delivered by forceps delivery. Elective Caesarean delivery for obstetrics indication was done in 12 cases. Two patients in the vaginal delivery group needed manual removal of placenta under general anesthesia because of retained placenta and mild postpartum hemorrhage (Table 3). All cases delivered prematurely, 22 cases delivered before 28 weeks of gestation, 14 cases delivered between 28 - 30 weeks of gestation and only 4 cases delivered after 31 weeks of gestation (Table 2). Due to prematurity, a low mean birth weight of 1.4 kg was recorded. The average number of days in the NICU was 4.3 days (Table 3). The prenatal and neonatal mortalities in this group were very high at 45% and 35%, respectively.

Discussion

This study showed that amnioinfusion is a safe procedure and can be performed at the outpatient setting. The procedure is inexpensive with minimal equipment needed and can be performed by all obstetricians trained in intrauterine invasive procedures. This will make it easily accessible to all patients.

In this study, the main fetal structural anomaly observed was renal. There were 10 cases of bilateral renal agenesis and 15 cases of infantile polycystic kidney disease. The diagnosis of renal anomaly was difficult because of high BMI, lack of fluid as acoustic window and the presence of scar tissue due to previous surgery, mainly repeat Cesarean delivery and liposuction which are performed extensively in this part of the world.

The diagnosis was confirmed only after amnioinfusion. Counseling of parents improved dramatically after confirming the diagnosis of this serious fetal anomaly which is incompatible with life. We advise obstetricians to avoid intrapartum monitoring and avoid intervention except for maternal indication, so as to avoid unnecessary operative delivery. In this part of the world, patients tend to have a large family and another caesarean delivery may increase the chance of contracting a more serious complication such as morbidity adherent placenta, as a result of multiple repeat cesarean deliveries. Our study showed that even in the absence of fetal malformation, the presence of oligohydramnios is associated with many complications such as, higher chance of early preterm labour, severe intrauterine growth restriction, high operative delivery rate, low Apgar score and NICU admission. These findings have been debated by many other investigators[13,14,15]. In the absence of major fetal malformation and a border line oligohydramnios, there could be a group of patients who may benefit from amnioinfusion mainly to improve lung maturity if it was done at the right gestational age[16].

Conclusion:

The limitation of this study is reflected in the fact that it is a longitudinal observational study and not a randomized trial. However, randomization will be difficult due to the shortage of cases. The lack of information about the long term effect on live born babies can be criticized. However, we can conclude with the following:

1) The procedure is very safe, simple and inexpensive.

2) The procedure is very critical in making the final diagnosis and facilitating counseling of the family.

3) Majority of these cases have a major malformation not compatible with life.

This information influences the mode of delivery and decreases the chance of operative delivery with serious consequences.

Disclosure of interests

The authors declare no conflict of interests with regard to this observational study

Contribution to authorship

All the procedures are done by the author

Details of ethics approval

All patients gave consent before amnioinfusion. No ethical approval obtained

Funding

No grant or funding for this study.

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