ORIGINAL ARTICLE

AMNIOREDUCTION-ITS EFFICACY IN IDIOPATHIC POLYHYDRAMNIOS

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ABSTRACT

Objectives: *To evaluate the efficacy of amnioreduction in improving maternal dyspnea and premature contractions in singleton pregnancies with idiopathic polyhydrmnios and to find out the frequency of perinatal mortality and complications associated with amnioreduction.*

Material and Methods: *This pilot interventional study was conducted at Liaqat Memorial Hospital, KUST Institute of Medical Sciences, Kohat from June 2008 to May 2009 on 15 patients having singleton pregnancy with idiopathic polyhydramnios. Amnioreduction was performed by the consultant using standard technique. The Modified Medical Research Council Dyspnea Scale was used to assess the level of maternal dyspnea before and after the procedure. Resolution of premature contractions was also noted. All the babies were seen by the pediatricians and were followed up for one week in the nursery. All relevant details were recorded on predesigned proforma. Data were analyzed by SPSS window's version 16.*

Results: *Total 26 amnioreductions were performed on the 15 patients. Frequency of polyhydramnios in our study was 0.529%. Maternal dyspnea improved in 88.9% cases while reduction in premature uterine contractions was observed in only 38.46% cases. Preterm labour (within 1st 48 hours of amnioreduction) was seen in 19.2% cases and abruptio placentae (within 24 hours of the procedure) in 11.5% cases. Perinatal mortality in this study was 53.33%.*

Conclusion: *Amnioreduction is an effective method in relieving maternal dyspnea due to idiopathic polyhydrmnios in singleton pregnancies however its efficacy in reducing uterine contractions was unsatisfactory. The perinatal mortality was higher and the procedure was associated with abruptio placentae and preterm labour.*

Key Words: *Idiopathic Polyhydramnios, Amnioreduction, Amniotic Fluid Index, Abruptio Placentae, Preterm Labour, Premature Uterine Contractions, Preterm Premature Rupture of the Membrane (PPROM).*

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INTRODUCTION

Polyhydramnios is a pathological condition describing an excess of amniotic fluid in the amniotic sac.It complicates 0.5%-2% of pregnancies.[1-4] The normal fluid around the baby gradually increases until there is about 800-1000 ml at 36 to 37 weeks of pregnancy. The amount of fluid can be measured through different methods, most commonly through evaluation of amniotic fluid index (AFI) or deep pocket measurements. Diagnosis of polyhydramnios is made when AFI shows a fluid level of more than 25 centimeters (or above the 95th percentile), or a single maximal vertical pool depth (MVPD) of >8 cm, or if a fluid level of 2000 ml is seen.[5-7] Polyhydramnios may be classified as mild (MVPD 8–12 cm), moderate (MVPD 12–15 cm) or severe (MVPD >15 cm).[8]

Polyhydramnios is usually an idiopathic condition (60%), but may occur due to maternal diabetes, renal and cardiac diseases, fetal structural anomalies (esophageal atresia, duodenal atresia, chromosomal abnormalities, neural tube defects), isoimmunization, congenital infections and multiple pregnancies (twin to twin transfusion syndrome).[2, 4]

Regardless of the etiology, polyhydramnios are associated with increased maternal and fetal complications.[9] Maternal complications of polyhydramnios are abdominal discomforts, uterine irritability, compromised respiratory functions, unstable lie, placental abruption, postpartum hemorrhage (PPH) and rarely ureteric obstruction (with gross uterine distension). The fetal risks include high perinatal mortality rate of about 13% even in normal fetuses with idiopathic hydramnios.[8]

Therapeutic intervention is mainly carried out for relieving maternal symptoms. If the patient becomes

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symptomatic, either with uterine irritability, respiratory compromise, or discomfort, treatment may be necessary to prolong the pregnancy. Based on gestational age, two options are available: amnioreduction or the use of prostaglandin inhibitors to attempt a medical reduction of fluid production.[1,9,10] Some data suggest that prostaglandin inhibitors, such as indomethacin or ibuprofen, may reduce fetal urine production.[8] This favours medical therapy especially when polyhydramnios develops at early gestational ages. But due to the concern about closure of the fetal ductus arteriosus with prostaglandin treatment,[11] therapy should be conducted only in those centers that have the ability to follow fetal ductal blood flow. In addition, it is recommmended to avoid such treatment beyond 32 weeks gestational age.[2]

The underlying cause usually directs the treatment but in severe acute polyhydramnios, therapeutic amnioreduction has shown improved outcome regarding maternal symptoms and perinatal outcome,[9] although repeated procedures may be required. Professor Fisk's group in London has adopted the criteria for therapeutic amnioreduction as an AFI of >40 cm or an MVPD of >12 cm.[12] The amount of amniotic fluid can be drained by Abdel-Fattah SA formula that 1 cm decrease in AFI corresponds to a need to remove 100 mL of amniotic fluid.[13] Risks associated with amnioreduction are placental abruption, preterm premature rupture of the membrane (PPROM), chorio-amnionitis and membrane detachment.[14]

In Pakistan, the available data showed the incidence rate of polyhydramnios is 2-2.4% with associated perinatal mortality of 32-33% and fetal malformation rate is up to 55%.[15-18] As there is no local Pakistani study available regarding therapeutic intervention of polyhydrmnios, we planned this study to evaluate the efficacy of amnioreduction in improving maternal dyspnea and premature contractions in singleton pregnancies with idiopathic polyhydrmnios and to find out the frequency of perinatal mortality associated with amnioreduction in our population.

MATERIAL AND METHODS

This pilot interventional study was conducted in Liaqat Memorial/ DHQ Teaching Hospital, KUST Institute of Medical Sciences (KIMS) Kohat from June 2008 to May 2009. This study included all admitted women having single pregnancy with idiopathic polyhydramnios and having abdominal discomfort and/or dyspnea. Diagnosis of polyhydramnios were established when AFI was more than 25cm during their second and third trimester. Informed consent was taken from all patients. While all those women who had multiple gestation, pretem premature rupture of the membranes (PPROM), preterm labour, chorioamnionitis, fetuses with intra uterine growth retardation, previous uterine scar, history of abruption, TORCHS positive, had isoimmunization and non availability of consent- were excluded from this trial. Fifteen patients with singleton pregnancies complicated with idiopathic polyhydramnios fulfilled the inclusion criteria.

Demographic details, symptomatology (before and after the procedure), clinical finding along with all the investigations were recorded on a specially designed profoma. After fulfilling the U/S criteria, screening tests were performed on all the patients including, complete blood count with Rh factor, indirect Coomb, TORCHS screening and GTT (glucose tolerance test).

Maternal dyspnea (difficult breathing, breathlessness, increased respiratory efforts or uncomfortable breathing) and premature contractions were the two symptoms to be assessed for the efficacy of amnioreduction. Level of dyspnea was assessed by MMRC (Modified Medical Research Council) dyspnea scale.[19] Grade 2 and above were taken as positive while grade 1 and below were taken as improvement in the dyspnea. Contractions were assessed for the frequency and durations by tocography. More than one contraction in 10 minutes were significant for the diagnosis of premature contractions.

We used wide bore 18G needle with sterile standard technique. The needle hub was cannulated with the wide bore tubing and drainage was adjusted at the rate of 50-60 ml/min. At the end of procedure, AFI of <25cm was the target. After amnioreduction, Anti D were given to all the Rhesus negative women. Before and after the procedures as well as during labour fetal cardiac activity was monitored electronically with CTG (cardio toco graphy). Total 26 procedures were perfomed on 15 patients. Eight patients had been subjected once to the procedures (n=8) while 3 patients had two procedures (n=6) and four patients had undergone 3 amnioreduc-tions (n=12). The indications for the repeat procedures were recurrent maternal symptoms and reacumulation of the amniotic fluid. All the babies were attended by the pediatrician and were followed up for 07 days.

Data was analyzed by using the SPSS/version 16.0. The following factors were analysed: Symptomatic improvement in maternal dyspnea and premature contractions, the age of the woman, gravidity, gestational age at the diagnosis/procedure, the amniotic fluid volume drained per each procedure, gestational age at the delivery, mode of delivery, and perinatal outcome. In addition, procedure related complications (cesarean section rate, abruptio placenta and preterm labour) were also assessed.

RESULTS

Total cases of polyhydramnios in this study period were 40 out of the total 7561 live births making the frequency of polyhydramnios 0.529%. Out of these 40 patients 15 (37.5%) patients with singleton pregnancies having idiopathic polyhydramnios fulfilled the inclusion criteria.

Of the total 15 patients, five (33.3%) were primigravida while 10 (66.6%) were multigravida. Mean age of the patients was 30.93±6.77 years. Mean gestational age at the time of diagnosis of idiopathic polyhydramnios was 30.58±1.9 weeks. Mean gestational age at the time of procedure was 31±1 weeks. Mean gestation at the time of delivery was 33.5±1.4 weeks with the mean increase in gestation was 14.13±.8.77 days. Average amount of fluid which was drained in each procedure was 2357.69±710.6ml. Mean time taken for amnioreduction was 54.38±7.1 minutes.

Of the total 26 procedures, 13 procedures were performed for maternal dyspnea only, 8 procedures were performed for premature contractions while the rest of procedures were carried out for both the indications (Figure 1). Out of 18 (13+5) procedures in which amnioreduction was performed for maternal dyspnea, improvement was seen in 16 (88.8%) procedures, while out of 13 (8+5) procedures which were performed for premature contractions, only 5 (38.5%) got improved (Table 1).

Perinatal mortality rate in our study was 53.33% (n=8/15). Out of the total 15 babies, 8 either delivered dead (n=4) or died within the first week of delivery (n=4) while 7 babies were still alive after one week of delivery (Table 2). Various complications related to the procedure of manioreduction (Table 3) included 3 cases of placental abruption (abruptio placenta within 1st 24 hrs of the procedure); 5 cases of emergency C/sections (either due to fetal distress or abruptio placentae after the procedures) while five patients got procedure related preterm labour (preterm labour within 1st 48 hrs of amnioreduction). The rest of patients who delivered before term but in whom the onset of preterm labour was more than 48 hours after amnioreduction were not counted as procedure related complications.

DISCUSSION

Overdistention of the uterus from polyhydramnios causes a variety of complications including premature uterine contractions, preterm premature rupture of the membranes, chorioamnionitis and abruption. In addition it gives severe discomfort to the mother especially maternal dyspnea. To relieve these symptoms and to prolong the pregnancy, amnioreduction has been carried out in different studies.[1,9] Literature has described amnioreduction mainly in multiple pregnancy with twin-twin transfusion syndrome[20-22] but few studies describe the procedure in singleton pregnancy also.[23,24]

We observed 0.529% frequency of polyhydramnios in our study, which is with in the range of 0.5-2% observed worldwide.[1-4] However our findings are comparatively lower than the incidence of polyhydramnios observed by other Pakistani studies like 2.4% by Nabeela Waheed et al[15] and 2% Anisa Fawad et al.[16] The reason may be that our data was limited to live births only. The fetal losses and elective terminations before the age of viability were not included in this study resulting in possible bias.The differences in the incidence rates of polyhydramnios may also be erxplained by variations in diagnostic criteria, the threshold used for severity of polyhydramnios and the gestational age (preterm, term, or postterm) at the time of diagnosis.[25]

In our study, although the sample size was not larger enough, amnioreduction seemed to reduce maternal symptoms particularly maternal dydpnea (88.9% improvement). However reduction of the uterine activity was not satisfactory (only 38.46% showed improvement). Piantelli G et al[1] showed that amnioreduction was able to resolve maternal dyspnea in 100% of cases while uterine contractions were reduced in 64% cases only. Kim HM showed 100% reduction in maternal dyspnea and chest tightness and uterine contraction were relieved in 72.7% cases.[26] Thus our study favours the observation that overall amnioreduction fails to releive uterine contraction in polyhydramnios patients.

In our study, the number of days gained are also not very encouraging (on average 14 days) and cannot be certainly linked to the procedure itself. Piantelli G et al[1] also had a median gain of 18 days with each procedure. Moise et al showed a mean gain of 59.9 +26.4 days for amnioreduction.[27] A well planned, randomised controlled trial is needed to study the time gained from the procedure of amnioreduction in singleton pregnancies complicated by polyhydramnios.

Perinatal mortality rate in our study was 53.33% and only 46.67% newborn could survive for one week after delivery. However it is difficult to attribute this mortality to amnioreduction only as polyhydramnios itself may also contribute to this adverse outcome. Various

EFFICACY OF AMNIOREDUCTION IN 26 PROCEDURES

Symptomatology	Number of procedures(n=26)	Improved	Not improved
Dyspnea n=18 (13+5)	Dyspnea Alone (n=13)	16 (88.9%)	2 (11.1%)
	Dyspnea With Premature contarction (5)		
Premature Contractions n=13 (8+5)	Premature contarction Alone (n=8)	5 (38.46%)	8 (61.54%)
	Premature contarction With Dyspnea (n=5)		

Table I

PERINTAL MORTALITY IN PATIENTS WITH POLYHYDRAMNIOS UNDERGOING AMNIOREDUCTION

Perintal Mortality	Frequency (n=15)	Percentage
Dead (Still birth: n=4 (Died within one week after Delivery: n=4)	8	53.3
Alive (one week after Delivery)	7	46.7

Table II

FREQUENCY OF COMPLICTIONS WITH AMNIOREDUCTION

Complications	Frequency (n=26)	Percentage
Abruptio Placentae within 24 hours of the procedure	3	11.5
EmergencyCesarean section needed	5	19.2
Preterm labour within 1st 48 hours of amnio-reduction	5	19.2

Table III

MATERNAL SYMPTOMS IN 26 PROCEDURES OF AMNIOREDUCTIONS

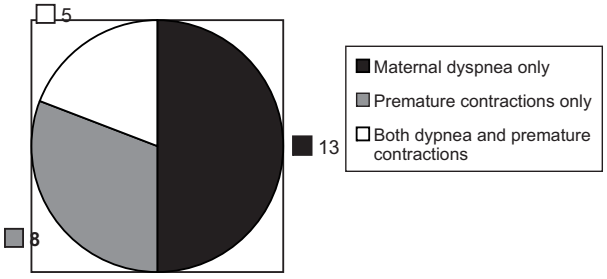

Fig. I

studies using modern techniques have shown a perinatal survival rate from 37-83% by aggressive amnioreduction (amniotic fluid volume is reduced to normal.[23,28-31] Fetal survival rate is significantly related to gestational age at diagnosis, presence of end-diastolic blood flow in the umbilical artery velocity waveforms, presence of hydrops, aggressive therapeutic amniocentesis, mean volume of amniotic fluid removed per week, higher birth weight and gestational age at delivery.[30,32]

Amnioreduction is usually associated with various complications like uterine contractions, preterm labor, PPROM and chorioamnionitis.[20-22,31,33] Various studies have reported a complication rate of 1.5-15.2%.[14,23,24,33]

In our study, preterm labour within 1st 48 hours of amnioreduction occurred in 19.2% cases and abruptio placentae (within 24 hours of the procedure) was observed 11.5% cases. Piantelli G observed preterm delivery in 20% and abruptio placentae in 10% cases. Mari G et al, in a large series of 760 amnioreductions observed ruptured membranes in 6.2% of pregnancies, placental abruption in 1.3% and chorioamnionitis in 0.9% cases.[30] Complications rate varied according to the technique used for amniocentesis (e.g. vacuum bottle aspiration system, wall suction etc), duration of procedure (rapid/slow), volume drained per procedure, gestational age at diagnosis and delivery.[1,20,23,33] According to Leung WC et al, it is hard to speculate whether the preterm labor and PROM are natural complications of polyhydramnios or have occurred as a result of amnioreduction.[24]

CONCLUSION

Amnioreduction is an effective method in relieving maternal dyspnea due to idiopathic polyhydrmnios in singleton pregnancies however its efficacy in reducing uterine contractions has not been satisfactory. The perinatal mortality was higher and the procedure was associated with abruptio placentae and preterm labour. Large scale, well designed, randomized controlled trial is needed to study the outcome of amnioreduction in idiopathic polyhydrmnios complicating singleton pregnancies.

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CONFLICT OF INTEREST

Authors declared no conflict of interest