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Original Research Article

A comparative study of intravenous hydration and amnioinfusion for IUGR associated with oligohydramnios in pregnant women and fetomaternal outcome

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ABSTRACT

Background: Ultrasound assessment of amniotic fluid has significant implication in obstetric care and it has become an integral and important component of pregnancy assessment.
Methods: A prospective study done in all pregnant women (n=30) who had been diagnosed with oligohydromnios (with AFI<8 by Phelan's method) by ultrasonography will be attending in obstetric gynecology department SMS Medical College, Jaipur will be selected according to inclusion or exclusion criteria (as per sample size) after written informed consent.
Results: Higher incidence of preterm delivery in the i.v. infusion group as compared to the amino acid group and difference was significant (p value <0.05). In amnioinfusion group 3 cases (20.0%) had LSCS and in i.v. infusion group 6 cases (40.0%) had delivered by LSCS. The distribution of delivery mode did not differ significantly across two intervention groups (p value >0.05). Significantly higher proportion of cases from amino acid group had larger birth weight and significantly higher proportion of cases from i.v. infusion group had smaller birth weight (p value <0.001).
Conclusions: This study points towards the use of intravenous hydration and amnioinfusion in increasing the liquor in oligohydramnios associated with IUGR and proves useful in reducing perinatal morbidity and mortality.

Keywords: Amnioinfusion, Intravenous hydration, Oligohydramnios

INTRODUCTION

Ultrasound assessment of amniotic fluid has significant implication in obstetric care and it has become an integral and important component of pregnancy assessment.[1,2] Its evaluation is vital for predicting fetal well-being as abnormalities of amniotic fluid are often associated with fetal mortality, morbidity and anomaly.[3,4] The importance of the amniotic fluid volume as an indicator of fetal well-being has been extensively documented.[5-11] It reflects both mother and fetal status.[12] The maintenance of appropriate amniotic fluid volume for gestational age remains an important and integral component for fetal well-being determination.[13]

Objective

To compare the fetal outcome of intravenous infusions versus amnioinfusion for oligohydramnios during pregnancy and to compare the efficacy of intravenous infusion drip versus amnioinfusion in increasing fetal weight and amniotic fluid.

METHODS

Study site

This study was conducted at Department of Obstetrics and Gynecology and Surgery SMS Hospital, Jaipur, Rajasthan.

Study population

All pregnant women (n=30) who had been diagnosed with oligohydromnios (with AFI<8 by Phelan's method) by ultrasonography attending in obstetric gynecology department SMS Medical college, Jaipur.

Study design

It was a prospective study. Sample size was 30. This study took place from April 2016 till May 2018.

Calculation of sample size

The following formula was applied for calculation of the sample size $n = \frac{4pq}{L^2}$

Where,

n = sample size, p = positive character q = 1-p,

L = Allowable error

As incidence is 50%, hence p=0.5, q=0.5, L=10% = 0.1

n = 4 × 0.5 × 0.5 / 0.1 × 0.1 = 100.

Thus by applying this formula minimal sample size required was 100.

Inclusion criteria

Subjects were the women with IUGR and oligohydramnios confirmed clinicosonologically at 28-41 weeks of pregnancy, singleton pregnancy, antenatal cases between 19-40 years

Exclusion criteria:

Severe anemia, heart disease, pre-existing or gestational diabetes maternal pulmonary disorder, premature rupture of membranes congenital malformation in baby, women who did not give consent

Data collection

According to the proforma approved by the guide and co-guide which included all the details of clinical and diagnostic tests done.

Data entry

Data was entered on Microsoft excel for the convenience of transport to analysis software.

Statistical methods

In this study all the analysis will be performed by using statistical software SPSS version 10.0.

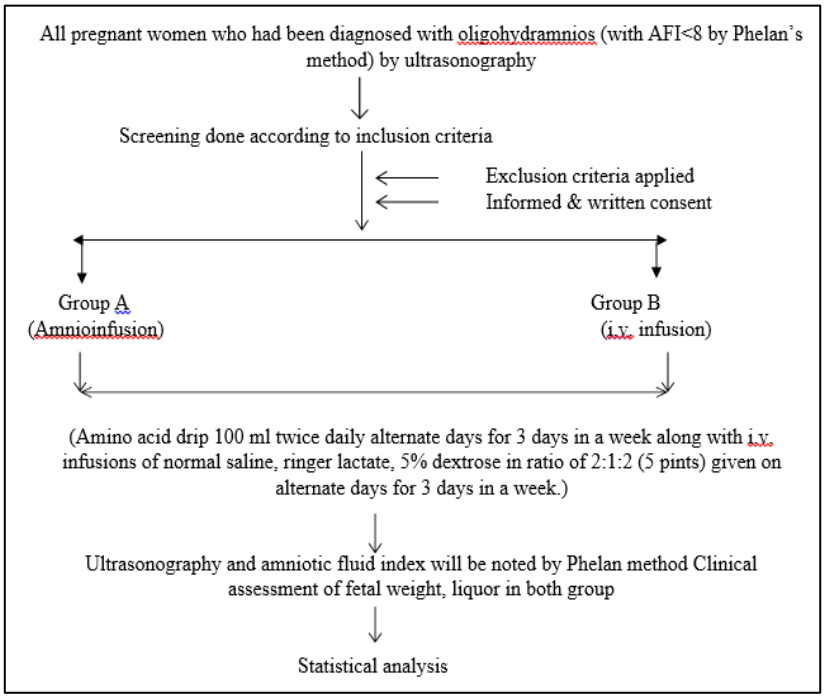

Figure 1: Methodology flow chart.

RESULTS

The 30 cases studied, 4 cases (13.3%), had age between 19-24 years, 12 cases (40.0%) had age between 25-29 years, 10 cases (30.3%) had age between 30-35 years, 4 cases (13.3%) had age between 35-40 years.

Table 1: The age distribution of the women studied (n=30).

Age group (years)	No. of cases	% of cases
19-24	4	13.3
25-29	12	40.0
30-35	10	33.3
35-40	4	13.3
Total	30	100

In amnioinfusion 1 case (6.6%) had delivery at gestational age between 28-31 weeks, 7 cases (46.7%) had delivery at gestational age between 32-35 weeks, 7 cases (46.7%) had delivery at gestational age between 36-40 weeks and in i.v. infusion group 6 cases (40.0%) had delivery at gestational age between 28-31 weeks and 9 cases (60.0%) had delivery at gestational age between 32-35 weeks.

Table 2: The distribution of gestational age at the time of delivery across two groups of intervention (n=30).

Gestational age (weeks)	Group A	Group B	P value
28-31	1 (6.6)	6 (40.0)	0.004*
32-35	7 (46.7)	9 (60.0)	
36-40	7 (46.7)	0	
Total	15 (100.0)	15 (100.0)	

Values are n (% of cases). P value by Chi-Square test, p value <0.05 is statistically considered significant. *p value <0.05.

In i.v. infusion group cases had delivery earlier than amnioinfusion group and difference was statistically significant (p value <0.05).

Table 3: The distribution of maternal outcome across two groups of intervention (n=30).

Delivery/outcome	Group A	Group B	P value
LSCS	3 (20.0)	6 (40.0)	0.232^{NS}
Normal	12 (80.0)	9 (60.0)	
Total	15 (100.0)	15 (100.0)	

Values are n (% of cases). P value by Chi-Square test, p value <0.05 is statistically considered significant. NS is statistically considered non-significant.

Of the 15 cases studied, in amnioinfusion group 3 cases (20.0%) had LSCS and 12 cases (80.0%) had normal vaginal delivery. Of the 15 cases in IV infusion group 6 cases (40.0%) had delivered by LSCS and 9 cases (60.0%) had delivered by normal vaginal delivery. The distribution of delivery mode did not differ significantly across two intervention groups (p value >0.05).

Table 4: The distribution of birth weight across two groups of intervention (n=30).

Birth weight	Group A	Group B	P value
<2500	2 (13.3)	11 (73.3)	0.001***
≥2500	13 (86.7)	4 (26.7)	
Total	15 (100.0)	15 (100.0)	

Values are n (% of cases). P value by Chi-square test, p value <0.05 is statistically considered significant. *p value <0.05. ***P value <0.001 (statistically highly significant).

The 30 cases studied, in amnioinfusion group 2 cases (13.3%) had delivered baby of birth weight <2500 gm and 13 cases (86.7%) had delivered baby of birth weight ≥2500 gm. In i.v. infusion group 11 cases (73.3%) had delivered baby of birth weight <2500 gm and 4 cases (26.7%) had delivered baby of birth weight ≥2500. Significantly higher proportion of cases from amino acid group had larger birth weight and significantly higher proportion of cases from i.v. infusion group had smaller birth weight (p value <0.001).

Higher incidence of preterm delivery in the normal saline group as compared to the amino acid group and difference was significant (p value <0.05). In amnioinfusion 1 case (6.6%) had delivery at gestational age between 28-31 weeks, 7 cases (46.7%) had delivery at gestational age between 32-35 weeks, 7 cases (46.7%) had delivery at gestational age between 36-40 weeks and in i.v. infusion group 6 cases (40.0%) had delivery at gestational age between 28-31 weeks and 9 cases (60.0%) had delivery at gestational age between 32-35 weeks.

Of the 15 cases studied, in amnioinfusion group 3 cases (20.0%) had LSCS and 12 cases (80.0%) had normal vaginal delivery. Of the 15 cases in i.v. infusion group 6 cases (40.0%) had delivered by LSCS and 9 cases (60.0%) had delivered by normal vaginal delivery. The distribution of delivery mode did not differ significantly across two intervention groups (p value >0.05).

The 30 cases studied, in amnioinfusion group 2 cases (13.3%) had delivered baby of birth weight <2500 gm and 13 cases (86.7%) had delivered baby of birth weight ≥2500 gm. In i.v. infusion group 11 cases (73.3%) had delivered baby of birth weight <2500 gm and 4 cases (26.7%) had delivered baby of birth weight ≥2500 gm. The distribution of birth weight differs significantly across two intervention groups (p value <0.001).

Significantly higher proportion of cases from amino acid group had larger birth weight and significantly higher proportion of cases from i.v. infusion group had smaller birth weight (p value<0.001).

DISCUSSION

Oligohydramnios is a late sign of foetal malnutrition. Over the years many different medical and surgical interventions have been tried to improve the liquor in oligohydramnios. Various studies have suggested improvement of AFI by infusion of amino acids and large amounts of glucose and even 10% maltose. Maternal hydration and infusion of amino acids is a well-known therapeutic intervention to improve the placental fluid transfer. With respect to physiological principles, water transfer between mother and foetus is regulated by osmotic forces, in which electrolyte gradients determine net trans-placental water exchange.

The obstetric outcome of these patients has been detailed in table no 3, it can be seen that 30% of the total sample size required a caesarean delivery, the main indication being fetal decelerations. This can be attributed to the fact that foetuses with oligohydramnios are likely to experience cord compression and variable decelerations. The incidence of caesarean delivery was high in normal saline group (40%) in comparison with the amino acid infusion group (20%). The difference was statistically not significant. The findings are consistent with the results observed by Hebbar et al, who found a caesarean section rate of around 62% in their study.[15]

The distribution of birth weight differs significantly across two intervention groups (p value <0.001%). Significantly higher proportion of cases from amino acid group had larger birth weight and significantly higher proportion of cases from normal saline group had smaller birth weight. This difference might be because of higher percentage (40%) of women in normal saline group delivered between 28-31 weeks of gestation as compared to only one woman (6.6%) in the amino acid group delivered in this gestation period. This was comparable with Shivumar et al in his study: the role of intravenous hydration and amino acid infusion in oligohydramnios, where amino acid drip given every alternate day in cases of oligohydramnios improved foetal weight significantly.[16]

Higher incidence of preterm delivery in the normal saline group as compared to the amino acid group. There was no incidence of necrotizing enterocolitis, hypoxic ischemic encephalopathy, or sepsis in any of the baby and there was no neonatal mortality. These results were also comparable to the study by Prabha et al.[14]

This study has several limitations and the foremost being a small sample size. To prove the point a study with large sample size needs to be done. Another limitation was the other confounding factors like subclinical infections, asymptomatic bacteriuria which lead to higher incidence of preterm delivery in the normal saline group. There should have been an equal sample size for each gestational age and the AFI group. There is continuous search for alternate suitable therapies to improve AFI in oligohydramnios.

CONCLUSION

This study points towards the use of intravenous hydration and amnioinfusion in increasing the liquor in oligohydramnios and proves useful in reducing perinatal morbidity and mortality and thus improving pregnancy outcomes, prolonging gestational age at time of delivery thereby improvement in weight gain. The amino acid therapy is more useful in patients with foetal growth restriction. Proper diet, rest, oral hydration and foetal surveillance have comparable outcomes as with intravenous infusions. Intravenous normal saline drip is cost effective as compared to the amino acid group.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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