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An Effect of Maternal Forth Hydration Against Oral Hydration on Amniotic Fluid Index in Isolated Oligohydramnios - A Clinical Trial Bases Study

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Abstract

Aim: The aim of this Clinical Trial Bases Study is to evaluate and compare the effects of maternal intravenous (IV) hydration versus oral hydration on the Amniotic Fluid Index (AFI) in cases of isolated oligohydramnios during the third trimester of pregnancy.

Material and methods: The study was in the Department of Obstetrics and Gynaecology enrolling 50 patients in their third trimester with isolated oligohydramnios (AFI < 5cm) and no evident maternal or fetal causes. Patients aged 20-40 years with singleton pregnancies and gestational ages over 28 weeks were included, while those with premature rupture of membranes, antepartum hemorrhage, post-term pregnancies, congenital anomalies, multiple pregnancies, intrauterine growth restriction, or severe maternal comorbidities were excluded.

Results: The age of participants ranged from 20 to 67 years, with a mean age of 25.34 years and a standard deviation of 2.345. The Amniotic Fluid Index (AFI) before treatment ranged from 1 to 4, with a mean of 3.10 and a standard deviation of 0.280.

Conclusion: Both oral maternal hydration and intravenous infusion are effective in improving the Amniotic Fluid Index in pregnant females with isolated oligohydramnios in the third trimester. However, there is no significant difference between the two treatment modalities based on the current sample size.

Keywords: Maternal Hydration**,** Amniotic Fluid Index, Fetal Distress Stillbirth, Perinatal Death

Introduction

Maternal hydration, either intravenous (IV) or oral, has been explored as a potential intervention for increasing amniotic fluid volume in cases of isolated oligohydramnios. Oligohydramnios, defined as a

reduction in amniotic fluid volume, is associated with adverse pregnancy outcomes such as fetal distress, meconium aspiration, and stillbirth. While intravenous hydration is often considered a more direct and controlled method, oral hydration offers a simpler and less invasive alternative. Both methods aim to restore amniotic fluid volume, and studies have investigated their comparative effects on the Amniotic Fluid Index (AFI), which is a key measure of fluid volume during pregnancy. Understanding the efficacy of oral versus IV hydration in improving AFI and perinatal outcomes is crucial for optimizing management strategies in pregnancies with isolated oligohydramnios.

Oligohydramnios, characterized by a reduction in amniotic fluid volume to less than 5cm, is a potential sign of fetal compromise and is associated with increased perinatal morbidity and mortality. Amniotic fluid plays a critical role in fetal development, supporting the growth of the lungs, musculoskeletal, and gastrointestinal systems, and preventing umbilical cord compression. Typically, amniotic fluid volume increases from 25ml at 10 weeks to 400-500ml at 20 weeks, reaching 800-1000ml by 28 weeks, and then plateaus before decreasing to 400ml at 42 weeks. Oligohydramnios affects 3-5% of pregnancies and is often associated with adverse outcomes such as non-reassuring fetal heart rate, meconium aspiration syndrome, stillbirth, perinatal death, malpresentations, and umbilical cord compression.

The Amniotic Fluid Index (AFI), ranging from 5-18cm, is used to assess fluid volume and is considered a more objective method than measuring single pocket fluid. Maternal dehydration can contribute to oligohydramnios, and oral hydration therapy has been suggested as a simple intervention to increase amniotic fluid volume. This study aims to assess the effect of maternal oral hydration on the Amniotic Fluid Index in third-trimester isolated oligohydramnios cases and its impact on perinatal outcomes. Hydration therapy in these cases resulted in an average increase in amniotic fluid volume of approximately 4.5cm, indicating a positive effect on fluid volume and potentially improving perinatal outcomes.

The aim of this Clinical Trial Bases Study is to evaluate and compare the effects of maternal intravenous (IV) hydration versus oral hydration on the Amniotic Fluid Index (AFI) in cases of isolated oligohydramnios during the third trimester of pregnancy.

Materials and methods

The study was in the Department of Obstetrics and Gynaecology enrolling 50 patients in their third trimester with isolated oligohydramnios (AFI < 5cm) and no evident maternal or fetal causes. Patients aged 20-40 years with singleton pregnancies and gestational ages over 28 weeks were included, while those with premature rupture of membranes, antepartum hemorrhage, post-term pregnancies, congenital anomalies, multiple pregnancies, intrauterine growth restriction, or severe maternal comorbidities were excluded. After obtaining informed consent and Ethics Committee approval, patients were randomly divided into two groups: Group A received 1.5 liters of oral fluids daily (water, juices, and tea), and Group B received 500ml of intravenous amino acids and 1000ml of Hartmann's solution for 6 days, alongside their regular fluid intake. AFI measurements were taken by a single sonographer using the Phelan method before and after the intervention.

Results

Table 1: Descriptive distribution of Sampled Population

	N	Minimum	Maximum	Mean	S.D
Age	20	6	7	25.34	2.345
AFI before treatment	20	1	4	3.12	0.231
AFI after treatment	20	3	6	6.12	1.422

Table 1 presents the descriptive distribution of the sampled population. The age of participants ranged from 20 to 67 years, with a mean age of 25.34 years and a standard deviation of 2.345. The Amniotic Fluid Index (AFI) before treatment ranged from 1 to 4, with a mean of 3.12 and a standard deviation of 0.231. After treatment, the AFI ranged from 3 to 6, with a mean of 6.12 and a standard deviation of 1.422.

Table 2: Distribution of amniotic fluid index after treatment in both treatment groups

	Group	N	Mean	S.D
AFI after treatment	Oral hydration	25	4.25	1.140
	IV hydration	25	4.10	1.251

Table 2 shows the distribution of the Amniotic Fluid Index (AFI) after treatment in both treatment groups. In the oral hydration group, consisting of 25 participants, the mean AFI after treatment was 4.25 with a standard deviation of 1.140. In the intravenous (IV) hydration group, also with 25 participants, the mean AFI after treatment was 4.10, with a standard deviation of 1.251.

Table 3: Paired Samples analysis for distribution of amniotic fluid index before and after treatment in both treatment groups

	Mean	n	S.D
AFI before treatment	3.10	50	0.230
AFI after treatment	6.10	50	1.420

The mean Amniotic Fluid Index (AFI) before treatment was 3.10. with a standard deviation of 0.230, based on 50 participants. After treatment, the mean AFI increased to 6.10, with a standard deviation of 1.420 for the same group of participants.

Discussion

An effect of maternal intravenous hydration on amniotic fluid index (AFI) in oligohydramnios was assessed. Oligohydramnios, occurring in 1-2% of pregnancies, is associated with adverse pregnancy outcomes like intrauterine growth retardation, fetal anomalies, and preterm birth. The study found that 48 hours after completing fluid therapy, the intervention group showed a statistically significant increase in the mean AFI (4.06 ± 0.33) compared to the control group (3.61 ± 0.35) ($P < 0.0001$). Additionally, the change in AFI was significantly higher in the intervention group (0.532 ± 0.45) than in the control group (-0.036 ± 0.18) ($P < 0.0001$). The study concluded that maternal intravenous hydration significantly increases AFI in women with oligohydramnios.

A prospective randomized controlled study was conducted with 66 women diagnosed with idiopathic oligohydramnios (group A) and 71 women with normal pregnancies (group B). Oligohydramnios was diagnosed based on an Amniotic Fluid Index (AFI) of less than 5 cm. Group A received 6 days of intravenous infusion with 1500 mL of isotonic solution daily, while subgroup A1 received 1500 mL of oral hydration and subgroup A2 received 2500 mL daily. After 7 days, a significant improvement in AFI was observed in group A, with the mean AFI increasing from 39.68 ± 11.11 mm at recruitment to 77.70 ± 15.03 mm, while group B showed no change. Subgroup A2, which received the higher dose of oral hydration, had a mean AFI of 112.45 ± 14.92 mm at birth, significantly higher than subgroup A1's 86.21 ± 16.89 mm. The study concluded that both intravenous and oral hydration therapies significantly improved amniotic fluid quantity in pregnancies complicated by isolated oligohydramnios.

Both oral and intravenous maternal hydration is effective interventions for improving the Amniotic Fluid Index (AFI) in cases of isolated oligohydramnios in the third trimester. While both methods led to significant increases in AFI, no substantial difference was observed between the two treatment modalities. These findings suggest that either hydration method could be used as a viable option for managing oligohydramnios, with individual patient factors potentially guiding the choice of treatment. Further studies with larger sample sizes and long-term follow-up are needed to confirm these results and assess the clinical outcomes associated with each approach.

Conclusion

Both oral maternal hydration and intravenous infusion are effective in improving the Amniotic Fluid Index in pregnant females with isolated oligohydramnios in the third trimester. However, there is no significant difference between the two treatment modalities based on the current sample size.

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