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ROLE OF PARENTERAL AMINO ACIDS SUPPLEMENATION IN OLIGOHYDRAMNIOS & IUGR COMPLICATED PREGNANCIES

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ABSTRACT OBJECTIVES: To see whether parenteral nutritional supplementation of women with oligohydramnios/IUGR can improve the amount of liquor and to evaluate the role of parenteral therapy in improving maternal and perinatal outcome and to correlate between the occurrence of oligohydramnios and IUGR among women of different age, parity, education and socioeconomic status.

METHODOLOGY: In a prospective randomized controlled study participants for study were selected in two groups: Study group of patients in all 120 patients were included in this study. 60 patients each were assigned to control (Who did not receive amino acids) and case group (These were booked and received amino acids i.v.) respectively. **RESULTS:** Improved maternal nutritional status by IV amino acid infusion appears to improve AFI. This improvement may not have been achieved with diet alone, because, of non-compliance and maternal nutrition and the amount of liquor amnii. From the study conducted, there is considerable evidence to suggest the beneficial role of IV infusion of amino acids and glucose and pregnancies complicated with oligohydramnios and IUGR. **CONCLUSION:** Amino acids perform a multitude of structural, hormonal, and catalytic functions essential of life. Utilization and demand of amino acids varies between the healthy state and disease states. Amino acids enhances immune function in malnutrition and infectious disease and also help in various disease states the diabetes where they have an important role in glucose homeostasis.

KEYWORDS: Amino Acid; Oligohydramnios; Intra uterine growth retardation.

INTRODUCTION: Development of fertilized ovum into a complex, fully formed and healthy fetus is one of the most fascinating wonders of nature. As the healthcare provider, it is the obstetrician who is responsible for taking the pregnant women and her baby through this wonderful sojourn. Proper fetal programming, successful adaption of maternal metabolism to the pregnancy and absolute fine tuning of the interplay between maternal and fetal metabolism are the essential prerequisites for the successful culmination of pregnancy.¹

At cellular level, formation of fetus consists of multiplication and differentiation of body cell into various organ systems, hyperplasia of cells and hypertrophy of cell organelles and cytoplasm. The first of these i.e. multiplication and differentiation takes place in first trimester, hyperplasia continues in second trimester, while cell hypertrophy takes place in late second and third trimester resulting in increase in body weight and size, as well as maturation of various systems.² When the hyperplasia and hypertrophy in the second and third trimesters takes place in suboptimal manner, it results in deficient growth in fetal weight, size and maturation of fetal metabolism, which is called the intrauterine growth restriction. IUGR is one of the major problems of pregnancy and is associated with 5-20 fold increase in perinatal mortality. There is 5-fold increase in stillbirth rate as well as 3-fold increase in neonatal mortality and morbidity.

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Studies using parenteral solution of 10% dextrose or fructose and 17% amino acids have shown an increase in birth weight with some reduction in perinatal mortality in undernourished mothers.

It is for these reasons, our attention has been directed to assess how essential is parenteral nutrition in IUGR complicated pregnancies.³ This study will review the physiology of amniotic fluid exchange regulation, content, clinical significance, and abnormalities in both volume and content and how oligohydramnios which often coexists with IUGR when present before delivery can lead to maternal and perinatal morbidity and if there is any role of delivery can lead to maternal and perinatal morbidity and if there is any role of IV amino acid infusion and IV fluids in improving the amniotic fluid index few weeks before delivery can reduce duration of stay and financial burden on the patients after delivery, increasing the chance of delivering a healthy baby.

MATERIAL AND METHODS: The present study entitled “Role of parenteral Amino Acids Supplementation in oligohydramnios and IUGR Complicated Pregnancies” was conducted in the Department of Obstetrics & Gynecology, LN Medical College and J K. Hospital, (M.P.) during the period of August 2012 to April 2014. In all 120 patients were included in this study. 60 patients each were assigned to control and case group respectively.

Study Design: The patients were divided into two groups:

- **Group 1 (Case Group):** Sixty women who were clinically and sonographically proven cases of oligohydramnios and/or IUGR in third trimester of pregnancy admitted at our institution as booked cases and were followed up till delivery.
- **Group 2 (Control Group):** Sixty women who were clinically and sonographically proven cases of oligohydramnios and/or IUGR in third trimester of pregnancy, who came as emergency cases, did not receive any IV amino acid infusion.

Inclusion Criteria:

- Clinically or sonographically proven cases of oligohydramnios/IUGR, fluid is decreased if AF1<10 cm and markedly decreased if AFI<5cm.
- Gestational age more than 28 weeks upto term.

Exclusion Criteria:

- Patients having congenital anomalies in the fetus were excluded from the study.
- Patients have premature rupture of membranes (PROM) as a cause of reduced amniotic fluid volume were excluded from the study.
- Patients having major respiratory, CVS or abdominal pathology were also excluded from the study.

METHODOLOGY: Plan of activity and time chart were formulated after tacking verbal from the women and/or relatives. Patient's socio demographic data were obtained. Other potential explanatory variable were obtained including maternal age, booking status, PIH and other risk factors at the time of admission were recorded. Detailed clinical history including obstetric, menstrual, past and personal history were taken.

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Thorough general, systemic and obstetric examination was conducted. Women's hematological profile was done. USG at the time of admission was recorded including feta biometry and amniotic fluid volume. Study group received intervention in the form of IV fluids and IV amino acids 200 cc on alternate days for ten days. On the other days, 3 units of IV fluids were infused. Repeat USG was performed at the end of 2 weeks and 4 weeks. Daily fetal movements count and twice daily FHS charting was done to ascertain fetal wellbeing during the intervention period. Repeat infusions were given if required after 3-4 weeks. Oral iron, calcium and multivitamins were also given. Women were followed up till their delivery. During the intervention period, if the fetal status was non-reassuring (CTG), elective cesarean section was performed. Outcome was noted in the form of mode of delivery, fetal outcome, apgar score, fetal birth weight, maturity, admission to nursery and postnatal complication, if any. All the information was entered in the proforma and analyzed and observations were made and accordingly discussion and recommendation were made.

Statistical Analysis: Statistical analysis was done with Stata 11 software. Mode of delivery, fetal outcome, apgar score, fetal birth weight, maturity, admission to nursery and postnatal complications were compared between two groups and data was analyzed statistically. For continuous variables descriptive statistics (Mean and standard deviations) were computed. Comparison of means in group 1 and group 2 was done using unpaired t-test. For categorical data chi-square test was applied. $P < 0.05$ was considered significant.

RESULTS:

AFI	Pregnancy Outcome		
	Premature	Normal delivery	LSCS
<5cm	1 (3.33%)	1 (3.33%)	1 (3.33%)
	2(16.66%)	7(58.33%)	3(25.0%)
	-	4(80%)	1(20%)

Table 1: AFI and Pregnancy Outcome

AFI	VLBW baby	LBW baby	Normal baby	A/S<5
<5cm	3(100%)	-	8(66.66%)	4
5.1-10cm	-	4(33.33%)	4(80%)	3
>10 cms	-	1 (20%)	-	0

AFI	Cases(N=60)		Controls(N=60)	
	No.	%	No.	%
Moderate oligohydramnios	40	66.66	42	70.00
Severe Oligohydramnios	20	33.33	18	30.00
Total	60	100.00	60	100.00

Table 2: Distribution of Patients According to AFI on Admission

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	Total Number	Patients with IUGR	%
Moderate oligohydramnios	82	43	52.43
Severe oligohydramnios	38	36	94.73

Table 3: Distribution of Patients According to IUGR

Maternal Factors	Total	AFI	
	No.	Cases Group	Control Group
Post-term pregnancy (>40 wks)	18	0	18
Prolonged pregnancy (40-42 wks)			
PIH	15	8	7
Chronic renal disease	2	1	1
Chronic abruption	3	1	2
Premature pains	3	1	2
Premature pains	22	5	17
Malnutrition + Anaemia	15	2	10

Table 4: Maternal Factors with Oligohydramnios

AFI	At admission		At 2 weeks follow up		At 4 weeks follow up	
	No.	%	No.	%	No.	%
≤ 5 cm	20	33.33	15	25.00	12	12.00
5.1-10 cm	40	66.66	26	43.33	18	30.00
> 10 cm	0	0	19	31.36	30	50.00
Total	60	100.00	60	100.00	60	100.00

Table 5: AFI Before and After Infusion

Mode of Delivery	Cases (N=60)		Controls (N=60)	
	No.	%	No.	%
LSCS	12	20.00	20	33.33
Vaginal Delivery	48	80.00	40	66.66

Table 6: Mode of Delivery

AFI	Total No.	Preterm Delivery		Term Delivery		LSCS Delivery	
≤ 5 cm	30	9	30.00	9	30.00	12	40.00
5.1-10 cm	60	5	8.33	40	66.66	15	25.00
> 10 cm	30	1	3.33	24	80.00	5	16.66

Table 7: AFI and Pregnancy Outcome

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AFI	Total No.	Very Low Birth Weight		Low Birth Weight		Normal Birth Weight	
		No.	%	No.	%	No.	%
≤ 5 cm	30	14	46.66	10	33.33	6	20.00
5.1-10 cm	60	6	10.00	16	26.66	38	63.33
> 10 cm	30	0	0.00	2	6.66	28	93.33

Table 8: AFI and Fetal Outcome

Apgar Score	At 1 min		At 5 min	
	Case Group	Control Group	Case Group	Control Group
8-10	-	-	42	22
5-7	42	22	13	18
3-4	18	38	5	20
<3	-	-	-	-

Table 9: Distribution of Apgar Score at Birth at 1 min and 5 min

DISCUSSION: All the evidence that we have indicates that it is reasonable to assume in practicality every human being, and certainly in almost every newborn baby that there is an active will towards health and an impulse towards growth or towards the actualization.

Fetal growth retardation ranks third after prematurity and malformations as a cause of perinatal deaths. Clinical acumen combined with USG testing will identify no more than 70% growth retarded fetuses. During the study period of 9 months from August 2008 to April 2009 there were 3868 admissions, out of which, total deliveries were 2000. 490 patients had oligohydramnios and 220 patients had oligohydramnios associated with IUGR. Incidence of oligohydramnios with IUGR was 5.68% among hospital admission, whereas 12.66% patients had IUGR.

Incidence: The incidence of oligohydramnios is comparable to similar various other studies, according to which oligohydramnios complicates 0.5–8% of pregnancies. Incidence of IUGR varies from region to region and even in the same region, it varies in different subpopulation. In India, according to recent UNICEF surveys, the incidence of IUGR is 25-30%.⁴

Body Mass Index: Among the cases, 5 out of 60(8.33%) were underweight and 7 out of 60 controls (11.66%) were overweight or obese. Only 78% patients had BMI in the normal range. According of the study of Robert E. Black et al (2008).⁵ Maternal under nutrition i.e. BMI <18.5kg/m² ranges from 10 percent to 19 percent in most counties. Low BMI is prevalent in almost 40% women in India, maternal short stature and low BMI have independent adverse effects on pregnancy outcomes.

Relationship of AFI to IUGR: 94.73% patients with AFI <5cm had IUGR associated with it, showing that almost all the patients with severe oligohydramnios had IUGR, whereas 52.43% patients with moderate oligohydramnios had IUGR. These findings were very much similar to those of Abida Ahmed (2005), where all the patients with severe oligohydramnios had IUGR and 60% patients with moderate oligohydramnios had IUGR.⁶

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Not every patients had associated factors along with oligohydramnios, but most commonly factors which were associated are enlisted above. Premature pains and post-term pregnancy were maximum associated with oligohydramnios in our study.

AFI before After Infusion: The above table shows the improvement we had during the course of treatment. After 2 weeks of amino acids, patients with $AFI \leq 5$ cm were down from 20 to just 15 and after 4 weeks, there were only 12 patients with $AFI \leq 5$ cm. similarly, there was a reduction in number of patients with $AFI 5.1-10$ cm from 40 to 18 at the end of 4 weeks. Out of 60 patients, who had oligohydramnios at the time of admission, 30 patients improved and had normal amount of liquor, showing 50% improvement.

Mode of Delivery: 12 out of 60 patients (20%) who had received IV amino acids have LSCS, whereas 20 out of 60 patients (33.33%) patients who had never received IV amino acids had cesarean section. 48 out of 60 patients (80%) had vaginal delivery, whereas 40 out of 60 (66.66%) controls delivery vaginally.

AFI and Pregnancy Outcome: Among 30 patients with severe oligohydramnios, 9(30%) patients had preterm delivery. 9(30%) had term delivery and 12(40%) had caesarean delivery for fetal distress and meconium stained liquor. In patients, with $AFI 5.1-10$ cm 66% patients had term delivery showing that improvement of AFI correlates with normal term delivery and only 20% patients had LSCS.⁷

Indication for LSCS: In the treated group, out of 12 patients who had LSCS, only 2(16.66%) patients had section for fetal distress and meconium stained liquor. Whereas out of 20 patients, who had never received IV amino acids, 12(60%) patients had section for fetal distress and meconium stained liquor. Other indication for LSCS in our study were oligohydramnios, malpresentation, primi breech, CPD and previous section.

AFI and Fetal Outcome: Out of 30 patients with severe oligohydramnios, 14(46.66%) patients had very low birth weight babies (VLBW), whereas in patient with AFI more than 10 cm, no patient had very low birth weight baby, 28(93.33%) patients had babies and birth weight in normal range and just 2(6.66%) patients had babies with low birth weight (LBW).⁸

Apgar Score at Birth: Only 18 out of 60 patients, who received treatment had Apgar score less than 5 at the end of 1 minute, whereas in control group, there were 38 out of 60 patients. In previous studies, babies of severe oligohydramnios patients had low apgar score at birth and 100% were very low birth weight babies (VLBW). Babies of patients whose AFI improved to normal had good apgar score, even though being very low birth weight babies.

Morbidity: Only twenty percent of those who received treatment had morbidity due to LSCS (Operative morbidity), whereas patients who never received treatment had 33.33% operative morbidity. Neonatal morbidity was 46.66% in untreated group and 8.33% in treatment group, showing definite improvement in pregnancy outcome in those who received IV amino acid infusion.

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CONCLUSION: Intrauterine growth restriction may occur even when the mother is not apparently ill or without any identifiable underlying pathology. One most important reason for this is poor maternal nutrition. A number of studies have examined different forms treatment of IUGR. Improved maternal nutritional status by IV amino acid infusion appears to improve AFI.⁹ This improvement may not have been achieved with diet alone, because, of non-compliance and maternal nutrition and the amount of liquor amnii. From the study conducted, there is considerable evidence to suggest the beneficial role of IV infusion of amino acids and glucose and pregnancies complicated with oligohydramnios and IUGR.¹⁰ Regular antenatal and intranatal monitoring should be done to diagnose any fetal compromise at the earliest. Termination of pregnancy according to the balance of risk of intrauterine asphyxia against those of prematurity should be done to obtain the best outcome. Cesarean section is more liberally indicated specially if there are associated adverse factors as the fetus does not tolerate the reduced oxygen supply and birth trauma encountered during vaginal delivery.

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