



ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

ROLE OF L-ARGININE IN OLIGOHYDRAMNIOS

KEY WORDS: L-arginine
Oligohydramnios, Amniotic Fluid Index.

Dr. Rani Dipa*

MBBS, DGO, DNB, Senior Resident, Obstetrics & Gynecology, Patna Medical College and Hospital (PMCH), Patna. *Corresponding Author

Dr. Kamalini Kumar

MBBS, DGO, MD, Obstetrics & Gynecology, Associate professor, JNKTMC, Madhepura.

ABSTRACT

Background – Oligohydramnios is a known obstetrics complication which is associated with operative interferences and perinatal morbidity and mortality. L arginine is a precursor of nitric oxide and play a important role in local vasodilatation. Administration of L arginine has been suggested to improve amniotic fluid index (AFI) in Oligohydramnios.

Aims and Objective :- To study the effect of L-arginine in fetal outcome in case of Oligohydramnios.

Materials and Methods :- A retrospective study was conducted at PMCH, Patna consisting of 100 antenatal patients diagnosed with Oligohydramnios (AFI < 8cm) remote from term patients were evaluated for all antenatal risk factors and were started on L-arginine sachets (3 gm, 3 sachets a day). The treatment was continued till an adequate improvement in liquor was noted. However patients were considered for delivery if the liquor remained <5. Further mean increase in AFI, intervention on delivery interval and neonatal outcome were studied.

Results :- The mean gestational age at the time of recruitment was 32.3 weeks. The mean AFI noted was 5.421 cm. These patients were delivered at 35 ± 1.1 weeks and then pregnancy could be prolonged by 2.4 ± 1 weeks. The mean AFI at the end of therapeutic intervention was 8.753, and then a AFI increase of 3.332 cm could be obtained. There was no significant neonatal mortality and morbidity in these patients. Significant improvement in liquor volume was obtained in these patients after intervention with L-arginine sachets.

Conclusion:- L-arginine supplementation is promising in improving volume of amniotic fluid in case of Oligohydramnios and prolonging pregnancy by a mean of 2.4 weeks allowing fetal lung maturation these benefiting the neonatal outcome.

INTRODUCTION :-

Amniotic fluid (AF) surrounds the fetus after first few weeks of gestation which serves to protect the fetus and umbilical cord from compression. It is an important aspect for adequate fetal growth and good fetal outcome. Oligohydramnios is a decreased amount of amniotic fluid affecting 3-5% of pregnancies. Decreased amniotic fluid is associated with placental insufficiency impaired lung development in fetus, and fetal growth restriction (FGR). Long term complication of Oligohydramnios caused compression and variation in fetal heart rate, during labor and increased chance of operative deliveries. Infants may have anatomic and functional abnormalities such as skeletal deformities, contractures and pulmonary hypoplasia.

Normally amniotic fluid increases about a litre between 32 and 34 weeks of gestation, but afterwards it decreases till term around 400 ml. The amount of AF is most commonly evaluated by ultrasound using Amniotic Fluid Index (AFI) or Single largest pocket (SLP). An AFI of 8 cm and above is considered normal, between 5 cm and 8 cm is low normal and <5 is Oligohydramnios.

In chronic placental insufficiency, the fetus tries to acclimatize by redirecting blood flow to vital organs such as brain and heart. There is significant reduction in urine output which results in reduction in available intrauterine space for adequate fetal growth.

Lack of movement of amniotic fluid within the tracheobronchial tree results in pulmonary hypoplasia.

L-arginine is a semi-essential amino acid and the sole endogenous precursor of nitric oxide (NO) is involved in the regulation of blood flow in the vascular beds. It is an important regulator of placental perfusion. It Causes vasodilatation and shows aggregative effect of platelets. This mechanism increases the volume and viscosity of blood in the fetomaternal circulation.

L-arginine promotes the intrauterine growth of fetus by increasing bioavailability of endothelial NO production and

improving the umbilical artery flow in pregnancy induced hypertension and fetal growth restriction.

MATERIALS AND METHODS:-

It is a retrospective study of 100 patients diagnosed with Oligohydramnios by ultrasound (AFI less than 5th percentile for less than gestational age, AFI <8cm) carried out at Patna Medical College & Hospital.

Inclusion Criteria:-

The inclusion criteria were 24-36 weeks gestational age in singleton pregnancies with or without complications and initial AFI between 4 and 8 in presence of intact membranes.

Exclusion Criteria:-

Exclusion criteria were smoking and chronic illness like hypertension, congenital heart disease, renal disease, Diabetes mellitus, fetal malformations, severe pre eclampsia, severe FGR, preterm premature rupture of membrane (PPROM).

The amniotic fluid volume was calculated with the four quadrant technique. The AFI was calculated by summing up the maximum vertical fluid pockets (measured in cm) in each of the four quadrants.

Patients were administered L arginine 3 gm per sachet in oral form. Serial ultrasound monitoring at regular intervals was performed and patients were followed up till delivery. Effect of L arginine on Oligohydramnios and intrauterine growth was analyzed.

Close monitoring was carried out for any hemodynamic alterations. Patients compliance was good and so detrimental side effects were noted due to L arginine intervention. Patients were considered for delivery if the liquor remained <5 irrespective of the gestational age. These patients were given two doses of injection betamethasone 12 mg intramuscularly 24 hours apart to accelerate fetal lung maturity.

RESULTS:-

The average neonatal birth weight after giving L arginine was 2.76 Kg. Average gestational delivery was 36 weeks. L

arginine increases the amniotic fluid volume, accelerates the fetal weight and helps to prolong the duration of pregnancy. Among the 100 patients, 19 patients had preterm delivery. Most of the patients were primigravida. They were detected to have low liquor during their third trimester between 29 and 35 weeks of gestation.

Table No. 1, Partity, mean gestational age and AFI.

Total No. of Patients	100
Parity	Primigravide – 74% Multigravide – 26%
Mean Gestational Age	32.3 Weeks (Range 29-35 Weeks)
Mean AFI before intervention	5.421

Table No. – 2, Antenatal Risk Factors:-

Complications	Number(100) = Percentage
Mild FGR	34
Threatened Preterm	18
Hypertension in Pregnancy	22
Anemia	4
Previous LsCs	8
Hypothyroidism	4
Asthma	2
No Complications	8

Table No. – 3, Mode of Delivery :-

Mode of Delivery	Frequency
Normal Delivery	28
Cesarean Section	72

Table No. – 4 Weight of baby at birth :-

Weight of Baby at birth	Frequency
<2.5 Kg	20
2.5 -2.9 Kg	32
2.9 Kg and above	48

The overall increase in liquor was found to be 2.6 cm [Pretreatment AFI 6 (SD 1.205) post treatment AFI 8.6 (SD 1.042) P<0.05]. The increase was statistically significant in all the classes.

The end point of the intervention was to achieve reasonable gestational age of 36-37 weeks in our study. The average gestational age at the time of delivery was 35 ± 1.1 weeks, and thus 2.4 weeks of prolongation period was noted overall growth of the fetus and improvement was noted due to increased gestational period. There was no significant neonatal morbidity in the baby born.

Rate of Cesarean delivery noted is 72%. Main indication is fetal distress 46% as fetus with less amount of liquor are likely to experience cord compression and variable deceleration. There were no perinatal deaths. There were 9 neonates who had 5 min APGAR score between 4 and 6. Four of them recovered in NICU. Two babies developed RDS.

Table – 5:-

Birth Weight	2.3-2.9 Kg
Small for Gestational Age	34%
APGAR Score	
<4	Nil
4-6	6
>7	94
Still Birth/Neonatal Death	Nil
NICU Admission	19%

DISCUSSION:-

Amniotic fluid has major role in development of fetal lungs and severe oligohydramnios leads to pulmonary hypoplasia. Low amniotic fluid is defined as <200, <500 ml below 3rd percentile; which is equal to AFI 4 for gestational age as a single largest pocket of 2 cm.

L-arginine is a semi essential amino acid acting as a precurssor of NO. NO has a diverse role in obstetrics as it plays a vital role in labor, IUGR and pre-eclampsia. L-arginine promotes intrauterine growth of the foetus by increasing bioavailibility of endothelial NO and improving the umbilical artery flow in pregnant women with PIH & IUGR.

Delivery of patients with gestational age <34 weeks with Oligohydramnios is a challenging situation. To avoid serious complications related to mother and fetus, therapeutic intervention is desirable to prolong the pregnancy, So that risk of prematurity is minimized. Oral L-arginine can be used as cheap and feasible method.

REFERENCES:-

- Zhang N, Xiong AH, Xio X et al, Effect and mechanism of L-arginine therapy for fetal growth retardation due to pregnancy induced hypertension. Nan Fang Yi, Ke Da Xue Xue Bao, 2007; 27(2) : 198-200
- RCOG; Nitric oxide, the endothelium, pregnancy and preeclampsia Br J obstet Gynaecol. 1996; 103:4-15.
- Appleton J Arginine: Clinical potential of a semi essential amino acid Altern Med Rev 2002; 7; 512-22.
- Magann EF; Nolan TE, He rs LW et al. Measurement of amniotic fluid volume. Accuracy of ultrasonography technique. Am J obstet Gynaecol 1992; 167, 1533-7.
- Magann EF, Sanderson M Martin JN, et al. The amniotic fluid index, single deepest pocket, and two diameter pocket in normal human pregnancy; Am J obstet Gynaecol 2000; 182:1581-8.
- Nabhan AF, Abdelmoula YA, Amniotic Fluid index versus single deepest vertical pocket as a screening test for preventing adverse pregnancy outcome. Cochrane Database Syst Rev. 2008; 3 CD 006893.
- Mittal R, Satwant K, Mittal N, et al: L-arginine supplementation in intrauterine growth retardation; Int J pharm chem sci 2013; 2 (3); 1569-72, (ISSN:2277-5005).
- Vivian DP; Giuseppe C, Fabio F, clinical use of nitric oxide donars and L arginine in obstetric; J Maler Fetal Neonatal Med 2007; 20(8):569.79.
- Lamparello, C, De Blasio A; Merenda A, et al, Use of L-arginine in intrauterine growth retardation (IUGR): authors experience, Minesva Ginecol 1997; 49 :5 77-81.
- Staff AC, Berge L, Hanger G et al. Dietary supplementation with L-arginine or placebo in women with preeclampsia Aeta obstet Gynaecol Scand 2004; 83; 103-7
- Thurien PJ, Baron KA; Fennessy PV, et al ovine placental and fetal arginine metabolism at normal and increased maternal plasma arginine concentrations, Pediatr Re-2002; 51; 464-71.