

ORIGINAL ARTICLE

Comparison in the Mean Amniotic Fluid Index with Omega-3 Fatty Acids versus Placebo in Cases of Unexplained Oligohydramnios

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ABSTRACT

Background: Oligohydramnios is hazardous for fetal health for which new treatment modalities are being sought out. The fetus floats in amniotic fluid which takes care of its proper development. Omega-3 Fatty acids protect against inflammation and raised blood pressure. With omega-3, AFI can be improved and the complication scan be reduced leading to an overall better fetal outcome.

Aim: To compare the mean amniotic fluid index with omega-3 polyunsaturated fatty acids supplementation versus placebo for management of cases of unexplained oligohydramnios

Methods: A randomized control trial was held at Gynecology Unit 2, Lady Willingdon Hospital, Lahore from 21-12-2020 to 21-06-2022. 60 females were recruited to the study and randomly divided into two groups. Group 1 treated with omega-3 once capsule daily contained 1000 mg. of fish oil and group 2 treated with placebo. After 4 weeks, females were subjected to ultrasonography by a single senior sonologist with assistance of researcher. All the collected data was analyzed on SPSS version 21. Mean AFI was compared in both groups by use of independent sample t-test taking p-value<0.05 as significant.

Results: Mean age in omega-3 group was 25.63±3.57 years, and in placebo group was 25±2.704 years. 22(36.67%) females were nulliparous. The mean change of AFI with omega-3 was 4.90±1.185 and with placebo group was 2.93±0.944 (p-value=<0.001).

Conclusion: it was inferred that by supplementing omega-3 polyunsaturated fatty acids showed better results in terms of mean AFI than placebo for management of cases of unexplained oligohydramnios.

Keywords: Omega-3 Polyunsaturated, Amniotic Fluid Index, Unexplained Oligohydramnios

INTRODUCTION

Oligohydramnios is a condition which makes a pregnancy high risk. Oligohydramnios in third trimester is usually unexplained and is associated with complicated pregnancy, congenital anomalies and perinatal morbidity. Low amniotic fluid index (AFI) is closely related to adverse perinatal outcomes. It is seen 4.4% of term and 1% of pre-term pregnancies. Oligohydramnios is characterized by AFI of ≤5cm. Its incidence is 3-5% of all the pregnancies. A good method of determining abnormality in AFI is by assessment of AFI zoographically¹.

Low amniotic fluid levels can lead to various maternal, fetal and placental complications with adverse fetal outcome². There is no optimal treatment of unexplained oligohydramnios as no single treatment has come up to raise AFI or cause betterment in neonatal outcome. Oxidative stress occurring in pregnancy gives rise to free radicals which are far more than the buffering capacity of the mother and developing baby^{3,4}.

Excessive free radicals in circulation will jeopardize vasodilatation, resulting in vasoconstriction. This in turn leads to hampered blood flow to uterus and a fall in fetal urination and thus decreasing the liquor below normal limits⁵.

Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), produced by nature are omega (ω)-3 long-chain polyunsaturated fatty acids (PUFAs), present sparingly in oily fish⁶. Ω-3 Fatty acids are antioxidants and have and are responsible for normal human development⁷. One study indicated that there was much more increase in AFI in the ω-3 group when compared to the placebo. This means that ω-3 fatty acids may be responsible in improving the AFI in cases of unexplained oligohydramnios as they cause an increase in blood flow to the uterus⁸.

Rationale of this study is comparison of increase in AFI with omega-3 polyunsaturated fatty acids supplementation versus placebo for management of cases of unexplained oligohydramnios in local setup. Literature has showed that there is an improvement in AFI with Omega -3 and complications of low AFI can be reduced. But very few studies have been found in literature, as well as no local data available related to efficiency of omega-3 in

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management of oligohydramnios. So we want to conduct this study to get local evidence and implement the use of Omega-3 for improvement in AFI in oligohydramnios. This will help to a change in our practice and in future we will recommend to take Omega-3 for improvement in AFI.

The objective of the study was to compare the mean amniotic fluid index with omega-3 polyunsaturated fatty acids supplementation versus placebo for management of cases of unexplained oligohydramnios

Operational definitions:

Oligohydramnios: If AFI<5cm on Transabdominal ultrasound after 32weeks of gestation (on LMP)

Amniotic fluid index: It was measured as in terms of cm after 4 weeks of administration of trial medication.

MATERIAL AND METHODS

A Randomized Controlled Trial was done at Gynecology Unit II, Lady Willingdon Hospital, Lahore from 21-12-2021 to 21-06-2022. Sample size consisting of 60 cases with 30 cases in both the groups was calculated by 95% confidence level, 80% power of test and taking value of mean AFI i.e. 5.30±1.33cm⁸ with omega-3 and 3.14±0.98cm⁸ with placebo for management of oligohydramnios. Non probability, consecutive sampling was done.

Females between 18-35 years presenting at duration of gestation >32 weeks (according to LMP) with oligohydramnios (as per operational definition) were recruited to the study. Females with medical disorders either chronic or pregnancy associated were excluded from the study.

Sixty females were recruited through the labourroom. Informed consent was taken. Demographic details (name, age, parity, gestational age and BMI) were noted down. Then females were divided randomly in two groups by lottery method. In group one, females were given omega-3 one capsule once daily containing 1000 mg fish oil (containing eicosapentaenoic acid up to 13% and docosahexaenoic acid up to 9%). In group two, females were given placebo with inactive ingredients. Then females were followed-up for four weeks. After that, females were directed to

have ultrasound by the same senior sonologist having a minimum of four years residency experience along with the researcher. AFI was noted (as per operational definition). All of the details were transferred to a proforma.

Data obtained was analysed by SPSS version 21. Quantitative variables like age, gestational age, BMI and AFI represented in the form of mean±SD. Qualitative variables like parity was represented in form of frequency. Comparison was drawn between both the groups for mean AFI by independent sample t-test taking p-value<0.05 as significant. The data was subjected to stratification for age, gestational age, parity and BMI. The groups were then subjected to comparison by using independent sample t-test taking p-value<0.05 as significant.

RESULTS

In this study sixty patients were recruited. The mean age of patients in omega-3 group was 25.63±3.57 years, whereas the mean age in placebo group was 25±2.704 years (Table 1).

In this study, there were 22(36.67%) nulliparous females, 17(28.33%) patients had parity 01, 14(23.33%) patients had parity 2, 3(5%) patients had parity 3 & 4 respectively and 1(1.67%) patients had parity 5 (Fig. 1).

According to this study, mean gestational age of the omega-3 group patients was 36.57±1.073 weeks and of the placebo group patients was 36.07±1.461 weeks. Statistically non-significant difference was found between both groups i.e. p-value=0.137 (Table 2).

In our study, mean BMI of the omega-3 group patients was 24.27±2.18 kg/m² and of the placebo group patients was 23.93±1.701 kg/m². Statistically no significant difference found between both the groups i.e. p-value=0.660 (Table 3).

In this study, the mean change of AFI of the omega-3 group patients was 4.90±1.185 and of the placebo group patients was 2.93±0.944. Statistically significant difference found between both the groups i.e. p-value<0.001 (Table 4).

In patients with age ≤25 years the mean change of AFI of omega-3 group patients was 5.18±0.951 and of placebo group patients was 3.05±0.950. In patients with age >25 years the mean change of AFI of omega-3 group patients was 4.54±1.39 and of placebo group patients was 2.63±0.916. Statistically significant difference found when the study groups were stratified by age i.e. p-value<0.001 (Table 5).

These results demonstrated that in null and primary patients, the mean change of AFI of omega-3 group patients was 4.95±1.12 and of AFI of placebo group patients was 2.83±0.985. In multiparity females the mean change of AFI of omega-3 group patients was 4.78±1.39 and of placebo group patients was 3.08±0.900. There was significant statistical difference found between the study groups stratified by parity i.e. p-value<0.001 (Table 6).

In our present study, in patients having gestational age 34-36 weeks, the mean change of AFI of omega-3 group patients was 4.56±1.21 and of placebo group patients was 2.76±0.752. In females with gestational age 37-38 weeks, the mean change of AFI of omega-3 group patients was 5.29±1.069 and of placebo group patients was 3.15±1.144. Statistically significant difference found between the study groups stratified by gestational age i.e. p-value<0.001 (Table 7).

It was seen that in patients with normal BMI, the mean change of AFI of omega-3 group patients was 4.83±1.230 and of placebo group patients was 2.92±0.997. In females with overweight BMI, the mean change of AFI of omega-3 group patients was 5.14±1.069 and of placebo group patients was 3.00±0.707. There was significant statistical difference found between the study groups stratified by BMI i.e. p-value<0.001 (Table 8).

n	30	30
Mean	25.63	25.00
SD	3.57	2.704

Fig. 1: Frequency distribution of parity

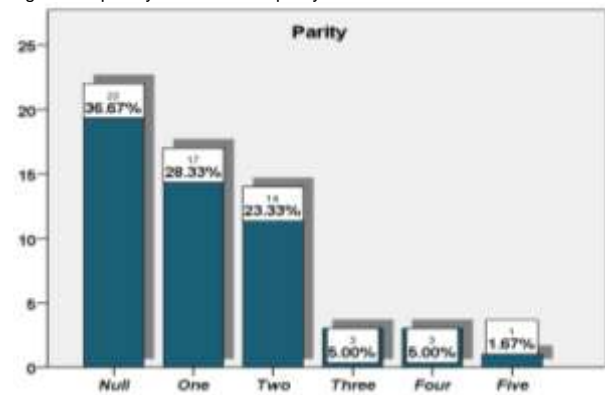


Table 2: Comparison of gestational age with study groups

Gestational age (weeks)	Study Groups		p-value
	Omega-3	Placebo	
N	30	30	0.137
Mean	36.57	36.07	
SD	1.073	1.461	

Table 3: Comparison of BMI with study groups

BMI (kg/m ²)	Study Groups		p-value
	Omega-3	Placebo	
N	30	30	0.660
Mean	24.27	23.93	
SD	2.18	1.701	

Table 4: Comparison of change of AFI with study groups

Change of AFI	Study Groups		p-value
	Omega-3	Placebo	
N	30	30	<0.001
Mean	4.90	2.93	
SD	1.185	0.944	

Table 5: Comparison of change of AFI with study groups stratified by age

Age (years)	Study Groups		p-value
	Omega-3	Placebo	
≤25	5.18±0.951	3.05±0.950	<0.001
>25	4.54±1.39	2.63±0.916	0.003

Table 6: Comparison of change of AFI with study groups stratified by parity

Parity	Study Groups		p-value
	Omega-3	Placebo	
Null & Primary	4.95±1.12	2.83±0.985	<0.001
Multiple	4.78±1.39	3.08±0.900	0.003

Table 7: Comparison of change of AFI with study groups stratified by gestational age

Gestational age	Study Groups		p-value
	Omega-3	Placebo	
34-36	4.56±1.21	2.76±0.752	<0.001
37-38	5.29±1.069	3.15±1.144	<0.001

Table 8: Comparison of change of AFI with study groups stratified by BMI

BMI	Study Groups		p-value
	Omega-3	Placebo	
Normal(18.5-25)	4.83±1.230	2.92±0.997	<0.001
Overweight(25-30)	5.14±1.069	3.00±0.707	0.003

DISCUSSION

Oligohydramnios in third trimester is usually unexplained and is associated with complicated pregnancy, congenital anomalies and perinatal morbidity. It is seen 4.4% of term and 1% of pre-term

Table 1: Comparison of age between study groups

Age (years)	Study Group	
	Omega-3	Placebo

pregnancies. The importance of oligohydramnios, even in the absence of fetal malformations is relatable to adverse pregnancy outcome. This became more evident after dissection performed on freshdead fetuses whose mothers had oligohydramnios on scan and with no clinical evidence of membrane rupture¹⁰.

Seafood contains polyunsaturated fatty acids which are nutrients of great importance. EPA and DHA have been shown to have multiple beneficial effects improving neurodevelopment in the childhood. Their absence from the food may be implicated in neurodevelopmental delay⁷.

In this study the mean change in AFI of the omega-3 group patients was 4.90 ± 1.185 whereas the mean change in AFI of the placebo group patients was 2.93 ± 0.4 . M Ismail et al⁸ concluded that there was much improvement in the AFI in the ω -3 group when compared to the placebo group and significant decrease in other parameters in the ω -3 group when a comparison was drawn between the baseline values during one month. They came to a conclusion that ω -3 fatty acids may elevate AFI values in cases of oligohydramnios of unknown etiology. This could be due to the increase in blood flow to uterus.

The current evidence does not support the use of Omega -3 PUFA supplementation in altering the incidence of pregnancy induced hypertension, Gestational diabetes mellitus or pre eclampsia. It may be that benefits derived from PUFA supplementation are more seen in high risk population such as women with a history of complications. This narrative of literature review supports our stance to some an extent¹¹.

Omega -3 in pregnancy is found to be associated with prolongation of duration of gestation. The use of Omega -3 PUFA is also related with a better birth weight. These findings also relate to our study. Use of omega 3 in pregnancy has important role in development of brain and retina^{12,13}.

Not much has been studied to evaluate the efficacy of mean AFI with omega-3 polyunsaturated fatty acids supplementation versus placebo for management of cases of unexplained Oligohydramnios. So more studies having larger sample sizes need to be conducted for better understanding of the effectiveness of supplementation of omega-3 fatty acids during pregnancy.

CONCLUSION

This study concluded that supplementation with omega-3 polyunsaturated fatty acids showed better results in terms of mean

AFI than placebo for management of cases of unexplained oligohydramnios.

Conflict of interest: Nothing to declare

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