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Commentary

EPA + DHA in Prevention of Early Preterm Birth – Do We Know How to Apply it?

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The use of long chain polyunsaturated (LC-PUFAs) omega-3 fatty acids in pregnant women dates back to 1985, when Olsen SF published the results of the first conducted observational study of the effect of dietary fish oil on the outcome of pregnancy [1]. Although further studies did not independently examine the role of docosahexaenoic acid (DHA) versus eicosapentaenoic acid (EPA), today we know that DHA seems to be responsible for the majority of the observed effects. It is also well established that LC-PUFAs, particularly DHA, are critical to fetal growth, neural and retinal development.

After 23 years, again Olsen SF and co-authors, present interesting data based on analysis performed on a large group of 91,661 pregnant women [2]. This is the first study to examine whether determined values of plasma EPA-DHA concentration, evaluated on 9th and 25th week of pregnancy are associated with the risk of subsequent early preterm birth. Authors showed a threshold effect of plasma EPA-DHA concentrations between 2.0% and 2.5% with a significantly increased risk of early preterm birth below these values, which then flattened sharply out at higher plasma EPA-DHA levels. These results allow us to conclude that evaluation of plasma EPA-DHA concentration in the first trimester of pregnancy and continuing in the second and maybe the third trimester, might become a standard form of monitoring, which could suggest interventions like dietary intake or supplementation of EPA-DHA.

It is widely accepted that one of the reasons for early preterm births is uteroplacental ischemia resulting from disturbances during the process of placentation. Recently Carvajal JA [3] suggested that DHA supplementation early in pregnancy might prevent placental ischemia and deep placentation disorders (preeclampsia, fetal growth restriction). Whether plasma EPA-DHA concentrations between 2.0% and 2.5% are optimal for prevention of placentation disorders may be explained in future clinical observations.

It is also known that DHA and other fatty acids are associated with fetal insulin sensitivity and beta-cell function. Recently Zhao JP and co-authors [4], found that low circulating DHA levels may cause compromised fetal insulin sensitivity, that may be involved in perinatally programming the susceptibility to type 2 diabetes in the offspring delivered by mothers with gestational diabetes. Whether obstetricians should consider monitoring plasma EPA-DHA concentrations in diabetic mothers might be determined in future investigations.

Mother's-body EPA – DHA stores represent the only source of these fatty acids for the fetus. Both EPA and DHA are actively transported across the placenta to the growing intrauterine child. It seems to be especially important during the third trimester of pregnancy, when the weight of fetal brain weight increases from 75 g to 400 g (between 23rd-40th weeks of pregnancy). The rate of DHA accretion into the brain during the last 17 weeks of pregnancy is comparable to that which occurs within the next 80 weeks of life. On the other hand, the accretion of EPA into the brain is negligible. Moreover, it was also found that higher DHA levels in the first few days of life are associated with a decreased number of intraventricular haemorrhages and improved outcomes in preterm born children [5].

The range of doses for EPA-DHA supplementation that are generally recommended for pregnant women is relatively wide, from 200 mg/day to 1000 mg/day. The results presented by Olsen and co-authors, clearly underline the importance of obtaining target plasma EPA-DHA concentrations regardless of the amount of fatty acids dose. It means that the obstetrician should not recommend one constant dose of supplement, but rather ought to adjust the dosage according to the results of plasma EPA-DHA concentration evaluation. It is especially true because the transfer of fatty acids from the mother to the developing fetus during normal pregnancy decreases maternal plasma DHA levels [6, 7].

Nevertheless, the results obtained from this study do not explain the proportions of plasma EPA/DHA concentrations that were preventing preterm delivery. One may speculate, that proportions are not stable throughout pregnancy and depend on the transport activity from mother to fetus. As we know, the accretion of DHA into the brain of developing fetus during the last trimester of pregnancy is significant and may influence the proportions of EPA/DHA markedly.

In my opinion, the most important conclusion that comes out from this study is the need for plasma EPA-DHA concentration monitoring during pregnancy. The proportions of EPA/DHA in supplementation should be established in future investigations.

Disclosure

I declare that I have no conflict of interest.

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