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Relationship between serum polyunsaturated fatty acids and pregnancy in women undergoing in vitro fertilization.

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Abstract

CONTEXT:
Polyunsaturated fatty acids (PUFAs) and their metabolism may be important in normal reproductive function and fertility. Associations between physiologic PUFAs and pregnancy have not been established in women.

OBJECTIVE:
The purpose of this study was to investigate associations between serum levels of PUFAs and embryo implantation in women undergoing in vitro fertilization (IVF).

DESIGN:
This was a prospective cohort study conducted between 2010 and 2012.

SETTING:
The study was conducted at the Washington University Reproductive Medicine Center.

PATIENTS:
Participants were 200 women undergoing IVF and participating in an ongoing specimen tissue bank.

INTERVENTION:
Fasting serum PUFAs were measured with liquid chromatography-mass spectroscopy. PUFAs measured included linoleic acid (LA), α-linolenic acid (ALA), eicosapentaenoic acid, arachidonic acid, and docosahexaenoic acid.

MAIN OUTCOME MEASURES:
Relationships between serum levels of measured PUFAs and embryo implantation in women undergoing IVF were analyzed.

RESULTS:
In unadjusted analyses, none of the PUFAs alone were associated with a chance of pregnancy; however, women with increased LA:ALA ratios had a higher chance of pregnancy compared with women with lower LA:ALA ratios (relative risk, 1.52; 95% confidence interval, 1.09-2.13). This relationship held after multivariable logistic regression adjusting for age, antral follicle count, body mass index, history of previous pregnancy, and history of endometriosis (odds ratio, 2.7; 95% confidence interval, 1.3-5.7). Embryo implantation rates were also weakly associated with LA:ALA ratios ($r = 0.21$, $P = .003$).

CONCLUSIONS:
Our work shows that increased ω-6 to ω-3 PUFA ratios in women undergoing IVF are associated with increased implantation and pregnancy rates. Prospective trials are needed to determine whether manipulation of PUFA ratios through diet or pharmacologic intervention may benefit women planning to conceive.