Abstract

The objective of this study was to assess whether the plasma level of n-3

polyunsaturated fatty acids (PUFA) in patients were associated with the development of

common infectious diseases (e.g., influenza) and common allergic diseases (e.g.,

asthma). We conducted a retrospective cohort study using secondary data at St. Luke's

International Hospital from January 2007 to December 2017. We included all adult

patients who had measured plasma fatty acids levels at the hospital. We excluded

patients who had a prior medical history of allergic or infectious diseases. Our primary

outcomes were allergic or infectious diseases based only on their written diagnosis. The

plasma levels of n-3 PUFAs, such as eicosapentaenoic acid (EPA) and docosahexaenoic

acid (DHA), were categorized into quartile groups and compared between patients with

and without primary outcomes. A total of 2,085 patient records were included, with a

mean age of 63.0 years (SD: 13.7), 67.0% men, mean EPA level 82.69 μg/ml, and mean

DHA level 137.93 μg/ml. A total of 1,506 cohort patients with allergic diseases were

divided into four groups according to their quartile plasma EPA and DHA levels.

Likewise, a total of 1,472 cohort patients with infectious diseases were divided into four

groups. The mean EPA levels (80.06 μg/ml vs. 85.06 μg/ml for with or without

infectious diseases; 84.63 μg/ml vs. 83.99 μg/ml for with or without allergic diseases)

and DHA levels (134.94 µg/ml vs. 140.79 µg/ml for with or without infectious diseases;

138.69 µg/ml vs. 139.79 µg/ml for with or without allergic diseases) were similar

between those with and without primary outcomes. Kaplan-Meier analysis showed that

neither EPA nor DHA levels were significantly associated with the cumulative

development of allergic and infectious diseases (log-rank test; $p = 0.933$, $p = 0.908$, $p =$

0.585, $p = 0.720$, respectively). The multivariate Cox proportional hazard regression

analysis adjusted for sex, age (< 65 years or ≥ 65 years), BMI (< 18.4 kg/m^2 or 18.5-

24.9 kg/m^2 or ≥ 25.0 kg/m^2), WBC (leukocytes; $< 7,000$ /µl or $\geq 7,000$ /µl) and CRP (C-

reactive protein; < 1 mg/dl or ≥ 1 mg/dl),revealed that the associations between the

development of infectious diseases and EPA and DHA levels showed a decreasing trend

in dose-dependent manner, but were not significantly different. Therefore, the highest

versus lowest quartiles were not independently associated with a decreased risk of

allergic diseases (model C: hazard ratio (HR): 0.89, 95%confidence interval (CI): [0.62-

1.29], $p = 0.547$ for EPA; and HR: 0.91, 95%CI: [0.63-1.30], $p = 0.600$ for DHA) and

infectious diseases (HR: 1.30, 95%CI: [0.92-1.84], $p = 0.142$ for EPA; and HR: 1.35,

95%CI: [0.96-1.91], $p = 0.085$ for DHA). In conclusion, the EPA and DHA levels were

not significantly associated with infectious or allergic diseases.