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The Impact of Processing Methods on Free Fatty Acids Measurements in Type 2 Diabetes

Author(S):
Abigail Epstein, Medical Student[1]*, Raquel Poliwoda, RN[1]*, Welbeck Sowah, MA[1], Minka Chikolareva, RN, MS, MBA[1], Oana Sandu, MD[1], *First Author, [1]Albert Einstein College of Medicine, Bronx, NY

Organization/Affiliation:
[1]Albert Einstein College of Medicine

Abstract

Background: Type 2 diabetes (T2D) is associated with an increase in plasma free fatty acid (FFA) levels and elevated risk of cardiovascular disease. Links to inflammation and dyslipidemia lead to cellular impairment. Treatment strategies aimed at improving patients' lipid profile rely on detection and follow up measurements.

Aim: We investigated the effect of blood collection and storing methods on measuring the FFA alterations in patients with T2D.

Methods: We conducted a review of observational studies and secondary data to explore reasons for variability of FFA results obtained with different methods. We searched PubMed for original articles that reported variations in FFA concentrations based on different techniques.

Results: Our review revealed that plasma FFA levels can be affected by collection and processing methods. Strong associations were reported between high saturated FFA levels and impaired insulin sensitivity and with HbA1c in patients with poor diabetes control. Paraoxon or Tetrahydrolipstatin(THL) additives prevented lipolysis. Microfluorimetric measurements were accurate and less costly than spectrofotometrics(Miles). Immediate testing or freezing plasma improved accuracy of results(Zambon). Samples frozen with THL showed significantly lower FFA, 28.4%, $P < 0.008$(Krebs) compared to samples without THL.

Conclusions: FFA detection is highly dependent on the appropriate collection and processing techniques. THL addition to collection tubes provides lipolytic inhibition with easier technical manipulation than Paraoxon. Immediate measurements or freezing samples improved accuracy.