Key Summary of Conference Abstract

Biomarkers of Glucose-Insulin Homeostasis, Randomized Treatment with Omega-3 and Vitamin D Supplementation, and Incident Type 2 Diabetes: Prospective Analysis From the VITamin D and OmegA-3 TriaL (VITAL)

Background

- Insulin resistance is the key driver in the development of type 2 diabetes (T2D).[1]
- However, data about the association between T2D and specific glucose-insulin homeostasis biomarkers have been inconsistent.
- In addition, whether such associations are influenced by supplementation with vitamin D or omega-3 fatty acids (n-3 FA) is unclear.
- **Objective:** This study examined the association between glucose-insulin biomarkers and risk of incident T2D. It also examined whether supplementation with vitamin D or n-3 FA modified any associations between the biomarkers and incident T2D risk.

Methods

- VITAL is a randomized trial investigating whether supplemental vitamin D (cholecalciferol, 2000 IU/d) or n-3 FA (EPA+DHA, 1 g/d) influence CVD and cancer risk.[2,3]
- In this study, VITAL trial participants with incident T2D were matched to healthy control participants based on age and sex.
- The associations of incident T2D risk with baseline levels of insulin, C-peptide, and HbA1c, and insulin resistance score (IRS) were assessed with conditional logistic regression.
  - The models adjusted for demographics, T2D risk factors (eg, body mass index), and randomized treatment (ie, vitamin D or n-3 FA supplementation or placebo).
- The interactions between each of the glucose–insulin biomarkers and the treatment groups were also tested.

Results

- The study population included 359 patients with incident T2D matched to 359 healthy control participants.
  - Mean age of the matched cohorts was 66 years; 45% were female and 16% were African American.
- Baseline levels of all 4 biomarkers were associated with risk of incident T2D: adjusted odds ratios (aORs) per incremental standard deviation are shown below.
  - Insulin: aOR, 1.46; 95% CI, 1.10 to 1.94
  - C-peptide: aOR, 1.72; 95% CI, 1.28 to 2.31
  - HbA1c: aOR, 80.43; 95% CI, 25.90-249.77
  - IRS: aOR, 1.59; 95% CI, 1.26-2.01
- Vitamin D and n-3 FA supplementation did not affect the associations of the glucose-insulin biomarkers with incident T2D.

Conclusions

- In this study, higher levels of glucose-insulin homeostasis biomarkers were associated with increased risk of T2D.
- Vitamin D and n-3 FA supplementation did not affect these associations.

Poster presentation at the Scientific Sessions of the American Heart Association (AHA)

Authors

Frank Qian,[a,b] Yanjun Guo,[c] Heike Luttmann-Gibson,[b,c] Natalya Gomelskaya,[c] Yanyan Liu,[c] Olga Demler,[c] Nancy Cook,[b,c] I-Min Lee,[b,c] Julie E Buring,[b,c] Julia Larsen,[d] Jennifer Boring,[d] Michael J McPhaul,[d] JoAnn E. Manson,[b,c] Aruna Pradhan,[c] Samia Mora[c]

Affiliations

[a]Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA
[b]Harvard T.H. Chan School of Public Health, Boston, MA, USA
[c]Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA
[d]Quest Diagnostics Nichols Institute, San Juan Capistrano, CA, USA

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References

1. Petersen MC, Shulman GI. Mechanisms of insulin action and insulin resistance. *Physiol Rev*. 2018;98:2133-2223. doi: 10.1152/physrev.00063.2017
2. Manson JE, Cook NR, Lee IM, et al. Vitamin D supplements and prevention of cancer and cardiovascular disease. *N Engl J Med*. 2019;380:33-44. doi: 10.1056/NEJMoa1809944
3. Manson JE, Cook NR, Lee IM, et al. Marine n-3 fatty acids and prevention of cardiovascular disease and cancer. *N Engl J Med*. 2019;380:23-32. doi: 10.1056/NEJMoa1811403