#0102

Diabetics and Insulin Resistant Patients, Especially Post COVID-19, Have an Increased Biologic Age From Analysis of Brain FDG PET

Author/s:
HT Pretorius MD,PhD., GM Hubbell MD, B Budke CNMT, NM Bodnar BS,CNMT, B Murray, BM Brosal, D Menke AA.

Organizations/Affiliations:
Blue Ash Nuclear Medicine, LLC

Abstract

Background: Diabetics and Insulin Resistant (IR) patients have greater risk of cognitive impairment, often exacerbated by COVID-19.

Objective: Report brain biologic age (AB) in diabetics and IR patients, particularly post long COVID-19.

Methods: Brain biologic age (AB) was determined from the Nuclear Brain Functional index (BFi) as: $AB = 121.22 - (0.9634)(BFi)$. This simple relation follows from the Gompertz-like nature of BFi we reported previously from brain FDG PET analysis. Cognition was also monitored with Montreal Cognitive Assessment (MoCA).

Results: BFi predicts maximal AB of 121.22 years, near the oldest human chronologic age. In eight near-normal, educated people, including a physician and a veterinarian, BFI was 86.9+/-9.1 years, indicating AB 37.5+/-8.8 years despite their chronologic age 62.6+/-9.8 years. In contrast 17 IR or diabetic patients had BFI 45.7+/-9.6 and AB 77.2+/-9.3 years ($p < 0.00000004$) with chronologic age 60.1+/-14.6 years, similar ($p = 0.6$) to the near-normals. Of eight patients (47%) with COVID-19, BFI was 41.2+-6.2 vs. BFI 49.8+-10.4 ($p < 0.05$) for those without COVID-19. At least two of the long COVID-19 patients had growth hormone deficiency. One patient had Cushing's disease, two had prostate cancer, one thyroid cancer, and nearly all had hepatic steatosis and hyperlipidemia. The MoCA results of 23.5+-2.1 in abnormal patients vs. 26.8+-2.1 in near-normals, though significant ($p < 0.005$), were much less sensitive than the larger differences in AB.

Conclusion: Biologic brain age of diabetics and IR patients with multiple comorbidities, including COVID-19, is remarkably compromised in comparison to near-normal patients.