

Presidents Round

Scientific Presentation - Big Data

38 DEMENTIA, ApoE AND COVID-19 SEVERITY

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Introduction: During the COVID-19 pandemic, pre-existing dementia was associated with a 3x increase in risk of hospitalisation and (25.6%) of COVID-19 related deaths had dementia. However, it is unclear whether people living with dementia are at higher risk of COVID-19 due to dementia or whether there may be a biologically plausible link between dementia and COVID-19. The ApoE e4 allele is highly associated with dementia. We aimed to test the COVID-19 risk associated with dementia and the association between ApoE e4 allele and COVID-19 with the aim of clarifying biological vulnerability.

Methods: UK Biobank (England) participants baseline (2006 to 2010), plus secondary care data to 2017. Separate analysis tested dementia and ApoE genotype association with COVID-19 status (16th March–31st May 2020) or mortality (to March 31, 2020, plus incomplete deaths from April, 2020) in logistic models, adjusted for demographics and technical covariates.

Results: In 269,070 participants aged 65+, including 507 (0.2%) hospitalized COVID-19 patients, those with pre-existing dementia were at increased risk of being hospitalized for COVID-19 (OR = 3.50 95% CI 1.93 to 6.34) and also for COVID-19 and death (OR = 7.30 95% CI 3.28–16.21). In 375,689 European-ancestry UKB participants, ApoE e4e4 homozygotes were more likely to be COVID-19 test positives (reaching genome-wide significance: OR = 2.24, 95% CI: 1.72–2.93, $p = 3.24 \times 10^{-9}$) and of mortality with test-confirmed COVID-19 (OR = 4.29, 95% CI: 2.38–7.72, $p = 1.22 \times 10^{-6}$), compared to e3e3s homozygotes. The associations were little changed in subsets of participants who were free of diseases associated with ApoE e4 and COVID-19 severity.

Conclusion: Dementia was found to be disproportionately common in older adults who develop severe COVID-19. We have shown a plausible genetic pathway of increased COVID-19 risk with dementia, therefore suggesting that the positive association between dementia and COVID-19 is not just the result of high cases of COVID-19 in care homes.