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Oral Presentations

42 EXPLORING THE IMPACT OF AGE AND FRAILTY STATUS ON THE IMMUNE RESPONSE TO COVID-19 ILLNESS USING DETAILED IMMUNO-PHENOTYPING

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Background: Whilst age and frailty are independently associated with mortality in COVID-19 illness, the underlying immunological mechanisms explaining this remain unexplored. We aimed to explore the impact of age and frailty on the acute immune response to COVID-19 illness.
Methods: We recruited older (aged 65+; n = 33) and younger (aged 20–50; n = 43) participants with acute COVID-19 illness for clinical assessment and detailed immunophenotyping for T-cell, neutrophil, monocyte and inflammatory markers using flow cytometry. We additionally assessed circulating levels of several important pro-inflammatory cytokines. Wilxocon rank-sum, chi-square tests and linear regression were used to examine the impact of age and frailty (Clinical Frailty Score 3–9) on the immune response in COVID-19 illness. Results were compared to age-matched pre-pandemic controls (n = 40).
Results: COVID-19 illness was associated with a marked pro-inflammatory response (raised CRP, IL-6, IL-2R), lymphopenia and emergency myelopoesis (an expansion of non-classical/intermediate monocytes and immature neutrophils) in both age groups (all $P < 0.001$). In comparison to younger participants (35.7 ± 8.6 years), older adults (76.7 ± 7.8 years) had a more marked reduction in naïve CD4+ and CD8+ cells and a more marked expansion of activated CD4+, CD8+ and effector CD8+ T-cells (all $P < 0.001$). These findings were independent of illness severity (all $P < 0.001$). In comparison to their younger counterparts, older adults had a reduced number of CD10+ neutrophils/non-classical monocytes and greater CRP, IL-6 and IL-2R ($P < 0.05$), although results were attenuated on adjusting for COVID-19 severity. Frailty was not associated with any significant difference in immune cell population or pro-inflammatory response in acute COVID-19 illness.
Conclusion: Increasing age, but not frailty status, was associated with reduced naïve T-cells and a more marked expansion of activated/effector T-cells in acute COVID-19 illness. These findings have important implications for understanding impact of age on anti-viral and pro-inflammatory immune responses.