Abstract ID: 92924

Student: Stadler Julia

Area of Research: Metabolism, circulation and inflammatory diseases

PhD Programme: PhD Inflammatory Disorders in Pregnancy (DP-iDP)

Semester: 9

Alterations in high-density lipoprotein-related parameters and mortality risk among hospitalized COVID-19 patients.

Julia T. Stadler; Harald Mangge; Alankrita Rani; Pero Curcic; Markus Hermann; Florian Prüller; Gunther Marsche

Background: Cholesterol in the plasma membrane is required for proper trafficking of receptors which facilitate severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. High-density lipoproteins (HDL) mobilize cholesterol from the plasma membrane, and low HDL cholesterol levels are associated with COVID-19 disease severity and mortality. However, HDL cholesterol levels alone poorly reflect the function of this complex family of particles, and a detailed assessment of COVID-19-associated changes in HDL functionality and its prognostic value is lacking.

Methods: In the present study, we assessed HDL cholesterol efflux capacity, HDL anti-inflammatory and antioxidant properties, and changes in HDL composition and metabolism in COVID-19 (n = 48) and non-COVID pneumonia patients (n = 32).

Results: COVID-19 infection markedly reduced the activity of lecithin-cholesteryl-acyltransferase and functional parameters of HDL, such as the cholesterol efflux capacity, arylesterase activity of paraoxonase-1, and anti-oxidative capacity of apoB-depleted serum when compared to non-COVID pneumonia at baseline, paralleled by markedly reduced levels of HDL-cholesterol. Of particular interest, low HDL cholesterol efflux capacity was associated with increased mortality risk in COVID-19 patients, independent of HDL-C levels.

Conclusion: Our findings highlight profound effects of COVID-19 infection on HDL function, metabolism, and composition. Low HDL cholesterol efflux capacity indicates a fatal course of COVID-19, independent of HDL-cholesterol levels.