Gut health compromised in severe COVID-19

February 18 2022

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New research of samples of intestine from people who have died of COVID-19 has shown the impact of the virus on the gut immune system.

The study is published today in *Frontiers in Immunology* by researchers from King's College London with funding by the Medica Research Council via the UK Coronavirus Immunology Consortium, and support from the NIHR Guy's and St Thomas' BRC. It looked at samples of gastrointestinal tract from patients who died after being diagnosed with COVID-19 during the first wave of the pandemic.

Lymphoid tissue in the gut normally maintains healthy intestinal microbial populations which are essential for good health. Researchers observed that the system that would normally regulate the composition of the microbial communities—otherwise known as Peyer's Patches—were severely disrupted in severe COVID-19. This was irrespective of whether there was evidence of virus present in the gut or not.

While severe COVID-19 can lead to breathing problems and high fever, some patients can experience diarrhea, nausea and vomiting, which suggests involvement of the gastrointestinal tract.

Professor Jo Spencer, from King's College London said that "this study shows that in severe COVID-19, this key component of the immune system is disrupted, whether the intestine itself is infected with SARS-CoV-2 or not. This would likely contribute to the disturbances in intestinal microbial populations in COVID-19 reported by others."

Observations of the samples found the structure and cellularity in Peyer's Patches—a grouping of lymphoid follicles that lines the small

intestines—had been altered independent of the local levels of the virus. This included depletion of the germinal centers, which normally propagate antibody producing cells, in patients who died with COVID-19.

This resulting poor local immunity could lead to a reduction in microbial diversity, known as dysbiosis. Researchers also noted that the findings suggest that oral vaccination may not be effective if the patient is already ill, as the gut immune system is already compromised.

Professor Spencer added that "in the future it will be important to understand factors driving such lymphoid tissue dysregulation in severe inflammatory responses."

More information: Silvia C. Trevelin et al, Disrupted Peyer's Patch Microanatomy in COVID-19 Including Germinal Centre Atrophy Independent of Local Virus, *Frontiers in Immunology* (2022). DOI: 10.3389/fimmu.2022.838328

Provided by King's College London