

## All program: Inflammatory diseases

### Patients with inflammatory rheumatic diseases are at increased risk of COVID-19 related hospitalization: data from a prospective controlled cohort study

*Boekel L<sup>1</sup>, Hooijberg F<sup>1</sup>, Vogelzang EH<sup>2</sup>, Leeuw M<sup>1</sup>, Atiqi S<sup>1</sup>, van Vollenhoven R<sup>3</sup>, Voskuyl AE<sup>4</sup>, van der Horst-Bruinsma IE<sup>4</sup>, Lems WF<sup>1, 4</sup>, Kuijpers TW<sup>5</sup>, van Ham SM<sup>6,7</sup>, Wieske L<sup>8</sup>, Eftimov F<sup>8</sup>, Steenhuis M<sup>6</sup>, Keijzer S<sup>6</sup>, Christianawati O<sup>6</sup>, Loeff F<sup>6</sup>, Tas SW<sup>3</sup>, Nurmohamed MT<sup>1,3</sup>, Rispens T<sup>6</sup>, Wolbink GJ<sup>1,6</sup>*

- 1) Department of Rheumatology, Amsterdam Rheumatology and Immunology Center, location Reade, Dr. Jan van Breemenstraat 2, 1056 AB Amsterdam, the Netherlands
- 2) Department of Medical Microbiology and Infection Control, Amsterdam UMC, location AMC, Meibergdreef 9, 1105 AZ Amsterdam, the Netherlands
- 3) Department of Rheumatology and Clinical Immunology, Amsterdam Rheumatology and immunology Center, University of Amsterdam, Meibergdreef 9, 1105 AZ Amsterdam, the Netherlands
- 4) Department of Rheumatology and Clinical Immunology, Amsterdam Rheumatology and immunology Center, VU University medical center, De boelelaan 1117, 1081 HV Amsterdam, the Netherlands
- 5) Department of Pediatric Immunology, Rheumatology and Infectious Disease, Amsterdam UMC, location AMC, University of Amsterdam Meibergdreef 9, 1105 AZ Amsterdam, the Netherlands
- 6) Department of Immunopathology, Sanquin Research, Amsterdam, The Netherlands, and Landsteiner Laboratory Academic Medical Center, Plesmanlaan 125, 1066 CX Amsterdam, the Netherlands
- 7) Swammerdam Institute for Life Sciences, University of Amsterdam, the Netherlands
- 8) Department of Neurology and Neurophysiology, Amsterdam Neuroscience, Amsterdam UMC, University of Amsterdam, Amsterdam, the Netherlands

#### Background

Retrospective studies have suggested that patients with rheumatic diseases may be at increased risk of severe COVID-19 related disease, and that this risk may partly be related to specific antirheumatic therapies. We investigated this in a large prospective controlled cohort study.

#### Methods

All adult patients with inflammatory rheumatic diseases from the Amsterdam Rheumatology & Immunology Center, Amsterdam and Amsterdam UMC were invited to participate in the study. Patients were asked to register their own healthy control subject who were of the same sex and comparable age. Data on patient and COVID-19 related characteristics were collected via digital questionnaires. Serum samples were collected twice and analyzed for the presence of SARS-CoV-2 specific antibodies.

#### Results

In total, 3279 rheumatic patients and 1110 healthy controls were included in the study. Diagnosis of COVID-19 was confirmed in 307 (9%) patients and 128 (12%) controls, of whom 18 (6%) patients and 1 (1%) control subject were hospitalized ( $P 0.02$ ). Patients with older age, male sex, a history of chronic pulmonary disease or diabetes, and patients who were treated with prednisone or rituximab were more frequently hospitalized. In contrast, patients treated with hydroxychloroquine or TNF-inhibitors were less frequently hospitalized.

#### Conclusions

Our data suggest, albeit based on a limited number of hospitalized patients and controls, that patients with rheumatic diseases are at increased risk of COVID-19 related hospitalization. In addition, treatment with rituximab or prednisone seems to increase the risk of COVID-19 related hospitalization, while treatment TNF-inhibitors and hydroxychloroquine may have protective effects.