Incidence and risk factors of COVID-19 in patients with vasculitis in the first year of the pandemic: a Danish nationwide cohort study

Sirs,

Previous studies have shown higher incidence of hospitalisation with coronavirus disease 2019 (COVID-19) in patients with rheumatic disease than the general population (1). Using Danish nationwide registries, we investigated the incidence of COVID-19-related hospitalisation among patients with vasculitis compared with general population controls (GPCs). Further, the impact of treatment with glucocorticoid was evaluated.

A cohort study of patients with vasculitis matched 1:1000 on age and gender with GPCs was conducted. Patients with small-vessel vasculitis (SVV, including polyarteritis with lung involvement, granulomatosis with polyangiitis (GPA) and microscopic polyangiitis) and large-vessel vasculitis (LVV, including giant cell arteritis (GCA)) were included. From the Danish National Patient Register (DNPR) (2), we retrieved data on patients with vasculitis and information on COVID-19 hospitalisation (ICD-10 codes B342A, B972, or B972A). The cohort was followed from 1 March 2020 (baseline) to date of COVID-19 hospitalisation, date of death, or 2 February 2021. Cases were defined as two or more registrations in the DNPR; for LVV within 2 years prior baseline and for SVV between 1 January 1995 and baseline, requiring a registration in the year up to baseline. National COVID-19 surveillance data was used to calculate the odds ratio (OR) of being PCR tested and tested positive for SARS-CoV2, respectively.

A case-control study was nested within the cohort to estimate the impact of glucocorticoids on the incidence of hospitalisation. Each patient with vasculitis hospitalised was matched on age and sex with 5 non-hospitalised patients with vasculitis. Information on redeemed glucocorticoid prescriptions within 6 months before hospitalisation were retrieved from the Danish Prescription Registry. Comorbidities were chronic lung disease; diabetes mellitus; cardiovascular disease; obesity and cancer. Cox proportional hazards model with age as time scale and adjusted for comorbidities were used to calculate hazard ratios (HR) for COVID-19 hospitalisation. The HR for hospitalisation in the nested case-control analysis was calculated using conditional logistic regression.

A total of 1862 patients with LVV and 1090 with SVV were identified. Compared with the GPCs, patients with vasculitis were less tested indicating preventive strategy. However, patients had similar likelihoods of a positive SARS-CoV2 test as GPCs. These findings are comparable to the Euro-COVIMID multicentre study of patients with inflammatory diseases including GCA (3).

Sixteen patients with LVV and 15 with SVV were admitted to the hospital with COVID-19 (Table I). The comorbidity-adjusted Cox models showed increased HRs for SVV, but with lower effect sizes than for the age and sex adjusted Cox model. In a study from UK and Ireland of 65 patients with SVV who acquired COVID-19 showed that 91% of the cases required hospitalisation (4). The study did not compare with the background population, but the findings are in line with our results for patients with SVV. For LVV, comorbidities to a large extent drove the increased risk.

In the nested case-control analysis, glucocorticoids did not increase the HR of hospitalisation significantly. However, there were only few events, thus the results are not conclusive.

The study had limited statistical power with just 31 patients with vasculitis admitted with COVID-19. Another potential limitation is the use of ICD-10 codes for case definition; however, GCA, GPA and COVID-19 codes in the DNPR have been validated and exposure misclassification was further minimised by requiring 2 registrations with one in the year leading up to baseline (5-7).

In conclusion, patients with SVV had a higher incidence of hospitalisation with COVID-19. Patients with vasculitis were less tested, however, they had the same likelihood of testing positive as individuals in the general population. The risk related to treatment with glucocorticoids needs further investigation.

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Table I. Numbers, incidence rates and hazard ratios for hospitalisation with COVID-19 infection among patients with vasculitis and the general population controls.

	Large-vessel vasculitis	Small-vessel vasculitis	General population
Patients hospitalised with COVID-19 (n)	16	15	8584 // 3935
Person years of observation	1917	1116	1912577 // 1126747
Age and sex adjusted rates per 1000 person years (95% CI)	7.4 (4.5 to 12.1)	13.4 (7.8 to 23.2)	4.1 (4.0 to 4.2)
HR (95% CI) for hospitalisation with COVID-19 adjusted for sex with age as underlying time scale	1.89 (1.16 to 3.08)	4.02 (2.42 to 6.68)	1 (Ref.)
HR (95% CI) for hospitalisation with COVID-19 adjusted for sex and comorbidities* with age as underlying time scale	1.30 (0.79 to 2.13)	2.73 (1.64 to 4.55)	1 (Ref.)

COVID-19: corona virus disease 2019; n: number; HR: hazard ratio; CI: confidence interval.
* Comorbidities included lung disease, cardiovascular disease, diabetes mellitus, and cancer.

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