Second decline in admissions with heart failure and myocardial infarction during the COVID-19 pandemic

Brief title: COVID-19 and admissions with heart failure and myocardial infarction

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Keywords: Heat failure; Myocardial infarction; COVID19; Admissions

Abbreviation
COVID-19 Coronavirus disease

HF	Heart failure
MI	Myocardial infarction
NHFA	National Heart Failure Audit
MINAP	Myocardial Ischaemia National Audit Project
IRR	Incident rate ratio
CI	Confidence interval
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2

During the first-wave of the COVID-19 pandemic there was a decline in admissions with cardiovascular disease, corresponding to social containment mandates.(1-3) It is not clear whether widespread media coverage around this phenomenon during the first wave would potentially lessen the impact of any subsequent social containment mandates on cardiovascular admissions. Using data from the National Heart Failure Audit (NHFA) and Myocardial Ischaemia National Audit Project (MINAP), we examined whether the public response to the second national lockdown in the United Kingdom (UK) replicated that of the first.

We studied the daily incidence of admissions with heart failure (HF) and myocardial infarction (MI) among adults in the National Institute for Cardiovascular Outcomes Research databank between 1st November 2018 and 17th November 2020. To avoid data reporting lag bias, we only included rapid reporting hospitals (22 and 42 hospitals for NHFA and MINAP, respectively) for the analysis. We compared the daily incidence of hospital admissions for the pre COVID-19 period 1st November 2018 to 22nd March 2020 with that of the nadir and peak following the first UK lockdown, and the rates in the second UK lockdown to date of latest available data (17th November 2020). Incidence rate ratios, estimated from an interrupted times series using a generalized linear model for a Poisson distribution fitted and adjusted for seasonality with a harmonic term, were used to compare the relative change in event rates between the periods. All datasets used in our study collect information routinely used for audit research purposes without requiring informed patient consent fall under section 251 of the National Health Service Act 2006 and therefore institutional board review was not required for this study. Access to datasets required for this study has been fast tracked by adopting a novel collaboration as part of the national drive for research related to COVID-19.

For the rapid reporting hospitals, there were 62,683 admissions with HF and MI between 1st November 2018 and 17th November 2020. From 23rd March 2020 (first UK lockdown) daily HF and MI hospitalisations decreased by 54% (IRR 0.46, 95% CI 0.41-0.51)

and by 32% (IRR 0.68, 95% CI 0.65-0.73) to a nadir on 2nd April, 2020 and 4th April 2020, respectively (Figure 1A). For admissions with HF and MI, peak recovery occurred on 16th June 2020 and 29th June 2020, respectively, but remained at 95% (IRR 0.95 95% CI 0.91-0.99) and 93% (0.93, 95% CI 0.90-0.95) of pre COVID-19 rates. From the beginning of October 2020 there was a second decline in admissions by 41% for HF (IRR: 0.59, 95% CI: 0.54-0.64) and by 34% for MI (IRR: 0.66, 95% CI: 0.63-0.69) up to 17th November 2020 compared with pre COVID-19 period. As a comparison, there was little variation in admissions with HF and MI in the baseline year between 2018 and 2019 (Figure 1B).

Despite an initial recovery in admissions with HF and MI, the latter part of 2020 has witnessed a second decline in people hospitalised with these conditions, which pre-dated the onset of the second national lockdown in the UK. The second dip appears of similar magnitude to that of the first, and signals that the public are fearful of attending hospitals despite having medical emergencies, and that this varies over time - possibly relating to numbers of cases and social mandates. Given that the period cohort for this analysis cannot determine a nadir in admissions, rates of admissions may decline further. This is important because earlier work from the UK described how delays to seeking help were temporally related to an inflation in deaths from a range of acute cardiovascular diseases.(4,5) Clear public messaging is necessary to prevent further unintended consequences of social distancing mandates to reduce the spread of the SARS-CoV-2 virus.

Data availability: The authors do not have authorisation to share the data, but the data can be accessed through NHS Digital upon approval.

Reference

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Figure legends

Figure 1. Times series of daily admissions with heart failure and myocardial infarction.

The daily admission data were presented for HF and MI from 1st November 2019 to 17th November 2020 (30,380 admissions, panel A), and from 1st November 2018 to 17th November 2019 (33,831 admissions, panel B). Daily hospitalisations were plotted in scatter plot and fitted with a smooth curve using local weighted scatterplot smoothing technique for HF and AMI respectively. The peak and nadir of daily hospitalisations were derived from the fitted curve. Updates of the Figure will be available at cardiovascularcovid.leeds.ac.uk