LETTER TO THE EDITOR

Decline in acute coronary syndrome hospitalisation rates during COVID-19 lockdown in private hospitals in South Africa

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Cardiovascular presentation of acute coronary syndrome (ACS) patients with severe acute respiratory disease coronavirus-2 (SARS-CoV-2), referred to as "COVID-19", can be complex with varying presentations of ST-elevation myocardial infarction (STEMI), stress cardiomyopathy, non-ischaemic cardiomyopathy, coronary spasm or non-specific myocardial injury.[1,2] Concern has been expressed worldwide regarding the failure of patients with emergent ACS to access healthcare during the SARS-coronavirus disease 19 (COVID-19) pandemic, which was declared to be a pandemic by the World Health Organization (WHO) on 14 March 2020. The first COVID-19 case was diagnosed in South Africa on 5 March 2020. On 15 March 2020, the South African President, Cyril Ramaphosa, declared a national state of disaster in terms of the Disaster Management Act, 2002, and coronavirus alert level 5 lockdown regulations were applied to reduce the transmission of the virus from 27 March. Alert level 4 lockdown regulations were then made applicable from 1 May 2020. A marked decrease in the volume of patients presenting with ACS was observed during lockdown in April 2020 by one of the three major private hospital groups in South Africa.

We conducted a study of admission rates of ACS in all Mediclinic hospitals in South Africa. The aim of the study was to quantify the extent of change in admission rates of ACS subtypes and to establish the degree of change in subtype proportions in the private sector assumed to be related to COVID-19 and/or lockdown implementation. Time intervals were demarcated by lockdown measures (March: pre-lockdown versus April: post-lockdown implementation), and comparisons were performed with equitable time periods (2019 versus 2020). For the comparison of proportions, data for April and May were summated.

CHANGE IN ACS SUB-TYPE HOSPITALISATION RATES

ICD-10 codes (WHO ICD-10; Version 19) at discharge were used to examine trend in ACS subtypes.

- I20.0 Unstable angina
- I21.0 Acute transmural myocardial infarction of anterior wall
- I21.1 Acute transmural myocardial infarction of inferior wall
- I21.2 Acute transmural myocardial infarction of other sites
- I21.3 Acute transmural myocardial infarction of unspecified site
- I21.4 Acute subendocardial myocardial infarction
- I21.9 Acute myocardial infarction, unspecified

The number of patients hospitalised for ACS for a given month is reported in Table 1. Change is expressed as the difference between 2019 and 2020 number of hospitalised patients/2019 number of hospitalised patients. A slight decline in hospitalisation rates in March 2020 compared with March 2019 is evident for ACS, mirrored by a similar degree of change in unstable angina (UA) hospitalisations, while non ST- elevation myocardial infarction (NSTEMI) increased slightly, with reciprocal changes in myocardial infarctions, unspecified (MIU), and no change in STEMI hospitalisations. Following the application of full lockdown regulations, the largest degree of change in ACS hospitalisations is observed for UA. The 43% reduction in ACS is further explained by negative changes in order of magnitude in MIU, NSTEMI and STEMI hospitalisations.

Our findings corroborate findings of other countries regarding the decline in numbers of acute myocardial infarction hospitalisations – albeit across differing but equitable time periods

and also employing differing definitions of ACS subtypes[1-4] – but clearly to a lesser extent. In addition, greater reductions were observed in NSTEMI compared with STEMI hospitalisations in our investigation, as was observed elsewhere,[3,4] and again to a lesser extent, for instance compared with a report of a 65.4% reduction in NSTEMI admissions and a 26.5% reduction in STEMI admissions in Italy during the pandemic.[4]

CHANGE IN STEMI AND NSTEMI PROPORTIONS OF ACS PRESENTATION SINCE THE START OF THE PANDEMIC

As collated internationally for 2006 - 2012[5] and cited in a recent editorial,[6] STEMI presentation comprised 25% - 40% of myocardial infarction presentations. Proportions for STEMI and NSTEMI were reported as 41% and 32% of ACS admissions in South Africa for the time period 2007 - 2008.[7] Upon analysis of the data for the time periods 1 March 2020 - 30 April 2019 (n=2513 patients) and 1 March 2020 - 30 April 2020 (n=1593 patients), we observed much lower proportions of ACS for STEMI and NSTEMI than those reported approximately 10 years ago for South Africa.[7] During lockdown, the proportion of ACS patients with a discharge diagnosis of STEMI and NSTEMI increased slightly between the equivalent months (5.5% - 6.8% and 11.7% - 14.8%, respectively), whereas the proportion of UA patients decreased from 66.7% - 62.2%. The proportion of the remainder of the ACS patients who had a discharge diagnosis of MIU did not appear to change (16.2% and 16.1% respectively) between the 2 time periods. The change in proportions of ACS presentations between 2019 and 2020 for both STEMI and NSTEMI – with 2019 proportions as denominator – amounted to a relative increase in respective admissions of 24.3% and 27.2%. Thus, proportions of ACS subtypes changed considerably during lockdown in South Africa. This may be of clinical relevance and may inform strategies to optimise the management of ACS during the pandemic.

We acknowledge that this a crude estimate of the impact of the pandemic on ACS admissions, with no consideration for mechanisms leading to the reduction in hospitalisation for acute myocardial infarctions. Although the ACS rates are still relatively low, the expectation is that the rates and proportion of STEMI and NSTEMI presentations will most likely increase in the near future, considering COVID-related economic, myocardial and mental health challenges, as well as other possible hypotheses for changes in ACS volume during the COVID-19 pandemic, which were elegantly expounded in a recent editorial.[6]

We would like to recommend an increased alertness for masked ACS based on a sound grasp of the pathophysiology of COVID-19 infections, an urgency for a systems approach to preparedness for the management of all subtypes of ACS, and intensified and extended follow-up and rehabilitation of COVID ACS patients.

Conflict of interest: none declared.

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TABLE I: Change in acute coronary syndrome case presentations during corresponding months in 2019 and 2020 in private South African hospitals.

		March			April		
Condition	ICD-10 code	2019 (n)	2020 (n)	Change %	2019 (n)	2020 (n)	Change %
ACS		1 254	1 165	-7.1	1 269	718	-43.4
STEMI	I21.0 - I21.2	73	73	0.0	65	55	-15.4
NSTEMI	I21.4	138	163	18.1	156	116	-25.6
UA	I20.0	831	758	-8.8	852	414	-51.4
MIU	I21.3	212	171	-19.3	196	133	-32.1

STEMI = ST-elevation myocardial infarction, NSTEMI = Non ST-elevation myocardial infarction, UA = Unstable angina, MIU = Unspecified myocardial infarction.