

COVID-19 outbreak and cardiovascular care in Brazil: Impact on outcomes of hospitalizations for acute coronary syndrome and heart failure

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Submitted



COVID-19 Outbreak in Brazil

Casos novos de COVID-19 por data de notificação



Data da notificação

Source: https://covid.saude.gov.br

Healthcare delivery during COVID-19 Pandemic



Italy Out-of-hospital Cardiac Arrest increased US STEMI activations reduced

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N Engl J Med 2020; 383:496-498

J Am Coll Cardiol 2020 Jun;75(22):2871–2

ACS and HF hospitalization outcomes in Europe



De Luca, G. et al. J Am Coll Cardiol. 2020;76(20):2321-30

Eur J Heart Fail. 2020 Aug 18 : 10.1002/ejhf.1986

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Objective

To evaluate the changes in clinical characteristics, severity, treatment and 30-day case fatality rates of patients admitted for ACS or HF during COVID-19 outbreak, as compared with previous periods, in tertiary hospitals in Brazil.



Study population and assembly of patients

Population

- Patients admitted for ACS or acute HF in Brazil

Sample

- Participants of the BPC program
- Centers that started inclusion before January 2019 and remained active during the Outbreak

Exclusion criteria

Missing data for date admission or key covariates Lost of follow-up

Definitions

Study Periods

- Before COVID-19 outbreak March 13th, 2020
 - Epidemiological weeks 12 to 35, 2018-2019
- "Early" COVID-19 oubreak March 13th to May 31st, 2020
 - Epidemiological weeks 12 to 18, 2020
- "Late" COVID-19 outbreak Jun 1st to August 31st, 2020
 - Epidemiological weeks 19 to 35, 2020

Outcome and Follow up

• All cause death in a 30-day follow up.

Boas Práticas em Cardiologia (BPC) Program





Study period: Epidemiological weeks 12 to 35 from 2018 to 2020



Baseline characteristics of ACS patients

	Before Outbreak	Early Outbreak	Late Outbreak	n value
Age, years	62.11 ± 11.18	62.01 ± 10.74	60.91 ± 11.59	0.23
Women, n(%)	287 (32.4%)	41 (36.9%)	121 (34.5%)	0.54
BMI, Kg/m2	26.78 ± 4.31	26.83 ± 4.33	27.15 ± 4.93	0.44
Hypertension, n(%)	593 (66.9%)	83 (74.8%)	230 (65.5%)	0.18
Diabetes mellitus, n(%)	305 (34.4%)	37 (33.3%)	127 (36.2%)	0.79
Dyslipidemia, n(%)	227 (25.6%)	20 (18.0%)	60 (17.1%)	0.003
Smoker, n(%)	213 (24.0%)	28 (25.2%)	96 (27.4%)	0.47
Previous CAD, n(%)	199 (22.4%)	17 (15.3%)	65 (18.5%)	0.10
Preivous MI, n(%)	137 (15.4%)	11 (9.9%)	30 (8.5%)	0.003
Preivous HF, n(%)	34 (3.8%)	6 (5.4%)	12 (3.4%)	0.64
Low education, n(%)	376 (42.4%)	59 (53.2%)	187 (53.3%)	< 0.001
Low income, n(%)	287 (32.4%)	39 (35.1%)	141 (40.2%)	0.033



Characteristics of ACS patients at admission



Acute HF and LV dysfunction





Reperfusion strategies for STEMI



	Before Outbreak n=314	Early Outbreak n=33	Late Outbreak n=113	p value
Door to balloon < 90 min	62%	59%	65%	0.83



COVID-19 outbreak and mortality of ACS hospitalizations



Figure: Kaplan-Meier estimates of the probability of death in patients admitted for any acute coronary syndrome (Left), ST elevation myocardial infarction (Right)

Before outbreak Early outbreak

Late outbreak



COVID-19 outbreak and mortality of ACS hospitalizations

	HR (95% CI)	adj HR (95% CI)
Any ACS		
Early Outbreak period	1.35 (0.52 <i>,</i> 3.50)	1.24 (0.47 <i>,</i> 3.24)
Late Outbreak period	0.99 (0.48, 2.04)	0.92 (0.44 <i>,</i> 1.91)
STEMI		
Early Outbreak period	2.00 (0.75 <i>,</i> 5.29)	1.91 (0.71 <i>,</i> 5.14)
Late Outbreak period	0.69 (0.26, 1.83)	0.59 (0.22 <i>,</i> 1.59)

*Adjusted for age, sex, hypertension, diabetes, dyslipidemia, smoking status, previous coronary artery disease, heart failure and socioeconomic factors



Baseline characteristics of HF patients

	Before Outbreak	Early Outbreak	Late Outbreak	
	n=467	n=95	n=86	<i>p</i> value
Age, years	59.66 ± 15.97	60.50 ± 14.63	62.81 ± 13.70	0.22
Women, n(%)	196 (42.0%)	45 (47.4%)	32 (37.2%)	0.38
BMI, Kg/m2	26.06 ± 5.63	27.67 ± 6.03	26.55 ± 6.85	0.05
Etiology				0.12
Ischemic	81 (17.3%)	18 (18.9%)	20 (23.3%)	
Chagasic	41 (8.8%)	15 (15.8%)	11 (12.8%)	
Other	345 (73.9%)	62 (65.3%)	55 (64.0%)	
LVEF, %	43.32 ± 17.61	37.88 ± 14.48	36.25 ± 15.06	< 0.001
Hypertension, n(%)	314 (67.2%)	56 (58.9%)	57 (66.3%)	0.30
Diabetes mellitus n(%)	159 (34 0%)	24 (25 3%)	34 (39 5%)	0 11
Previous HF, n(%)	292 (62.5%)	72 (75.8%)	63 (73.3%)	0.014
CKD, n(%)	55 (11.8%)	23 (24.2%)	19 (22.1%)	0.001
CRT, n(%)	2 (0.4%)	1 (1.1%)	2 (2.3%)	0.17
ICD, n(%)	30 (6.4%)	5 (5.3%)	11 (12.8%)	0.08
Low education, n(%)	186 (39.8%)	47 (49.5%)	42 (48.8%)	0.10
Low income, n(%)	345 (73.9%)	71 (74.7%)	58 (68.2%)	0.52

LVEF – Left ventricle ejection fraction, CKD – Chronic Kidney Disease, CRT – Cardiac resynchronization therapy, ICD – implantable cardioversor defibrillator



Hemodynamic profile and severity of HF at admission



COVID-19 outbreak and mortality after HF hospitalization



	HR (95% CI)	adj HR (95% CI)
Heart Failure		
Early Outbreak period	2.12 (1.17, 3.85)	1.95 (1.06, 3.61)
ate Outbreak period	2.79 (1.53, 5.08)	2.60 (1.39, 4.88)

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Figure: Kaplan-Meier estimates of the probability of death in patients admitted for acute Heart Failure

Limitations

- Only public hospitals were included
- Byomarkers, such as BNP and troponin, was missing
- COVID-19 diagnosis of participants was unavailable

CONCLUSIONS

• ACS hospitalizations:

- Delay in admissions after symptom onset
- Lower rates of thrombolysis of STEMI patients
- Higher rates of acute HF and LV dysfunction
- No significant increase in early mortality
- HF hospitalizations:
 - Lower LV ejection fraction
 - Higher rates of kidney dysfunction
 - Two-fold increase in 30-day mortality

Thank you!



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