

# Reduction in Acute Stroke Admissions During the COVID-19 Pandemic – Data from the Israeli National Stroke Registry

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## Introduction

The COVID-19 pandemic overwhelmed healthcare systems worldwide and medical care for other acute diseases was negatively impacted. We aimed to investigate the effect of the COVID-19 outbreak on admission rates and in-hospital care for acute stroke and transient ischemic attack (TIA) in Israel, shortly after the start of the pandemic.

## Materials & Methods

We conducted a retrospective observational study, based on data reported to the Israeli National Stroke Registry from seven tertiary hospitals. Included were all hospital admissions for acute stroke or TIA that occurred between January 1 and April 30, 2020. Data were stratified into two periods according to the timing of COVID-19 restrictions: 1) "Pre-pandemic": January 1 to March 7, 2020. 2) "Pandemic": March 8 to April 30, 2020. We compared the weekly counts of hospitalizations between the two periods. We further investigated changes in demographic characteristics and in some key parameters of stroke-care, including: percentage of reperfusion therapies performed; time from hospital arrival to brain imaging and to thrombolysis; length of hospital stay and in-hospital mortality.

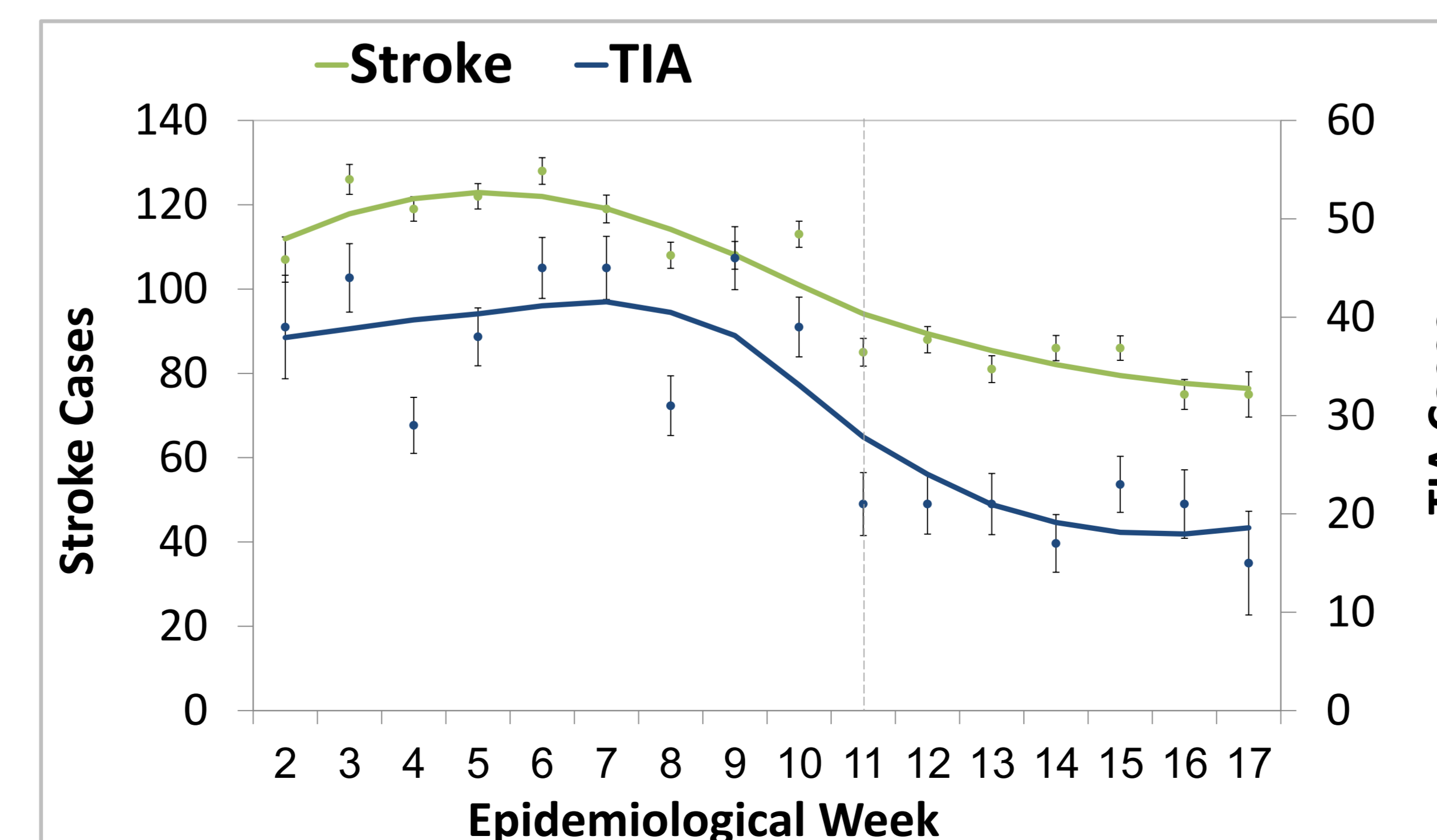
## Results

Included were 2,260 cases: 1,469 in the pre-COVID-19 period and 791 in the COVID-19 period. Hospital admissions significantly declined between the two periods, by 48% for TIA (RR=0.52 95% CI 0.43-0.64) and by 29% for stroke (RR=0.71 95% CI 0.64-0.78). No significant changes were detected in demographic characteristics and in most parameters of stroke management. While the percentage of reperfusion therapies performed remained unchanged, the absolute number of patients treated with reperfusion therapies seemed to decrease. Higher in-hospital mortality was observed only for hemorrhagic stroke.

**Table 1. Patients' Characteristics**

	Pre-pandemic N=1,469	Pandemic N=791	P- value
<b>Age</b>	74.2	73.4	
Median years (IQR)	(65.2-83.0)	(65.1-82.3)	0.28
<b>Males</b>	807	445	
n (%)	(54.9)	(56.3)	0.55
<b>Jews</b>	1,330	708	
n (%)	(90.5)	(89.5)	0.43
<b>Ischemic stroke</b>	948	550	
n (%)	(64.5)	(69.5)	
<b>Hemorrhagic stroke</b>	169	72	
n (%)	(11.5)	(9.1)	0.04
<b>TIA</b>	352	169	
n (%)	(24.0)	(21.4)	
<b>Arrival by ambulance</b>	887	519	
n (%)	(60.4)	(65.6)	0.01
<b>Stroke severity (NIHSS score)</b>	4.0	4.0	
Median (IQR)	(2-9)	(2-8)	0.94

**Figure 1. Weekly hospital admissions for acute stroke and TIA**



**Table 2. Parameters of stroke-care and in-hospital management**

	Pre-pandemic N=1,469	Pandemic N=791	P- value
<b>Neurology ward</b> n (%)	801 (54.5)	540 (68.3)	<0.001
<b>Length of hospital stay</b>			
<b>Hemorrhagic stroke</b>	n=169	n=72	
Median days (IQR)	7.0 (3.0-13.0)	3.0 (1.0-8.0)	<0.001
<b>Ischemic stroke</b>	n=948	n=550	
Median days (IQR)	5.0 (2.0-9.0)	4.0 (2.0-7.0)	<0.001
<b>TIA</b>	n=352	n=169	
Median days (IQR)	2.0 (1.0-4.0)	2.0 (1.0-3.0)	0.24
<b>In-hospital mortality</b>			
<b>Hemorrhagic stroke</b> n (%)	51 (30.2)	36 (50.0)	0.003
<b>Ischemic stroke</b> n (%)	82 (8.6)	41 (7.5)	0.42
<b>Arrived in 4.5 hours</b> n (%)	305 (32.2)	178 (32.4)	0.98
<b>Arrived in 24 hours</b> n (%)	694 (73.2)	404 (73.5)	0.98
<b>Hospital arrival to first CT</b> Median minutes (IQR)	65.0 (28.0-164.0)	63.0 (28.0-137.0)	0.35
<b>Hospital arrival to t-PA</b> Median minutes (IQR)	62.5 (41.0-95.5)	61.0 (42.0-94.0)	0.99
<b>Thrombolysis</b> n (%)	121 (12.8)	79 (14.4)	0.38
<b>Thrombectomy</b> n (%)	97 (10.2)	59 (10.7)	0.76
<b>Any reperfusion therapy per week</b> Median (IQR)	20 (18-22)	15 (11-21)	0.34

## Conclusions

The marked decrease in admissions for acute stroke and TIA, occurring at a time of a relatively low burden of COVID-19, is of great concern. Public awareness campaigns are needed, as patients reluctant to seek urgent stroke-care are deprived of lifesaving procedures and secondary prevention treatments.