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Short communication

SARS-CoV-2 pandemic and epilepsy: The impact on emergency department attendances for seizures

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ABSTRACT

Introduction: The risk of acquiring SARS-CoV-2 in a hospital setting and the need of reorganizing the Emergency Departments (EDs) to cope with infected patients have led to a reduction of ED attendances for non-infectious acute conditions and to a different management of chronic disorders.

Methods: We performed a retrospective study evaluating the frequency and features of ED attendances for seizures during the lockdown period (March 10th–April 30th 2020) in the University Hospital of Trieste, Italy. We studied the possible pandemic impact on the way patients with seizures sought for medical assistance by comparing the lockdown period to a matched period in 2019 and to a period of identical length preceding the lockdown (January 18th–March 9th 2020).

Results: A striking decrease in total ED attendances was observed during lockdown (4664) compared to the matched control (10424) and to the pre-lockdown (9522) periods. A similar reduction, although to a lesser extent, was detected for seizure attendances to the ED: there were 37 during lockdown and 63 and 44 respectively during the two other periods. Intriguingly, during the lockdown a higher number of patients attended the ED with first seizures ($p = 0.013$), and more EEGs ($p = 0.008$) and CT brain scans ($p = 0.018$) were performed; there was a trend towards more frequent transport to the ED by ambulance ($p = 0.061$) in the lockdown period.

Conclusions: Our data suggest that the pandemic has affected the way patients with seizures access the Health Care System.

1. Introduction

The first reported cases of unexplained severe pneumonia in Wuhan date back to December 31st, 2019 [1]. On February 20th, 2020, in Codogno Hospital, the first Italian case of SARS-CoV-2 was diagnosed. The virus has rapidly spread throughout the whole peninsula and on March 9th, the Italian Government imposed a national lockdown in order to reduce the viral transmission and to avoid overloading the National Health System.

The urgent need of reorganizing Emergency Departments (EDs) to cope with the rising number of infected patients had, and it is still having, a significant impact on the management of both acute and chronic conditions. In fact, the risk of acquiring SARS-CoV-2 in hospital-based setting has deeply shaped the access of patients to the Health Care resources [2,3]. The net reduction of patients admitted for

acute coronary syndromes in northern Italy is a striking example of how the fear of the pandemic could overtake the need of medical assistance. Despite the growing evidence of neurological involvement during the SARS-CoV-2 infection [4], very little is known on how the pandemic modified the access to health care in patients with neurological conditions. Recently, a taskforce of experts has published an evidence-based consensus [5] on the management of epileptic patients during the pandemic, highlighting that those patients should receive as much care as possible at home since SARS-CoV-2 infection could pose a life-threatening risk.

The University Hospital of Trieste, in northern-east of Italy, is part of the Italian National Health System and directly serves a population of 234.493 people. The hospital is the hub centre of the “Giuliano-Isontina” area (total population 373.839, it is composed of one hub and two spoke hospitals, one of which has a neurology ward) in the Friuli-

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Venezia Giulia region (FVG). The population has a median age of 48 years and 47,9 % of them are males. The ED guarantees a 24-hs free-of-charge admission. Our neurological ward has 32 beds, 8 of them dedicated to sub-intensive care monitoring. Patients with seizures are firstly evaluated in the ED by a general neurologist who may prescribe, if necessary, EEG and brain computed tomography (CT) scans in the emergency setting. Patients are then referred to the epilepsy unit, where more specific examinations may be requested. During the pandemic, nasal swabs were performed in the ED and positive patients were admitted to dedicated wards, intensive and sub-intensive care units. In March 2020, 1593 positive patients in FVG (545 in Trieste) and 113 deaths (60 in Trieste) were recorded. By the end of April, the total number of positive patients in FVG increased to 3008 (1252 in Trieste) and the deaths increased to 289 (153 in Trieste) [6]. We performed a retrospective study evaluating the frequency and features of ED attendances for seizures during the lockdown period, in order to verify if the pandemic could have had an impact on how patients with seizures sought medical assistance.

2. Materials and methods

The aim of our analysis is to describe the frequency and characteristics of ED attendances for seizures during the nation-wide lockdown in the University Hospital of Trieste, and to compare it to a similar period immediately preceding the lockdown (“pre-lockdown”) as well as to the same period in 2019 (“matched control”). We defined the “lockdown period” from the 10th of March to the 30th of April (52 days). As a “matched control period” we picked the same days in 2019. We also analysed the “pre-lockdown period”, with the same duration, from the 18th of January to the 9th of March. Data were retrospectively collected by reviewing medical charts of each patient admitted for seizure in the ED. Age, sex, triage code, attendance by ambulance, required hospitalization, first seizure, seizure semiology and diagnostic tests performed (EEG or CT) of each patient were collected. Seizures were classified, following ILAE 2017 recommendations, in focal onset, with or without awareness impairment, generalized onset and status epilepticus [7]. We also reported the total number of ED attendances for all causes (data provided through ED registry by one of the authors, F.C.). Continuous variables are presented as median (range) and non-continuous variables as number (percentage). A statistical analysis was performed in order to compare the distribution of variables between the “lockdown”, the “pre-lockdown” and “matched control” periods: Chi-squared and Kruskal-Wallis tests were used as appropriate. P-values < 0.05 were considered as statistically significant. The study was conducted according to the Declaration of Helsinki. The study was approved by the local ethics committee.

3. Results

A total number of 144 patients with seizures attended the ED during the whole period considered (lockdown, pre-lockdown and matched control). Data regarding the three periods are summarized in Table 1 and Fig. 1. The number of total ED attendances decreased from 10424 in the “matched control” and 9522 in the “pre-lockdown” to 4664 in the “lockdown” period. In parallel, the number of ED attendances for seizures decreased with the spread of SARS-CoV-2: during the “lockdown period” only 37 patients went to the ED for seizures, compared to 69 and 44 patients who sought for medical assistance for seizures during the “matched control period” and “pre-lockdown period”.

When comparing the “lockdown period” with “matched control period”, we found a significant increase in the number of first seizures ($p = 0.013$), EEG ($p = 0.008$) and CT scans ($p = 0.018$) performed in the ED. A trend favouring attendances by ambulance ($p = 0.061$) was also detected during the “lockdown period” compared to the matched control period. Surprisingly, during the “lockdown period” we found an increase in the admissions to the ward for seizures ($p = 0.043$) and a

more severe triage code ($p = 0.027$) if compared to the “pre-lockdown period”. Furthermore, comparison of the two control periods showed no differences, except for the number of EEG performed, which was higher in 2020 ($p = 0.005$).

4. Discussion

The total number of ED attendances dramatically decreased during the lockdown, raising concerns about the reduced seek of medical assistance for SARS-CoV-2 unrelated, yet life-threatening, conditions; indeed, a drastic reduction of hospitalization for acute coronary syndromes has been reported in several Italian hospitals during the lockdown (547 admissions compared to 889 in the previous months and 756 in the previous year) [3].

Seizures play a major role in the ED since it has been estimated that about 1 % of all evaluations are related to them [8]. Our study shows that SARS-CoV-2 pandemic had an impact on the ED attendances for seizure, although their reduction was not as dramatic as reduction of total ED attendance. In fact, the number of seizure evaluations was nearly halved during the “lockdown” when compared to the “matched control period” in 2019 (37 vs 69).

A slight reduction of attendances was also noted between the “pre-lockdown” and the “lockdown” periods (44 vs 37), and between the “matched control” and “pre-lockdown” periods (69 vs 44). Those findings suggest that the pandemic, even before the lockdown, has reduced the seek for medical assistance, even in patients with this acute, life-threatening condition.

Regarding neurology ward admissions, we noted a higher number of admitted patients during the lockdown when compared to the preceding months (36,1 % vs 15,8 %). The increase could be related to a more severe clinical picture of ED attending patients, as highlighted by the difference in triage codes between the two periods, or by the need of further diagnostic tests that could not be easily performed in an outpatient setting during the lockdown (e.g. MRI).

Intriguingly, we also found that patients who attended the ED during the “lockdown” for seizures were mostly experiencing their first epileptic event. It has been estimated that 46 % of patients presenting with seizures in the ED are known epileptics [9]. In our population, 77.8 % and 65.9 % of patients were known epileptics in the “matched control” and “pre-lockdown” periods, respectively. The percentage of chronic patients presenting to the ED decreased to the 54.1 % during lockdown. We hypothesize that in patients with known epilepsy and in their relatives, who have already experienced and managed seizures, the fear of contagion tended to scale back the perceived benefit of seeking medical aid.

Finally, despite the limitations imposed by the reorganization of EDs, the number of EEGs and CT scans performed increased during the lockdown, probably due to the higher number of attending first seizures, which required further testing for diagnostic and therapeutic purposes [10].

In our experience, dedicated pathways for SARS-CoV-2 patients were developed rapidly, in order to limit the exposure of health care workers and provide to infected patients the needed diagnostic procedures [11]. All patients who attended to the ED and required diagnostic assessment or ward admission, underwent to SARS-CoV-2 nasal swab. This procedure allowed us to complete the diagnostic assessment in most of the patients presenting with first seizures and to safely admit to the ward those patients who required further medical care.

5. Conclusions

On one hand, our data suggest that SARS-CoV-2 pandemic has an impact on how patients with seizures access the Health Care resources. In particular, patients with chronic epilepsy seek medical care for seizure to a lesser extent. On the other hand, the initial diagnostic work-up for patients with first seizures in the ED has not been affected by the

Table 1

Attendances to the emergency department for seizures in the “matched control”, “pre-lockdown” and “lockdown” periods.

	10 Mar. – 30 Apr. 2019 (Matched control)	18 Jan. – 9 Mar. 2020 (Pre-lockdown)	10 Mar. – 30 Apr. 2020 (Lockdown)	Matched control vs lockdown, p-value	Pre-lockdown vs Lockdown, p-value	Matched control vs pre-lockdown, p-value
Estimated total ED attendances	10424	9522	4664	–	–	–
Attendances for seizures	63	44	37	–	–	–
Age, years	54 (18–96)	68 (20–90)	61 (18–88)	0,235	0,235	0,235
Sex						
Male	35 (55,6 %)	20 (45,5 %)	18 (48,6 %)	0,504	0,774	0,304
Female	28 (44,4 %)	24 (54,5 %)	19 (51,4 %)			
Semeiology						
TC	34 (54 %)	21 (47,7 %)	15 (40,5 %)	0,337	0,277	0,243
F+	9 (14,3 %)	12 (27,3 %)	8 (21,7 %)			
F	20 (31,7 %)	11 (25 %)	13 (35,1 %)			
SE	0 (0 %)	0 (0 %)	1 (2,7 %)			
First seizure						
No	49 (77,8 %)	29 (65,9 %)	20 (54,1 %)	0,013	0,261	0,174
Yes	14 (22,2 %)	15 (34,1 %)	17 (45,9 %)			
Access to ED						
Other	11 (19 %)	4 (9,1 %)	2 (5,4 %)	0,061	0,528	0,163
Ambulance	47 (81 %)	40 (90,9 %)	35 (94,6 %)			
Triage code						
White	0 (0 %)	1 (2,4 %)	0 (0 %)	0,391	0,027	0,127
Green	6 (10,2 %)	10 (26,8 %)	1 (2,7 %)			
Yellow	43 (72,9 %)	26 (63,4 %)	29 (78,4 %)			
Red	10 (16,9 %)	4 (9,1 %)	7 (18,9 %)			
Ward admission						
No	49 (79 %)	37 (84,2 %)	23 (63,9 %)	0,102	0,043	0,547
Yes	13 (21 %)	7 (15,8 %)	13 (36,1 %)			
EEG						
No	48 (76,2 %)	22 (50 %)	18 (50 %)	0,008	1,000	0,005
Yes	15 (23,8 %)	22 (50 %)	18 (50 %)			
CT scan						
No	25 (39,7 %)	10 (23,3 %)	6 (16,7 %)	0,018	0,468	0,077
Yes	38 (60,3 %)	33 (76,7 %)	30 (83,3 %)			

TC: Tonic clonic seizure; F+: focal seizure with impairment of awareness; F: focal seizure without impairment of awareness; SE: status epilepticus; EEG electroencephalography, CT computer tomography Data are expressed as median (range) and number (percentage) as appropriate.

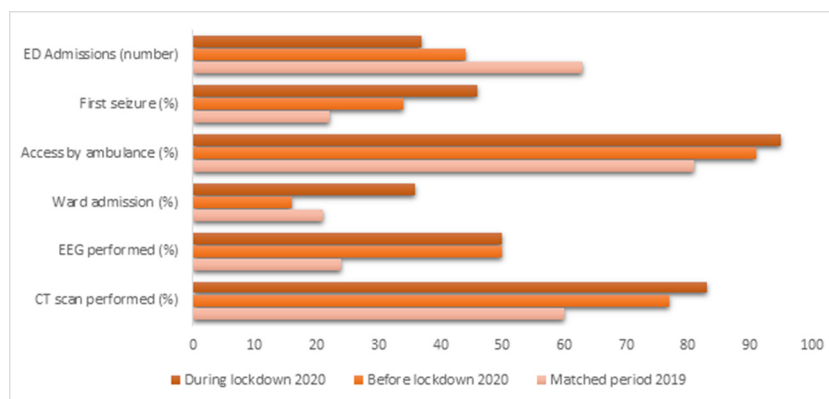


Fig. 1. Main characteristics of attendances to the emergency department for seizures in the “matched control”, “pre-lockdown” and “lockdown” periods.

pandemic and subsequent ED reorganization.

Declaration of Competing Interest

The authors report no declarations of interest.

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