



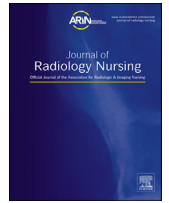
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Feature Article

Covid-19: As a Fear Factor in Response to Stroke Code and Other Interventional Radiology Emergencies?

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The COVID-19 coronavirus crisis has posed an international challenge for all health systems. The first patient registered in Spain with the COVID-19 coronavirus was known on January 31, and the state of alarm was declared on March 14, 2020. The advance of the infection worldwide has caused a modification of the usual pattern in hospital emergency responses. This study describes the incidence of emergencies in the interventional radiology section of the Marqués de Valdecilla University Hospital and analyzes whether the presence of COVID-19 caused a decrease in the number of patients treated especially for ischemic strokes. A descriptive cross-sectional study was carried out on a sample of 236 patients treated at the interventional radiology on call between June 1, 2019 and May 10, 2020, at the Marqués de Valdecilla University Hospital. No specific results were found that indicate a decrease in the incidence of urgent procedures, especially mechanical thrombectomies in patients with ischemic strokes performed by the interventional radiology team since the establishment of the alarm state by COVID-19 in Cantabria. Patients' fear of contracting COVID-19 infection in the hospital environment has not led to a decrease in urgent procedures, especially for ischemic strokes.

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Introduction

The COVID-19 coronavirus crisis has posed a challenge both nationally and internationally for all health systems that has rarely been experienced in recent decades. The COVID-19 coronavirus was first identified on December 1, 2019 in Wuhan city, the capital of Hubei province, China, when a group of people with severe pneumonia of unknown cause was reported. The concern began to grow

exponentially when the number of cases increased rapidly in the rest of Hubei and continued to spread in other territories such as Korea, Iran, Italy, France, and so forth until reaching Spain, where the number of people infected by this virus increased to over 260,000 cases. The rapid expansion of the disease caused the World Health Organization, on January 30, 2020, to declare it a health emergency of international concern, recognizing it as a global pandemic on March 11, 2020 (Vazquez & Redolar-Ripoll, 2020). On March 14, this same year, the state of Spain declared a state of alarm.

Coronaviruses are a group of viruses that have been known for a long time and that usually cause mild infections in most of their cases. However, in the 21st century, 2 serious coronavirus infections have taken place: SARS (China, year 2002) and MERS (Middle East, year 2012), which had a mortality of 10% and 35%, respectively (Davenne, Giot, & Huynen, 2020; Sifuentes-Rodríguez & Palacios-Reyes, 2020). The name of coronavirus is defined by the glycoprotein (molecules composed of a protein linked to one or more carbohydrates, simple or compound) characteristic of its coat (Bowman, Back, Esch, & Marshall, 2020; Mason, 2020). These elements are what allow the virus to bind to specific receptors to enter

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the cell and multiply inside the cell, creating copies of the virus itself (Baloch, Baloch, Zheng, & Pei, 2020). The virus receptor is called ACE2 and is present in many human tissues such as lung alveoli, heart, and kidneys, among others. The virus contacts the ACE2 receptors of the pulmonary alveoli and triggers not only cellular damage by its own replication, but also an inflammatory reaction in the alveoli (Kolifarhood et al., 2020). For this reason, the symptoms in these infections are mainly respiratory and patients who suffer from severe involvement develop a picture of respiratory distress that may sometimes require mechanical ventilation. The most common transmission mechanism is direct contact with respiratory secretions that are generated by a sick person's cough or sneeze (Desforges et al., 2019). These secretions could infect another person if they come in contact with their nose, eyes, or mouth. It is also a frequent focus of contagion if the droplets fall on objects or any surface, because another person would also catch it when touched, and they last on surfaces for several hours. Likewise, it can also be transmitted through the air at short distances between one person and another, although transmission at distances greater than one or 2 m is unlikely.

COVID-19 in Spain

The first patient registered in Spain with COVID-19 coronavirus was known on January 31. On June 14, 2020, there were more than 244,000 confirmed cases, and the number of deaths amounted to almost 27,136, being one of the territories hardest hit by the infection. Furthermore, the collapse it has caused at the health level with the delay of thousands of diagnostic and therapeutic tests augurs a shocking future at the socio-health level (Hodcroft, 2020). Some procedures that due to their urgency could not be postponed have been reduced in frequency during this time in which the number of people who went for emergency services has been reduced in high percentages for fear of contagion of the virus (Dafer, Osteraas, & Biller, 2020).

Objective

This study aims to assess whether the incidence of cases attended in the emergency department interventional radiology service of the Marqués de Valdecilla University Hospital since the declaration of the state of alarm in Spain due to coronavirus (March 14, 2020) has been reduced starting from the hypothesis that the urgency of the procedures dealt with should not be modified during this time given the marked urgency of the same.

Method

Scope of the Study

A descriptive cross-sectional study was carried out with a sample of 239 patients attended urgently (outside the normal work

shift) at the interventional radiology department between June 1, 2019 and June 14, 2020, at the Marqués de Valdecilla University Hospital. The medical on call located divided into 2 teams. The interventional neuroradiology team attends to, among other emergencies, ischemic stroke by means of intracranial mechanical thrombectomy or subarachnoid hemorrhages by embolizing them. The interventional radiology team performs, among other urgent procedures, embolizations of hemorrhages in different body parts, placement of vena cava filters to prevent pulmonary thromboembolism in patients who cannot be anticoagulated, placement of endoprosthesis for treatment or control bleeding aortic aneurysms as well as other urgent procedures.

Statistical Analysis

The data were collected in an Excel spreadsheet and analyzed with the SPSS statistical program (Statistical Package for the Social Sciences of IBM, version 19.0, Chicago, EE.UU). The Kolmogorov-Smirnov test was used to assess the normality of the variables. Using Fisher's exact test or a chi-squared test, the relationships between the emergencies attended before March 14 of 2020 and those attended afterward coinciding with the start of the state of alarm in Spain were found, especially analyzing the percentage of mechanical intracranial thrombectomies in the stroke code. For this, a 95% confidence interval (CI = 95%) was used, and a statistically significant value of $p < .05$ was considered. The results are presented in absolute values (N) and in percentages (%). The Cohen's delta statistic was used to assess the size of the effect (r).

Results

From July 1, 2019 to June 14, 2020, 236 procedures have been attended outside the normal shift of the working day. Analyzing the incidence of emergencies both globally and stratified by each of the interventional radiology on-call teams, it can be seen that although there is a decrease in urgent procedures carried out on dates after the declaration of the state of alarm in both sections, no statistically significant results were found ($p > .05$). The data are shown in Table 1 and in Figure 1.

Of the total samples analyzed, 68.6% (N = 162) were neuroradiology emergencies. Of note are the ischemic stroke emergencies that accounted for 61.7% (N = 100), followed by embolization of brain aneurysms, with 14.2% (N = 23). Although there is a decrease in the number of ischemic stroke cases that have been treated by means of intracranial mechanical thrombectomy at the Marqués de Valdecilla University Hospital on dates after the declaration of the state of alarm in Spanish territory, the results are not statistically significant ($p > .05$). Interventional radiology emergencies have accounted for 31.4% of them (N = 75), highlighting the embolization of vascular hemorrhages in 54.7% (N = 41) and percutaneous transluminal angioplasty in 16% (N = 12) of the cases. In all the

Table 1
Emergencies carried out before and after the state of alarm in Cantabria, Spain, 2019–2020

	Total			Neuroradiology			Interventional emergencies			χ^2	P value
	N	%	M ¹	N	%	M ²	N	%	M ³		
Total emergencies	236	100	0,62	162	65,2	0,42	75	34,8	0,19	0,837	,521
Emergencies before 14 March	213	90,2	0,74	147	67,4	0,51	69	32,55	0,24		
Emergencies after 14 March	23	9,8	0,26	15	59,2	0,17	6	40,8	0,06		

M¹: Average number of procedures/day (379 total days). M²: Average of procedures/day (287 days prealarm status). M³: Average of procedures/day (92 days postalarm state). χ^2 : chi-square test.

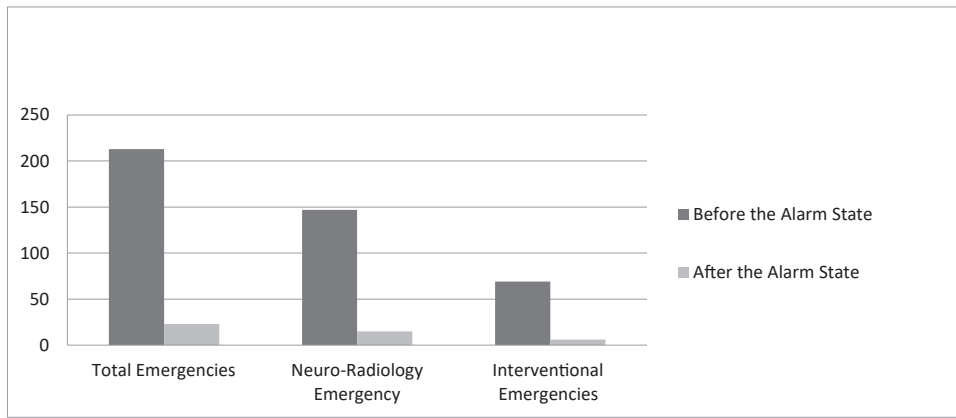


Figure 1. Emergencies carried out before and after the state of alarm in Cantabria, Spain, 2019-2020.

urgent procedures analyzed, there was a decrease in them from March 14 to June 14, but none of the results obtained were statistically significant except for the placement of the vena cava filter ($p = .03$).

The data are presented in the following in Tables 2 and 3.

Discussion

There are studies that show that the number of radiological imaging tests has decreased (Naidich et al., 2020). Although the fear of getting COVID-19 causing a decrease in other types of pathologies due to fear of going to the hospital at the risk of contagion such as ischemic stroke, we have not found significant results, so our hypothesis is true. This contradicts some reviewed articles (Dafer, et al., 2020) where certain pathologies of an urgent nature such as acute myocardial infarction have decreased by almost 50%, as shown by the works published by Spanish and UK cardiologists (Lopez-Bravo et al., 2020; Rodriguez-Pardo et al., 2020; Tan & Aboulhosn, 2020). One of the measures taken in various hospitals to prevent the spread of the coronavirus was the deprogramming of all scheduled health care activities, as well as nonurgent surgical interventions. However, collateral damage has occurred in other patients who, although not affected by the virus, may suffer from other types of diseases, chronic or not, that require immediate and urgent intervention so that irreparable damage is not caused to their health. The presence of COVID-19 in our society has not eliminated other serious pathologies that must be treated immediately, such as myocardial infarctions, strokes, and appendicitis, but doctors have perceived that many patients refuse to go to the emergency department due to fear and may intentionally stay at home instead of risking exposure to the virus in the hospital (Rubin & Wessely, 2020). Fear of COVID-19 is overcoming other medical concerns, including emergency stroke treatment (Bersano et al., 2020; Brooks et al., 2020; Dubey et al., 2020; Fuentes et al., 2020). The decrease in a large number of

scheduled surgeries that carry a high risk of formation of pulmonary thromboembolism secondary to a contraindication to anticoagulants and prolonged rest and that were susceptible to placement of vena cava filters may be a response to the significant reduction of this procedure. The COVID-19 coronavirus has modified the pattern of cases that attend hospital emergencies because of the presence of especially respiratory pathologies compatible with COVID-19 infection, causing a decrease in other types of pathologies because of fear of go to hospitals at the risk of contagion. Therefore, it is necessary to design information strategies that are more effective or adapted to this special pandemic circumstance, which emphasize the importance of going to hospitals at the first warning signs that imply urgent pathologies that do not admit delay.

Limitations

Among the limitations that we can highlight, only patients who have been treated within the localized guard during the first wave of infections have been taken into account. Perhaps the ignorance of the pandemic and the fear of contagion in a situation never experienced until then has been able to reduce the incidence of these emergencies compared with those that have been treated in this second wave.

Nursing Implications

Health education is the hallmark of the nursing community. Perhaps a much more prominent role of nurses at the forefront of this pandemic, leading and managing the information provided and education based on the best possible evidence, could have provided citizens with tools to be able to discriminate when it was really necessary to go to hospital centers if the urgency outweighed the risk of contagion of the coronavirus.

Table 2 Emergencies in interventional neuroradiology, Santander, Cantabria, 2019-2020

	Before N = 147		After N = 15		Total N = 162		Static	Value	P value
	n	%	n	%	n	%			
Stroke	90	61,2	10	66,7	100	61,7	χ^2	0,171	,680
Brain aneurysm embolization	22	15,0	1	6,7	23	14,2	Fisher	0,770	,697
Carotid PTA	11	7,5	0	0,0	11	6,8	Fisher	1,204	,601
Presurgical arteriography	12	8,2	2	13,3	14	8,6	Fisher	0,461	,622
AVM embolization	8	5,4	2	13,3	10	6,2	Fisher	1,463	,233
SAH embolization	4	2,7	0	0,0	4	2,5	Fisher	0,418	1,000

PTA = percutaneous transluminal angioplasty; AVM = arteriovenous malformation; SAH = subarachnoid hemorrhage.

Table 3
Emergencies in interventional radiology, Santander, Cantabria, 2019-2020

	Before N = 69		After N = 6		Total N = 75		Static	Value	P value
	n	%	n	%	n	%			
Hemorrhage embolization (any location)	37	53,6	4	66,7	41	54,7	Fisher	0,379	,683
Aortic endoprosthesis	5	7,2	0	0,0	5	6,7	Fisher	0,466	1,000
Mesenteric thrombectomy	2	2,9	0	0,0	2	2,7	Fisher	0,179	1,000
PTA (any location)	12	17,4	0	0,0	12	16,0	Fisher	1,242	,581
Vena cava filter	2	2,9	2	33,3	4	5,3	Fisher	10,127	,030
TIPS	5	7,2	0	0,0	5	6,7	Fisher	0,466	1,000
Fibrinolysis	6	8,7	0	0,0	6	8,0	Fisher	0,567	1,000

PTA = percutaneous transluminal angioplasty; TIPS = transjugular intrahepatic portosystemic shunt.

Future Implications

Studies are needed to assess whether this was only an initial impact due to the chaotic situation or whether it has remained similar during all months to assess possible future actions at a general level and in particular in the interventional and neurovascular radiology section that favor a full and comprehensive care of patients undergoing treatments.

Conclusion

Is the COVID-19 coronavirus capable of minimizing myocardial infarctions, strokes, or trauma among other emergencies? One reality is that the confinement of the population has decreased the demand for care in major emergencies in which the time factor plays a key role in their resolution. COVID-19 is forcing health care professionals to continually rethink emergency indications that can be treated with interventional radiology to prevent patients with symptoms of urgent pathologies from staying at home for fear of contagion. This study shows that although there was a slight decrease in urgent procedures, the interventional radiology teams at the Marqués de Valdecilla University Hospital have continued to develop a health care activity similar to that carried out before the COVID-19 epidemic.

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