REFERENCES

1. Fontenla A, Lopez-Gil M, Tamargo-Menendez J, et al. Ivabradine for chronic heart rate control in persistent atrial fibrillation. Design of the BRAKE-AF project. *Rev Esp Cardiol.* 2020;73:368–375.
2. Fontenla A, Villagraz L, De Juan J, Lozano A, Giacoman S, Lopez-Gil M. Ivabradine as an alternative to AV node ablation in a patient with permanent atrial fibrillation. *Rev Esp Cardiol.* 2017;70:1019–1020.
3. Fontenla A, Villagraz L, Lozano A, López-Gil M. Ivabradine as an atrioventricular node modulator. Promise or reality? *Response Rev Esp Cardiol.* 2017;70:1024.
4. De Ferrari GM, Maier LS, Mont L, et al. Ranolazine in the treatment of atrial fibrillation: Results of the dose-ranging RAFFAELLO (Ranolazine in Atrial Fibrillation Following An ELectricaL CardiOversion) study. *Heart Rhythm.* 2015;12:872–878.
5. Abdelnabi M, Ahmed A, Almaghraby A, Saleh Y, Badran H. Ivabradine and AF: Coincidence, Correlation or a New Treatment? *Arrhythm Electrophysiol Rev.* 2020;8:300–303.

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Competing risk largely explains the drop in admissions for acute cardiovascular disease during the COVID-19 pandemic

El riesgo competitivo puede explicar en gran medida la disminución de los ingresos por enfermedad cardiovascular aguda durante la pandemia de COVID-19

To the Editor:

The peak of the COVID-19 pandemic was accompanied by a widely observed drop in hospital admissions for acute myocardial infarction (AMI) and other cardiovascular disorders. In Spain, the number of percutaneous coronary interventions dropped by 40%,[1] and within Spain Catalonia saw a 50% decline in hospital admissions for AMI.[2] Reductions of around 40% in admissions for urgent cardiovascular conditions have also been reported in other countries affected by the pandemic.[3]

A number of feasible explanations have been proposed for this situation, including the avoidance of medical care due to social distancing concerns, underdiagnosis of ST-segment elevation myocardial infarction (STEMI), and competing risk with the acquisition and severity of COVID-19.[2] However, a view appears to have taken hold that the most likely cause of the drop in cardiovascular admissions is patient reluctance to seek medical help due to fears about the pandemic, and this view is reflected in campaigns reminding patients with these conditions of the importance of contacting emergency services.

With the currently available data, it is not possible to determine the relative contribution of avoidance of medical attention, underdiagnosis, and competing risk. However, a careful review or the data suggests that the main factor underlying the reduction in cardiovascular emergency admissions is competing risk, although there has obviously also been a slowdown in diagnosis, as we have reported.[4]

Competing risk can be defined as a "situation [that] happens when the occurrence of one type of event changes the ability to observe the event of interest."[5] This situation tends to arise when there are alternative outcomes, such that the occurrence of one event or outcome impedes the occurrence of the other, which might be the main focus of interest. Competing risk is a particular concern in long-term follow-up studies, especially studies of high-risk patients in whom the outcome measure is not death. The patients in these studies have a high risk of dying during the follow-up period from a variety of causes, and death obviously prevents a patient from later having the event of interest (AMI or stroke, for example). Studies of this type should therefore always report total mortality because this acts as a competing risk for the outcome measure.[6] With COVID-19, the deaths of large numbers of people from this disease will clearly have prevented the same individuals from having an AMI and attending hospital for its treatment.

An analysis of the data presented by Romaguera et al.[2] reveals that, during the peak of the pandemic between March 1 and April 19, 2020, there was a 50% reduction in the number of patients admitted for STEMI at Catalan hospitals compared with the same period in 2019 (524 in 2019 vs 395 in 2020). This was reflected in a drop in daily admissions over the 50-day period from 10.5 to 7.9 (incident rate ratio, 0.75; 95% confidence interval [95%CI], 0.66-0.86). Notably, compared with those treated in the same period in 2019, patients admitted during the pandemic peak tended to be younger (mean age, 63.4 ± 0.6 years in 2019 vs 61.9 ± 0.7 years in 2020; $P = .104$), and fewer of them were older than 80 years (70% in 2019 vs 37% in 2020: $P = .062$). Mortality due to COVID-19 is high among elderly patients, and it is precisely this age group that has not sought hospital treatment for AMI, probably because they were infected by and died from the coronavirus.

Delays have been reported in the care of patients who contacted the emergency services during the pandemic; however, medical care was not delayed for those who went directly to hospital, although these patients did experience an increase in door-to-balloon time. In other words, during the most intense phase of the pandemic, patients who directly seeking hospital care experienced no increase in time to first medical contact but, once admitted, waited longer before transfer to the catheterization lab, probably due to the high burden of care at hospitals during this period.

While a variety of factors may have contributed to the reduction in hospital admissions for AMI during the COVID-19 pandemic, the data indicate that this reduction was largely due to a situation of competing risk between COVID-19 mortality and acute cardiac ischemia. The pandemic has provided us with an *in vivo* experiment.

CONFLICTS OF INTEREST

M.Á. Arias is an associate editor at *Revista Española de Cardiología*; this manuscript has been handled in accordance with the editorial procedure established by the journal to ensure impartiality.

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REFERENCES

1. Rodríguez-Leor O, Cid-Álvarez B, Ojeda S, et al. Impacto de la pandemia de COVID-19 sobre la actividad asistencial en cardiología intervencionista en España. *REC Interv Cardiol.* 2020;2:82–89.

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https://doi.org/10.1016/j.rec.2020.08.014

2. Romaguera R, Ribera A, Güell-Viaplana F, et al. Reducción de los ingresos por infarto agudo de miocardio con elevación del segmento ST en Cataluña durante la pandemia de COVID-19. *Rev Esp Cardiol.* 2020;73:778–780.
3. García S, Albaghdadi MS, Meraj PM, et al. Reduction in ST-segment elevation cardiac catheterization laboratory activations in the United States during COVID-19 pandemic. *J Am Coll Cardiol.* 2020;75:2871–2872.
4. Gadella A, Sastre MA, Maicas C, Rodríguez-Padial L, Arias MA. Infarto agudo de miocardio con elevación del segmento ST en tiempos de COVID-19: ¿regreso al siglo pasado? *Una llamada de atención Rev Esp Cardiol.* 2020;73:582–583.
5. Pintilie M. Análisis de riesgos competitivos. *Rev Esp Cardiol.* 2011;64:599–605.
6. Katz MH. *Multivariable analysis. A practical guide for clinicians.* Cambridge: Cambridge University Press; 1999:75.

https://doi.org/10.1016/j.rec.2020.07.016
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Competing risk largely explains the drop in admissions for acute cardiovascular disease during the COVID-19 pandemic. Response

El riesgo competitivo puede explicar en gran medida la disminución de los ingresos por enfermedad cardiovascular aguda durante la pandemia de COVID-19. Respuesta

To the Editor,

The existence of competing risks is also one of our main hypotheses to explain the reduction in admissions for acute cardiovascular disease during the COVID-19 pandemic.[1] The excess mortality from all causes of more than 50% that occurred in Catalonia (11 568 deaths), especially in patients older than 74 years (9749),[2] would also explain the slight decrease in the average age of patients seen.[3]

The AMI code registry also showed, in March, a slight (not significant) increase in complications indicative of delays to care: cardiogenic shock, ventricular fibrillation, and acute phase mortality. However, we do not have solid data that allow us to verify these hypotheses. In fact, the excess mortality by cause for Spain is not yet known. In the USA, more than a third of the excess was due to causes other than COVID-19, and the cardiac mortality practically doubled.[4] Accepting the limitations of extrapolating these figures to our setting, we could postulate that, of the 43 938 excess deaths in Spain,[2] approximately 15 000 would be from causes other than COVID-19, and many of these from cardiac causes. In this case, not only would there be a competing risk with death from COVID-19, but also with cardiac death caused by the secondary effect of the pandemic on access to health care.

Therefore, although the proportion attributable to each factor is unknown, it seems that they would all have a substantial relative weight, and some—such as fear of attending hospital—could be prevented with simple information campaigns.

In addition, it would be expected that such a large reduction in non–COVID-19 care[5] would have a substantial impact on health in the mid- term and on organization of patient care for those with cardiovascular disease.

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The pandemic certainly provides us with an enormous in vivo experiment, as well as some challenges: interpreting the partial and often biased view of reality that the data affords us and reusing these data in an attempt to improve patient care for those with cardiovascular disease in this new situation.

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REFERENCES

1. Rodríguez-Padial L, Arias MA. El riesgo competitivo puede explicar en gran medida la disminución de los ingresos por enfermedad cardiovascular aguda durante la pandemia de COVID-19. *Rev Esp Cardiol.* 2020. http://doi.org/10.1016/j.recesp.2020.07.022
2. Sistema de Monitorización de la Mortalidad diaria (MoMo) en España. Available at: https://momo.isciii.es/public/momo/dashboard/momo_dashboard.html. Accessed 20 Aug 2020.
3. Romaguera R, Ribera A, Güell-Viaplana F, et al. Reducción de los ingresos por infarto agudo de miocardio con elevación del segmento ST en Cataluña durante la pandemia de COVID-19. *Rev Esp Cardiol.* 2020;73:778–780.
4. Woolf SH, Chapman DA, Sabo RT, Weinberger DM, Hill L. Excess deaths from COVID-19 and other causes March-April 2020. *JAMA.* 2020. http://doi.org/10.1001/jama.2020.11787
5. Rodríguez-Leor O, Cid-Álvarez B, Ojeda S, et al. Impacto de la pandemia de COVID-19 sobre la actividad asistencial en cardiología intervencionista en España. *REC Interv Cardiol.* 2020;2:82–89.

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Simultaneous percutaneous repair in mitral and tricuspid regurgitation: step by step

Reparación percutánea simultánea en la insuficiencia mitral y tricuspídea: paso a paso

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To the Editor,

We read with interest the recently-published scientific letter by Caneiro-Queija et al.,[1] in which they showed the possibility of combined treatment of mitral regurgitation (MR) and tricuspid regurgitation (TR) in a single procedure using MitraClip devices. It does indeed demonstrate the high levels at which operators and structural intervention are currently working, but we would like to raise some points regarding the indication for performing the 2 repairs in a single procedure.