Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Letter to the Editor 'Aneurysmal Subarachnoid Hemorrhage: Collateral Damage of COVID?'

Letter:

To limit the spread of COVID 19, the Canadian government implemented a travel ban to foreigners entering Canada on March 16, 2020. Only essential businesses were allowed to remain open in many jurisdictions, including ours. Strong recommendations were made for the general public to stay at home. During this time, St. Michael's Hospital, a tertiary institution in downtown Toronto, limited neurosurgical/endovascular procedures to those deemed urgent/emergent. The repair of ruptured aneurysms was among these procedures, due to the risk of rebleeding if left untreated. Our neurovascular service continued to receive referrals for the management of aneurysmal subarachnoid hemorrhage (aSAH) and other urgent conditions, including hemorrhagic and ischemic stroke. We adhered to the new hospital processes designed to limit in-hospital spread of COVID.

Interestingly, we found a steep decline in the number of patients with aSAH (Figure 1). Compared to the previous year, the number of ruptured aneurysms we treated decreased by 64% for March and by 75% for April. A similar observation was made by the Lariboisière Hospital in Paris, France. There, the census of patients coming in with aSAH dropped significantly after the French government took measures to drastically limit social interactions.[1] A study based on the utilization of the RAPID software for 231,753 possible acute stroke patients found a 39% decrease in neuroimaging after a state of national emergency was declared in the United States.[2] This likely reflects a similar decrease in the number of patients urgently consulting for stroke symptoms.

We are unsure how to explain the decrease in ruptured aneurysm referrals during this time period. It is possible, but perhaps unlikely, that the natural incidence of aneurysm rupture has decreased, for example due to lifestyle changes (e.g., reduced physical activity) induced by COVID-19 measures. A more plausible explanation might be reluctance in seeking care after sentinel headache because of fear of contracting COVID-19 in the hospital. If so, these patients would be at risk of a fatal rebleed at home. Consequently, they might never reach our tertiary hospital for management. A study on ST elevation myocardial infarction patients in Hong Kong, after their hospitals suspended all nonessential clinic visits in an effort to contain COVID-19, showed that the median time from symptom onset to first medical contact increased by 74%.[3] The increase may reflect the patients' reluctance to go to a hospital in the midst of a pandemic.

Restructuring of health care protocols in the community and the hospital to limit COVID-19 transmission and to prepare for a "surge" may adversely affect access to care of other diseases. This collateral damage was readily observed in one of the countries hardest hit by COVID-19, Italy. A small series of pediatric patients documented delayed presentations of diabetic ketoacidosis, leukemia, and convulsions resulting in clinical deteriorations that might have been avoided with earlier diagnosis and treatment.[4] In Toronto, most primary care physicians have converted to telephone consults. Thus their decision-making is no longer guided by a formal physical examination. This may affect their ability to distinguish aSAH from other types of headaches, such as migraine.

Province-wide and national data on symptom onset to first medical contact times are needed to correlate the decrease in aSAH cases observed in our institution. If confirmed, further studies should be done to ascertain the reasons behind the phenomenon

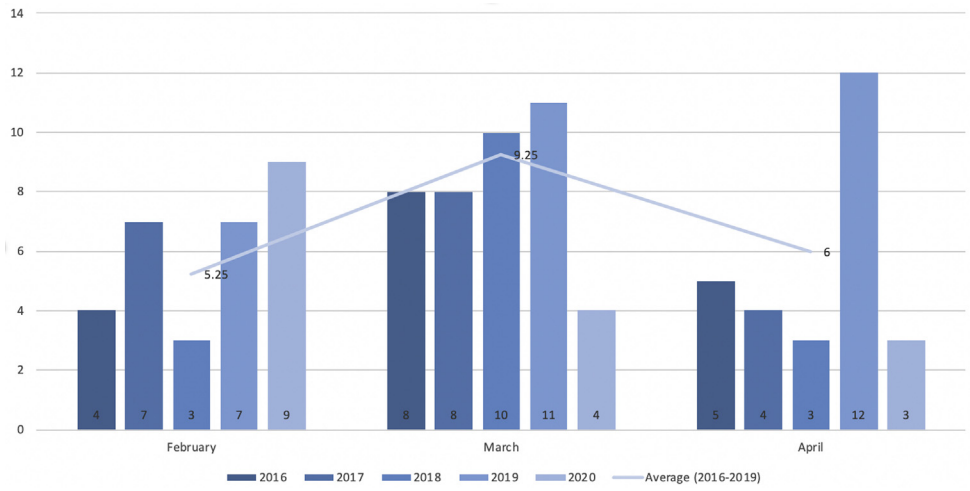

Figure 1. Number of treated ruptured aneurysms grouped according to the month and year of repair. The line graph illustrates the average number of cases for a particular month from 2016–2019.

so that these can be addressed. The effects of the COVID-19 pandemic are likely to continue for the near future. Health care systems need to adopt strategies that address the COVID-19 pandemic while ensuring that the needs of other diseases, such as aSAH, are readily met.

***Jose Danilo Bengzon Diestro*[1], *Yang Mei Li*[2], *Carmen Parra-Fariñas*[1], *Dipanka Sarma*[1,2], *Aditya Bharatha*[1,2], *Thomas R. Marotta*[1,2], *Julian Spears*[1,2]**

From the [1]*Division of Diagnostic and Therapeutic Neuroradiology, Department of Medical Imaging, St. Michael's Hospital, University of Toronto, Toronto; and* [2]*Division of Neurosurgery, Department of Surgery, University of Toronto, Toronto, Canada*

To whom correspondence should be addressed: Jose Danilo Bengzon Diestro, M.D. [E-mail: danni.diestro@gmail.com]

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