

COVID-19 Can Cause Increasing Volume in Extracranial Scalp Arteriovenous Malformations

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ABSTRACT

The presence of coronaviruses in the human central nervous system is now a recognized fact as they appear to be part of a viral flora of the brain, with potential neuropathological consequences in genetically or otherwise susceptible individuals, SARS-CoV-2 has been associated with a variety of multi-organ complications, with an increasing proportion of patients presenting with extra pulmonary symptoms. As we expand our understanding of the neurological ramifications of COVID-19, clinicians need to be increasingly aware of the precarious coagulation balance.

Our report provides evidence about the potential of SARS-CoV-2 to cause rebleeding the in extra cranial scalp arteriovenous malformations.

To our knowledge, this is the first documented case, to report a COVID-19 patient which increasing the size of AVM. Whether this is a coincidence, or an inevitable correlation.

Keywords

COVID-19, Arteriovenous malformations, Rebleeding.

Introduction

The presence of coronaviruses in the human central nervous system is now a recognized fact as they appear to be part of a viral flora of the brain [1], with potential neuropathological consequences in genetically or otherwise susceptible individuals, if the neuroinvasion of SARS-CoV-2 does take a part in the development of respiratory failure in COVID-19 patients [1,2].

The precaution with masks will be the most effective measure to protect against the possible entry of the virus into the central nervous system. Here we report a case of COVID-19 causing rebleeding in the in extracranial scalp arteriovenous malformations.

Case Presentation

This 70-year-old female was admitted to our department with headache and soft scalp mass of the frontal vertex, the patient

noted the rapid increase in this mass for 3 days with accentuation of headaches, dizziness, and profound asthenia with fever. The patient's medical history was unremarkable. She had no history of trauma.

Physical examination identified a 10 cm × 6 cm subcutaneous pulsatile, soft, compressible mass (Figure 1), painless, that which has tripled in volume in the last 3 days. There was bruit over the mass and powerful pulsation.

Neurological examination revealed no abnormalities A brain MR imaging study was then performed showing frontal soft tissue lesion compatible with extracranial scalp arteriovenous malformations (Figure 2).

The persistent fatigue, diffuse myalgia, and high fever making covid suspected, his oropharyngeal swab was tested positive for SARS-CoV-2 by reverse-transcription polymerase- chain-reaction (RT-PCR) assays. No other respiratory viral pathogens were detected. He received supportive care and anti COVID treatment

according to the national protocol including Azithromycin and Hydroxychloroquine, vitamin therapy combining zinc and vitamin C and low dose glucocorticoid. The laboratory results indicated elevated C-reactive protein (20 mg/L), normal white blood cell count (6500/ μ L), thrombocytopenia (95,000/ μ L) and lymphopenia (360/ μ L). Unfortunately, the patient refuses any surgery.



Figure 1: Subcutaneous pulsatile, soft, compressible mass.

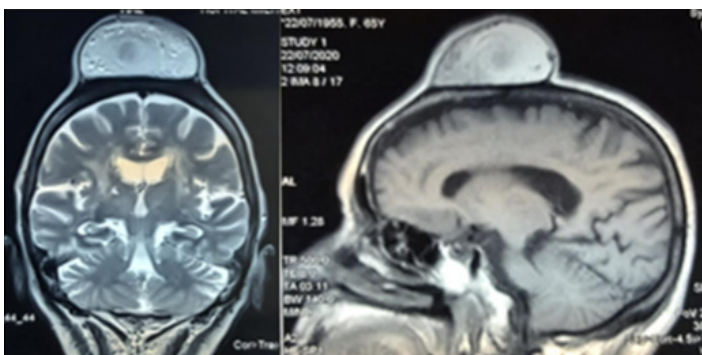


Figure 2: Brain MR imaging study showing frontal soft tissue lesion compatible with extra-cranial scalp arteriovenous malformations.

Discussion

The COVID-19 pandemic has modified the routine workflow of several areas of medicine, including neurosurgery, it is highly likely that neurosurgeons would have to provide medical care to individuals with active COVID-19 and underlying disorders of the central nervous system.

The most commonly described clinical features of COVID-19 have related to overwhelming respiratory and neurological symptoms which have been underestimated and under-reported [2,3].

An increasing number of reports describe COVID-19 related hypercoagulation, recommending more aggressive hydration and anticoagulation in COVID-19 positive patients, it is also possible

that this patient suffered a hemorrhagic conversion.

Extra cranial arteriovenous malformations are rare. Their exact incidence is unknown. As a best estimate, Visser et al [4], recently demonstrated that AVMs comprised only 4.7% of their vascular anomalies practice. So far, race or sex predilection has not been demonstrated. Scalp AVMs are relatively rare and can be either traumatic or spontaneous. These lesions may be found incidentally or owing to signs and symptoms that they produce such as headache, epilepsy, tinnitus, hemorrhage and focal neurological deficit [5].

However, spontaneous AVM of the scalp can be present at birth, but is asymptomatic, until adulthood in most patients [6,7]. Deterioration of the symptoms in these cases is usually caused due to trauma, pregnancy, or hormonal changes. In our case, there was no history or evidence of trauma or fracture, and also the AVM tripled in volume in the last 3 days, but the patient tested positive for SARS-CoV-2 by reverse-transcription polymerase-chain-reaction (RT-PCR) assays.

MRA well delineated the extent of the nidus with excellent interobservers agreement. The nidus is formed of tangles of dilated tortuous vascular structures at the site of connection between the arteries and veins. Regarding clinical utility, the ultimate goal of imaging, when managing patients affected by symptomatic AVMs, is to identify the nidus in order to allow proper occlusion and regression of the symptoms [8].

This case is perhaps the first one, that shows clear that COVID-19, can cause increasing volume in extracranial scalp arteriovenous malformations, by rebleeding stroke phenomenon or the possibility of increased blood flow. At the level of speculation, perhaps the “thrombocytopenia” flared up into a rebleeding localized only to the arteriovenous malformations.

Conclusion

AVMs may progress slowly, or enter periods of rapid expansion as in our case. To our knowledge, this is the first documented case, to report a COVID-19 patient which increasing the size of AVM. Whether this is a coincidence, or an inevitable correlation. Hence, the case was seemingly a spontaneous AVM that increasing the volume caused by COVID-19.

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