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Intracranial aneurysm: research in preclinical outcome models and human effectiveness of intraluminal devices

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ABSTRACT

Endovascular treatment of intracranial aneurysms has become one of the most important preclinical research arenas. This influential progress is due to the incredible development of new devices and catheters technologies. One of the main outcomes for intraluminal devices used for treatment is the rate of occlusion of the aneurysm.

Dear Editor,

The endovascular treatment of intracranial aneurysms has become one of the most important preclinical research arenas. ¹ This influential progress is due to incredible development of new devices and catheters technologies. One of main outcome for intraluminal devices used for treatment is the rate of occlusion of the aneurysm. Coil embolization, stenting, flower diverter and intrasaccular disruptors cause progressive healing of the aneurysm. ² One of the most important challenges is recanalization resulting in retreatment in up to 20% of cases. ² Although the mechanisms of aneurysm healing are poorly understood, much of the information has been obtained from preclinical animal models. The latter do not emulate the conditions of the healing process that occurs in humans. ³ One recent biggest problem facing the world today is SARS-CoV-2 epidemic and the capability of SARS virus to infect multiple cell types and thus several organs ⁴ Varga et al, showed evidence of direct viral infection of the endothelial cell and diffuse endothelial inflammation. ⁵ Although the 3 cases mentioned in the report did not include any cerebral vasculature histology though the same impact of

Keywords

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virus can be there. This endotheliitis associated with COVID-19 may have relevant implications for preclinical investigation, usually in animal models capable of being coronavirus-infected and in humans receiving treatment with devices such as stents, flow diverters, and intrasaccular disruptors.

Ravindran et al, published a systematic review where they evaluated the published literature regarding endothelialization after flow diverter deployment.⁶ For example, after pipeline embolization device (PED) deployment, progressive endothelialization occurs in two forms rapidly, at the parent artery and slowly at the aneurysmal neck.⁷ At the histopathological level, the presence of inflammatory cells and thrombi have been determined, all of which contribute to the effectiveness of the devices.⁸ The infection associated with SARS-CoV-2 leads to a hyperinflammatory response.⁹ The presence of a dysregulated macrophage response that injures the host. The role of this inflammatory response and its effect must be established on the endothelialization and healing process of intracranial aneurysms after treating with endovascular devices.⁹ The clinical implication at this time is unknown with pandemic in full force. With time, patients who are getting devices placed for aneurysm treatment might not heal these aneurysms fully. More research is necessary to establish the effect of coronavirus on the healing and endothelialization of intracranial aneurysms.

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