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Cerebral venous dynamics change as potential indication of cerebral aneurysmal rupture

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Introduction: Many inconsistent etiologies of cerebral aneurysmal rupture including a wide spectrum of factors have been reported. Our recent observation discloses the potential new factor of cerebral aneurysm rupture with cerebral venous pressure gradient.

Materials and Methods: We retrospectively reviewed 25 cases treated with coil embolization with or without cerebral aneurysmal rupture. Seven males and 18 females were recruited in this study. The age ranging from 49 to 71 and average being 59. Quantitative color-coded cerebral angiography was performed during coil therapeutic procedures to measure cerebral venous circulation.

Result and Conclusion: Ruptured cases had shorter and symmetrical cerebral venous circulation time ($P < 0.05$). In addition, an asymmetrical venous outflow pattern was critical for aneurysmal rupture as seen in case 1. Non-ruptured cases tended to have slower and asymmetrical cerebral venous circulation compared with rupture cases as seen case 2. Symmetrical and shorter cerebral venous circulation in the epislateral dysplasia venous outlet may be a potential new factor for cerebral aneurysm rupture. An asymmetrical venous outflow pattern was critical for managing cerebral aneurysm and determines aneurysmal rupture.

Illustrative Case: Case 1: A 50 year old male presented with acute anterior communicating saccular aneurysm ruptured and treated by endovascular coiling immediately post Dyna CT study. He discharged without any sequelae but still just mild headache. The venous phase showed atresia of left dural venous sinus, right dural venous sinus is dominated venous drainage but there is symmetrical venous flow. Post-Postcoiling showed the arterial flow had no change but delayed venous flow. This symmetrical venous flow might indicate increasing venous pressure gradient.

Case2: A 64 year old female had asymptomatic non-ruptured Rt distal internal carotid small wide neck saccular aneurysm
Result and Conclusion: Cerebral venous circulation time among rupture and non-rupture patients:

Non-rupture: Right Δ CCT:11.32+/-88 Left Δ CCT:12.49+/-42Rupture: Right Δ CCT:11.12+/-1.87 Left Δ CCT:11.54+/-2.22

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Biography

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