Thrombus

Colloquially a blood clot, is the final product of the blood coagulation step in hemostasis. There are two components to a thrombus: aggregated platelets that form a platelet plug, and a mesh of cross-linked fibrin protein. The substance making up a thrombus is sometimes called cruor. A thrombus is a healthy response to injury intended to prevent bleeding, but can be harmful in thrombosis, when clots obstruct blood flow through healthy blood vessels.

It is unclear whether clot composition analysis is helpful to predict a stroke mechanism in acute large vessel occlusion.

In addition, the relationship between early vessel signs on imaging studies and clot compositions has been poorly understood.

Histopathologic analysis

Histopathologic analysis of retrieved clots from 37 patients with acute middle cerebral artery occlusion was performed. Patients underwent gradient echo sequences before endovascular therapy. Retrieved clots underwent semiquantitative proportion analysis to quantify red blood cells, fibrin, platelets, and white blood cells by area. Correlations between clot compositions and stroke subtypes and susceptibility vessel signs on gradient-echo imaging were assessed.

Stroke etiology was classified as cardioembolism in 22 patients (59.4%), large-artery atherosclerosis in 8 (21.6%), and undetermined in 7 (18.9%). The clots from cardioembolism had a significantly higher proportion of red blood cells (37.8% versus 16.9%, P = .031) and a lower proportion of fibrin (32.3% versus 48.5%, P = .044) compared with those from large artery atherosclerosis. The proportion of red blood cells was significantly higher in clots with a susceptibility vessel sign than in those without it (48.0% versus 1.9%, P < .001), whereas the proportions of fibrin (26.4% versus 57.0%, P < .001) and platelets (22.6% versus 36.9%, P = .011) were significantly higher in clots without a susceptibility vessel sign than those with it.

The histologic composition of clots retrieved from cerebral arteries in patients with acute stroke differs between those with cardioembolism and large-artery atherosclerosis. In addition, a susceptibility vessel sign on gradient-echo imaging is strongly associated with a high proportion of red blood cells and a low proportion of fibrin and platelets in retrieved clots [1].

1)
Kim SK, Yoon W, Kim TS, Kim HS, Heo TW, Park MS. Histologic Analysis of Retrieved Clots in Acute Ischemic Stroke: Correlation with Stroke Etiology and Gradient-Echo MRI. AJNR Am J Neuroradiol. 2015 Jul 9. [Epub ahead of print] PubMed PMID: 26159515.