Japan Adult Moyamoya Trial

Data from the Japanese Adult Moyamoya (JAM) Trial were used in a study: 158 hemispheres in 79 patients. A newly formed expert panel evaluated the SPECT results submitted at trial enrollment and classified the cortical hemodynamic state of the middle cerebral artery territory of each hemisphere into one of the following three groups: SPECT stage (SS) 0 as normal, SS1 as decreased cerebrovascular reserve (CVR), and SS2 as decreased CVR with decreased baseline blood flow. In the nonsurgical cohort of the JAM Trial, the subsequent hemorrhage rate during the 5-year follow-up was compared between the SS0 (hemodynamic failure negative) and SS1+2 (hemodynamic failure positive) groups. The effect of direct or combined direct/indirect bypass surgery on hemorrhage prevention was examined in each subgroup.

The hemodynamic grade was SS0 in 59 (37.3%) hemispheres, SS1 in 87 (55.1%), and SS2 in 12 (7.6%). In the nonsurgical cohort, subsequent hemorrhage rates in the SS0 and SS1+2 groups were 12 cases per 1000 person-years and 67 cases per 1000 person-years, respectively. Kaplan-Meier analysis revealed that hemorrhagic events were significantly more common in the SS1+2 group ($p = 0.019$, log-rank test). Cox regression analysis showed that hemodynamic failure was an independent risk factor for subsequent hemorrhage (HR 5.37, 95% CI 1.07-27.02). In the SS1+2 subgroup, bypass surgery significantly suppressed hemorrhagic events during 5 years ($p = 0.001$, HR 0.16, 95% CI 0.04-0.57), with no significant effect in the SS0 group ($p = 0.655$, HR 1.56, 95% CI 0.22-11.10). Examination of effect modification revealed that the effect of surgery tended to differ nonsignificantly between these two subgroups ($p = 0.056$).

Hemodynamic failure is an independent risk factor for subsequent hemorrhage in hemorrhagic moyamoya disease. Direct bypass surgery showed a significant preventive effect in the hemodynamically impaired hemispheres. Thus, hemodynamic failure, as well as previously proposed factors such as choroidal anastomosis, should be considered for the surgical indication in hemorrhagic moyamoya disease.Clinical trial registration no.: C000000166 (umin.ac.jp) [1].

1)
Takahashi JC, Funaki T, Houkin K, Kuroda S, Fujimura M, Tomata Y, Miyamoto S. Impact of cortical hemodynamic failure on both subsequent hemorrhagic stroke and effect of bypass surgery in hemorrhagic moyamoya disease: a supplementary analysis of the Japan Adult Moyamoya Trial. J Neurosurg. 2020 Mar 13:1-6. doi: 10.3171/2020.1.JNS192392. [Epub ahead of print] PubMed PMID: 32168484.