Unruptured intracranial aneurysm diagnosis

Unruptured intracranial aneurysms (IAs) are typically asymptomatic and undetected except for incidental discovery on imaging. Blood-based diagnostic biomarkers could lead to improvements in IA management.

Preliminary findings show that RNA expression from circulating neutrophils carries an IA-associated signature. These findings highlight a potential to use predictive biomarkers from peripheral blood samples to identify patients with IAs [1)].

A total of 4070 healthy adults 22 years or older (mean age [± SD] 50.6 ± 11.0 years; 41.9% women) who underwent a brain examination known as "Brain Dock" in the central Tokyo area between April 2014 and March 2015 were checked for unruptured saccular aneurysm using 3T MRI/MRA.

The following types of cases were excluded:

1) protrusions with a maximum diameter < 2 mm at locations other than arterial bifurcations.

2) conical protrusions at arterial bifurcations with a diameter < 3 mm.

3) cases of suspected aneurysms with unclear imaging of the involved artery.

When an aneurysm was definitively diagnosed, the case was included in the aneurysm group.

Imaizumi et al., also investigated the relationship between aneurysm occurrence and risk factors (age, sex, smoking history, hypertension, diabetes, and hyperlipidemia).

One hundred eighty-eight aneurysms were identified in 176 individuals (detection rate 4.32%), with the detection rate for women being significantly higher (6.2% vs 3.0%, $p < 0.001$). The average age in the aneurysm group was significantly higher than in the patients in whom aneurysms were not detected (53.0 ± 11.1 vs 50.5 ± 11.0 years). The detection rate tended to increase with age. The detection rates were 3.6% for people in their 30s, 3.5% for those in their 40s, 4.1% for those in their 50s, 6.9% for those in their 60s, and 6.8% for those in their 70s. Excluding persons in their 20s and 80s-age groups in which no aneurysms were discovered-the detection rate in women was higher in all age ranges. Of the individuals with aneurysms, 12 (6.81%) had multiple cerebral aneurysms; no sex difference was observed with respect to the prevalence of multiple aneurysms. Regarding aneurysm size, 2.0-2.9 mm was the most common size range, with 87 occurrences (46.3%), followed by 3.0-3.9 mm (67 [35.6%]) and 4.0-4.9 mm (20 [10.6%]). The largest aneurysm was 13 mm. Regarding location, the internal carotid artery (ICA) was the most common aneurysm site, with 148 (78.7%) occurrences. Within the ICA, C1 was the site of 46 aneurysms (24.5%); C2, 57 (30.3%); and C3, 29 (15.4%). The aneurysm detection rates for C2, C3, and C4 were 2.23%, 1.23%, and 0.64%, respectively, for women and 0.68%, 0.34%, and 0.21%, respectively, for men; ICA aneurysms were significantly more common in women than in men (5.27% vs 2.20%, $p < 0.001$). Multivariate logistic regression analysis revealed that age ($p < 0.001$, OR 1.03, 95% CI 1.01-1.04), female sex ($p < 0.001$, OR 2.28, 95% CI 1.64-3.16), and smoking history ($p = 0.011$, OR 1.52, 95% CI 1.10-2.11) were significant risk factors for aneurysm occurrence

In this study, both female sex and older age were independently associated with an increased aneurysm detection rate. Aneurysms were most common in the ICA, and the frequency of aneurysms

in ICA sites was markedly higher in women [2].

1)

Tutino VM, Poppenberg KE, Jiang K, Jarvis JN, Sun Y, Sonig A, Siddiqui AH, Snyder KV, Levy EI, Kolega J, Meng H. Circulating neutrophil transcriptome may reveal intracranial aneurysm signature. PLoS One. 2018 Jan 17;13(1):e0191407. doi: 10.1371/journal.pone.0191407. eCollection 2018. PubMed PMID: 29342213.

2)

Imaizumi Y, Mizutani T, Shimizu K, Sato Y, Taguchi J. Detection rates and sites of unruptured intracranial aneurysms according to sex and age: an analysis of MR angiography-based brain examinations of 4070 healthy Japanese adults. J Neurosurg. 2018 Apr 1:1-6. doi: 10.3171/2017.9.JNS171191. [Epub ahead of print] PubMed PMID: 29624149.