Brain Dock

http://gyo-toku.jp/en/exam-immunization/brain-dock.html

The Brain Dock is the “Ningen Dock for the brain”. The Ningen Dock is a complete medical check, but does not include in-depth inspections of the brain. Since brain diseases are very difficult to treat, it is very important to prevent or find a predictor without fail. Brain Dock can detect a brain aneurysm, brain tumor, unruptured brain aneurysm, Asymptomatic brain infarction, and so on.

They recommend middle-aged and elderly people to have Brain Dock once to feel safe.

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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 [1)].

Kuroiwa et al., analyzed cases of small brain ischemic lesions found in examinees of a brain dock (neurological health screening center). Small cerebral infarction was found in 17 % of the examinees (733 cases). White matter lesions were found in 24 %. Infarctions were located in the cortex or subcortical white matter in 31 % and in the basal ganglia in 44 % of cases. Infratentorial infarction was found in 1.6 %.

They developed an animal model of small infarction in the cortex or basal ganglia induced by photothrombosis in rodents. Sprague Dawley rats or Mongolian gerbils were anesthetized and photothrombotic infarction was induced in the left caudate nucleus or parietal cortex by light exposure via an optic fiber and intravenous Rose Bengal dye injection. Histological examination revealed development of a small spherical infarction surrounding the tip of the optic fiber. The lesion turned to a cyst by 6 weeks after lesioning. Neurological deficits were found in animals both with cortical and caudate infarction. Behavioral changes in an open field test differed with the lesion site. Neurological deficits were sustained longer in animals with larger infarctions. Thus, photothrombotic infarction is useful for analyzing location-dependent and size-dependent neurological and neuropathological changes after cerebral infarction. [2)].

A cross-sectional study included 1,414 adults without neurological disorders who underwent health-screening tests of the brain, referred to as the “Brain Dock,” in our center. The MMSE scores were compared between age groups (40-44, 45-49, 50-54, 55-59, 60-64, 65-69, or ≥70 years) and educational levels [the low education level group (6-12 years) and the high education level group (≥13 years)].

The median age was 59 years, and 763 (54%) were women. There was no significant difference in the MMSE total score between women and men. The stepwise method of the multiple linear regression analysis confirmed that a higher age [β value, -0.129; standard error (S.E.), 0.020; $p<0.001$], low education level (6-12 years) (β value, -0.226; S.E., 0.075; $p=0.003$), and women (β values, 0.148; S.E.,

0.066; p=0.024) was significantly associated with decreased MMSE score. In general, both the percentile scores and mean scores decreased with aging and were lower in the low education level group than in the high education level group. The degree of decrement in scores with age was stronger in the low education level group than in the high education level group.

The provided data for age- and education-specific reference norms will be useful for both clinicians and investigators who perform comprehensive brain examinations to assess the cognitive function of subjects [3].

Dot-like low intensity spots (a dot-like hemosiderin spot: dotHS) on T2*-weighted MR images (T2*WI), which is regarded as a sensitive method for hemosiderin detection, have been histologically diagnosed as old microbleeds associated with microangiopathies. The clinical significance of the dotHS, however, is still under debate. Therefore, we investigated the factors associated with dotHS.

Horita et al., investigated 209 healthy volunteers in our hospital (sex: 106 males, 103 females; age: 38 to 78 years old, mean age: 56.4 +/- 8.3 years old) using “Brain Dock”, a formalized screening system for asymptomatic brain diseases. The Odds ratio (OR) was estimated from multiple logistic regression analyses using the dotHS and variables.

T2*WI demonstrated dotHS in 7.7% of volunteers, and the mean number of dotHS was 0.16 +/- 0.78. The hemosiderin was preferentially deposited in the basal ganglia and thalamus. Age > or = 65 years old (OR: 5.9; 95% confidence interval [CI]: 1.4-25.9; p = 0.02), hypertension (OR: 7.0; 95% CI: 1.4-34.7; p = 0.02), and headache (OR: 5.8; 95% CI: 1.4-24.6; p = 0.02) were all found to be independently associated with dotHS.

The dotHS was significantly associated with several factors, including age, hypertension and headache [4].

References

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