**Supplementary Materials**

Using hemodynamic parameters quantified with computational fluid dynamics to explore potential mechanisms of occurrence and progression in Alzheimer Disease

Jian Xie§1, Zaiheng Cheng§2, LiHua Gu1, Bokai Wu2, Gao-jia Zhang3,Wen-Shin Shiu2, , Rongliang Chen2, Zan Wang1, Chang Liu2, Xiao-chuan Cai4, Li-Ping Wang2, Jia Liu\*2, Zhijun Zhang1\*

§ These authors contributed equally to this work.

\*Correspondence: [janemengzhang@vip.163.com](mailto:janemengzhang@vip.163.com); [jia.liu@siat.ac.cn](mailto:jia.liu@siat.ac.cn).

1Zhijun Zhang, PhD& MD, Department of Neurology, Affiliated ZhongDa Hospital, School of Medicine , Southeast University , Nanjing , Jiangsu 210009 , China.

2Jia Liu, PhD, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, Guangzhou 518055, China.

Contents

Supplementary TableS1, TableS2.

Supplementary FigureS1.

Supplementary Table S1: Supplementary demographics and clinical characteristics of participants

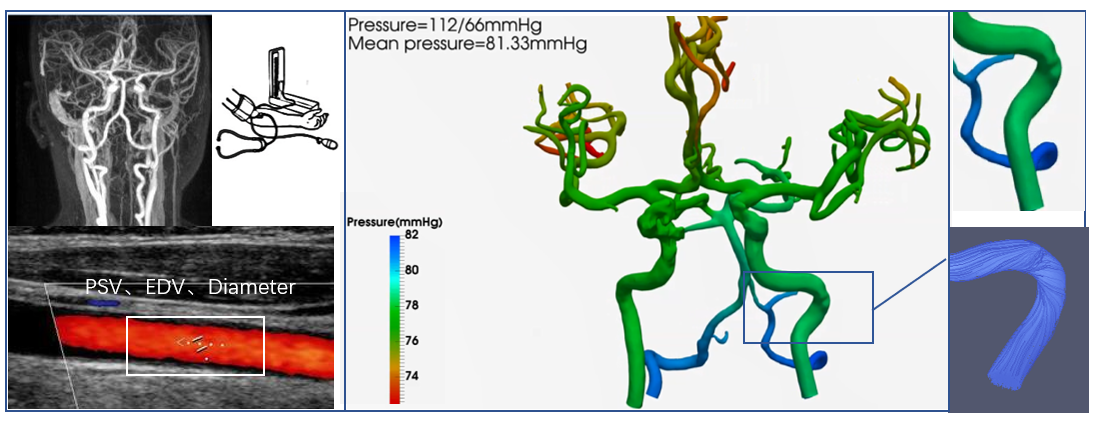
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Characteristics | | AD(n=30) | VaD(n=29) | HCs(n=34) | *F* value | *P* value |
| MAP(mmHg) | | 95.40±9.22 | 99.26±13.87 | 97.34±11.12 | 0.842 | 0.434 |
| HR(p/min) | | 73.72±10.43 | 75.04±7.43 | 73.62±8.54 | 0.23 | 0.80 |
| BMR | | 23.72±21.22 | 23.03±14.93 | 24.91±14.98 | 0.09 | 0.91 |
| History of  Atrial fiberration | | 1 | 1 | 0 |  |  |
| Alcohol Abuse | | 1 | 2 | 1 |  |  |
| ASCVD  risk | Low-risk | 2 | 0 | 6 | *χ2*=7.05 | 0.11 |
| Mid-risk | 3 | 1 | 7 |  |  |
| High-risk | 15 | 12 | 15 |  |  |
| Hb(g/L) | | 127.64±12.10 | 125.92±15.65 | 134.48±17.56 | 0.08 | 2.62 |
| Total serum protein(g/L) | | 64.61±5.72 | 63.94±7.38 | 66.52±6.01 | 1.32 | 0.27 |
| Low serum albumin | | 1 | 3 | 2 |  |  |
| ALT(U/L) | | 18.86±8.67 | 19.42±16.56 | 19.41±10.09 | 0.02 | 0.98 |
| UN(mmol/L) | | 5.43±1.71 | 6.57±4.14 | 5.28±1.22 | 2.164 | 0.121 |
| SHcy (umol/L) | | 15.22±9.49 | 15.37±12.60 | 15.31±9.94 | 0.001 | 0.99 |
| HbA1c(%) | | 6.47±1.63 | 6.82±1.79 | 6.19±1.17 | 1.123 | 0.33 |

Abbreviations: MAP: mean artery pressure, HR: heart rate, BMR: basic metabolism rate=(HR+MAP)-111, Hb: Hemoglobin, ALT: alanine aminotransferase, Cr: creatinine, sHcy: serum homocysteine, HbA1c: glycosylated hemoglobin, ASCVD: Arteriosclerotic Cardiovascular Disease.

Supplementary Table S2 Hemodynamic parameters of all subjects

|  |  |  |
| --- | --- | --- |
|  | CBF | CVR |
| number | 93 | 93 |
| minimum | 4.69 | 4110.93 |
| maximum | 20.88 | 25529.00 |
| mean value | 10.96 | 10170.52 |
| standard deviation | 3.47 | 4273.141 |
| 25th percentile | 8.52 | 7000.00 |
| 50th percentile | 10.11 | 9368.15 |
| 75th percentile | 13.51 | 12813.89 |

a)



b)



**Supplementary figure S1** Procedure of CFD model, (a) a whole brain intracranial arterial tree was rebuilt, the pressure of every vessel was shown in color map, (b) pressure of every branch could be calculated.