**Supplement**

**Neurocognitive Function in Patients with Atrial Fibrillation Undergoing Pulmonary Vein Isolation**

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| **Supplementary Table 1:** | | |
| **Test** | **Description** | **Scale** |
| The Trail Making Test (TMT) | The Trail Making Test (TMT) is a validated neuropsychological test of executive functioning1 usually applied as two parts. In Part A (TMT A), the patient draws lines to connect circled numbers in ascending order (i.e., 1-2-3, etc.) as quickly and accurately as possible, allowing to measure visual attention and psychomotor speed. Similarly, part B (TMT B) requires connecting circled numbers and letters in an alternating numeric and alphabetic order (i.e., 1-A-2-B, etc.), assessing task switching abilities.2,3 We measured the time to correctly complete each part in seconds, correspondingly. If the patient was not able to finish the test in 180 seconds (TMT A) or 300 seconds (TMT B), respectively, the test was stopped and the number of correct connections was noted. In order to use data of all patients, we used the number of correct connections per second. | 0-XX correct connections per second |
| Semantic Fluency Test (SFT) | The Semantic Animal Fluency test allows to examining executive abilities and brain functions.[34] Patients have to enumerate as many animal names as possible within 60 seconds. During this task, they need to search for information from semantic memory and to produce the response. Test performance (i.e., total number of word productions) usually depends on the size and location of brain lesions.4 While semantic memory and word storage recruit the temporal lobe, modulation of attention and word search depend on processing by the frontal lobe5 or the prefrontal-lateral cerebellar system6 | 0-XX correct animals in one minute |
| Digit Symbol Substitution Test (DSST) | The DSST is a test of psychomotor speed performance where patients receive a key grid of numbers and matching symbols and a test section with numbers and empty boxes. They have to fill as many empty boxes as possible with the symbol that matches the given number. The score is the number of correct number-symbol matches achieved within 120 seconds, taken to reflect the overall efficiency of cognitive operations.7 | 0-XX correct symbols in two minutes |

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| **Supplementary Table 2:** Multivariable linear regression models for the association of PVI with change in cognition within one year when using Inverse Probability of Treatment Weighting | | | | | |
|  | β coefficient (95% confidence interval) | | | | |
|  | MoCA | TMT A | TMT B | DSST | SF |
| Intercept | 10.9 (8.98; 12.82) | 0.62 (-0.09; 0.08) | 0.23 (0.18; 0.28) | 23.5 (18.3; 28.6) | 14.8 (12.15; 17.50) |
| PVI | 1.19 (0.05; 2.32) | -0.007 (-0.09; 0.08) | -0.04 (-0.08; 0.01) | -1.75 (-6.37; 2.86) | -0.14 (-3.61; 3.34) |
| Baseline cognition | 0.67 (0.62; 0.72) | 0.64 (0.59; 0.69) | 0.73 (0.68; 0.78) | 0.84 (0.81; 0.88) | 0.63 (0.58; 0.68) |
| Time since last PVI | -0.003 (-0.01; 0.00) | 0.000 (0.00; 0.00) | 0.0001 (0.00; 0.00) | 0.009 (-0.01; 0.03) | 0.005 (-0.01; 0.02) |
| Age | -0.04 (-0.05; -0.02) | -0.005 (-0.01; 0.00) | -0.002 (0.00; 0.00) | -0.19 (-0.25; -0.14) | -0.09 (-0.12; -0.06) |
| Female sex | 0.29 (0.01; 0.57) | -0.003 (-0.02; 0.01) | 0.0009 (-0.01; 0.01) | 0.27 (-0.67; 1.20) | 0.13 (-0.34; 0.61) |
| History of heart failure | 0.03 (-0.23; 0.29) | -0.003 (-0.02; 0.01) | -0.008 (-0.02; 0.00) | 0.23 (-0.61; 1.08) | -0.17 (-0.65; 0.32) |
| History of stroke/TIA | -0.34 (-0.65; -0.03) | -0.01 (-0.03; 0.01) | -0.01 (-0.02; -0.01) | -0.81 (-1.76; 0.14) | -0.55 (-1.10; 0.00) |
| History of hypertension | -0.16 (-0.43; 0.10) | 0.007 (-0.01; 0.02) | 0.002 (-0.01; 0.01) | 0.08 (-0.83; 0.98) | -0.28 (-0.76; 0.21) |
| History of diabetes | -0.23 (-0.56; 0.10) | -0.03 (-0.05; -0.01) | -0.008 (-0.02; 0.00) | -1.08 (-2.09; -0.07) | -0.89 (-1.41; -0.37) |
| History of vascular disease | 0.05 (-0.21; 0.31) | -0.007 (-0.02; 0.01) | -0.002 (-0.01; 0.01) | -0.79 (-1.60; 0.02) | 0.31 (-0.17; 0.79) |
| Education higher | 0.77 (0.37; 1.17) | 0.04 (0.02; 0.06) | 0.002 (0.01; 0.03) | 0.82 (-0.28; 1.92) | 0.61 (0.02; 1.21) |
| Paroxysmal AF | -0.07 (-0.31; 0.18) | -0.005 (-0.02; 0.01) | -0.003 (-0.01; 0.00) | 0.36 (-0.44; 1.16) | -0.04 (-0.47; 0.39) |
| Oral anticoagulation | -0.11 (-0.75; 0.52) | -0.02 (-0.06; 0.03) | -0.01 (-0.04; 0.01) | -2.35 (-4.80; 0.10) | -0.95 (-2.20; 0.31) |
| History of electrocardioversion | -0.11 (-0.37; 0.15) | -0.01 (-0.03; 0.00) | 0.002 (-0.01; 0.01) | 0.02 (-0.81; 0.86) | -0.20 (-0.67; 0.27) |

The regression models were adjusted for age, sex, corresponding test value at baseline, time since PVI, history of heart failure, history of stroke/TIA, history of hypertension, history of diabetes, history of vascular disease, education, AF-type, history of anticoagulation, history of ECV

CI= confidence interval, βPVI= beta coefficient (Effect of PVI)

MoCA= Montreal Cognitive Assessment. TMT A= Trail Making Test A. TMT B= Trail Making Test B, DSST= Digit Symbol Substitution Test; SF = Semantic Fluency Test

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| **Supplementary Table 3:** Multivariable linear regression models for the association of PVI with change in cognition within one year in a propensity score matched population | | | | | |
|  | β coefficient (95% confidence interval) | | | | |
|  | MoCA | TMT A | TMT B | DSST | SF |
| Intercept | 12.7 (9.3; 16.0) | 0.47 (0.25; 0.68) | 0.25 (0.16; 0.35) | 20.11 (9.73; 30.49) | 12.06 (6.37; 17.75) |
| PVI | 1.02 (-0.22; 2.26) | -0.01 (-0.09; 0.11) | 0.04 (-0.08; 0.01) | -2.05 (-6.76; 2.66) | -0.07 (-2.78; 2.65) |
| Baseline cognition | 0.61 (0.53; 0.70) | 0.65 (0.57; 0.74) | 0.71 (0.63; 0.79) | 0.86 (0.79; 0.92) | 0.60 (0.51; 0.70) |
| Time since last PVI | -0.002 (-0.01; 0.00) | 0.00 (0.00; 0.00) | 0.00 (0.00; 0.00) | 0.006 (-0.01; 0.02) | 0.004 (-0.01; 0.01) |
| Age | -0.02 (-0.05; 0.01) | -0.03 (-0.01; 0.00) | -0.003 (0.00; 0.00) | -0.12 (-0.24; 0.00) | -0.04 (-0.11; 0.02) |
| Female sex | 0.59 (0.07; 1.11) | -0.04 (-0.08; 0.00) | -0.004 (-0.02; 0.01) | 0.33 (-1.66; 2.31) | -0.12 (-1.27; 1.02) |
| History of heart failure | 0.09 (-0.50; 0.68) | -0.03 (-0.07; 0.02) | -0.007 (-0.03; 0.01) | 1.95 (-0.29; 4.18) | -0.79 (-2.09; 0.50) |
| History of stroke/TIA | -0.04 (-0.88; 0.80) | -0.05 (-0.11; 0.02) | -0.02 (-0.06; 0.01) | -2.33 (-5.51; 0.84) | -1.43 (-3.26; 0.40) |
| History of hypertension | -0.57 (-1.06;-0.08) | 0.007 (-0.03; 0.04) | 0.005 (-0.01; 0.02) | -1.78 (-3.64; 0.09) | -0.52 (-1.59; 0.56) |
| History of diabetes | 0.18 (-0.60; 0.96) | 0.02 (-0.04; 0.08) | -0.006 (-0.03; 0.02) | -0.39 (-3.34; 2.55) | -0.07 (-1.77; 1.62) |
| History of vascular disease | 0.009 (-0.62; 0.64) | -0.02 (-0.06; 0.03) | -0.01 (-0.03; 0.01) | -0.68 (-3.06; 1.70) | 0.42 (-0.96; 1.79) |
| Education higher | 0.91 (0.13; 1.70) | 0.06 (0.00; 0.12) | 0.02 (-0.01; 0.05) | 1.93 (-1.07; 4.94) | 0.68 (-1.04; 2.41) |
| Paroxysmal AF | -0.21 (-0.72; 0.30) | 0.02 (-0.02; 0.05) | -0.00 (-0.02; 0.02) | 0.04 (-1.89; 1.97) | -0.002 (-1.11; 1.11) |
| Oral anticoagulation | -1.01 (-2.05; 0.04) | 0.05 (-0.03; 0.13) | 0.009 (-0.03; 0.05) | -3.90 (-7.86; 0.07) | -0.80 (-3.09; 1.48) |
| History of electrocardioversion | -0.26 (-0.77; 0.25) | -0.02 (-0.06; 0.02) | -0.004 (-0.02; 0.01) | -1.05 (-2.99; 0.88) | -0.22 (-1.33; 0.90) |

The regression models were adjusted for age, sex, corresponding test value at baseline, time since PVI, history of heart failure, history of stroke/TIA, history of hypertension, history of diabetes, history of vascular disease, education, AF-type, history of anticoagulation, history of ECV

CI= confidence interval, βPVI= beta coefficient (Effect of PVI)

MoCA= Montreal Cognitive Assessment. TMT A= Trail Making Test A. TMT B= Trail Making Test B, DSST= Digit Symbol Substitution Test; SF = Semantic Fluency Test

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