

## **Brain imaging determinants of functional prognosis after severe endocarditis:**

### **A multicenter observational study.**

#### **SUPPLEMENTAL MATERIALS**

##### **Registration procedure**

The registrations of the diffusion weighted imaging (DWI) images and computed tomography (CT) images were performed using RegLSM (<http://metavcimap.org/features/software-tools/>). Briefly, the DWI were linearly registered to native T1-weighted (T1w) images if the latter were available. They were next non-linearly registered to the T1 MNI-152 template. If T1w images were not available, DWI were directly registered to the MNI-152 template. An age-specific MRI template [1] served as an intermediate template because most patients were elderly. An identical registration method was applied for CT images using a specific registration algorithm [2]. Registration of T2\*-weighted images (wi) was performed with the aid of the Functional Magnetic Resonance Imaging Module of the Brain Software Library (FSL) ver. 6.0 ([www.fmrib.ox.ac.uk/fsl](http://www.fmrib.ox.ac.uk/fsl)). If the T1-wi image was available, the T2\*-wi was linearly registered to the native T1-wi and then further registered to the T1 MNI-152 template. If the T1-wi was not available, the T2\*-wi was non-linearly registered to the T2-MNI template and then further registered to the T1-MNI template. All lesions were transformed to the T1-MNI template using the resulting matrices. The registration results were subject to quality checks in which lesional maps on the MNI-152 template were compared to those on the original scans. Manual corrections were performed if necessary.

## Supplemental Tables

### Supplemental Table I. Timing of surgery.

	Total population (n=125)	mRS <3 (n=77)	mRS ≥3 (n=48)
Surgery indication			
Cardiogenic shock	11 (9)	6 (8)	5 (10)
Heart failure	12 (10)	7 (9)	5 (10)
Severe regurgitation	34 (27)	19 (25)	15 (31)
Uncontrolled infection	20 (16)	16 (21)	4 (8)
A need to prevent embolism	48 (38)	29 (38)	19 (40)
Theoretical timing (2015 ESC guidelines) <sup>3</sup>			
Emergency	63 (50)	38 (49)	25 (52)
Urgent	60 (48)	39 (50)	21 (44)
Elective	2 (1)	0 (0)	2 (4)
Real timing			
“In time” (2015 ESC guidelines) <sup>3</sup>	62 (50)	34 (44)	28 (58)
Time from diagnosis (days)*	24.8 (± 27)	27.6 (± 28)	20.4 (± 25)

Note: Unless otherwise specified, the data are numbers of participants with percentages in parentheses.

\* The data are means ± standard deviations.

mRS, modified Rankin Scale; ESC, European Society of Cardiology.

**Supplemental Table II. Descriptive statistics of the population treated by surgery and according to the functional outcomes based on the modified Rankin scale (mRS) score at 6 months.**

	Total population (n=125)	mRS <3 (n=77)	mRS ≥3 (n=48)	P-value
<b>Patient characteristics</b>				
Age (years)*	58 (± 14)	56 (± 15)	62 (± 11)	<b>0.007</b>
Sex, male	89 (71)	51 (66)	38 (79)	0.120
Previous endocarditis	5/121 (4)	2 (3)	3 (7)	0.301
Previous valve surgery	26 (21)	14 (18)	12 (25)	0.361
Intravenous drug user	13/119 (11)	11 (15)	2 (4)	0.077
Immunodepression	10 (8)	6 (8)	4 (8)	0.914
Diabetes mellitus	34 (27)	15 (20)	19 (40)	<b>0.014</b>
Renal insufficiency	48 (38)	24 (31)	24 (50)	<b>0.035</b>
Care-associated condition	25 (20)	12 (16)	13 (27)	0.118
<b>Clinical and microbiological features</b>				
SOFA score*	6.7 (± 3.5)	6.6 (± 3.7)	7 (± 3.3)	0.501
Glasgow coma scale score*	12.5 (3.7)	12.7 (± 3)	12.2 (± 3)	0.472
<i>Staphylococcus aureus</i> infection	67 (54)	37 (48)	30 (63)	0.115
<b>Echocardiographic findings</b>				
Aortic valve involved	80 (64)	49 (64)	31 (65)	0.915
Mitral valve involved	68 (54)	42 (55)	26 (55)	0.967
Aortic and mitral valves involved	44 (35)	28 (36)	16 (33)	0.908
Vegetation	115 (92)	72 (94)	43 (90)	0.432
Vegetation length (mm)*	14 (± 11)	15 (± 12)	14 (± 8)	0.476
Regurgitation ≥3/4	89 (71)	55 (80)	34 (71)	0.757
<b>Brain imaging findings</b>				
MRI	62 (50)	40 (52)	22 (46)	0.506
Contrast injection	108 (86)	69 (90)	39 (81)	0.185
Time from diagnosis (days)*	8 (± 16)	8 (± 15)	5 (± 17)	0.406
Ischemic stroke	96 (77)	56 (73)	40 (83)	0.172
Ischemic volume (mL)*	9.5 (± 16)	10 (± 18)	8.7 (± 13)	0.688
Hemorrhagic transformation	12 (10)	7 (9)	5 (10)	NA
Hemorrhagic transformation volume (mL)*	2 (± 2)	2.3 (± 2.5)	1.5 (± 1)	NA
Hemorrhagic stroke	16 (13)	13 (17)	3 (6)	0.084
Hemorrhagic stroke volume (mL)*	19 (± 26)	15 (± 20)	34 (±48)	0.571
Total hemorrhagic volume (mL)*	11.5 (± 21)	10.6(± 17)	13.7(± 31)	0.797
Subarachnoidal hemorrhage	24 (19)	17 (22)	7 (15)	0.301
Abscess	3 (2)	2 (2)	1 (1)	0.855
IIA	16 (13)	14 (18)	2 (4)	<b>0.021</b>
Leukopathy	62 (50)	32 (42)	30 (63)	<b>0.023</b>
Microbleeds (n)*	5 (± 8.6)	5.4 (± 9.6)	4.3 (± 6.6)	0.586
Volume of eloquent area (mL)*	1 (± 2.9)	0.9 (± 2.8)	1.1 (± 3.2)	0.745

Note: Unless otherwise specified, the data are numbers of participants with percentages in parentheses.

\* The data are means  $\pm$  standard deviations.

NA, non-applicable because of low numbers of cases. Volume means are calculated for patients affected by such events.

SOFA, Sequential Organ Failure Assessment; MRI, magnetic resonance imaging; IIA, infectious intracranial aneurysm.

## SUPPLEMENTAL REFERENCES

1. Rorden, C., et al., *Age-specific CT and MRI templates for spatial normalization*. Neuroimage, 2012. **61**(4): p. 957-65.
2. Kuijf, H.J., et al., *Registration of Brain CT Images to an MRI Template for the Purpose of Lesion-Symptom Mapping.*, in *MBIA*, L.T. Shen L., Yap PT., Huang H., Shen D., Westin CF. , Editor. 2013, Springer, Cham.