SVD score tool

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Purpose

Primary: continuous scale for grading SVD burden, for possible use in current as well as historical data.

Secondary: risk stratification of new stroke, dementia; correlation to life style factors.

> Only intended for research use currently
>
> The following scoring system is not formally published and has not been through peer-review.

Scoring

Table 1: SVD score table

MRI features	**Raw SVD score value**
Number of microbleeds (*T2*/SWI*)	
0	0
1	1
2-4	2
5-10	3
>10	4
Location of microbleeds – no points (*T2*/SWI*)	
Lobar, deep, or infratentorial (choose one or more)	L/D/I
Superficiel siderose (*T2*/SWI*)	
No siderosis	0
1 sulcus	1
>1 sulcus	2
Lacunes (*FLAIR*)	
0	0
1-2	1
3-5	2
>5	3
White matter hyperintensities – see Figure 1 (*FLAIR*)	
Absent	0
Punctate foci	1
Beginning confluence	2
Large confluent areas	3
Atrophy - see Figure 2 (*FLAIR/T1*)	
No	0
Mild	1
Moderate	2
Severe	3
Total SVD score	**0-15**

Setting

The scoring system is intended for use with acute MRI stroke scans. Scans are performed according to the acute stroke protocol at the given time of scan. Available sequences are DWI, ADC, 2D FLAIR, and T2* or SWI in our setting, but if available 3D FLAIR and T1 sequences should be used. Data capturing should reflect this, if data is later merged from different populations.

Scoring is performed independently by trained neurologists. Inter-rate-reliability-measures are performed to ensure validity.

Definitions on biomarkers

Definitions are mainly according to the STRIVE v1 criteria,(Wardlaw et al. 2013) with minor local specifications.

Microbleeds

Sequence: T2*/SWI

Small (generally 2–5 mm in diameter, but sometimes up to 10 mm) areas of signal void with associated blooming seen on SWI-weighted MRI.

Different cut-offs are used in different trials.(Akoudad et al. 2016) We try to register in a way, so that our analysis can be made similarly to other studies and to provide enough resolution.

As discussions about the importance of location is ongoing,(Vernooij et al. 2008) we register if microbleeds are located lobar, deep, or infratentorial.

Superficial siderosis

Sequence: T2*/SWI

"Investigators should describe the location of siderosis (i.e., the number of sulci involved and in which lobes)."(Wardlaw et al. 2013, 828)

Lacunar infarcts

Sequence: 2D/3D FLAIR

"A round or ovoid, subcortical, fluid-filled cavity (signal similar to CSF) of between 3 mm and about 15 mm in diameter, consistent with a previous acute small subcortical infarct or haemorrhage in the territory of one perforating arteriole."(Wardlaw et al. 2013, 825)

Additionally: "We identified asymptomatic lacunar infarcts as sharply demarcated hyperintense lesions <20 mm on T2-weighted images with corresponding hypointense lesions with a hyperintense rim on FLAIR. In lacunar stroke patients, the lesion could not be compatible with the clinical stroke."(Huijts et al. 2013)

White matter hyperintensities

Sequence: 2D/3D FLAIR

The Fazekas subscale for deep white matter is used. The scale divides the white matter in periventricular and deep white matter, and each region is given a grade depending on the size and confluence of lesions.(Fazekas et al. 1987)

No regional differences is noted.(Groot et al. 2000) Scoring is performed with visual reference from Radiopedia.org.

Atrophy

Sequence: 2D/3D FLAIR or T1

We follow definitions for the Global Cerebral Atrophy (GCA) score.(Harper et al. 2015)

A picture sample for reference is used.(Harper et al. 2015, fig. 1)

References

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