Université de Lille 2 DROIT ET SANTÉ

Predictors of mortality and functional outcome 1 year after decompressive hemicraniectomy for malignant middle cerebral artery infarction.

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BACKGROUND

Decompressive hemicraniectomy (DH) is currently recommended in patients with a high risk of malignant middle cerebral artery (MMCA) infarction, within 48 hours from symptoms onset. MMCA infarcts undergoing surgery are associated with case-fatality rates of approximately 22%. Data in literature on mortality and functional outcome after decompressive hemicraniectomy are obtained on small cohort of patients. Moreover, studies addressing the issue of independent predictors of vital and functional outcome are sparse.

AIMS

The aim of the study was to identify predictors of mortality and functional outcome 1 year after decompressive hemicraniectomy for MMCA infarction in a large cohort of consecutive patients.

METHODS

The Lille Decompressive Surgery Registry is a prospective and observational cohort that recruited consecutive patients from May 2005 to September 2015. Methodology concerning inclusion and exclusion criteria and surgical techniques is detailed elsewhere [3]. We performed univariate analysis and we selected variables from univariate analysis in order to perform the multivariate logistic regression analyses.

RESULTS

From May 2005 to September 2015, we prospectively recruited 118 patients (77 men, 65%), with a median age of 49 years (Interquartile range: 47-51). Twenty-two patients (19%) died during the first year of follow-up of whom 17 had died in the acute phase. The only independent predictor of mortality at 1 year was atrial fibrillation (OR 4,833;CI95% [1,549-15,077]). Among survivors, 37 patients (39%) had a poor functional outcome (mRS [4-5]). In the multivariate analysis, the independent predictors of poor outcome were: arterial hypertension (OR 3,3352; CI95% [1,225-10,301]) and excessive alcohol consumption (OR 11,482; CI95% [2,997-43,993]). Age and neurological severity at onset did not independently predict mortality and functional outcome 1 year after decompressive hemicraniectomy.
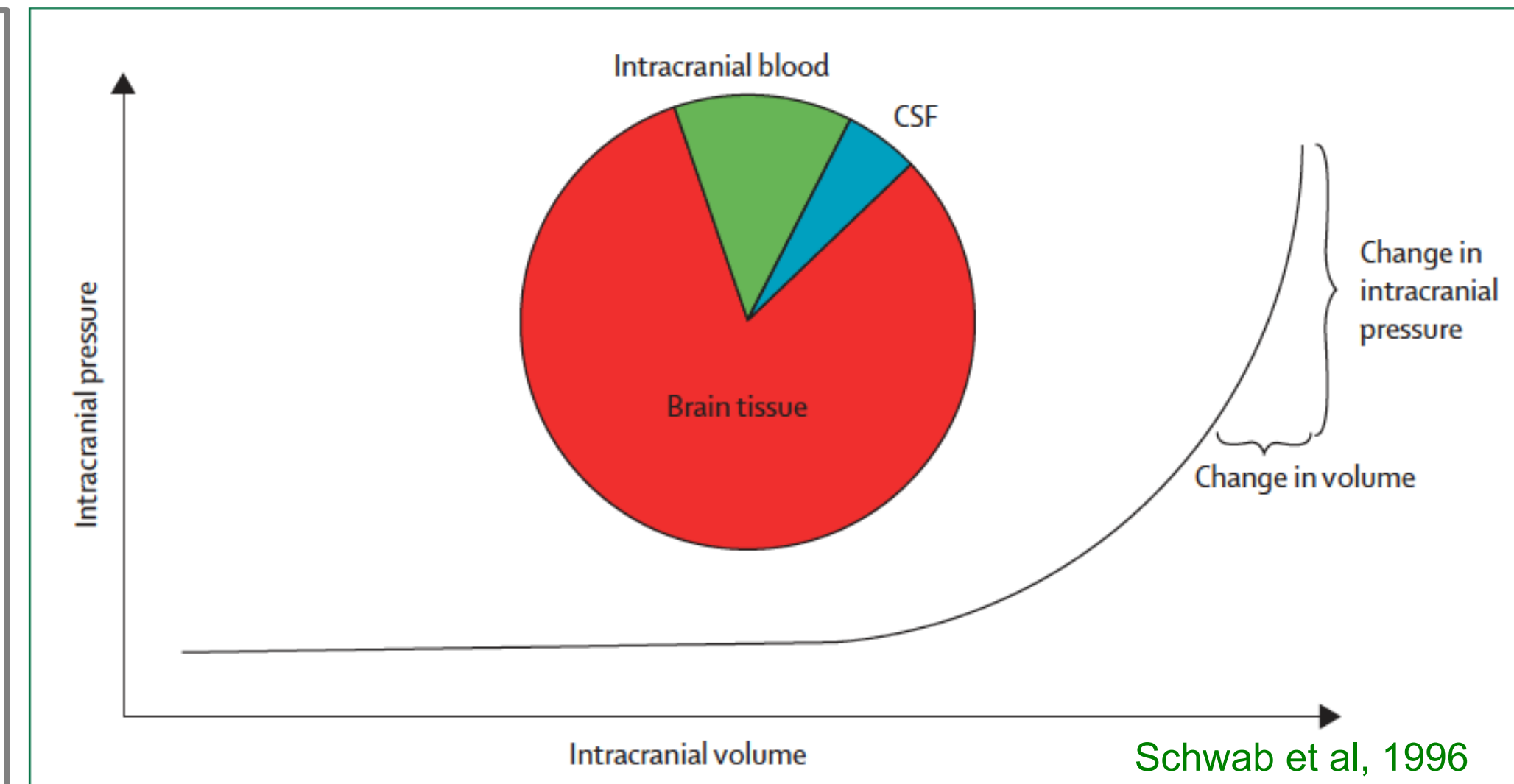

Fig 1. Brain oedema formation. Huttner and Schwab, Lancet Neurol, 2009.
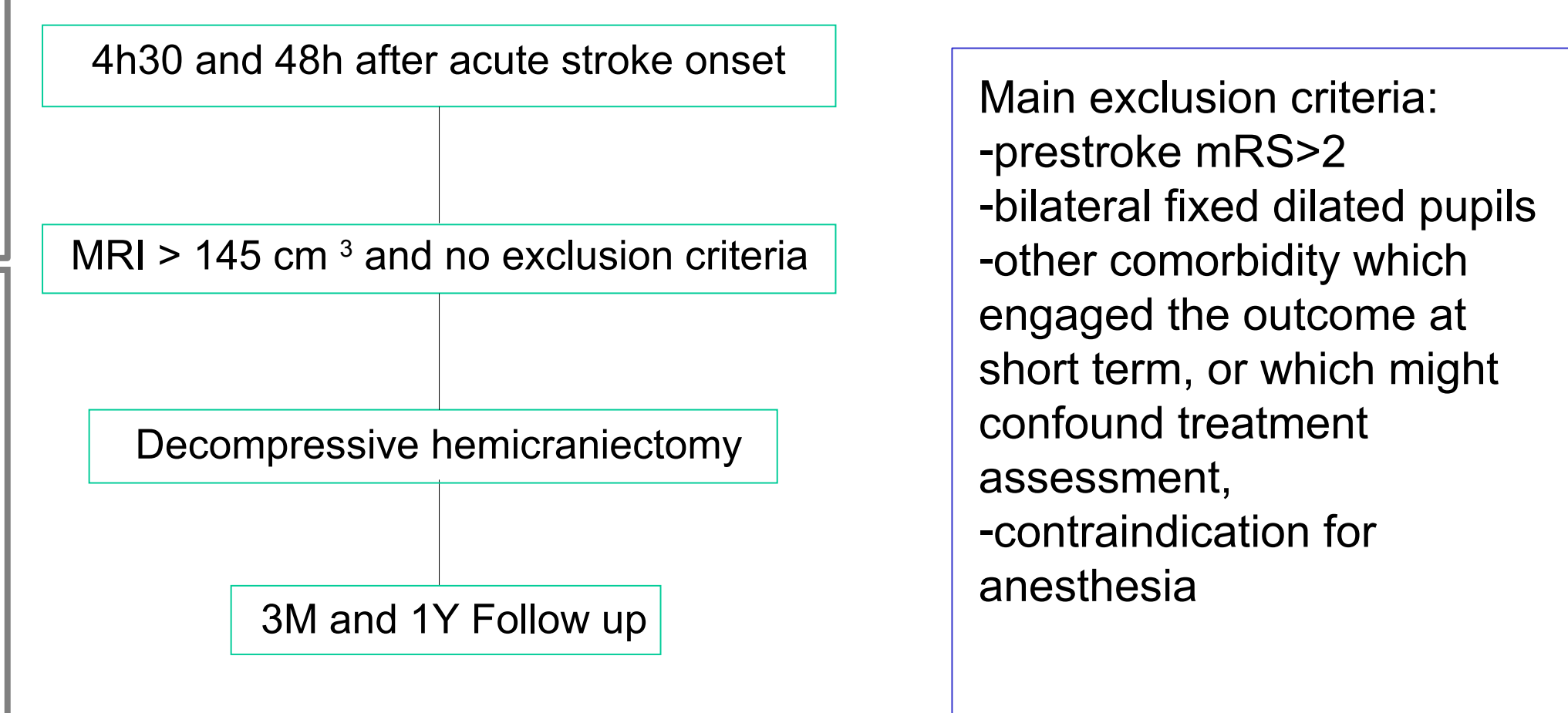

Main exclusion criteria:
-prestroke mRS>2
-bilateral fixed dilated pupils
-other comorbidity which engaged the outcome at short term, or which might confound treatment assessment,
-contraindication for anesthesia

Fig. 2: Lille Study flow chart

Demographic and stroke characteristics	N= 118
Age	49,3 (47,5 - 51,1)
Men	77 (65,3)
NIHSS	21,09 (20,22 – 21,96)
Stroke volume before in DWI (cm³)	210,2 (198,2 – 222,2)
Dominant infarct territory — no. (%)	66 (55,9)
Cardioembolic	37 (31.4)
i.v. rtPA	46 (39)
Thrombectomy	12 (10,2)

Table 1: Baseline characteristic of the whole population

Demographic and stroke characteristics	Tot, N=118	Survived, N=96	Dead, N=22 (18,6%)	P
Age	50 (43-57)	49 (42-55)	55 (45-64)	0.12
Atrial Fibrillation	16 (13.6%)	9 (7.6%)	7 (5.9%)	0.006
NIHSS at admission	18 (20-23)	20 (18-23)	22(18-25)	0.093
Time to DH	21h40 (13h35- 29h45)	22h15(14h-30h54)	15h09 (09h51-24h27)	0.024
Intensive care hospitalisation	42 (35.6%)	28 (23.7%)	14 (11.9%)	0.002

Table 2: Variables selected from univariate analysis of mortality 1Y year after a DH.

Demographic and stroke characteristics	Tot, N=96	mRS [0-3] N=59	mRS [4-5] N =37	P
Age	50 (43-57)	47 (40-53)	53 (44-59)	0.02
Arterial Hypertension	31 (32.3%)	15 (15.6%)	16 (16.7%)	0.069
Heavy alchol intake	16 (16.7%)	4 (4.2%)	12 (12.5%)	0.002
Atrial Fibrillatiom	9 (9.4%)	3 (3.1%)	6 (6.3%)	0.083
Volume	200 (160-242)	185 (154-219)	215 (166-230)	0.046

Table 3: Variables selected from univariate analysis of functional outcome 1Y year after a DH.

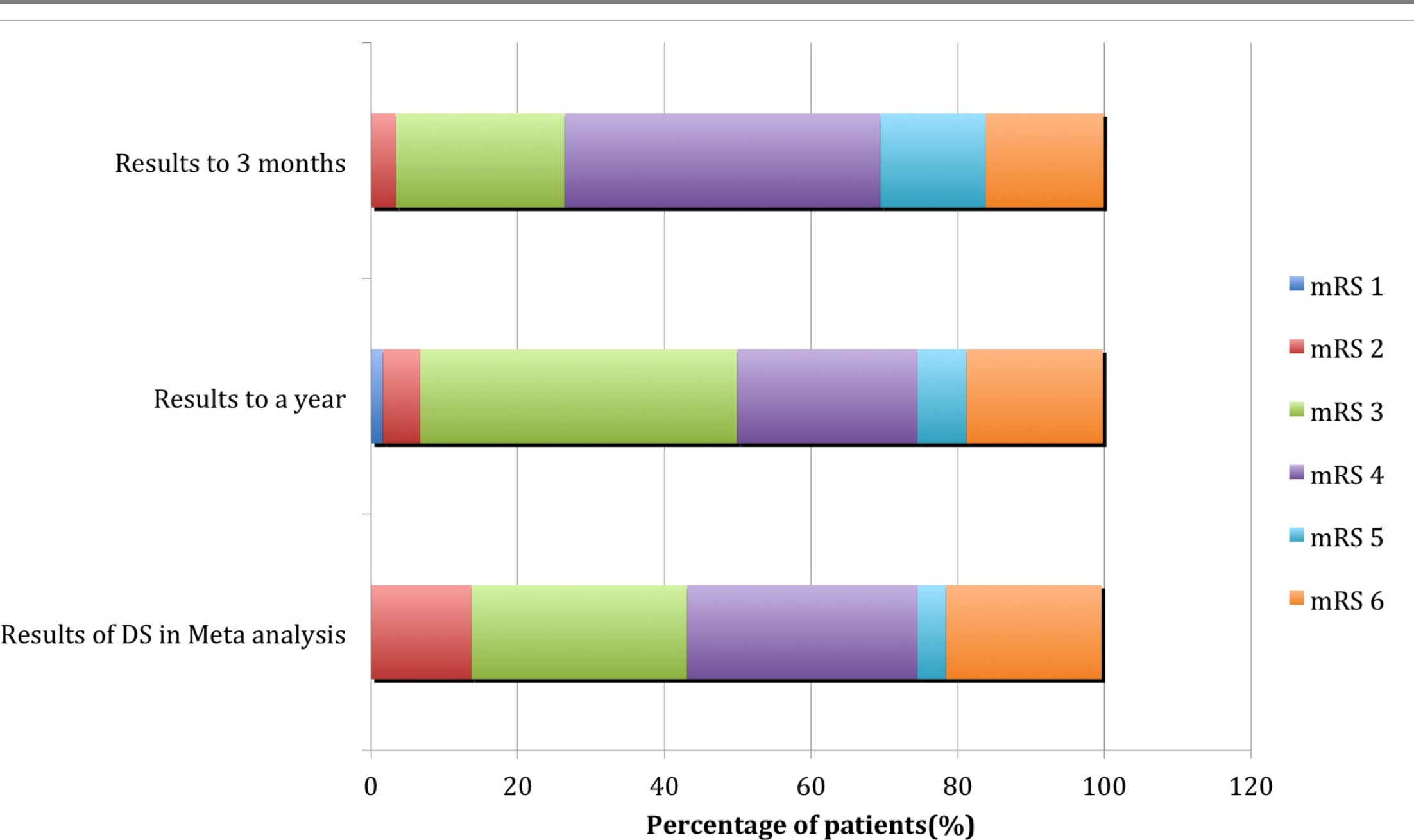Fig 3: Functional outcome and mortality 3M and one year after a DH, compared to the results of DH in 2009 meta analysis (Destiny, Decimal, Hamlet).

DISCUSSION

Patients' medical history and in particular vascular risk factors have a major impact on mortality and functional outcome 1 year after decompressive hemicraniectomy for MMCA infarct.