Pattern of care of patients with ruptured MCA aneurysms in Switzerland: insights from a national database (Swiss SOS)


BACKGROUND:
Middle cerebral artery (MCA) aneurysms represent 25% of all intracranial aneurysms. Due to their trifurcated anatomy, broad necks, dysmorphic shapes and branches, MCA aneurysms have long been considered unfavorable for coiling. Conversely, MCA aneurysms are considered favorable for clipping because they are accessible, can be easily manipulated after splitting the sylvian fissure, and other treatment techniques (thrombectomy, clip reconstruction, bypass) can be applied if conventional clipping fails. MCA aneurysms were underrepresented in the ISAT trial (303 aneurysms, 14.1%). Today, the management of MCA aneurysms varies between different centers and countries.

OBJECTIVE:
To investigate the pattern of care and outcomes of patients with a ruptured MCA aneurysm, as compared to patients with ruptured aneurysms of other arteries of the anterior circulation in Switzerland.

METHODS:
The Swiss SOS database is a nationwide, completely unselected, hospital-based, institutional review board (IRB)-approved multicentre database on aneurysmal subarachnoid haemorrhage (aSAH) patients. Patient data was obtained from Swiss SOS, at time of analysis covering 1067 patients treated for aSAH at one of eight Swiss neurovascular centres between 01/2009 - 12/2012. The local IRB of every participating centre consented to the study protocol. Informed consent was obtained from each patient or next of kin. DIND was defined as occurrence of focal neurological impairment, a decrease of at least 2 points on the GCS after ruling out of other causes (hydrocephalus, electrolyte disturbance, epilepsy, infection). Outcome was assessed using the modified Rankin Scale (mRS) at discharge from hospital. Multiple logistic regression was used to identify factors predicting outcome.

RESULTS:
Patients with MCA aneurysms were 5.5 times as likely to be clipped as compared to patients with aneurysms at other locations in the anterior circulation (OR 5.46; 95% CI 3.62-8.26; p<0.001). They were 1.5 times as likely to develop DIND as compared to patients with aneurysms at other locations in the anterior circulation (OR 1.55; 95% CI 1.07-2.26; p=0.021) (Clipping was not associated with DIND in multivariate analysis (OR 1.10; 95% CI 0.54-2.25; p=0.786)). In univariate analysis, predictors of favourable outcome (mRS ≤ 3) were WFNS grades 1 (OR 17.23; 95% CI 9.12-32.58; p<0.001), 2 (OR 12.96; 95% CI 6.44-26.07; p<0.001), 3 (OR 4.33; 95% CI 2.15-8.68; p<0.001), 4 (OR 2.32; 95% CI 1.20-4.50; p<0.001), 5 (base), no DIND (OR 4.42; 95% CI 2.90-6.75; p<0.001), location of the aneurysm other than MCA (OR 1.81; 95% CI 1.21-2.71; p=0.004). Clipping as occlusion therapy (OR 1.38; 95% CI 0.93-2.05; p=0.110) did not predict outcome for the whole cohort of patients with ant. circulation aneurysms. In the group of patients with MCA aneurysms only, 158 patients were clipped and 44 patients were coiled. Also in this selected cohort, type of occlusion therapy did not predict outcome (OR 0.68; 95% CI 0.30-1.51; p=0.348). After adjustment for all other predictors, remaining significant predictors for favourable outcome (mRS ≤ 3) were no DIND (OR 3.59; 95% CI 2.12-6.06; p<0.001), WFNS grades 1 (OR 11.96; 95% CI 5.64-25.36; p<0.001), 2 (OR 12.30; 95% CI 5.72-26.43; p<0.001), 3 (OR 4.39; 95% CI 1.92-10.02; p<0.001), 4 (OR 2.38; 95% CI 1.14-4.94; p=0.020), 5 (base). Neither type of aneurysm occlusion (OR 1.14; 95% CI 0.64-2.01; p=0.644) nor MCA location of the aneurysm (OR 1.52, 95% CI 0.86-2.68; p=0.144) were significant predictors of outcome in multivariate analysis. 

CONCLUSION:
Between 2009-2012, most patients (>70%) with ruptured MCA aneurysms were clipped in Switzerland. In univariate analysis, patients with MCA aneurysms revealed worse outcomes at hospital discharge. However, after more important predictors of outcome, such as DIND and WFNS grades were introduced into the model, MCA location lost its negative effect on outcome. Our data indicate that surgical management was no contributing factor for the observed unfavourable outcomes in the MCA group. Surgical management was not associated with higher rates of DIND. Overall, no DIND and low WFNS grades emerged as strong independent predictors of favourable outcome.
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