The preliminary study of the endovascular management of brain arteriovenous malformations by ethanol sclerotherapy

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Purpose: To discuss the safety of ethanol ablation therapy in treating brain arteriovenous malformation （bAVM）

Materials & Methods: Between September 3, 2018 and November 11,2018, a total of 12 patients with bAVM received targeted endovascular ethanol ablation therapy.

Results: Ethanol ablation therapy was carried out on 19 arteries in 12 patients. A total of 13 target aneurysms and 6 target arteriovenous fistulae were ablated. Among the 19 target arteries, 15 were completely ablated by pure ethanol injection, 2 were cured by ethanol combined with Onxy glue injection, one was cured by ethanol injection of arteriovenous fistula together with transvenous embolization, and one was demonstrated mild contrast opacification within the target aneurysm after treatment. Eight of the 12 patients developed different degrees of brain edema.

Five of the 8 patients had newly-developed cerebral infarction.

Only one patient remained obvious neurological impairment at the time of discharge.

Conclusions: For the treatment of bAVM, endovascular ethanol ablation maybe technically feasible and clinically safe, although studies with large sample are still needed to further clarify its effect .

①Right internal carotid artery digital subtraction angiography (DSA) showed the nidus was located on the right occipital lobe and an aneurysm on the feeding artery (arrow). ②After the microcatheter was in position, the rapid bolus injection of the mixture of absolute ethanol and 60% of iohexol 320 was performed. ③The postoperative DSA showed the target aneurysm was disappear, and few residues were found. Three-month angiography follow-up confirms the complete occlusion of the residual AVM

Patient	Gender /Age	Scale *	Location	Hemorrhage Type	Provoc-ation Test	Number Targets	of Ethanol /ml	Completely Ablation or Not	New-Onset Cerebral Edema/ Infarction Postoperatively	NIHSS Score		
										Preoperative	2 Days Postoperatively	Discharge
1	M/28	IV	Left Temporal Insula	Parenchyma	/	1 Aneurysm	2.3	Yes	No/No	4	4	2
2	F/26	II	Top of The Corpus Callosum	Parenchyma, Ventricle	/	2 Aneurysms	13.6	Yes	Yes/No	0	0	0
3	F/8	II	Right Parietal-Occipital Area	Parenchyma	-	1 Aneurysm	5.6	Yes	Yes/Yes	0	0	0
4	M/8	III	Diencephalon	Parenchyma, Ventricle	+	1 Aneurysm	3.0	Yes	Yes/Yes	0	5	2
5	F/16	III	Right Thalamus	Ventricle	/	1 Aneurysm, 1 Fistula	10.2	No	No/No	0	0	0
6	F/26	IV	Left Frontotemporal Area	No Hemorrhage	-	1 Aneurysm, 3 Fistulas	8.0	Yes	No/No	0	0	0
7	M/73	III	Right Thalamus	No Hemorrhage	-	1 Aneurysm	7.7	Yes	Yes/Yes	0	2	0
8	F/7	II	Left Parietal-Occipital Area	Ventricle	-	1 Aneurysm, 1 Fistula	6.0	Yes	Yes/No	0	0	0
9	F/16	III	Left Frontal-Parietal Area	Parenchyma	/	1 Fistula	3.0	Yes	Yes/Yes	0	2	2
10	M/18	IV	Left Frontotemporal, Basal Ganglia Area	Parenchyma, Ventricle	/	1 Aneurysm, 1 Fistula	11.2	Yes	No/No	31	31	31
11	M/23	I	The Right Temporal Area	Parenchyma	-	1 Fistula	7.6	Yes	Yes/Yes	0	0	0
12	F/26	IV	Left Thalamus	Parenchyma, Ventricle, SAH	/	1 Aneurysm	3.0	Yes	Yes/Yes	0	9	6

Note: *Spetzler-Martin grading scale; SAH, subarachnoid hemorrhage; NIHSS, National Institutes of Health Stroke