



Treatment of Spontaneous intradural vertebral artery dissections

T. Nakazawa, Y. Takeichi*, T. Yokoi, T. Fukami,
J. Jito, N. Nitta, K. Takagi, K. Nozaki
Shiga University of Medical Science,
Department of Neurosurgery; JAPAN
*Otsu Red-Cross Hospital,
Department of Neurosurgery; JAPAN

Spontaneous intradural VA dissections

- Subarachnoid hemorrhage
- Ischemia
- Headache
- Incidental

Vertebral artery

point of penetration through the dura

Wall of VA loses its external elastic lamina



Increased fragility

Dissection is most frequently seen

Among Asian people, especially in Japanese

- Predisposing factor
 - minor trauma
 - hypertension, atherosclerosis

unknown in the most cases
- Etiology, natural history
 - obscure

- From November 2004
starting to apply a coronary stent
to July 2010
- 47 consecutive patients
 - 31 patients with SAH(13 F, 18M)
 - 34 to 70 year-old (mean 53.2)
 - 16 patients(3F, 13M)
 - with ischemia
 - headache
 - incidental
 - 39 to 64 year-old (mean51.9)

Spontaneous cervicocephalic arterial dissections study japan

diagnosis criteria of cerebral artery dissections



I . Findings of the arterial lumen

Typical radiological aspect

- ① intimal flap or double lumen on angiogram
- ② intimal flap or double lumen on CT angio
- ③ hematoma in the arterial wall on T1-weighted image of MRI
- ④ dilatation and stenosis, retension of the contrast media, string sign, pearl sign, tapered occlusion on angiogram
- ⑤ dilatation and stenosis on MRA or CTA
- ⑥ intimal flap or double lumen on MRI, MRA, Enhanced volume T1WI
- ⑦ fusiform dilatation of parent artery on angiogram, MRA, CTA

II . Findings of the arterial extra shaping

fusiform dilatation on enhanced volume T1WI, BPAS, 3D-T2WI

III . chronological changes of the radiological findings

IV . finding on microsurgical intervention and pathological findings

- ① arterial dissection was observed at microsurgical intervention
- ② removed specimen was demonstrated pathologically

【absolute dissection】

I -① or I -② or I -③

III and no cause except for dissection

IV-① or IV-②

【dissection suspected strongly】

I -④ or I -⑤

I -⑥ and II

II and Arterial stenosis or occlusion

【possible dissection】

I -⑥ or I -⑦ or II

Table 2: Summary of the clinical characteristics, treatment, and outcomes on 16 patients with unruptured vertebral artery dissections

Patient No.	Age	Gender	Clinical presentation	Location	Treatment	Outcome
1	53	male	vertigo	left	observation	good recovery
2	55	male	headache	right	observation	good recovery
3	54	male	no symptom	right	observation	good recovery
4	58	male	no symptom	left	observation	good recovery
5	49	male	headache, diplopia	right	observation	good recovery
6	55	female	severe headache	right	observation	good recovery
7	53	male	no symptom	right	observation	good recovery
⑧	50	male	headache	left	stent only	good recovery
⑨	42	male	headache	left	stent assisted coiling	good recovery
10	44	male	headache	right	observation	good recovery
11	64	male	no symptom	right	observation	good recovery
12	61	male	headache	right	observation	good recovery
⑬	42	male	headache	right	stent only	good recovery
⑭	63	female	headache	left	stent assisted coiling	good recovery
15	49	female	headache	bilateral	proximal ligation of left VA with left OA-PICA anastomosis	good recovery
16	39	male	floating sensation	left	observation	good recovery

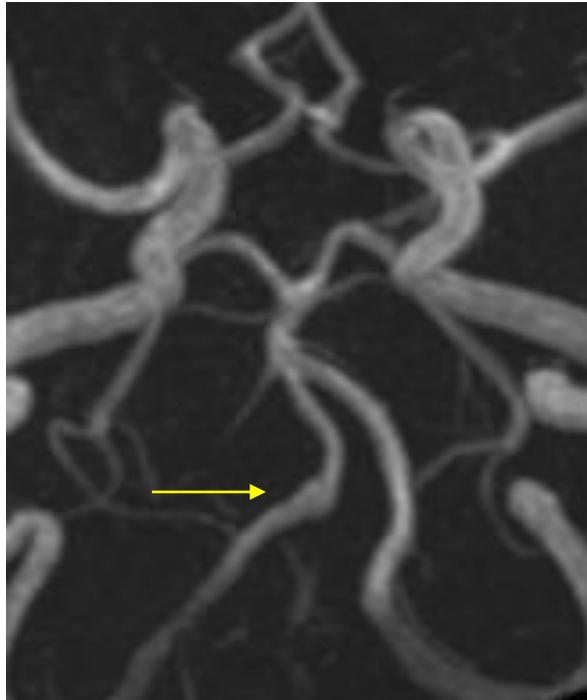
16 patients without SAH

3 patients returned normal wall shape of VA

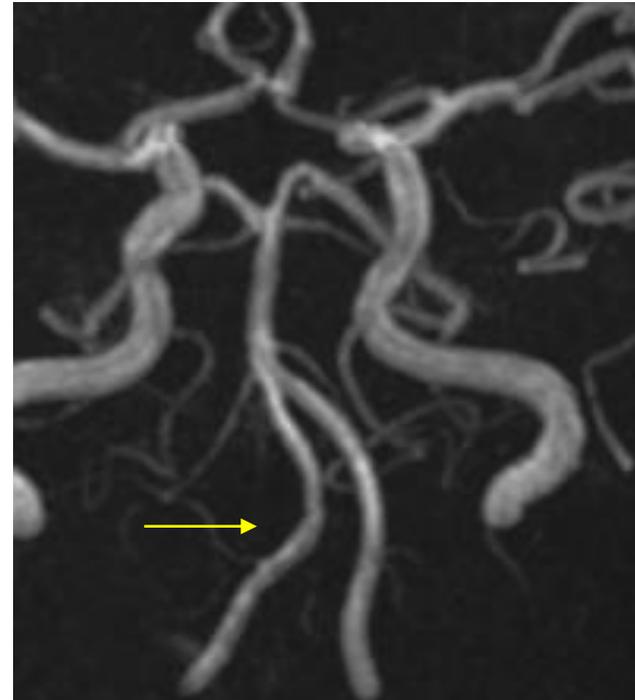
4 patients were performed stent placement
with or without coiling

One stent migration occurred with no symptom
A stent thrombosis happened
after stopping to take a antiplatelet
on patient's own

Patient No. 6
with unruptured
VA dissection



Unruptured right VA dissecting
was detected with MRA



The wall shape of VA on MRA
was normalized 6 months after
onset



Table 1: Summary of the clinical characteristics, treatment, and outcomes on 31 patients with ruptured vertebral artery dissections

Patient No.	Age	Gender	Clinical presentation	Location	Treatment	Outcome
①	35	female	SAH WFNS G1	right	stent assisted coiling	good recovery
②	34	male	SAH WFNS G1	left	stent assisted coiling	good recovery
3	63	female	SAH WFNS G1	right	internal coil trapping	good recovery
4	45	male	SAH WFNS G5	right	internal coil trapping	dead
⑤	54	female	SAH WFNS G5	left	stent assisted coiling	dead
6	48	male	SAH WFNS G4	bilateral	internal coil trapping	good recovery
7	65	male	SAH WFNS G5	right	internal coil trapping	severe disability
8	49	male	SAH WFNS G2	right	internal coil trapping	good recovery
⑨	62	male	SAH WFNS G3	left	stent assisted coiling	good recovery
⑩	62	male	SAH WFNS G1	left	stent assisted coiling	good recovery
11	45	male	SAH WFNS G1	left	internal coil trapping	good recovery
12	66	female	SAH WFNS G1	left	internal coil trapping	good recovery
13	39	male	SAH WFNS G1	left	internal coil trapping	good recovery
14	57	female	SAH WFNS G4	right	internal coil trapping	good recovery
15	56	male	SAH WFNS G2	right	internal coil trapping	moderate disability
16	51	female	SAH WFNS G2	right	internal coil trapping	good recovery
17	53	male	SAH WFNS G4	right	internal coil trapping	good recovery
18	60	male	SAH WFNS G5	right	internal coil trapping	good recovery
19	60	male	SAH WFNS G3	left	internal coil trapping	good recovery
20	52	female	SAH WFNS G2	left	internal coil trapping	dead
□	60	male	SAH WFNS G5	left	stent assisted coiling	good recovery
□	51	female	SAH WFNS G3	left	stent assisted coiling	good recovery
□	46	female	SAH WFNS G3	left	stent assisted coiling	good recovery
24	37	male	SAH WFNS G1	left	internal coil trapping	good recovery
25	60	male	SAH WFNS G2	left	internal coil trapping	good recovery
26	60	female	SAH WFNS G4	left	internal coil trapping	dead
27	53	male	SAH WFNS G5	right	internal coil trapping	dead
28	67	male	SAH WFNS G2	left	internal coil trapping	good recovery
□	70	female	SAH WFNS G2	bilateral	stent assisted coiling	dead
30	44	female	SAH WFNS G5	left	internal coil trapping	dead
31	44	female	SAH WFNS G2	left	internal coil trapping	good recovery

- All 31 ruptured dissections were treated with endovascular procedures

internal coil trapping 22 patients

stent assisted coiling 9 patient

When the dissection involved the posterior inferior cerebellar artery (PICA) or it existed in the dominant side, we adopted stent assisted coiling as far as possible for preservation of adjacent arterial blood flow.

complications(2/31)



A

Patients No.16 A 51-year-old women presented with severe headache and vomiting and transferred to our hospital.

A, Plain CT reveals subarachnoid hemorrhage in the ambient cistern and 4th ventricle.

B, Left vertebral angiogram depicts a dissecting aneurysm, but the left dominant PICA originates from the normal proximal VA.

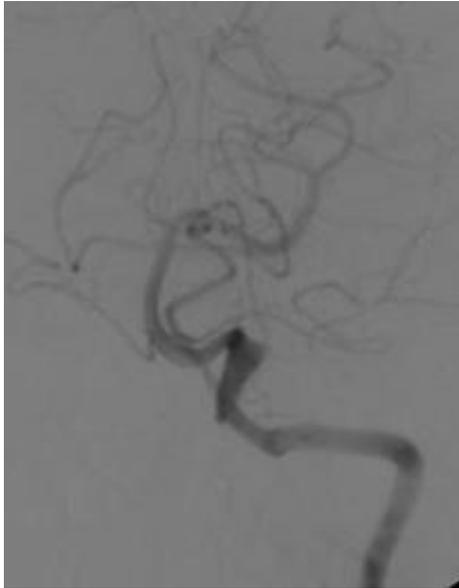
C, Internal coil trapping was performed and she recovered fully.



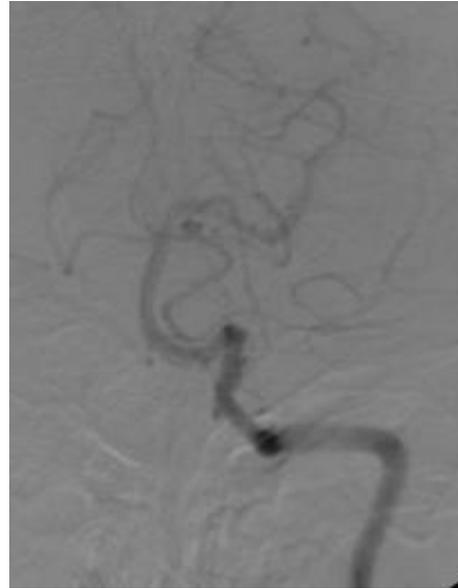
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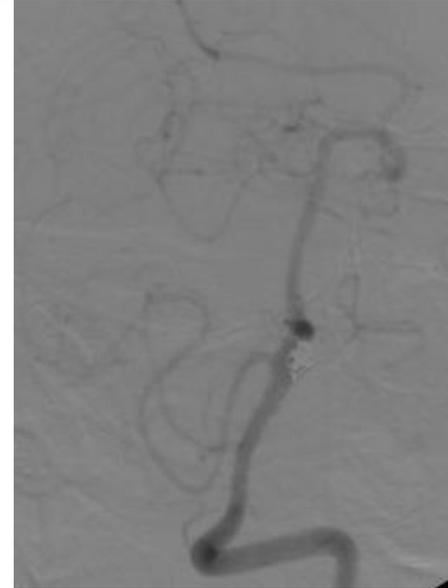
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A



B

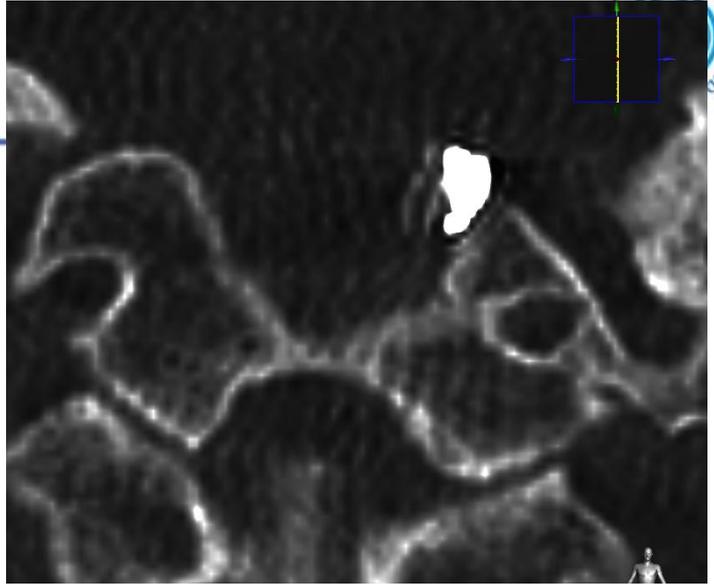


C

Patient No. 21 A 60-year-old man with severe subarachnoid hemorrhage.

A, Left vertebral angiogram demonstrates a dissecting aneurysm.

B, C, Left vertebral angiogram 7 days after stent-assisted coiling reveals complete obliteration of the fusiform dilatation with a preserved PICA.



A

B

C

Patient No.21: Two years after stent assisted coiling.
A,B, Left vertebral angiogram demonstrates the satisfactory reconstruction of the vertebral artery with preserving the PICA.
C, Xper CT shows a stent being a proper shape and good relationship with coils.
D, 3-D DSA shows coils and a good patency of the vertebral artery and the PICA.



D

Patient No.29 A 70 year-old women with SAH.

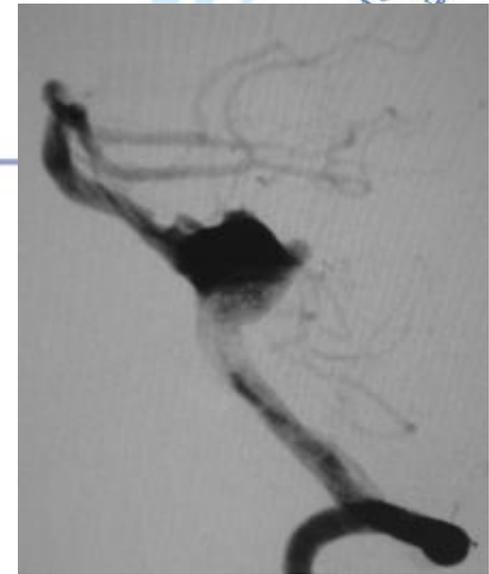
A,B, Left vertebral angiogram reveals the bilateral dissections from VA to BA with a large aneurysmal dilatation.

C,D, Left vertebral angiogram after stent assisted coiling demonstrates the rough packing and opacification of the aneurysm.

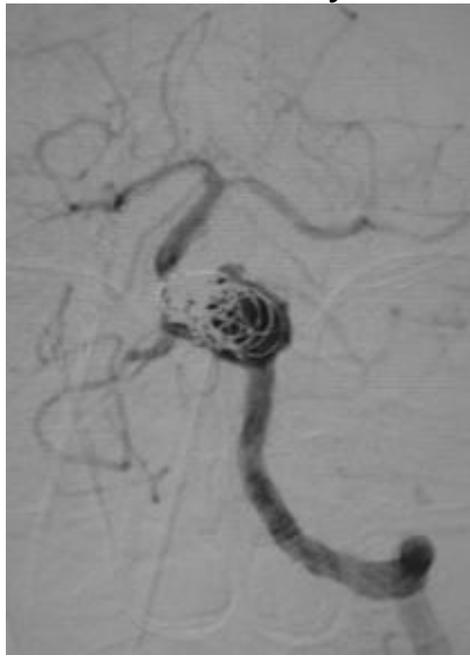
E, Right vertebral angiogram shows the opacification of the aneurysm



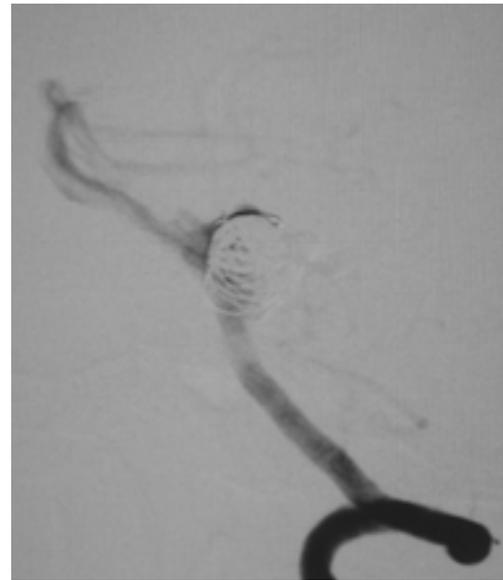
A



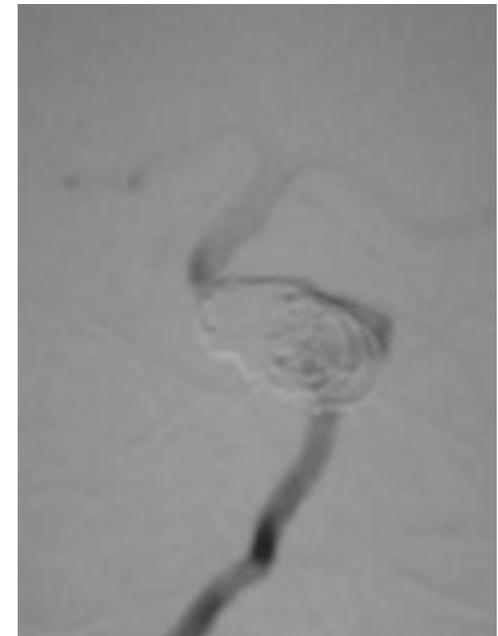
B



C



D



E

[problems in stenting]

First :The porous stent placement with or without coils remains the risk of rebleeding from acute to long-term

In our series, two recanalizaion has occurred.

Second : When is the antiplatelets therapy started in the acute phase of SAH.

The effect of antiplatelets therapy is not sufficient frequently at procedure, and this may makes the stent or the branch of the VA occlude.

Patient No2: A 34 year-old-man with SAH

A, Left vertebral angiogram demonstrates a dissecting aneurysm with involving RICA

B, After first embolization with coronary stent(S670) and coil.

C, 3 months after first embolization. The aneurysmal dilatation proceeds and recanalizes. D, A telescoping stent(Driver) placement and adding coils

E, 4 years after the second embolization. Angiogram shows marginal recanalization.

F, 3 months after the third embolization with a stent-within-stent technique results in no aneurysmal opacification.



A



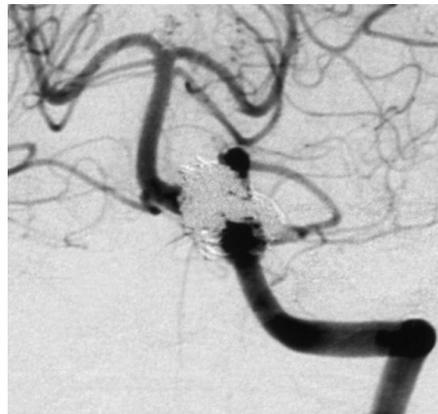
B



C



D



E



F

[Conclusions]

Internal coil trapping or stent placement with or without coil were very effective in preventing rebleeding of ruptured vertebral artery dissection.

Although unruptured dissections have benign courses in many instances, occasionally dissection initiates bleeding. It is necessary to detect the risk of bleeding with a careful watching and when progress appears to be made in dissection, patients should be treated promptly.

Stent assisted therapy that is possible to preserve patency of the parent artery and its branches, such as the dissection involving PICA, is a promising treatment for the vertebral artery dissections.

Stent placement across the dissected area with or without coils might be superior to internal coil trapping even if in the acute stage of subarachnoid hemorrhage.

However, the porous stent placement with or without coils for VA dissections still remains the risk of rerupture. Therefore, it needs long-time follow-up.