



## Emergency Superficial Temporal Artery–Superior Cerebellar Artery Bypass for the Refractory Vertebrobasilar Insufficiency with Partial Mastoidectomy

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### Key words

- Mastoidectomy
- STA–SCA bypass
- Vertebrobasilar insufficiency

### Abbreviations and Acronyms

- BA:** Basilar artery
- DWI:** Diffusion weighted imaging
- MRA:** Magnetic resonance angiography
- PCA:** Posterior cerebral artery
- PICA:** Posterior inferior cerebellar artery
- SCA:** Superior cerebellar artery
- STA:** Superficial temporal artery
- VA:** Vertebral artery
- VBI:** Vertebrobasilar insufficiency

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### INTRODUCTION

It is well-known that vertebrobasilar insufficiency (VBI) because of atherothrombosis with bilateral vertebral artery (VA) occlusion is resistant to medical treatment and has poor outcomes.<sup>1–4</sup> Although few reports have emphasized the usefulness of revascularization through superficial temporal artery (STA)–superior cerebellar artery (SCA) bypass for VBI,<sup>5,6</sup> this approach is considered difficult and challenging because of a deep and narrow anastomotic field. Here, we describe a patient with VBI who underwent emergency STA–SCA bypass under partial mastoidectomy after confirming the mismatch between diffusion-weighted imaging (DWI) findings and clinical symptoms. The patient showed a good outcome with this approach. To our knowledge, our surgical strategy has not been reported previously. Our findings demonstrate that surgeons should consider STA–SCA bypass if VBI is

■ **BACKGROUND:** Although it is well-known that vertebrobasilar insufficiency (VBI) because of atherothrombosis with bilateral vertebral artery (VA) occlusion is resistant to medical treatment from the acute to subacute stages, the most appropriate treatment for progressive infarction at these stages remains unclear. Here, we described a patient with VBI who underwent emergency superficial temporal artery–superior cerebellar artery (STA–SCA) bypass under partial mastoidectomy after confirming mismatch between diffusion-weighted imaging (DWI) findings and clinical symptoms. The patient showed a good outcome with this approach. To our knowledge, our surgical strategy has not been previously reported.

■ **CASE DESCRIPTION:** The patient was a 71-year-old woman with progressive infarction because of atherothrombosis with bilateral VA occlusions resistant to maximum medical treatment. Emergency STA–SCA bypass under partial mastoidectomy was performed after confirming DWI findings and symptom mismatch. A good outcome was achieved, and no additional cerebral infarctions were noted.

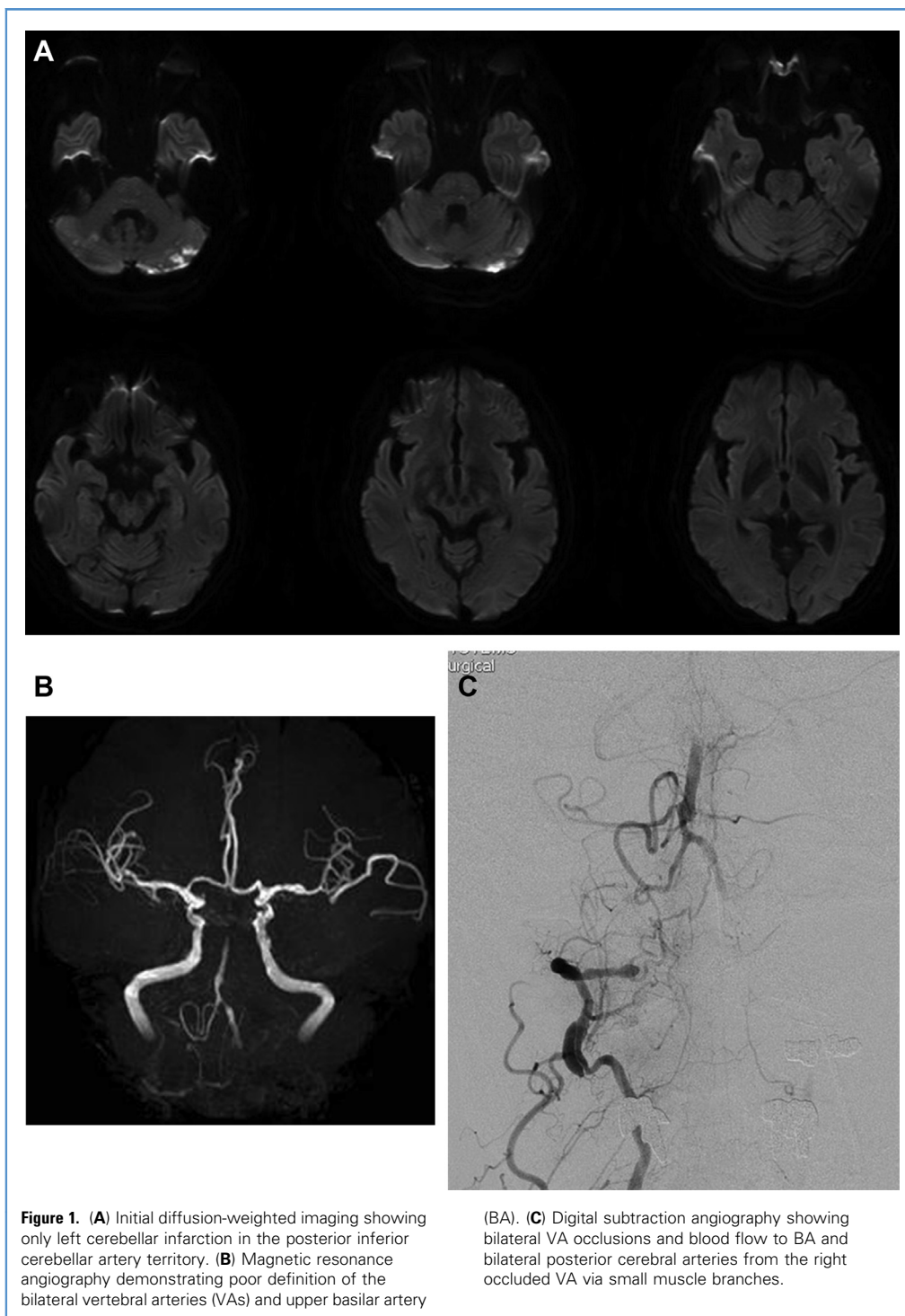
■ **CONCLUSIONS:** Emergency bypass should be considered as a treatment option for VBI that is resistant to maximal medical treatment after confirming DWI findings and symptom mismatch. Our approach involving partial mastoidectomy provides a wide and shallow operative field for STA–SCA bypass, which allows accurate bypass with good outcomes.

resistant to the maximum medical treatment.

### CASE DESCRIPTION

A 71-year-old woman with a significant medical history of hypertension and dyslipidemia, had a 1-day history of vertigo and trunk ataxia and score of 3 points on the National Institutes of Health Stroke Scale (NIHSS). DWI and magnetic resonance angiography (MRA) revealed left cerebellar infarction in the posterior inferior cerebellar artery (PICA) territory (Figure 1A) and poorly defined VA and upper basilar artery (BA), indicating hypoperfusion (Figure 1B). Digital subtraction angiography (DSA) demonstrated bilateral VA occlusions and blood flow to the BA and bilateral posterior cerebral arteries (PCAs) from the right occluded VA via small muscle branches (Figure 1C). There was no

collateral flow from the internal carotid arteries via the posterior communicating arteries despite bilateral VA occlusions. Atherothrombosis was diagnosed because of bilateral atherosclerotic VA occlusions, and the patient received dual antiplatelet therapy and continuous heparin injection. However, DWI on day 4 showed a new left cerebellar infarction and on day 5 showed new midbrain and right thalamus infarctions (Figure 2A). MRA demonstrated more poorly defined upper BA areas compared with those on initial MRA (Figure 2B) despite additional medical treatments involving hyperdynamic and hypervolemic therapies. Her clinical symptoms gradually worsened, and she finally became comatose (38 points on National Institutes of Health Stroke Scale). Considering the worsening clinical symptoms under maximal medical treatment, DWI findings, and symptom



mismatch, emergency STA–SCA bypass was performed on day 5.

The patient was fixed in the park bench position, and right temporo-suboccipital craniotomy was performed after

harvesting STA (**Figure 3A**). The tentorium interferes with the acquisition of a wide and shallow operative field for STA–SCA bypass with the subtemporal approach (**Figure 3B**); therefore, partial

mastoidectomy was performed after removal of outer table of mastoid bone for cosmetic mastoidectomy,<sup>7</sup> and it was kept minimal until the tentorium was cut (**Figure 3C–E**). Next, right STA–SCA

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