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Case Report

Thrombectomy in acute basilar artery dissection: A case report ☆

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ABSTRACT

A 34-year-old patient was admitted with unclear coma and stretch synergisms. CT-imaging was strongly suspicious of basilar artery dissection, this was confirmed on subsequent DSA. The patient was lysed and a complex thrombectomy was performed. Despite sufficient re-canalization, the patient unfortunately died shortly after.

To the best of our knowledge, this is the first description of an acute basilar artery dissection treated by thrombectomy.

Introduction

Dissections of the basilar artery are extremely rare and different entities are subsumed in the sparse literature. Basilar dissections with SAB or ischemia, with or without brainstem compression are described as well as dissecting aneurysms or incidental findings in severe underlying diseases. Consequently, the treatment options described vary and there is no clear recommended course of action [1–4,6].

We present (a case of) an acute basilar artery dissection treated by thrombectomy followed by stenting. In the literature, there are some case reports and series with small numbers of cases of endovascular treatment [2,4,6,7]; but to our knowledge, no case treated primarily by thrombectomy has been published yet.

Case report

A 34-year-old male patient was admitted to the emergency room of our hospital by ambulance. He had been found unconscious and was intubated at the site of finding due to a GCS of 4 points. In addition, stretch synergisms and wide pupils were apparent in the initial clinical examination.

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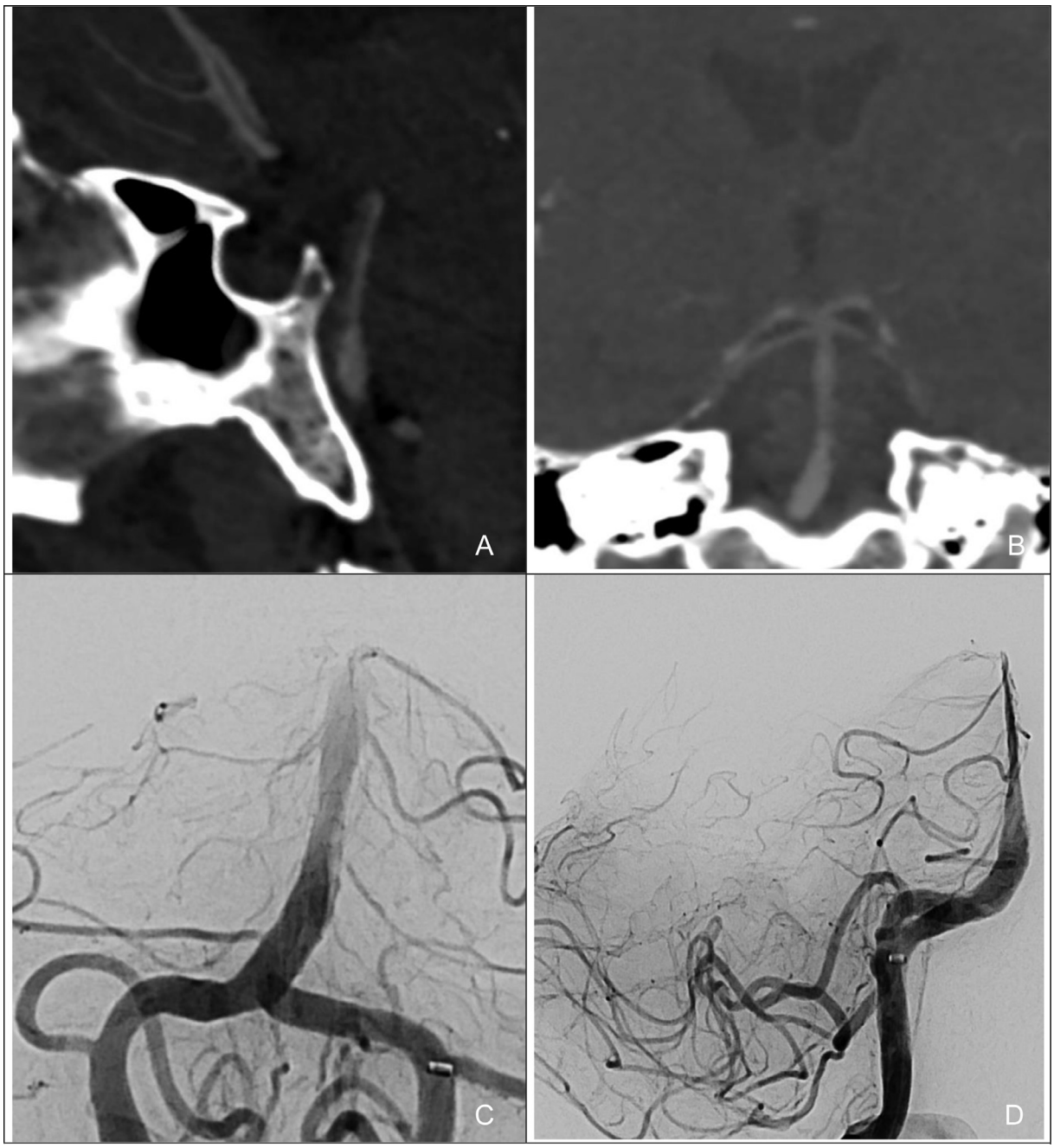

Fig. 1 – CTA (A and B) demonstrates a narrowing of the basilar artery with hypodensity of the anterior part; note the preserved perfusion of the bilateral PCA. Angiographic images (C and D) via the left V4-segment. Significant basilar narrowing due to the anterior dissecting membrane. Occlusion of the distal basilar artery and bilateral PCA. Preserved perfusion of the AICA and left SUCA.

Immediately upon arrival, nonenhanced CT (NECT) and computed tomography angiography (CTA) were performed. Early signs of ischemia were excluded. CTA revealed extensive narrowing and luminal constriction with partial hypodensity of the middle and distal third of the basilar artery.

Basilar artery dissection was strongly suspected, and lysis was performed according to a body weight-adapted regimen with bolus administration. In addition, emergency digital subtraction angiography (DSA) was performed in preparation for thrombectomy. (Fig. 1)

After puncture, the right vertebral artery was probed via an 8F sheath, a 5F-Vertebral-catheter, and subsequently with a 5F-Sofia-catheter.

Initial angiographic images via the distal left vertebral artery in 2 planes showed progressive vessel occlusion compared with CTA.

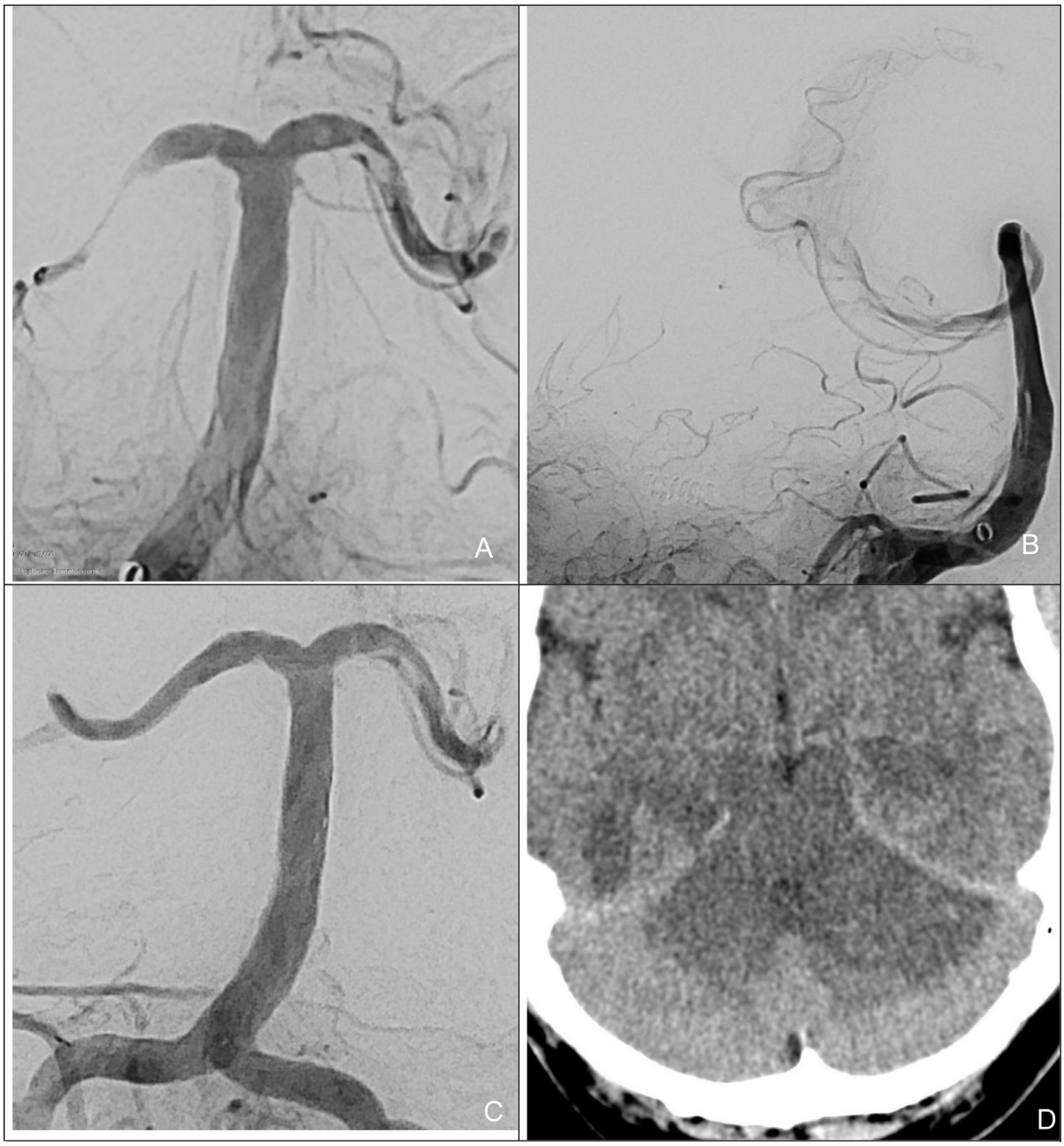

Fig. 2 – Angiographic images after bilateral thrombectomy of the P2-segments (A and B): Restored flow of basilar artery, small anterior dissecting membrane persists; reduced flow into bilateral PCA due to multiple emboli. After stent deployment complete reperfusion of the basilar artery (C); occlusion of the AICA and SUCA, several emboli in the peripheral PCA remain. NECT (D) 8 hours after thrombectomy: extensive ischemia in the posterior stromal area with pontomesencephalic involvement.

Basilar dissection was evident with a complex arterial supply situation. The anteriorly located brainstem perforators and bilateral posterior cerebral arteries (PCA) were supplied from the false lumen, the bilateral anterior inferior cerebellar arteries (AICA) and left superior cerebellar artery (SUCA) were supplied from the true lumen. The vertebral arteries and posterior inferior cerebellar artery (PICA) bilaterally showed unremarkable contrast.

In the interdisciplinary peri-interventional conference the patient's severe symptomatology was attributed to compression of the brainstem perforator branches. Therefore, primary stent placement resulting in flow reduction and compression of the false lumen was discarded.

In this complex situation the decision was made to perform thrombectomy and recanalization of the basilar artery.

For this purpose, the P2 segments on the right side and subsequently on the left side were probed using a microwire (Synchro-Standard) and microcatheter (Rebar-18). Despite several probing attempts, only the wrong lumen could be probed. A stent-retriever (pRESET 6-30) was deployed in each P2-segment and withdrawn through the basilar artery under constant aspiration (Sofia 5F).

This resulted in a rupture of the dissecting membrane and release of multiple thrombotic emboli (Fig. 2). Multiple thrombectomy maneuvers in the P2- and P3-Segments using the 5F-Sofia and pRESET 4-20 LITE were performed (not shown). Multiple distal thrombi remained in peripheral branches of the PCA.

To prevent re-dissection and basilar occlusion, the residual dissection membrane was adapted at the tear site. An Atlas stent 4.5-30 was used for this purpose.

The final examination demonstrated a completely reperfused basilar artery, several peripheral emboli in distal PCA branches remained. Unfortunately, the AICA and SUCA as well as several perforator branches were no longer perfused (Fig. 2).

Despite successful basilar reperfusion, the patient's clinical condition did not improve. A follow-up NECT showed extensive ischemic-demarcated areas in the brainstem, pons, cerebellum, and bilateral occipital regions. Unfortunately, the patient died shortly after.

Discussion

After confirming the diagnosis of acute basilar dissection on DSA, an emergency periinterventional interdisciplinary conference was convened and treatment options were analyzed.

The anteriorly extending dissecting membrane occluded the perforators over a long distance. The patient's severe clinical symptoms could be deduced from this. Conservative treatment was ruled out.

A purely reconstructive therapy, as published by some authors, was also not feasible [2,4,5,7,8] since it would not have resolved the acute clinical symptoms. The perforators would have remained occluded and extensive brainstem ischemia would have been inevitable.

No subarachnoid hemorrhage was present, and there was no evidence of dissecting aneurysm. Therapy with stent and coils, as published in small case series [2,3,6] was not considered as a suitable option.

Further measures of platelet inhibition were considered insufficient in the presence of systemic lysis.

That is why the destruction of the dissecting membrane, thrombectomy of possible emboli and subsequent stenting of the remaining intimal flap was considered the only sufficient option to adequately treat the patient.

Unfortunately, the patient died shortly after the procedure despite sufficient recanalization. It remains unclear if this happened due to either preinterventional ischemic brain injury or peri-interventional secondary thrombotic emboli.

Retrospectively, an additional treatment option might have been further probing attempts of the true lumen, for example via access via the right vertebral artery.

Furthermore, a primary aspiration thrombectomy without a stent retriever could have been an alternative to reduce the thrombus burden and possibly prevent secondary thrombus dislocation. However, due to the complexity of this case, an improvement would have been questionable.

The etiology of the dissection also remains unclear, and CT-diagnostics as well as DSA did not reveal any underlying vascular disease or other related conditions. However, further methods may be available in the future for detailed statements on vascular morphology and etiologic differentiation [9].

Conclusion

We present a unique case of hyperacute and severe basilar artery dissection which was treated by thrombolysis and subsequent endovascular treatment. Within the scope of this intervention, the dissection membrane had to be destroyed and the vessel reconstructed with stenting. In addition, multiple emboli were thrombectomized.

Despite a thorough literature search, we could not find a comparable case in existing literature. This highlights the complexity and rarity of the presented case and the significance to share our treatment's experience.

Patient consent

The authors declare that written consent for publication was obtained from the authorized surviving relatives of the patient.

Previous presentation

The authors of "Thrombectomy in acute basilar artery dissection – a case report" declare that the manuscript has not been previously published. The case report was written in accordance with the ethical standards laid down in the 1964 declaration of Helsinki and its later amendments.

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