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Successful Systemic Thrombolysis for Carotid Stent Thrombosis

Gerhard F. Hamann^a, Martin Liebetrau^a, Thomas Pfefferkorn^a, Markus M. Heiss^b

^aDepartment of Neurology and ^bDepartment of Surgery, Ludwig Maximilian University, Klinikum Grosshadern, Munich, Germany

Carotid artery stenting is an increasingly used treatment for carotid artery stenosis [1–3]. The complications include minor and major stroke and peri-interventional death [4]. Stent thrombosis is rarely reported to occur during the treatment of carotid stenosis, and there has been one report on the successful use of a glycoprotein IIb/IIIa antagonist [5].

Case Report

A 76-year-old man was admitted with symptoms consistent with a right middle cerebral artery (MCA) infarction. He was on his way home from a surgical ward, where he had received a stent 4 days before. The stent had been placed in the right internal carotid artery (ICA) to treat a 70% ICA stenosis which produced right-sided amaurosis fugax. The patient had had two previous endarterectomies on the same side. Immediately after stenting, which was confirmed to be successful by angiography, the patient received aspirin and intravenous heparin. His postoperative course was uneventful. It was planned to maintain the patient on 300 mg aspirin daily, but on hospital discharge he had been given neither anticoagulation nor aspirin by mistake. The treatment regimen at that time did not include clopidogrel. The neurological examination showed hemiparesis, hemineglect and homonymous hemianopia on the left side (NIHSS 16). The color-coded duplex sonography showed a thrombotic occlusion of the stented right ICA (fig. 1a) and an occlusion of the right MCA. Cranial computed tomography only revealed an old, right-sided posterior watershed infarct (fig. 2). The acute thrombosis of the stent was thought to be the source of an embolism of the right MCA. Since the patient fulfilled the criteria for intravenous thrombolysis, we started intravenous thrombolysis 2 h after the initial symptoms, using 70 mg rt-PA. Besides the thrombolysis, the patient immediately received intravenous heparin. The patient started to improve 30 min after initiation of thrombolysis. An ultrasound examination 1 h after the thrombolysis revealed an open stent (see fig. 1b) and restored normal right MCA blood flow velocity. The patient was discharged 5 days later. He still had a slight motor deficit (NIHSS 2), but a score of 1 on the Rankin scale and a Barthel index of 100.

Discussion

While stenting is widely used in cardiology, only limited experience has been gathered on its use in carotid artery disease [1, 2]. About 5,210 procedures have been reported worldwide (technical success rate 98.4%; transient ischemic attacks 2.82%, minor strokes 2.72%, major strokes, 1.49%; deaths 0.86%) [1]. Various clinical trials are being planned or are in progress to establish the indications for carotid artery stenting (CREST, SPACE, CASET) [6]. Recently, the Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS) demonstrated similar 3-year results for endovascular treatment and carotid endarterectomy for major risks and effectiveness, and avoidance of minor complications [7]. Stent thrombosis is a well-known problem in cardiology [8]. A thrombosis rate of 3.5% was reported as a first result [8]. Aggressive antiplatelet therapy, including the combined use of ticlopidin or clopidogrel and aspirin, reduces the rate of stent thrombosis to approximately 1% [8]. Platelet activation and aggregation may play a relevant role in the treatment of thrombotic occlusion of stented vessel segments [9]. Abciximab has been proposed in carotid stenting to prevent rethrombosis [9]. The treatment of early intracoronary stent thrombosis includes balloon angioplasty and intracoronary thrombolysis. Systemic thrombolysis has so far been attempted as a second therapeutic alternative [10]. We performed an intravenous rt-PA thrombolysis similar to the known NINDS protocol to reperfuse the MCA. In contrast to this protocol, heparin was given early because we hoped it would prevent another thrombosis, and indeed both the MCA and the thrombosed stent were recanalized. Thus, thrombolysis was able to dissolve a large thrombus in the stent and an embolus in the MCA. After the intervention, we discovered a recent case report about the intravenous administration of a glycoprotein IIb/IIIa receptor antagonist to recanalize acute stent thrombosis [7]. To the best of our knowledge, this is the first report of the use of intravenous thrombolysis to successfully recanalize a carotid stent thrombosis with concomitant embolic MCA occlusion. Obviously, this single case can only help to illuminate the available treatment options rather than provide general therapeutic recommendations.

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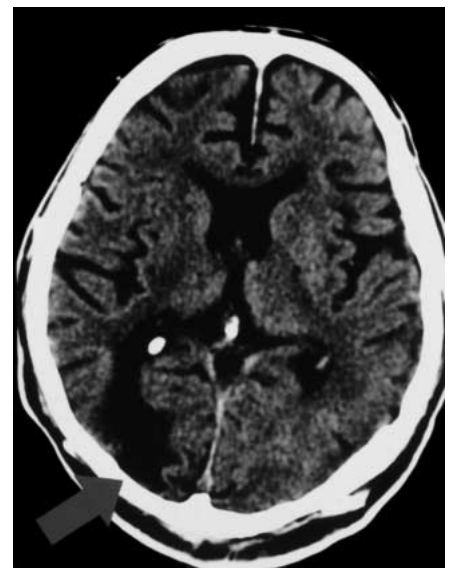
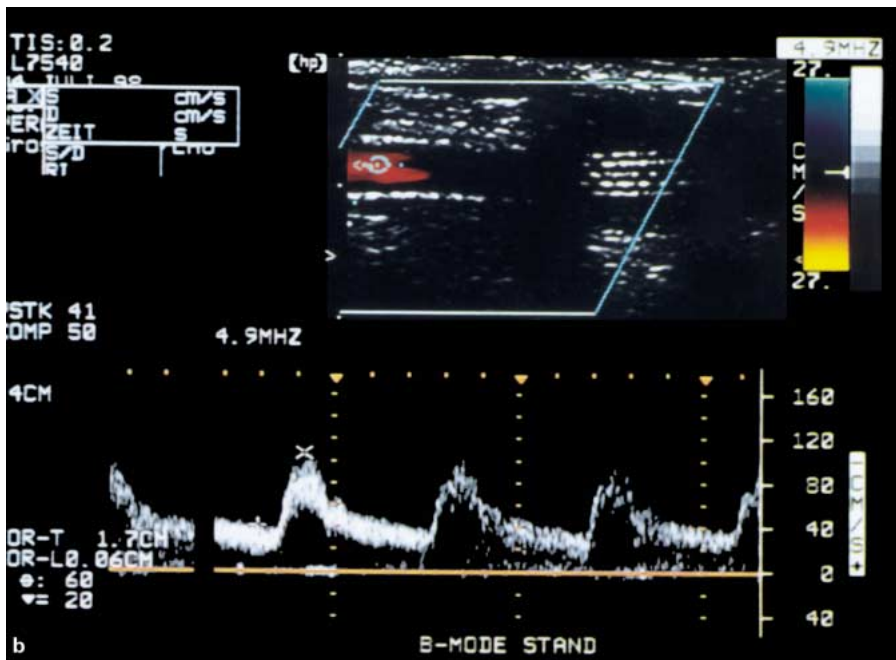
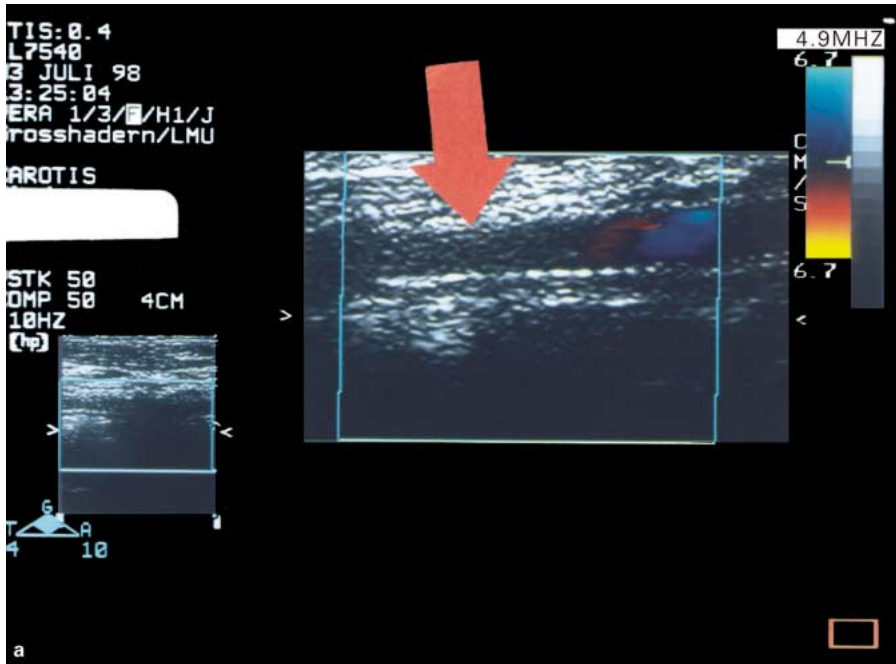


Fig. 1. a Color-coded duplex sonography of the right ICA demonstrating the thrombotic occlusion of this vessel (arrow) before treatment. b Color-coded duplex sonography of the right ICA after systemic thrombolysis showing the restored blood flow and the reopened vessel.

Fig. 2. Cranial computed tomography 1 h after the onset of initial symptoms of an acute MCA right-sided stroke. No early signs of infarction were detected, but an old watershed infarction (arrow) is visible between the territory of the MCA and the posterior cerebral artery on the right side. Courtesy of Prof. Brückmann, Head Institute of Neuro-radiology, Ludwig Maximilian University, Munich, Germany.

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Prof. Gerhard F. Hamann, MD, Department of Neurology,
Ludwig Maximilian University, Klinikum Grosshadern,
Marchioninistrasse 15, D–81377 Munich (Germany)
Tel. +49 89 7095 3670, Fax +49 89 7095 3677,
E-Mail hamann@brain.nfo.med.uni-muenchen.de