Sandwich Stenting Technique Performed In Acute Carotid Artery Stent Thrombosis: A Successful Case Report

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ABSTRACT

Even though acute carotid stent thrombosis is a rare complication of carotid artery stenting (CAS), it can cause fatal thromboembolic events. There are limited numbers of techniques which can be applied in this kind of emergencies. In this study, we reported a successful case in which the sandwich technique was successfully performed in the acute in-stent thrombosis. Conclusively, in-procedural in-stent thrombosis following CAS must be rapidly evaluated and treated. In this way, catastrophic events can be efficiently prevented. In this kind of cases, sandwich stent technique can be used as a rapid and efficient method.

Keywords: Carotid stenting, in-stent thrombosis, complications, sandwich technique

Akut Karotis Stent Trombozunda Başarılı Sandiviç Tekniği Vakası

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ÖZET

Akut karotis arter stent (KAS) trombozu nadir bir komplikasyon olmasına rağmen fatal tromboembolik olaylara neden olabilir. Akut olaylarda uygulanabilecek sınırlı sayıda teknik olmakla birlikte bu vaka bildirimizde akut KAS trombozunda başarılı bir şekilde uygulanan “sandiviç stent tekniğini” sunmaktayız. Prosedürel akut KAS trombozu hızlı ve etkin bir şekilde değerlendirilerek tedavi edilmesi gereken bir durumdur. Bu vakamızda kullandığımız teknik böyle katastrofik durumlarla başetmede hızlı ve güvenli alternative bir metod olarak kullanılabilir.

Anahtar Kelimeler: Karotis stentleme, instent tromboz, komplikasyon, sandiwiç tekniği

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Introduction

Even though Acute carotid artery stent thrombosis is a rare complication of carotid artery stenting, it can cause fatal thromboembolic events [(1)]. In such cases, rapid intervention should be performed in order to limit the cerebral ischemia. Here, we represented a successful case study of percutaneous mechanical thrombectomy which was performed by using the sandwich technique in order to treat the acute carotid stent thrombosis.

Case

A 65-year-old diabetic male patient was admitted to our hospital with a complaint of recent transient ischemic attack (TIA) involving the left internal carotid artery (LICA). He was diagnosed with the bilateral internal carotid stenosis (90% on the left and 75% on the right) (Figure A). The patient, was receiving Acetylsalicylic acid 100 mg + 75 mg of Clopidogrel treatment that was initiated 30 days ago and he was examined in the laboratory. The patient was evaluated in the laboratory on the 32. day of the TIA for the carotid artery stenting (CAS). Extracranial lesions were visualized and intracranial carotid angiography was taken (Video 1).Unfractionated heparin was administered to him and his ACT was measured between 250 and 350. We implanted an 8/6/30-mm self-expanding closed-cell nitinol stent [TheProtégé/SpiderFx (ev3 Endovascular Inc., Plymouth, Minnesota)] under Angio Guard (Cordis Corp., Miami, FL) protection. Furthermore, a post-dilation was performed with the stent together with Omnipass 5/20-mm balloon (Cordis Corporation, Warren, NJ). In control angiogram, instant massive thrombus image was observed (Figure B,C,D.E; insent massive thrombus can be seen in the control angiogram) (Video2). The patient was decompensated and became rapidly unconscious and hemodynamically unstable. He was immediately intubated and hemodynamic support was initiated.–The ACT was measured again and it was found as 265. Then, additional 5000 U unfractionated heparin was intravenously administered to the patient. Shortly after, postdilatation was performed by using a 4×20 mm balloon–(Guidant Corp., Indianapolis, IN). However, insent thrombus was persistent. Thus, we primarily performed a percutaneous aspiration of thrombus (Export; Medtronics, Mineapolis, MN,USA) but it was observed that the thrombus was not dissolved.-The desired flow and patency were not ensured. Upon this, additional instent implantation was performed by using the sandwich technique in order to limit the thrombus between two stents (F;G). Post-procedural control angiogram showed that there was a recanalization of the left

internal carotid artery (LICA). Additionally, complete clot dissolution, desired flow and patency were observed in the end of the procedure (H). Meanwhile, the distal vessel patency was shown by taking the intracranial angiography (Video3) Furthermore, intense yellow debris and fresh thrombus were observed in the filter basket in the distal protection device. The patient was consulted in Neurology clinics after the intervention. There was no neurological deficit upon the intervention even though small bright lesions were observed in the left cerebellar hemisphere according to the diffusion-weighted MRI results. We discharged the patient seven days later. The dual anti-platelet treatment of the patients was planned for 6 months. It was observed that there was a patency in the stent according to the results of carotid CT angiography which was performed after 6 months (Figure 2).

Discussion

In this study, we reported the 6-month follow-up recordings of the 65-year-old male patient who had an acute carotid stent thrombosis. Several conditions can increase the risk of thrombogenicity while performing carotid artery stenting procedures such as antiplatelet monotherapy, antiplatelet resistance, early discontinuation of treatment, thrombocythemia, diabetes mellitus, heparin resistance, vessel dissection, severe plaque protrusion, stent under expansion, and stent fracture[2,3]. The aspirin / clopidogrel resistance was not studied in this case report because it was thought that the rapid clinical and hemodynamic recovery was achieved by placing the thrombus / plaque / tissue prolapse or protrusion between two stent with the help of the sandwich technique. Furthermore, there was no new clinical event in the follow-ups of the patient upon the 6 months of dual anti-platelet treatment. Meanwhile, the stent patency was observed in the CT imaging after 6 months. Furthermore, procedural risks can also happen such as guiding catheter which cannot be frequently rinsed with flushing due to the heparin production. Furthermore, expiry date issues and thus thrombus can also be formed[4]. According to the literature, emergent treatment procedures of the acute carotid thrombosis after CAS can be as follows; removing the thrombus by open surgery and perform thromboendarterectomy[2], thrombolysis or facilitated thrombolysis can be ensured with the rescue use of GPIs (glycoprotein IIb/IIIa receptor inhibitors)[5], postdilatation can be performed with the help of distal protection filter instent during the percutaneous transluminal angioplasty[6] or additional stent can be implanted together with intravenous administration of recombinant tissue plasminogen activator[7]. The tPA was not preferred because of the low body-weith (54 kg) and HASBLED score was 4. In this case, stent filling defect is referred to

"image" and we believe that it is the thrombus occurs together with plaque/tissue prolapsed or protrusion because the clinical outcome of the patient was prominently improved and there was no thrombus in the intracranial angiogram. It has already been reported that the stent used in the intervention can lead to this kind of complications. Upon implantation, stent can increase the protrusion risk due to the 'free cell area'[8]. This risk is lower when closed cell stents are used compared to open cell stents. Upon this catastrophic event, we primarily performed thrombus aspiration by using a catheter and partially the thrombus retrieval was achieved. However, we could not achieve to dissolve the thrombus. Therefore, we aimed to limit the thrombus between two stents by using a secondary closed cell stent instead of an emergency surgery or thrombolytic therapy. The sandwich technique can be successfully used in the deployment of the consecutive closed-cell self expandable stents.It has been reported that the sandwich technique is being used in peripheral artery interventions[9] and in coping with carotid artery stent thrombosis[7]. The procedure was successfully performed as an alternative treatment without causing complications.

In conclusion, in-procedural in-stent thrombosis following CAS must be rapidly evaluated and treated. In this way, catastrophic events can be efficiently prevented. Percutaneous mechanical thrombectomy which can be performed with the sandwich technique is a useful tool in order to treatment the acute in-stent thrombosis after CAS.

Figure Legends:

Figure 1: Angiographic images of procedures which were performed in order to solve the left carotid artery stenosis, can be seen respectively. **A:** The left carotid internal artery stenosis can be observed prior to intervention. **B:** The first closed-cell self-expandable stenting. **C:** in-stent acute massive thrombus after stent implantation. **D:** aspiration catheter application to in-stent intensive thrombosis. **E:** persistent intense thrombus was observed upon thrombus aspiration.**F:** Placing a second closed-cell self-expandable stent in-stent **"sandwich technique". G:** Postdilation. **H**: patency and flow were observed upon a successfully performed sandwich technique.

Figure 2: After 6 months, stent patency was still present according to the control CT angiogram.

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