Erciyes Med J 2016; 38(4): 155-6 • DOI: 10.5152/etd.2016.0053

CASE REPORT

An Entrapped Subclavian Stent and its Successful Management

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ABSTRACT

Subclavian artery angioplasty with or without stenting is a well-accepted, less invasive alternative to surgical revascularization for symptomatic proximal subclavian artery stenosis. Stenting of subclavian artery lesions result in the immediate resolution of patients' symptoms with durable mid-term effects and few complications in a larger patient group with serious co-morbid conditions. However, it can also result in some complications. In addition to procedural complications, there could be technical failure of materials, such as incomplete expansion of the stent during deployment. Our case serves to highlight this complication of the endovascular procedure and provides a successful management strategy.

Keywords: Subclavian artery stenting, incomplete stent expansion, management strategy

INTRODUCTION

Subclavian artery stenosis is most commonly caused in atherosclerotic disease. Stenosis typically occurs in the first part of the subclavian artery. Intervention is generally reserved for the treatment of symptomatic patients. Symptoms may be attributable to upper extremity, cerebral, or coronary ischemia. Ischemic symptoms of the upper extremity are uncommon and typically occur only during upper extremity exercise as was seen in our case. When intervention is required, the endovascular approach is preferred over surgery due to its less invasive nature and successful results. The strategy used to treat subclavian stenosis is heavily influenced by the anatomy of the lesion, but it also varies considerably among operators (1, 2). In our clinic, we prefer to use a catheter-based system for subclavian stenosis and to stent the lesion wherever possible. However, rare complications can be seen during stenting. In this case, we share our experience and management strategy with incomplete stent expansion during an endovascular intervention of subclavian artery stenosis.

CASE REPORT

A 56-year-old man with a history of mitral ring annuloplasty, coronary artery bypass surgery, cerebrovascular accident, and upper left extremity claudication was admitted to our hospital for a comprehensive examination. Computed tomography angiography of the subclavian arteries revealed left subclavian artery (LSA) stenosis of more than 70% in the proximal portion. Selective coronary and subclavian angiography (Siemens, Artis zee, interventional angiography systems, Germany) revealed non-critical lesions in the left anterior descending and circumflex arteries, 90% stenosis after right ventricular branch of the right coronary artery, total occlusion of the aorta-saphenous vein–right coronary artery graft anastomosis, and 70% stenosis in the proximal portion of the LSA (Figure 1a). Subclavian artery stenting was planned. Written informed consent of the patient was taken.

The patient received therapy with anti-aggregant medications: acetylsalicylic acid 100 mg/day and clopidogrel 75 mg/day for 1 week before stent implantation. An 8-Fr introducer sheath was placed in the right femoral artery, and the LSA was cannulated with the help of an 8-Fr 4.0 Judgkins right-guiding catheter. Then, the lesion was passed through using a 0.035 hydrophilic guide wire, and an 8×30-mm balloon-expandable Scuba (Invatec S.p.A, Italy) stent was deployed. However, although the balloon was inflated till 13 atm (RBP), incomplete expansion of the mid-to-distal part of the stent was observed. The result was complete expansion of proximal one-third and incomplete expansion of distal two-thirds of the stent (Figure 1b). Because of the completely expanded part of the stent, we could not pull the stent back. In addition, there was a risk of misplacement and migration of the stent toward the distal end of the arteries. First, we moved our guiding catheter forward into the completely opened proximal part of the stent to prevent its migration. Then, we passed through the stent with the help

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Received
29.05.2016

Accepted
16.06.2016

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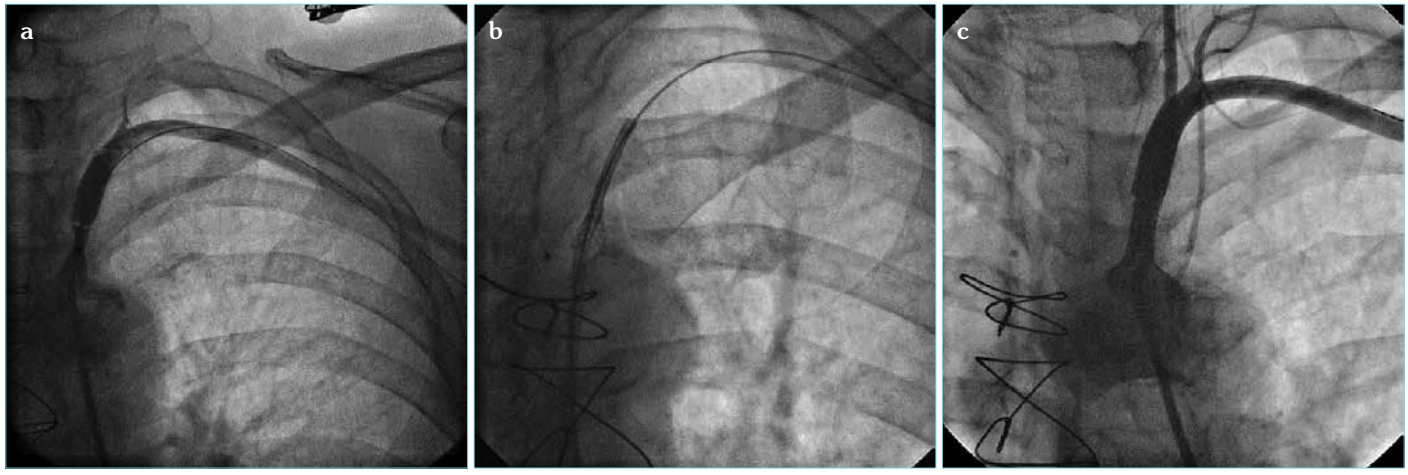

Figure 1. a-c. Coronary angiography images. (a) Ostial subclavian artery stenosis; (b) incomplete stent expansion with complete expansion of only proximal the one-third region; and (c) complete stent expansion

of a 5.0-Fr Bern hydrophilic catheter and exchanged the 0.035 guide wire with a 0.018×300-cm Treasure guide wire (Asahi Intecc, Thailand). Over this guide wire, first, the unexpanded stent was dilated using a 6.0×60-mm Glider Flex Over-the-Wire balloon (TriReme Medical Inc.; Pleasanton, California, USA), and complete stent expansion was achieved (Video 1). Then, balloon angioplasty was performed with a 7.0×50-mm Pyxis-v balloon (Stron Medical, Winsen, Germany), and the stent was successfully implanted (Video 2). The final angiogram showed no signs of remaining stenosis (Figure 1c).

DISCUSSION

The evolution in the technique from angioplasty alone to angioplasty with provisional stenting and finally, to angioplasty and stenting in all cases reflects the improved outcomes achieved with stenting. One of the initial studies to evaluate the primary stenting of subclavian arteries was reported by Kumar *et al. (3), who had an* excellent technical success rate of 100%. There was a lower chance of intimal injury, vessel thrombosis, and distal embolization as well as a higher procedural and technical success rate secondary to improved response to recoil.

Balloon-expandable stents have proved to be an appropriate choice for the intraluminal treatment of stenosis and occlusive lesions in the brachiocephalic arteries. However, stent placement in the supra-aortic arteries can be associated with some serious procedural complications, such as transient ischemic attacks, stroke, thrombosis, or arterial disruption leading to a pseudoaneurysm. Apart from procedural complications, there can be some technical complications such as balloon rupture or, as seen in this case, incomplete stent expansion that can potentially lead to vascular occlusion, thrombosis, and limb ischemia. Therefore, it should be managed as soon as possible. In this case, we immediately informed the cardio-vascular surgeons and started the presurgical preparations such as preparing the operating room, erythrocyte suspension, and intensive care unit. Meanwhile, we attempted to manage it with endovascular techniques and succeeded. At the end, the patient was discharged from the hospital 2 days after the procedure without any sequelae or symptoms.

CONCLUSION

Incomplete stent expansion (or partial stent expansion) previously reported during coronary and carotid artery stenting can be seen during subclavian artery stenting. In this case, we wanted to describe an endovascular method dealing with this unusual complication during subclavian stent deployment and by avoiding an unnecessary and a high-risk surgical procedure. Our technique seems to be an easy, elegant solution and should be utilized in such an unusual complication. However, it should always be kept in mind that surgical backup is important in all angioplasty procedures.

Video 1. Dilatation of the unexpanded part of the stent with an Over-the-Wire balloon

Video 2. The successfully implanted stent after the balloon angioplasty with a Pyxis-V balloon

Informed Consent: Written informed consent was obtained from the patient.

Peer-review: Externally peer-reviewed.

Authors' Contributions: Conceived and designed the experiments or case: HAK, ANA, HA, CS, SB, SS, EB. Performed the experiments or case: HAK, ANA, HA, CS, SB, SS, EB. Analyzed the data: HAK, ANA, HA, CS, SB, SS, EB. Wrote the paper: HAK, ANA, HA, CS, SB, SS, EB. All authors have read and approved the final manuscript.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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