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Technical note

Vertebral artery origin stenting with buddy wire technique in tortuous subclavian artery

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Abstract

Catheterization of vessels with severe tortuosity and atherosclerotic changes may represent a technical challenge and is associated with a higher incidence of vascular complications [Putman CM, Chaloupka JC. Use of large-caliber coronary guiding catheters for neurointerventional applications. AJNR Am J Neuroradiol 1996;17:697–704]. Placement of guiding catheter to the tortuous subclavian artery in vertebral artery origin stenting procedure is such a condition with difficulties. In the presence of severe tortuosity of aortic arch and proximal subclavian artery placement of guiding catheter may be difficult and yield poor backup support. We describe a technique that uses a buddy wire to make the guiding catheter stable in its proper position and make possible to perform stenting the vertebral artery origin stenosis.

Keywords: Buddy wire; Stenosis; Stenting; Subclavian artery; Tortuosity; Vertebral artery

1. Introduction

Positioning of a guiding catheter is the first and most important step of endovascular procedures in supraaortic interventions. It may be difficult to place a guiding catheter to the subclavian artery via transfemoral approach because of tortuosity. In this study, we contemplated using a microguidewire as a buddy wire in the vertebral artery (VA) origin stenting procedures.

2. Materials and methods

2.1. Patient demographics

During last 2 years, we have encountered 14 vertebral artery origin stenting procedures in 12 cases, in which a 6-French guiding catheter was introduced into the subclavian artery for VA origin stenting and balloon angioplasty, however navigation of the microguidewire and stent could not be possible because of tortuosity of aortic arch and proximal subclavian artery. Buddy wire technique was used in these cases. Nine of the patients were male where three were female; the mean age of the patients was 65.4 years (age range 60–72). All the patients with symptomatic stenosis ≥70% were had stenting and balloon angioplasty of VA origin with buddy wire technique. Since high restenosis rates have been reported after angioplasty alone, we have put stents to all these VA origin stenosis. The technique involves placing a 0.014 in· extrasupport microguidewire to the distal subclavian artery during the whole procedure to stabilize the guiding catheter.

2.2. Technical report

We have catheterized the subclavian artery with a 5-French diagnostic catheter and placed an exchange 0.035 in. guidewire (Roadrunner; Cook, Denmark) to distal subclavian artery then placed a 6-French guiding catheter (Envoy; Cordis, Miami Lakes, FL) to the subclavian artery. While the exchange guidewire was in the artery we have placed a 0.014 in. extrasupport mikroguidewire (Choice Extrasupport; Target/Boston Scientific, Miami, FL) to distal subclavian artery as a buddy wire to stabilize the guiding catheter in its position (Fig. 1a and b).

Then, a soft tip 0.014 in. microguidewire (Transend softtip; Target/Boston Scientific) was easily passed through the origin stenosis (Fig. 1c). After stabilization of the guiding catheter with these microguidewires we have withdrawn the 0.035 in. exchange guidewire and navigate the monorail, balloon-expandable stent to the stenotic segment and made balloon

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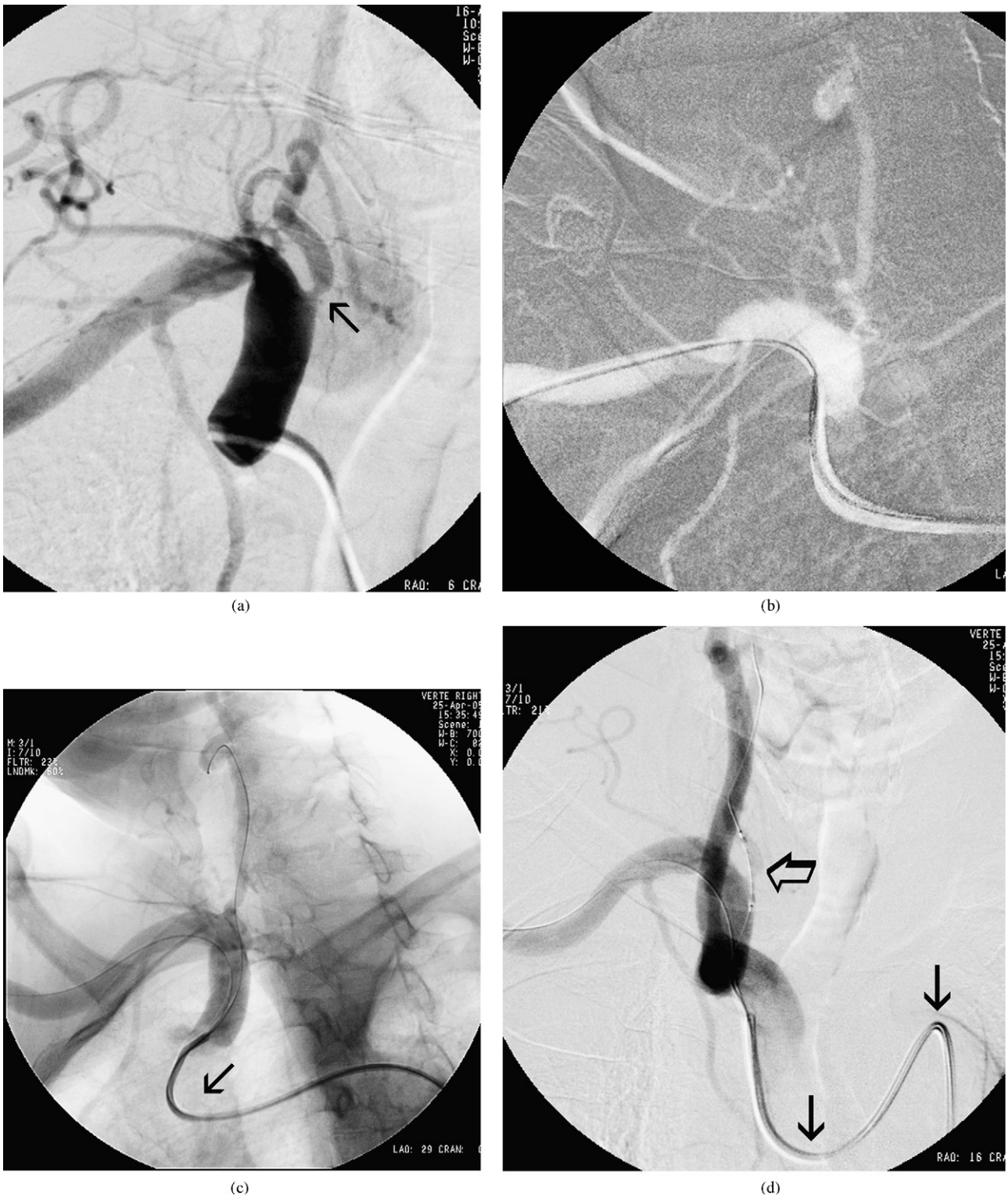

Fig. 1. (a) Right subclavian angiography shows significant stenosis of the right vertebral artery origin (black arrow), note the tortousity of subclavian artery. (b) Roadmap image shows the placement of exchange 0.035 in. guidewire and 0.014 in. support microguidewire to the distal subclavian artery. (c) Right subclavian angiography after passage of 0.014 soft-tip microguidewire through the vertebral artery origin stenosis and removal of exchange guidewire, note the buckling of guiding catheter (black arrow). (d) Right subclavian angiography after advancement of the guiding catheter and positioning of the balloon-expandable stent to the stenotic segment at the vertebral artery origin stenosis (white arrow), note the kinking and buckling of the guiding catheter (black arrow) but still in a acceptable position. (e) Control right subclavian angiography after delivery of stent shows good recanalization of the stenosis (black arrow), guiding catheter is still in appropriate position.