International Journal of Sciences

Research Article Volume 9 – October 2020 (10)

Kissing Balloon Angioplasty for Subclavian Artery Combined with Vertebral Artery Origin Stenosis

Yan Zhang, Zhenguang Wang, Zhaolong Zhang, Sun Chengjian, Rui Xu

Keywords: Kissing Balloon, Ubclavian Artery, Vertebral Artery

Clinical data

The patient, a 74-year-old male, was admitted to our hospital due to "transient loss of consciousness and weakness of the right limb for 1 day".The patient had a sudden fall without obvious inducement 1 day ago, transient loss of consciousness combined with right limb weakness, gradually clear consciousness after about 5 minutes, left right limb weakness, and then went to our hospital.Physical examination on admission: right nasolabial sulcus, right upper limb muscle strength level 3, right lower limb muscle strength level 4, right Babinski sign positive.Right upper limb blood pressure 145/80mmhg, left upper limb blood pressure 123/73 mmHg.CTA at the top of the head after admission suggested left internal carotid artery occlusion, severe stenosis at the beginning of left subclavian artery and left vertebral artery.Mri scan of the brain reveals left lateral paraventricular infarction (not shown in this image).Color doppler ultrasound also suggested severe localized stenosis at the beginning of the left vertebral artery.After 5 days of oral administration of aspirin 100mg QD and Bolivar 75mg Qd, cerebral angiography and endovascular interventional therapy were performed.

After local lidocaine anesthesia of the patient's right femoral artery, Seldinger was used to puncture and place the 5F arterial sheath.Cerebral angiography was performed using a 5F single curved angiography tube, which showed left internal carotid artery occlusion.Long segment stenosis of the left subclavian artery and severe initial stenosis of the left vertebral artery (Figure 1).The measurement showed that the distal diameter of the left vertebral artery stenosis was about 2.7mm, and the stenosis degree was about 85%.The distal diameter of the left subclavian artery stenosis was about 5.5mm and the stenosis degree was about 60%.70cm 6F sheath was exchanged (Cook, USA) and placed in the left subclavicular artery under the guidance of 0.035 in guidewire and 5F single bend catheter.After 3000IU of heparin was injected with systemic heparinized intravenous masses, two 200cm 0.014 in Synchro2 microguidewires (Stryker, USA) were introduced through the long sheath, and hyperselected to the distal end of the stenosis lesion under the diagram, respectively to the distal end of the left subclicular artery and the left vertebral artery V2 segment.The 3.0x15mm NCTREK balloon (Abbott, USA) was introduced into the initial stenosis of the left vertebral artery, and the 5X40mm Passeo-18 balloon (Biotrnik (GER) was introduced into the stenosis of the subclavicular artery through the microguide wire of the left subclavicular artery (Figure 2).The tension of the push rod of the balloon was fully released. After the position was confirmed by angiography again, two balloons were filled simultaneously to expand the stenosis (Figure 3).The immediate postoperative angiography showed that the two stenosis were significantly improved compared with the preoperative, the residual stenosis of the initial part of the vertebral artery was about 20%, and the residual stenosis of the subclavicular artery was about 10%.Patients with no positive signs of new nervous system were given 4000IU q12h of LMWH for three consecutive days after surgery, long-term aspirin 100mg qD oral, clopidogrel 75mg QD oral treatment for 3 months.The patient was followed up 3 months after the operation, and the right muscle strength of the patient was improved to grade 5-no positive signs of new nervous system.Color doppler ultrasound examination of the neck indicated slight stenosis at the beginning of the left vertebral artery, which was improved compared with that before surgery.

Discusssion

Subclavian artery stenosis was usually treated by surgical bypass surgery.In recent years, with the progress of interventional therapy equipment and technology, more and more patients have obtained satisfactory curative effect through interventional therapy.Interventional therapy mainly includes simple balloon dilatation and stent placement. Systematic reviews comparing the two treatments have shown that both have lower complication rates, and stent placement can better maintain the patency of blood vessels compared with simple balloon dilatation[1], but there is a lack of randomized controlled studies to further confirm this[2].In this case, considering the influence of subclavicular artery stenosis on the initial part of vertebral artery and the possibility of vertebral

Published at: http://www.ijsciences.com/pub/issue/2020-10/
DOI: 10.18483/ijSci.2387; Online ISSN: 2305-3925; Print ISSN: 2410-4477

Zhenguang Wang (Correspondence)
+

artery occlusion after stent placement, simple balloon dilatation was selected for treatment.At present, the primary treatment for vertebral artery stenosis is stent implantation, but the high restenosis rate after stent implantation is also not negligible [3].Recently, it has been reported that drug-eluting balloon has been used for the treatment of these lesions, and a satisfactory curative effect has been achieved[4].In this case, the diameter of the vertebral artery was small and the risk of restenosis after stent implantation was high, so simple balloon dilatation was used for treatment.

During balloon dilatation of the subclavicular artery, there is a risk of plaque displacement and vertebral artery occlusion. Therefore, the surgeon chose to use both balloons to perform balloon angioplasty on both narrow vessels simultaneously.In this case, t-shaped balloon dilatation was used to treat the initial stenosis of the subclavicular artery and vertebral artery, which has not been reported so far.This technique draws on the experience of a "kissing balloon" technique commonly used in the treatment of bifurcation stenosis of the coronary arteries.This technique has been reported in the 1990s, and its main advantage is that it can reduce the risk of aggravation or occlusion of adjacent vascular stenosis due to the "snow plough effect" of plaque, thus increasing the surgical safety[5].

For the treatment of the initial vertebral artery stenosis with subclavian artery stenosis, some literatures have summarized the treatment experience.Zhu Fengshui et al reported that t-shaped stent technology is a safe and effective treatment scheme for two stenosis vessels respectively.Recently, there have been similar reports abroad about the treatment of subclavicular artery stenosis affecting the beginning part of vertebral artery by t-stent technology[6].However, as reported in this case, T-shaped balloon formation technique is also an alternative surgical option for such lesions.In addition, stent placement can be used to remedy severe residual stenosis or dissection after balloon dilatation alone.

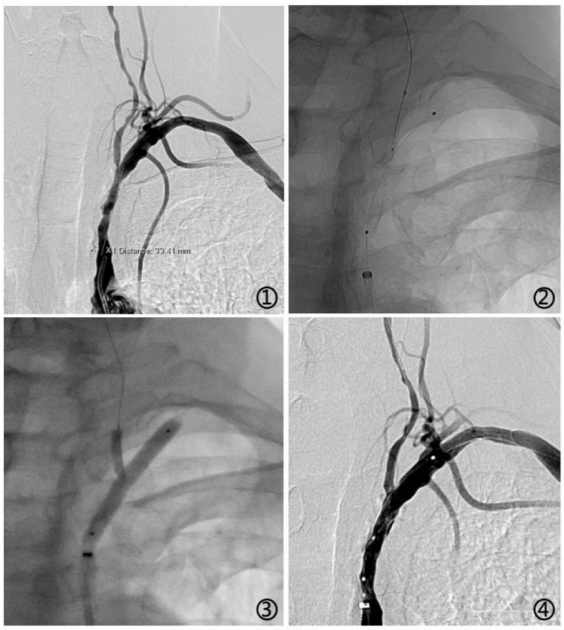

Figure 1 discography and surgical procedure

The left subclavian arteriography showed the stenosis of the left vertebral artery at the beginning and the left subclavian artery, and the stenosis affected the starting part of the vertebral artery;The NCTREK balloon at the beginning of the left vertebral artery was in place, and the PasSEo-18 balloon of the left subclavian artery was in place.(3) Filling both balloons at the same time to expand the stenosis;(4) After balloon dilatation, subclavian artery stenosis and vertebral artery initial stenosis were significantly improved.

References

1. Chatterjee, S., N. Nerella, S. Chakravarty, et al., *Angioplasty alone versus angioplasty and stenting for subclavian artery stenosis--a systematic review and meta-analysis.* Am J Ther, 2013. **20**(5): p. 520-3. https://doi.org/10.1097/MJT.0b013e31822831d8
2. Iared, W., J.E. Mourão, A. Puchnick, et al., *Angioplasty versus stenting for subclavian artery stenosis.* Cochrane Database Syst Rev, 2014. **2014**(5): p. Cd008461. https://doi.org/10.1002/14651858.CD008461.pub3
3. Borhani Haghighi, A., R.C. Edgell, S. Cruz-Flores, et al., *Vertebral artery origin stenosis and its treatment.* J Stroke Cerebrovasc Dis, 2011. **20**(4): p. 369-76. https://doi.org/10.1016/j.jstrokecerebrovasdis.2011.05.007
4. Wang, Y., Y. Ma, P. Gao, et al., *First Report of Drug-Coated Balloon Angioplasty for Vertebral Artery Origin Stenosis.* JACC Cardiovasc Interv, 2018. **11**(5): p. 500-502. https://doi.org/10.1016/j.jcin.2017.09.040
5. George, B.S., R.K. Myler, S.H. Stertzer, et al., *Balloon angioplasty of coronary bifurcation lesions: the kissing balloon technique.* Cathet Cardiovasc Diagn, 1986. **12**(2): p. 124-38. https://doi.org/10.1002/ccd.1810120212
6. Schneider, V., R. Dirschinger, I. Wustrow, et al., *Endovascular therapy of subclavian artery occlusive disease involving the vertebral artery origin.* Vasa, 2020. **49**(3): p. 205-213. https://doi.org/10.1024/0301-1526/a000842