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## Delayed carotid wallstent shortening



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## ABSTRACT

**INTRODUCTION:** Carotid angioplasty and stenting (CAS) has been demonstrated to be safe and an acceptable alternative to surgery. Stent malpositioning can occur during the maneuvers of delivering; technical errors can lead to proximal or distal slipping of the stent that needs the placement of additional pieces.

**PRESENTATION OF CASE:** We describe the case of a postoperative dislocation of a carotid stent that happened 1 year after placement. After the first ultrasound control confirmed the correct position of the Stent the following one, executed 9 months later, showed a severe restenosis due to a proximal dislocation of the stent. The problem was solved with the positioning of a further one more distally.

**DISCUSSION:** We observe the possibility of Carotid Wallstent shortening during the implant due to an incorrect placement or sizing, but a delayed displacement is a rare complication that, we highlight, can occur after CAS and that needs to be considered at the moment of the preoperative planning.

**CONCLUSION:** After CAS a closed ultrasound follow up is advisable for a long time in order to detect unexpected complications.

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## 1. Introduction

The gold standard for carotid disease is carotid endarterectomy (CEA) even though carotid angioplasty and stenting (CAS) has been demonstrated to be safe and an acceptable alternative.

Stent malpositioning can occur during the maneuvers of delivering; technical errors can lead to proximal or distal slipping of the stent that needs the placement of additional pieces [1].

Errors in the choice of size or type of stent are possible during the primary procedure and, if promptly recognized, can be easily solved without further complication for the patient.

In the first 48 h after implant the major risk is embolization of plaque material. In the first year another risk is represented by precoce restenosis due to recoiling or severe neo-endothelization of the stent [2].

For these reasons a close follow up with ultrasound is recommended in the first year after the procedure.

We describe a rare case of a postoperative dislocation of a carotid stent that happened 1 year after placement.

## 2. Presentation of case

An 82 years old man was admitted to our Division for a recurrent stenosis of the left internal carotid artery documented with EcoColorDoppler (ECD).

The medical history of the patient included hypertension, diabetes mellitus type 2 and coronary arterial disease that required percutaneous treatment.

His arterial history included chronic peripheral arterial disease and bilateral carotid endarterectomy followed by bilateral carotid arterial stenting (CAS) for earlier restenosis. In April 2011 the left carotid artery underwent surgical repair for severe stenosis and a vascular patch was placed to increase the arterial lumen.

The patient was discharged with the indication to continue a single antiplatelet therapy with ASA 100 mg.

The first ultrasound control in June 2011 was normal but the following (October 2011) revealed a severe carotid restenosis.

Then the patient underwent carotid arterial stenting with a carotid Wallstent RP (Boston Scientific) monorail 7 × 40 mm placed between the first 1,5 cm of the internal carotid and the distal part of common carotid.

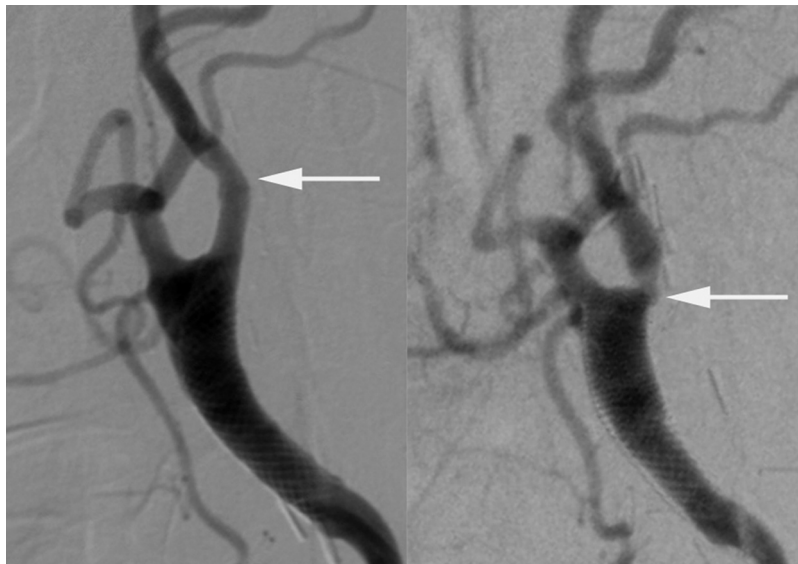
The final image confirmed the exact deployment of the carotid Wallstent and the complete correction of the restenosis (Fig. 1, left).

The Patient started a double antiplatelet therapy with ASA 100 mg and Clopidogrel 75 mg.

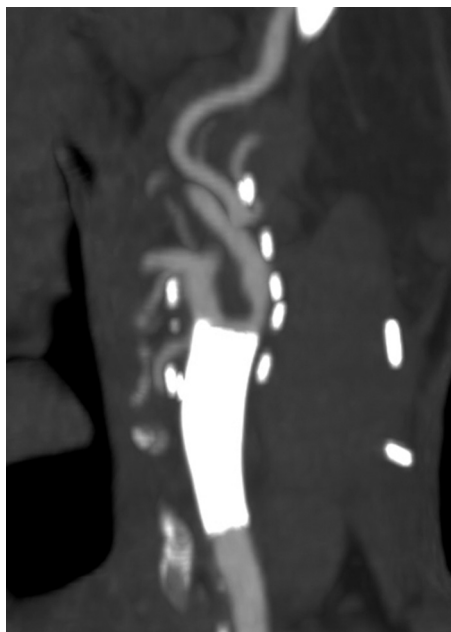
In September 2012 after two normal EcoColorDoppler (December 2011 and July 2012) a severe restenosis below the distal edge of the stent was discovered. The patient was asymptomatic.

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**Fig. 1.** The image on the left side shows the result of the first procedure. The image on the right demonstrates the shortening of the Wallstent.



**Fig. 2.** The AngioCT shows the fall of the Wallstent in the bulb.



**Fig. 3.** The final angiography underlines the complete stenosis correction.

An AngioCT scan [Fig. 2](#) was then performed in order to evaluate the exact point of restenosis and the relationship with the stent.

Surprisingly the stent appeared shortened and positioned only into the bulb discovering the point of the previous restenosis. ([Fig. 1](#), right).

We decided to place a stent distally to the first one.

A filter (Emboshield® NAV6 Embolic protection system; Abbott Vascular) was positioned in the distal carotid artery prior to deliver a Carotid Stent 8 × 40 mm (Precise RX; Cordis) between the distal internal carotid artery and the Wallstent with 1.5 cm of overlap.

Finally we inflated a 5 mm rapid exchange balloon (Sterling, Boston Scientific) in order to treat the stenosis and to obtain a perfect sealing of the stent to the distal arterial wall.

The final angiography showed the patency of the extracranial left carotids without any residual stenosis [Fig. 3](#)

No further problems were encountered in the follow up after 1 year.

### 3. Discussion

This was the first time we experienced such as complication. A review of the literature showed that a similar complication has been already described.

Yoon [3] described 4 cases of delayed carotid Wallstent shortening; all cases were due to the shortening of the distal edge of the stent that resulted in uncovering of the stenosis. In all cases he didn't perform a post-stent balloon dilatation.

He hypothesised that the cause was the elastic recoil of the carotid artery and the mismatch between the CCA and ICA.

In our case the stent maintained its own integrity, but underwent a remodeling that caused shortening and the loss of its original position.

The stent, probably, wasn't entirely fixed to the arterial wall (despite we have performed a post-stent balloon dilatation) and

the dynamic movement of the carotid bifurcation pushed by blood flow increased the distance between the steel and the wall.

The elastic forces of the Wallstent [4] won over its radial forces resulting in the stent shortening. These facts and the mismatch between the internal diameter and the bulb diameter caused the return of the stent to the original cylindrical shape.

We speculated that in this case the choice of a tapered open-cells stent instead of a cylindric one, could have been better.

Our patient, fortunately, didn't have symptoms, probably because of the nature of carotid disease (restenosis) with less risk to embolize.

The use of a nitinol carotid stent in the re-operation was dictated by 2 considerations: firstly the requirement to stenting the ICA farther (the nitinol open cells stent is less stiff than a steel stent and more conformable) [5].

Secondly, the radial force of nitinol can improve the stent stability.

Moreover, it is important that the post-dilatation of the carotid stent ensures his complete sealing to the arterial wall.

A closed ultrasound follow up is advisable for a long time in order to detect unexpected complications [7].

**Conflict of interest**

We have no conflicts of interest for this report.

**Funding**

We have not received any funding for this report.

**Consent**

Yes, all legal right was been respected.I have obtained written consent from the patient and I can provide this should the Editor ask to see it.

**Authors contribution**

Author name	Conception and design	Analysis and interpretation	Data collection	Writing the article	Critical revision of the article	Final approval of the article	Statistical analysis	Obtaining funding	Overall responsibility
Luca Garriboli	yes	yes	yes	yes	yes	yes			yes
Antonio Maria Jannello						yes			yes

As in our experience Nagayama described a case of subacute shortening of Carotid Wallstent occurred 24 h after the implante that discovered the plaque and resulted in a preoce restenosis.

Nagayama too choice to place a Nitinol Stent (Precise RX; Cordis) more distally in order to treat this compliace.

**4. Conclusion**

The shortening of Carotid Wallstent is more frequent during the implant due to an incorrect choice of the size or due an extreme size mismatch between the internal and the common carotid artery.

An event that occurs 1 year later the procedure is awfully rare but as demonstrate in our experience not defeatable and have to be considered at the moment of the preoperative planning.

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