



## Kasuistika | Case report

# Stenting of the aortic arch and supra-aortic vessels, in a patient with DeBakey type I dissection

Ivo Petrov<sup>a</sup>, Zoran Stankov<sup>a</sup>, Galina Kozareva<sup>b</sup>, Silvia A. Pavlova<sup>c</sup>, Iv. Tasheva<sup>a</sup>

<sup>a</sup> Department of Invasive Cardiology, "City Clinic" University Hospital, Sofia, Bulgaria

<sup>b</sup> Department of Diagnostic Imaging, "City Clinic" University Hospital, Sofia, Bulgaria

<sup>c</sup> Department of Cardiology, "City Clinic" University Hospital, Sofia, Bulgaria

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## SOUHRN

**Kontext:** Disekce aorty (AD) je stav vyžadující okamžité chirurgické řešení disekce typu I a II klasifikace dle DeBakeyho. Přes veškerý pokrok v diagnostických a léčebných postupech zůstává mortalita i nadále vysoká. Další trhliny, kritická komprese a obliterace pravého lumen spolu s ischemií koncového orgánu mohou ohrozit akutní i chronické klinické výsledky po chirurgickém řešení AD. V těchto případech může být léčbou volby endovaskulární léčba implantací nepotaženého stentu. Cílem je tedy uzavření proximální vstupní trhliny, dekomprese nepravého lumen vedoucí k jeho trombotizaci, přesměrování krevního proudu do pravého lumen a vyvolání procesu „remodelace aorty“.

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## ABSTRACT

**Background:** Aortic dissection (AD) is a medical condition which requires emergent surgical intervention for dissection type I and II DeBakey. Despite advances in diagnostic and therapeutic modalities, mortality is still high. Additional tears, critical true lumen compression and obliteration with end-organ ischemia can compromise acute and chronic clinical outcomes after surgical intervention of AD. Endovascular treatment with non-covered stent implantation can be the treatment of choice for these cases. Thus the purpose includes closure of the proximal entry tear, depressurization of the false lumen, leading to its thrombosis, redirection of the blood flow towards the true lumen and induction of "aortic remodeling" process.

**Address:** Assoc. Prof. Ivo Petrov, MD, PhD, City Clinic Cardiology Center University Hospital, 127 Okolovrasten pat Street, 1407 Sofia, Bulgaria, e-mail: [petrovivo@hotmail.com](mailto:petrovivo@hotmail.com)

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## Introduction

For type A aortic dissection surgery is the treatment of choice. Acute type A AD has a mortality of 50% within the first 48 hours if not operated. In-hospital complications (neurological deficits, altered mental status, myocardial or mesenteric ischemia, kidney failure, hypotension, cardiac tamponade, and limb ischemia) subsequently increased in patients who died compared with that of survivors ( $p < 0.05$  for all) [1]. The aim of surgical management of acute type A aortic dissection is to prevent death by rupture of the ascending aorta [2]. Because of the extent of the disease to the entire aorta, most surviving patients continue to have a patent distal false lumen [2], potentially leading to aneurysmal evolution and its complications, especially the rupture that is the first cause of late death [3]. It has been recognized that the long-term prognosis of the patients with thrombosed false lumen is superior to that of those with patent false lumen [4]. The following case represents endovascular way of treatment of patency of the false lumen, dissecting aneurysm evolution and avoiding reoperation in DeBakey type I dissection.



Figs. 1 and 2 – On the CT scan a double lumen is visualized in both the descending aorta and the supra-aortic vessels (see the arrows below). False lumen diameter in the descending aorta is measured – 30 mm, while the true lumen is compressed to 6 mm.

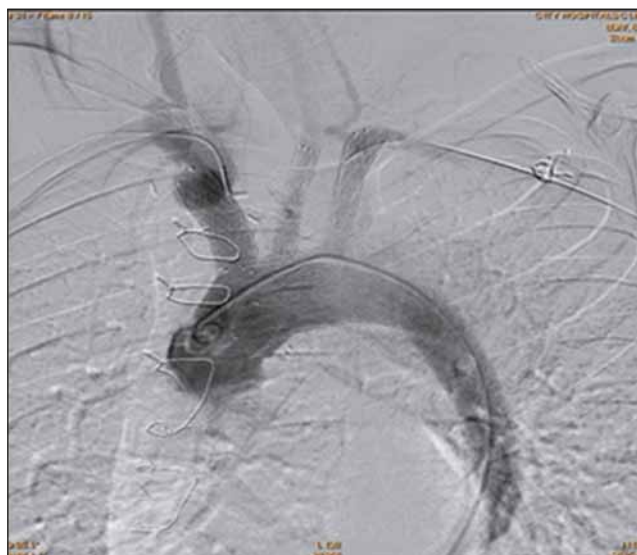


Fig. 3 – Final result on the angiography.

## Clinical case

We represent a clinical case of a 48-year-old male patient with history of not controlled and not treated arterial hypertension and dyslipidemia. He survived AD type I DeBakey and was operated in the acute phase. A resection of ascending aorta and implantation of prosthesis Polythese 32 was done. During the follow-up period, the patient was symptomatic with uncontrolled hypertension, worsening renal function and progressive claudication occurred.

Control CT showed partial thrombosis of aortic arch which is supplied by brachiocephalic trunk; dissection of left common carotid artery with compressed true lumen and proximal dissection of left subclavian artery; increasing of the diameter of the false lumen in the descending aorta was measured as well compression of the true lumen to 6 mm and false lumen expansion to 30 mm (Figs. 1 and 2).

An endovascular treatment was performed, aiming closure of the proximal entry tear and redirection of the blood flow in the true lumen and restoration of the flow in the branches. Via left and right radial 6 Fr access and left femoral 10 Fr access we implanted: Sinus XL 6 Fr 16/40 mm in the brachiocephalic trunk, Sinus XL 6 Fr 14/40 mm in the left common carotid artery, Sinus XL 6 Fr 14/40 mm in the left subclavian artery and Sinus XL 36/80 mm in the aortic arch with overlapping with stent Sinus XL 34/100 mm in the descending aorta (Fig. 3).

After the procedure the patient was sent back to the ward, with no intensive care unit stay. On the third day, he was discharged from hospital in good clinical condition with no complaints. Normalization of renal function and normalization of the blood pressure with the same optimal medical treatment were reached.

## Results

The post-procedure result shows decompression of the true lumen in all stented zones (Figs. 4 and 5). Implanted



Figs. 4 and 5 – One month later, the control CT scan showed decompression of the true lumen in the descending aorta up to 24 mm (from initial – 6 mm), reduction of the false lumen to 15 mm (from 30 mm) as well as total thrombosis of the false lumen in the stented supra-aortic vessels.

stents restore the flow in the true lumen, side branches and end-organ perfusion, preventing from aortic rupture and end-organ ischemia.

One month later, the patient is still asymptomatic with normal creatinine levels and blood pressure in optimal ranges over the same therapy. A control CT shows patent stent with no expansion in false lumen diameter in the thoracic and abdominal aorta. True lumen extension is measured to 24 mm and false lumen has decreased its diameter to 15 mm. One year uneventful follow-up was established.

## Conclusion

In aortic dissection, the most important predictors of late survival are inducing the process of aortic remodeling, false lumen thrombosis and true lumen expansion. The treatment of choice in this clinical case after surgical aortic arch repair due to type I dissection is implantation of non-covered stents in the aortic arch and the supra-aortic vessels. It appears as a safe and effective way of restoring the flow in the true lumen and the side branches in late complicated AD cases.

## Conflict of interest

None declared.

## Funding body

None.

## Ethical statement

Authors state that the research was conducted according to ethical standards.

## Informed consent

I declare, on behalf of all authors, that informed consent was obtained from the patient participating in this study.

## References

- [1] R.H. Mehta, T. Suzuki, P. Hagan, et al., Predicting death in patients with acute type A aortic dissection, *Circulation* 105 (2002) 200–206.
- [2] M. Heinemann, J. Laas, M. Karck, H.G. Borst, Thoracic aortic aneurysm after acute type A aortic dissection: necessity for follow-up, *Annals of Thoracic Surgery* 49 (1990) 580–584.
- [3] M.E. DeBakey, C.H. McCollum, E.S. Crawford, Dissection and dissecting aneurysms of the aorta: twenty-year follow-up of five hundred twenty-seven patients treated surgically, *Surgery* 92 (1982) 1118–1133.
- [4] R.E. Dinsmore, J.T. Willerson, M.J. Buckley, Dissecting aneurysm of the aorta. Aortographic features affecting prognosis, *Radiology* 105 (1972) 567–572.