

Case Report / Olgu Sunumu

Left main coronary artery stenosis treated with renal stents after Cabrol operation

Cabrol operasyonu sonrası sol ana koroner stenozunun renal stent ile tedavisi

Mustafa Karanfil¹, Mehmet Akif Erdöl¹, Burak Açar², Emre Aruğaslan¹, Ahmet Göktuğ Ertem¹

Institution where the research was done:
Ankara City Hospital, Ankara, Turkey

Author Affiliations:

¹Department of Cardiology, Ankara City Hospital, Ankara, Turkey

²Department of Cardiology, Kocaeli University Faculty of Medicine, Kocaeli, Turkey

ABSTRACT

Cabrol procedure is an alternative technique of anastomosing coronary arteries to the aortic root graft by an extra graft, if direct implantation of coronary arteries to the aortic root graft is not possible. The left main coronary artery stenosis is a rarely seen complication after aortic root operations. Treatment of large coronary arteries with renal stents is a challenging procedure. Herein, we, for the first time in the literature, present a case of left main coronary artery stenosis treated with renal stents after Cabrol operation.

Keywords: Aortic aneurysm, coronary artery disease, stent, thoracic.

There are several methods for coronary anastomosis in aortic root operations. In 1968, Bentall and De Bono^[1] described his method by direct implantation of coronaries to the aortic root graft. However, in some cases, there are some obstacles and difficulties for direct reimplantation of coronaries to the aortic root graft. In 1981, Cabrol described his technique by anastomosing coronaries to an extra graft between the aortic root graft and coronary arteries.^[2] This extra graft reduces tension between the aortic root graft and the coronary arteries. Although Cabrol operation should not be routine first-line method, it should be kept in mind in selected cases. Intervention of left main coronary artery

ÖZ

Cabrol işlemi, koroner arterlerin aort kök greftine direkt implantasyonunun mümkün olmadığı durumlarda, koroner arterlerin aort kök greftine ek bir greft kullanarak anastomoz yapıldığı alternatif bir tekniktir. Sol ana koroner arter stenozu, aort kök ameliyatlarından sonra nadir görülen bir komplikasyondur. Büyük çaplı koroner arterlerin renal stentler ile tedavisi zor bir işlemdir. Bu yazıda, literatürde ilk kez Cabrol ameliyatı sonrası sol ana koroner arter stenozunun renal stentler ile tedavi edildiği bir olgu sunuldu.

Anahtar sözcükler: Aort anevrizması, koroner arter hastalığı, stent, torasik.

(LMCA) after Cabrol operation can be challenging due to the complex nature of the anatomy and large size of coronary arteries.

In this article, we, for the first time in the literature, present a case of LMCA stenosis treated with renal stents after Cabrol operation.

CASE REPORT

A 56-year-old male patient who underwent a Cabrol operation and aortic and mitral mechanic valve replacement six years ago for native aortic valve endocarditis, an ascending aortic aneurysm, and severe mitral regurgitation was admitted to our

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Correspondence: Mustafa Karanfil, MD. Ankara Şehir Hastanesi Kardiyoloji Kliniği, 06800 Çankaya, Ankara, Türkiye.
Tel: +90 555 - 509 58 50 e-mail: mkaranfil42@yahoo.com

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outpatient clinic with unstable angina. A coronary angiogram (CA) was performed through the left radial access. The right coronary artery (RCA) was cannulated using a Judkins 4 right diagnostic (JR4) catheter. The RCA was directly anastomosed to the aortic root graft and there was no stenosis (Figure 1). The LMCA was unable to be visualized

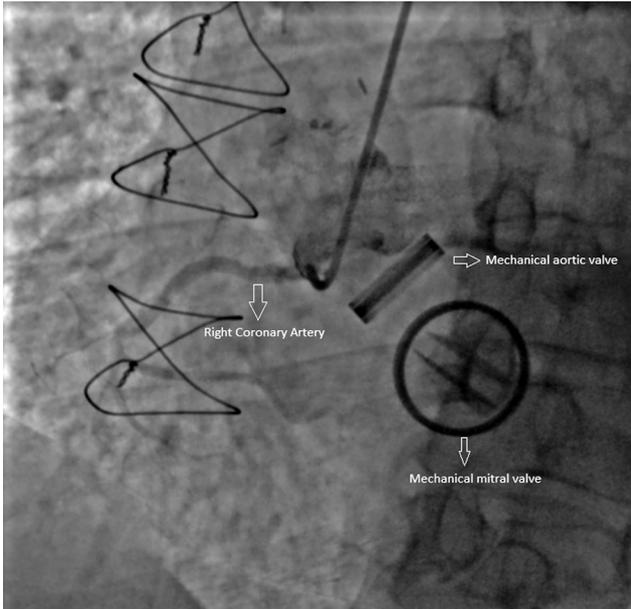


Figure 1. Coronary angiogram showing right coronary artery directly anastomosed to aortic root graft.

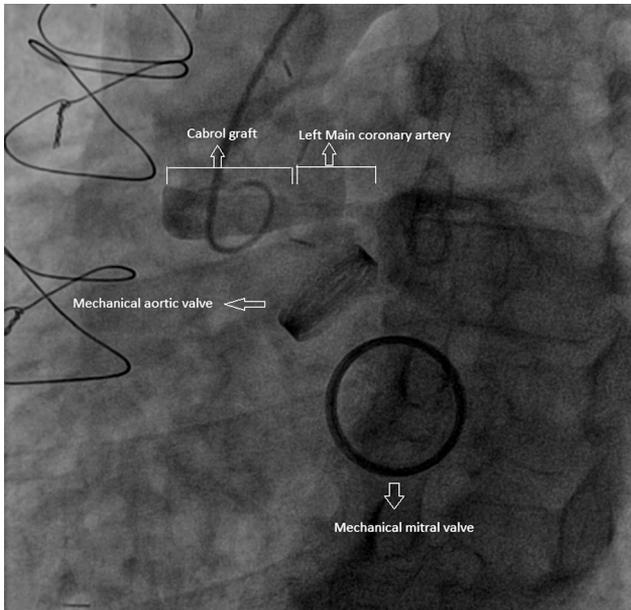


Figure 2. Aortography showing Cabrol graft between aortic root graft and left main coronary artery.

using a 3.5 left Judkins catheter and, therefore, an aortography was performed (Figure 2). Aortography revealed an extra graft between the aortic root graft and LMCA. The Cabrol graft was cannulated with a JR4 diagnostic catheter and LMCA stenosis was observed (Figure 3a, b). Computed tomography (CT)-CA was performed to understand whether it was stenosis, or pseudo-stenosis caused by tension between the Cabrol graft and LMCA. The cardiac radiologist reported that it was a true stenosis (70%) with a fibrofatty characteristic (Figure 4). The Society

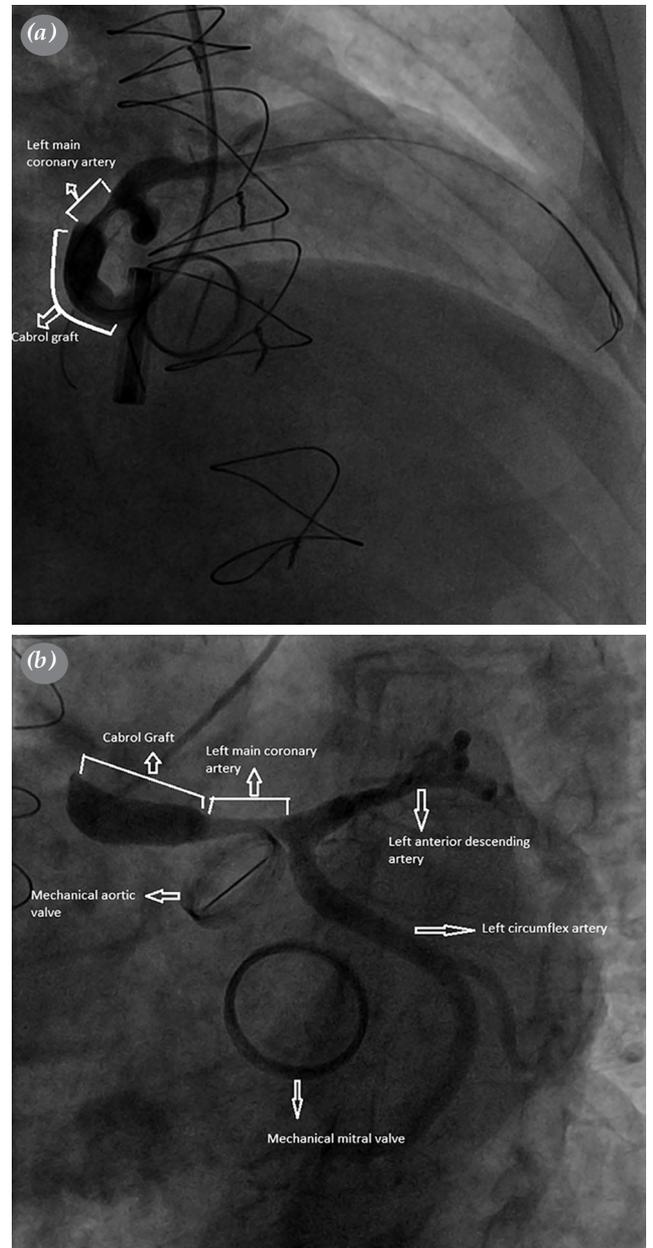


Figure 3. (a, b) Left main coronary artery stenosis.

of Thoracic Surgery (STS) score was calculated and the mortality risk was 8.23% for reoperation. The decision of the Heart Team was a percutaneous intervention, due to the high risk of reoperation. A written informed consent was obtained from each patient.



Figure 4. Coronary computed tomography angiography showing true left main coronary artery stenosis.

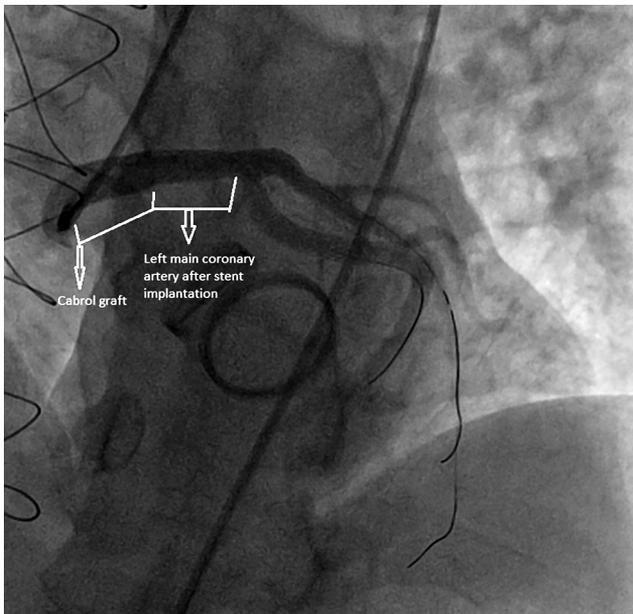


Figure 5. Post-percutaneous coronary intervention image of left main coronary artery.

Through the left radial access, the LMCA was cannulated with a JR4 guiding catheter. The lesion was passed with a 0.018 guidewire (Platinum Plus™; Boston Scientific Corp., MA, USA) through the left anterior descending (LAD) artery for support and a 0.014 guidewire was placed to the left circumflex artery (LCx) as to keep in touch. The size of the LMCA was reported about 6 mm after CT-CA. Due to the lack of coronary stent of an appropriate size, it was decided to implant two overlapped renal vascular stents (6×14 mm, RX Herculink Elite® Renal Stent System; Abbott Vascular Inc., CA, USA) (Figure 5).

The patient was discharged by acetylsalicylic acid (ASA), clopidogrel, and warfarin (triple therapy) therapy. At the first month control visit, the patient was free from anginal symptoms, and ASA was stopped. Six months later, the patient was admitted again with anginal symptoms and CA was performed which revealed 70% stenosis of LMCA. Despite early stent restenosis, it was decided to perform balloon angioplasty with prolonged triple therapy due to the high risk of reoperation. A balloon angioplasty was performed using a 6×20-mm peripheral balloon (Abbott; Armada 35) for LMCA stents. There was no residual stenosis. The patient was discharged with triple therapy for prolonged time.

At the first-year control visit on triple therapy, the patient was free of anginal symptoms. After 18 months, the patient was admitted with atypical chest pain, and control CA revealed 10 to 20% in-stent stenosis in

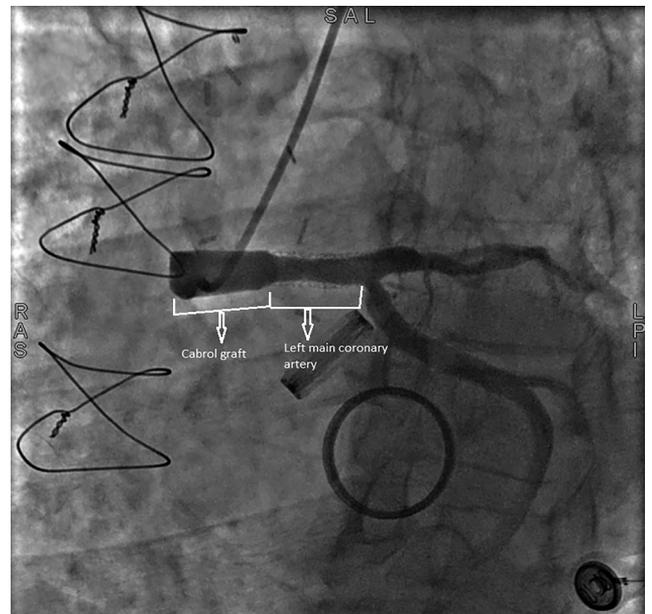


Figure 6. 10 to 20% left main coronary artery stenosis at control coronary angiography after prolonged triple therapy at 18 months.

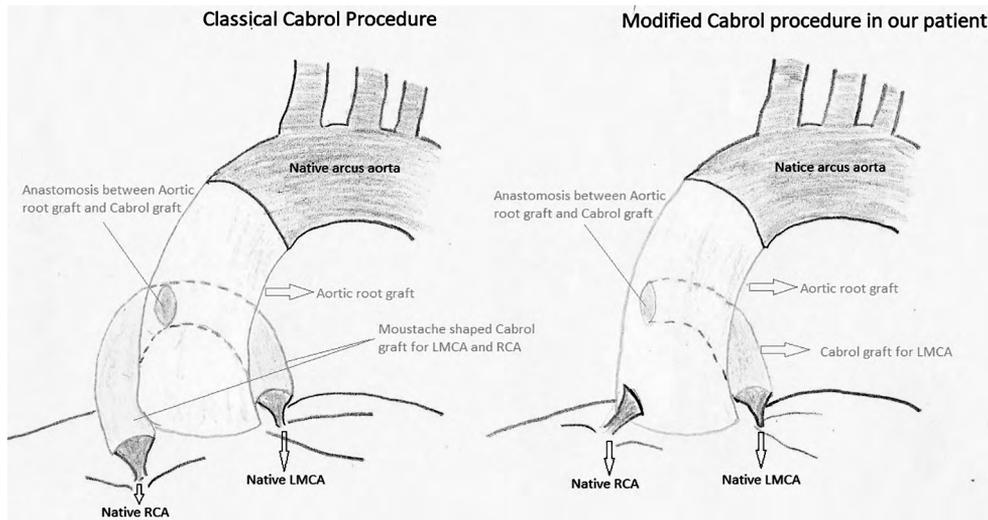


Figure 7. Illustration of classical Cabrol procedure and modified Cabrol procedure in our patient.

the LMCA and it was decided to continue medical treatment (Figure 6).

DISCUSSION

There are several techniques for reimplanting coronary arteries to the aortic root graft in aortic root operations. Bentall and De Bono^[1] first described direct anastomosing coronaries to the aortic root graft in 1968.^[1] In 1981, Cabrol et al.,^[2] described a technique termed as the Cabrol procedure implanting coronary arteries to a moustache shaped graft which is attached side-to-end to the aortic root graft and end-to-end to the coronary arteries (Figure 7). Later, this technique was called as classic Cabrol technique and modifications were described.^[3] Cabrol modifications include two different grafts from both coronary ostia to composite aortic root graft, a graft between aortic root and right coronary ostium and an extra graft anastomosed between the LMCA and extra graft between the right coronary and aortic root graft. In our case, there was a Cabrol graft between the LMCA and aortic root graft and the RCA was directly attached to aortic root graft (Figure 7).

Button modification of Bentall is the gold standard technique for coronary anastomosis to the aortic root graft. Cabrol is the method of choice in selected cases as reoperations, heavily calcified aorta, large dissections or aneurysms, and coronary ostium with low origins (<1.5 cm). The Cabrol procedure is also a bailout procedure, when unexpected complications occur and is not recommended as a routine first-line method for coronary anastomosis to aortic graft;

however, it is a valuable method in selected and complicated cases.^[3,4]

The LMCA stenosis or occlusion can be treated by percutaneous coronary intervention or reoperation.^[5,6] In our case, the patient was admitted with unstable angina six years after the operation. The CT-CA was performed to identify whether it was a pseudo-stenosis caused by tension or a true stenosis. The CT revealed that it was a true stenosis with fibrofatty characteristic.

Aortography is a method of choice to visualize the Cabrol graft ostium, as in our case. The Cabrol graft is usually anastomosed to the anterior wall of aortic root graft close to the coronary ostium which is attached to the Cabrol graft.

Undersized stenting of large coronary arteries carries the risk of stent restenosis and stent thrombosis. In general, large coronary angioplasty balloons and stents are not available and percutaneous intervention to large coronaries are still challenging. In our case, a cardiac radiologist reported that a 6×25-mm stent would be appropriate to the LMCA. Therefore, two overlapping 6×14-mm renal stents (RX Herculink Elite® Renal Stent System; Abbott Vascular Inc., CA, USA) were implanted. Although there are coronary artery stenosis cases treated with renal stents in the literature, there is a limited number of data regarding the long-term outcomes and optimal treatment strategy.^[7] Due to stent restenosis after six months after stent implantation, percutaneous balloon angioplasty was done and prolonged treatment with triple therapy was initiated in our patient.

In conclusion, the Cabrol procedure is not as frequent as the Bentall procedure; however, it is a very useful technique in selected patients. The Cabrol graft is usually anastomosed anteriorly to the aortic root graft close to the related coronary ostium. Cannulating the graft is similar to saphenous grafts, and an aortography may be helpful for the appropriate catheter selection. Being familiar with the anatomy of this procedure can be life-saving, particularly in acute conditions. Nonetheless, since renal stenting to coronary arteries is challenging and long-term results are scarce, further large-scale, long-term studies are needed to draw a firm conclusion.

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