Massive Myocardial Staining and Thebesian Venous Opacification during Complicated Coronary Angiography

Fatih Mehmet Ucar, MD¹ Ozcan Ozeke, MD¹ Ilker Duman, MD¹ Ugur Canpolat, MD¹
Halil Lutfi Kisacik, MD¹

¹ Department of Cardiology, Türkiye Yüksek İhtisas Training and Research Hospital, Ankara, Turkey

Address for correspondence: Ozcan Ozeke, MD, Türkiye Yüksek İhtisas Hastanesi, Kardiyoloji Klinigi, Ankara, 06100, Turkey (e-mail: ozcanozeke@gmail.com).

Int J Angiol 2016;25:e19–e20.

Abstract

Myocardial staining is a complication of coronary angiography or intervention procedures and consists of extravasations of contrast material into the myocardium. The powerful injection of contrast (myocardial staining) is caused by the improper positioning of the angiography or guiding catheter and can lead to refractory ventricular tachyarrhythmias and occasionally cardiac death. It results in small puffs of dye extravasating into pericoronary space (epicardial or myocardial). We presented an interesting image of a massive myocardial staining and dense coronary and thebesian venous opacification during complicated right coronary angiography. This case illustrates the value of careful manipulation and positioning of the coronary catheter during coronary angiogram.

Keywords

- ▶ myocardial staining
- ▶ coronary angiography
- ▶ complication

Myocardial staining is a complication of coronary angiography or intervention procedures and consists of extravasations of contrast material into the myocardium. The powerful injection of contrast (myocardial staining) is caused by the improper positioning of the angiography or guiding catheter and can lead to refractory ventricular tachyarrhythmias and occasionally cardiac death. It results in small puffs of dye extravasating into pericoronary space. Indeed, the coronary arteries have two distinct anatomical relationships with reference to epicardium and pericardial space. Half of the circumference of the coronary artery is represented by the myocardium and the remaining is related directly to the pericardial aspect.

Case Report

A 69-year-old male patient underwent angiography for investigation of chest pain via the left radial approach. The left coronary angiogram revealed normal coronary arteries. However, repeated attempts at cannulating the right coronary artery were unsuccessful and failed to visualize the ostium because of preferential cannulation of separate origin of a

conus branch. Moreover, there was also pressure dampening before the right coronary artery injection. Then, we considered to perform a “hit and run” technique; but unfortunately, massive myocardial staining of right ventricular outflow tract (RVOT) developed (▶ Fig. 1 and ▶ Video 1) and then immediately the catheter was pulled back. Visualization of the thebesian vein (black arrows), coronary vein, and sinus was also seen (Video 1). Emergency bedside hand-carried echocardiography showed no pericardial effusion. The patient remained asymptomatic without hemodynamic or arrhythmic compromise, though the myocardial staining appearance persisted on fluoroscopy. Then, we performed an aortic root angiogram after about 10 minutes of coronary angiogram to exclude possible iatrogenic aortic dissection, which showed no dissection flap but persistent RVOT myocardial staining (▶ Video 2). The course of our patient was uneventful, then he underwent a follow-up at coronary care unit approximately for 12 hours with electrocardiography (ECG). The continued ECG monitoring showed no changes. The next day, control fluoroscopy revealed the complete resolution of myocardial staining. He was discharged from hospital 2 days after the procedure. At present, this patient is being followed at the outpatient clinic.

published online
January 14, 2015

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Tel: +1(212) 584-4662.

DOI <http://dx.doi.org/10.1055/s-0034-1396930>.
ISSN 1061-1711.

Fig. 1 Right coronary angiogram showing the thebesian venous filling (black arrows) and myocardial staining (white arrow).

Video 1

Right coronary angiogram showing the massive myocardial staining, coronary sinus and vein, and thebesian venous opacification.

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Video 2

Aortic root angiogram after about 10 minutes of coronary angiogram to exclude possible iatrogenic aortic dissection showing no dissection flap but persistent right ventricular outflow tract myocardial staining.

Online content including video sequences viewable at: www.thieme-connect.com/products/ejournals/html/10-1055-s-0034-1396930-ija-13-0084-Video2.mp4

Discussion

Myocardial staining results in small puffs of dye extravasating into pericoronary space. Indeed, the coronary arteries have two distinct anatomical relationships with reference to epicardium and pericardial space. Half of the circumference of the coronary artery is represented by the myocardium and the remaining is related directly to the pericardial aspect. The powerful injection of contrast (myocardial staining) is caused by the improper positioning of the angiography or guiding catheter and can lead to refractory ventricular tachyarrhythmias and occasionally cardiac death. It results in small puffs of dye extravasating into pericoronary space.

The thebesian veins are valveless conduits arising from all four cardiac chambers and communicating with the coronary sinus. They may act as an alternate route of nutrition to the myocardium or as direct drainage conduits from the ventricle to the coronary sinus. Various forms and courses of the intramural venous tunnel, sinus, or channel of the right atrium have also been found, as did in the presented case.¹ This case illustrates the value of careful manipulation and positioning of the coronary catheter during coronary angiogram. It is imperative to check the position of the catheter tip with a small amount of contrast injection before coronary angiography (even though we checked our position with a small test injection) to avoid these types of complications.²⁻⁵

Conflict of Interest

There are no potential conflicts of interest, including related consultancies, shareholdings, and funding grants.

Disclaimer

The authors do not share any relationship with industry.

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