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Coronary air embolism during transcatheter closure of atrial septal defect



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A 58-year-old hypertensive male presented with progressive shortness of breath of one-year duration. On evaluation, he was found to have 32-mm ostium secundum atrial septal defect (ASD) with significant left to right shunt. He was taken-up for trans-catheter device closure of ASD. A coronary angiogram revealed normal coronaries. Pulmonary artery (systolic/diastolic/mean) pressure was 55/25/37 mmHg, and pulmonary vs. systemic blood flow ratio (Q_p/Q_s) was 2.75/1.0. A 12-French delivery sheath was placed in the left atrium via right femoral venous approach to deploy a 36-mm Amplatzer septal occluder device (St. Jude Medical, Plymouth, MN, USA). During the deployment of device across the atrial septum, the patient suddenly developed chest pain, hypotension (blood pressure dropped to 60 mmHg), and sinus bradycardia. Cardiac monitor did show significant ST segment elevation in inferior leads. Intravenous atropine was given to improve the heart rate; followed by normal saline and dopamine were rapidly infused to improve the blood pressure. A repeat right coronary angiogram revealed occluded mid part of right coronary artery (RCA) (Fig. 1A), with a moving air column distal to occlusion (Video 1). Patient was put on high flow 100% oxygen inhalation through ventilation mask. A forceful 10-ml saline injection was given in RCA to dissipate the air column. Finally, the air column could be dispelled and a TIMI-3 flow was

achieved in RCA (Fig. 1B). Patient had a rapid hemodynamic recovery following it. As the undersized 36-mm Amplatzer device (St. Jude Medical) could not occlude the defect, he was subjected for surgical patch closure of ASD, at follow-up.

Air embolism of coronary circulation is an inadvertent, iatrogenic complication of cardiac catheterization. Mostly, small air embolism does not have any clinical consequences;

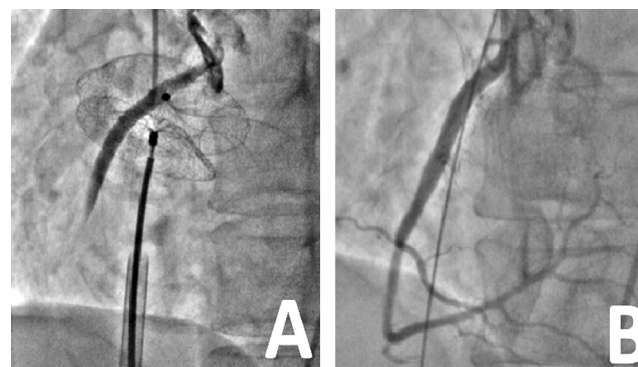


Fig. 1 – The right coronary artery (RCA) angiogram showed (A) occluded mid RCA following coronary air embolism. (B) TIMI-3 flow in RCA following treatment of air embolism.

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however, a massive air embolism can result into acute hemodynamic instability, myocardial infarction, ventricular arrhythmia, and even death, if not promptly treated.¹ Air embolism during ASD device closure is usually caused by entrapped/residual air in delivery sheath, which is pushed into left atrium following device advancement through the sheath.² Coronary air embolism is usually of RCA as right coronary sinus is superior and anterior most in supine position.² The treatment of massive air embolism includes hemodynamic support, oxygen inhalation, and forceful intra-coronary injection of saline or contrast agent to dispel the air column, which was successful in the index case.^{1,3} Those who do not respond require immediate cardio-pulmonary resuscitation, temporary pacing, intra-aortic balloon counter-pulsation, and catheter aspiration of entrapped intra-coronary air.^{1,3}

Conflicts of interest

The authors have none to declare.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.ihj.2016.01.007](https://doi.org/10.1016/j.ihj.2016.01.007).

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