Thrombus in transit raising suspicion for a hypercoagulable state

Arjun Kanwal ¹, Jason Kaplan,² Beani Forst,³ Bhavin Patel⁴

¹Internal Medicine, MedStar Union Memorial Hospital, Baltimore, Maryland, USA

²Internal Medicine, McLaren-Oakland Hospital, Pontiac, Michigan, USA

³Internal Medicine, Creighton University/Valleywise Health Medical Center, Phoenix, Arizona, USA

⁴Cardiology, MedStar Franklin Square Medical Center, Baltimore, Maryland, USA

Correspondence to

Dr Arjun Kanwal;
arjun.kanwal@medstar.net

Accepted 16 September 2020

DESCRIPTION

A patient with recent two-vessel coronary artery bypass graft (CABG) 11 days prior to admission presented with shortness of breath and orthopnea. The procedure was uncomplicated and tolerated well. On arrival he was hypoxic and initial ECG and cardiac enzymes were negative for active ischaemia. Echocardiogram revealed thrombus extending in the right atrium (video 1).

This raised our clinical suspicion for venous thromboembolism.

CT angiogram of the chest demonstrated extensive bilateral pulmonary emboli including a saddle thrombus. Extensive thrombus was also noted within the inferior vena cava, iliac veins and common femoral veins. The patient was found to have heparin-induced thrombocytopenia (HIT) with significant serum titre of PF4-heparin complex antibodies and started on argatroban. He underwent a redo median sternotomy, atrial exploration and removal of the right atrial clot. Pulmonary arteriotomy and extraction of clot from the main, right main and left main pulmonary arteries with suction aspiration of the main lobar branches of each lung were performed (figure 1). He was discharged on anticoagulation and at follow-up the patient had no further shortness of breath.

HIT is commonly suspected in the patient population who underwent cardiac surgery; however, the incidence is only between 1% and 2%.¹ Cardiac thrombosis in patients with HIT has been demonstrated in the literature, however, it is exceedingly rare. Management of these patients can be difficult as the standard of care in cardiac and pulmonary embolectomy requires exposure to unfractionated heparin. Tirofiban, a glycoprotein IIB-IIIa inhibitor has been used in such patients with favourable outcomes.² Agatroban has also been studied, however less so and its efficacy is still under question. Bivalirudin, a direct thrombin inhibitor, has been a well-documented alternative used during percutaneous coronary interventions and has become more popularised in coronary bypass in patients with heparin hypersensitivity.³ Due to its rapid anticoagulation effect, short half live and other favourable pharmacological properties, the use of bivalirudin in the operating room is rapidly growing.⁴ In 2007, the CHOOSE-ON trial treated 50 patients with confirmed for suspected HIT with bivalirudin, demonstrating a safe and effective anticoagulation strategy.⁵ Bivalirudin has been very well studied as an alternative to heparin for cardiopulmonary bypass (CPB) and

Figure 1 Clot extraction from the main, right main and left main pulmonary arteries with suction aspiration of the main lobar branches of each lung remaining in the shape of the artery.

Learning points

- ▶ Cardiac thrombosis is rare after heparin-induced thrombocytopenia, however the diagnosis should be considered in patients with cardiac thrombi if they have received heparin.
- ▶ Heparin-induced thrombocytopenia incidence is 1%–2% in population who underwent cardiac surgery.

is included in the clinical guidelines for anticoagulation on CPB. Ongoing prospective, randomised clinic trials are still needed to help establish the efficacy and appropriate protocols for alternatives to heparin usage in the operating room during CABG.

Twitter Arjun Kanwal @arjun.kanwal

Contributors All four authors were involved in the completion of this manuscript. AK was involved in creating the manuscript. JK was involved in editing the manuscript. BF was involved in acquiring the images. BP was involved in editing images and editing manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

ORCID iD

Arjun Kanwal <http://orcid.org/0000-0002-6370-289X>

© BMJ Publishing Group Limited 2020. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Kanwal A, Kaplan J, Forst B, et al. *BMJ Case Rep* 2020;**13**:e235489. doi:10.1136/bcr-2020-235489

REFERENCES

- 1 Ahmed A, Al-Mondhiry H, Milling TJ, *et al.* Heparin-Induced thrombocytopenia associated with massive intracardiac thrombosis: a case report. *Case Rep Hematol* 2012;2012:1–4.
- 2 Pishko AM, Cuker A. Heparin-Induced thrombocytopenia in cardiac surgery patients. *Semin Thromb Hemost* 2017;43:691–8.
- 3 Nikolaidis N, Velissaris T, Ohri SK. Bivalirudin anticoagulation for cardiopulmonary bypass: an unusual case. *Tex Heart Inst J* 2007;34:115–8.
- 4 Gatt P, Galea SA, Busuttill W, *et al.* Bivalirudin as an alternative anticoagulant for cardiopulmonary bypass during adult cardiac Surgery-A change in practice. *J Extra Corpor Technol* 2017;49:49–53.
- 5 Koster A, Dyke CM, Aldea G, *et al.* Bivalirudin during cardiopulmonary bypass in patients with previous or acute heparin-induced thrombocytopenia and heparin antibodies: results of the CHOOSE-ON trial. *Ann Thorac Surg* 2007;83:572–7.

Copyright 2020 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <https://www.bmj.com/company/products-services/rights-and-licensing/permissions/>
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

Customer Service

If you have any further queries about your subscription, please contact our customer services team on +44 (0) 207111 1105 or via email at support@bmj.com.

Visit casereports.bmj.com for more articles like this and to become a Fellow