Journal of Cardiology Cases 9 (2014) 243–244

Contents lists available at www.sciencedirect.com

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Editorial

Editorial: Invisible hematoma causing shock after open-heart surgery: Localized cardiac tamponade

Keywords:
Tamponade
Post-operative hematoma
Intra-pericardial hematoma
Cardiac surgery

Shock is a physiological state characterized by an inadequate tissue perfusion and cellular oxygenation associated with persistent hypotension, resulting in adverse effects on multiple organ systems. Possible causes of shock following cardiac surgery include pump failure, pulmonary embolism, hypovolemia, sepsis, and tamponade. As the prolongation of shock status can lead to irreversible organ damage or death, a prompt diagnosis of underlying cause and initiation of treatment are critical. Echocardiography is generally the first option for comprehensive assessment. However, in rare cases, unexpected cardiac tamponade can occur as a cause of shock following cardiac surgery, and this may not be detected using transthoracic echocardiography in the early period after surgery. Huang et al. [1] reported a case who had cardiac arrest on day 8 after mechanical mitral valve replacement. They found a large intra-pericardial mass compressing the right atrium (RA), a rare condition, referred to as "localized" or "isolated cardiac tamponade."

There have been several reports of a localized hematoma or hemorrhage causing systemic hypotension after cardiac surgery [2–11]. These patients exhibited progressive and persistent hypotension, tachycardia, and elevated central venous or RA pressures; these features are consistent with cardiac tamponade. However, pulmonary capillary wedge pressure and pulmonary artery pressure were normal, and pulsus paradoxus was absent. The period from surgery to the onset of shock varied considerably – from 12 h to 31 months. The cause of hypotension was not revealed using transthoracic echocardiography, but transesophageal echocardiography could provide an excellent image quality due to the alternative acoustic window. In reality, immediately after cardiac surgery, the area observable using transthoracic echocardiography is limited. In addition to surgical wounds and dressings, mechanical ventilators and intra-aortic balloon pump restrict possible changes in patient position for alternate views, and this often results in poor image quality. Moreover, when a patient is in agony, examination and diagnosis must be performed quickly to minimize patient discomfort. If a hematoma is localized in the retrosternal space, the inferior vena cava may be distended and the right ventricular free wall is not collapsed in early diastole, but the hematoma itself may be overlooked using transthoracic echocardiography. Although the specificity of transthoracic echocardiography for detecting pericardial hematoma is 83%, the sensitivity is only 33% [12]. Furthermore, Beppu et al. [7] reported that the 'y' descent of the RA pressure tracing was prominent, which is the characteristic of constrictive pericarditis rather than cardiac tamponade. Especially in ventilated patients under intensive care, transesophageal echocardiography may be superior to detect localized tamponade.

Cardiac tamponade due to hematoma may also occur during anticoagulant therapy. A left ventricular assist device (LVAD) is often used for end-stage heart failure and requires anticoagulant therapy with a targeted international normalized ratio of 3.0–4.0 to prevent LVAD thrombosis. Therefore, localized cardiac tamponade can occur late after LVAD implantation. Hematoma compressing the right heart is a potentially life-threatening condition even under LVAD support. To begin with, in such patients, pulsus paradoxus may be masked by LVAD action. When pericardial effusion cannot be detected using transthoracic echocardiography in patients with persistent and progressive hypotension, right ventricular heart failure may be thought to manifest due to strong mechanical assistance to the left ventricle. However, if hemodynamics did not improve despite adequate catecholamine support, additional diagnostic imaging is needed to explore the cause of hypotension. In this situation, computed tomography is recommended (unless an endotracheal tube is inserted), because it is technically hard to evaluate critically ill and un-sedated patients using transesophageal echocardiography.

Isolated RA tamponade is a rare and unexpected complication of cardiac surgery. In critically ill postoperative patients, it may be difficult to recognize a hematoma adjoining RA in the retrosternal space using transthoracic echocardiography. If the clinical manifestations and course are consistent with cardiac tamponade despite the lack of detectable pericardial effusion, the possibility of an invisible hematoma compressing only RA should be also considered after open-heart surgery.

References

[1] Huang HD, Garcia M, Alam M, Misra A, Lakkis N, Tabbaa R. Post-operative intrapericardial hematoma presenting as isolated right atrial tamponade. J Cardiol Cases 2014;9:48–9.

DOI of original article: http://dx.doi.org/10.1016/j.jccase.2013.09.008.

http://dx.doi.org/10.1016/j.jccase.2014.02.002
1878-5409 © 2014 Japanese College of Cardiology. Published by Elsevier Ltd. Open access under CC BY-NC-ND license.

[2] Kochar GS, Jacobs LE, Kotler MN. Right atrial compression in postoperative cardiac patients: detection by transesophageal echocardiography. J Am Coll Cardiol 1990;16:511–6.
[3] Chamoun G, Farah MG. Echocardiographic diagnosis of right atrial tamponade. Chest 1990;97:1012–4.
[4] Simpson IA, Munsch C, Smith EE, Parker DJ. Pericardial haemorrhage causing right atrial compression after cardiac surgery: role of transoesophageal echocardiography. Br Heart J 1991;65:355–6.
[5] Tanaka N, Beppu S, Ikegami K, Kumon K, Izumi S, Nakajima S, Nakatani S, Miyatake K, Nimura Y. Efficacy of transesophageal echocardiography immediately after open heart surgery: diagnosis of coagula tamponade. J Cardiol 1991;26(Suppl.):111–7 [in Japanese].
[6] Schoebrechts B, Herregods MC, Van de Werf F, De Geest H. Usefulness of transesophageal echocardiography in patients with hemodynamic deterioration late after cardiac surgery. Chest 1993;104:1631–2.
[7] Beppu S, Tanaka N, Nakatani S, Ikegami K, Kumon K, Miyatake K. Pericardial clot after open heart surgery: its specific localization and haemodynamics. Eur Heart J 1993;14:230–4.
[8] Grishkin BA, Catalano PW, Watts MA. Isolated right atrial compression as a late sequela of aortic valve replacement. Tex Heart Inst J 1994;21:225–7.
[9] Saner HE, Olson JD, Goldenberg IF, Asinger RW. Isolated right atrial tamponade after open heart surgery: role of echocardiography in diagnosis and management. Cardiology 1995;86:464–72.
[10] Ananthasubramaniam K, Jaffery Z. Postoperative right atrial compression by extracardiac hematoma: transesophageal echocardiographic diagnosis in the critically ill patient. Echocardiography 2007;24:661–3.
[11] Grumann A, Baretto L, Dugard A, Morera P, Cornu E, Amiel JB, Vignon PP. Localized cardiac tamponade after open-heart surgery. Ann Thorac Cardiovasc Surg 2012;18:524–9.
[12] Floerchinger B, Camboni D, Schopka S, Kolat P, Hilker M, Schmid C. Delayed cardiac tamponade after open heart surgery – is supplemental CT imaging reasonable? J Cardiothorac Surg 2013;8:158.

Hideaki Kanzaki (MD, FJCC)*
Department of Cardiovascular Medicine, Heart Failure Division, National Cerebral and Cardiovascular Center, 5-7-1 Fujishiro-dai, Suita, Osaka 565-8565, Japan

*Tel.: +81 668335012; fax: +81 68727486.
E-mail address: kanzakih@hsp.ncvc.go.jp

13 November 2013