CASE REPORT

Conservative Management of Postoperative Right Atrial Compressive Hematoma in Cardiac Surgery

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ABSTRACT

Compression on right chambers in the early postoperative course after cardiac surgery in a fully or partially stable patient poses a challenge regarding its management, especially the best conduct to monitor the situation.
This report describes the case of a 54-year-old male patient with a significant clinical history –including previous coronary artery bypass surgery–, who underwent mitral and aortic valve replacement (with bioprostheses), and tricuspid valve repair. Due to massive bleeding unresponsive to transfusion of blood products during surgery, the patient was re-explored in the operating room and a recombinant activated factor VII dose was infused as a result of diffuse bleeding. The patient presented postoperative elevated right atrial pressure, and an isolated compression due to hematoma was detected; initially, a conservative approach was adopted. He was monitored under continuous transesophageal echocardiogram, and management was based on ventricular filling parameters, in addition to direct and continuous observation of the hematoma.

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Key words > Cardiac Tamponade – Doppler echocardiography - Monitoring - Thoracic Surgery

BACKGROUND

Presence of hemodynamic instability in a patient with a compression image on the right cavities during the early postoperative course after cardiac surgery may raise the alarm about an impending cardiac tamponade and subsequent surgical approach. On the contrary, visualizing that image in a fully or partially stable patient poses a challenge regarding its management, especially the best conduct to monitor the situation. This report describes the case of a patient with isolated compression of the right atrium due to a large hematoma, which was managed conservatively under continuous hemodynamic monitoring through transesophageal echocardiography.

CLINICAL REPORT

We present the case of a 54-year-old male patient with a history of coronary artery bypass-graft surgery in 2002 (mammary artery bypass to anterior descending artery, and saphenous vein bypasses to the circumflex and right coronary arteries, which were patent), hypertension, dyslipidemia, Hodgkin lymphoma treated with chemotherapy and radiotherapy (10 years ago), leukemia treated with bone marrow transplant, and corticosteroid-induced diabetes. The patient presented preoperative progressive Class III dyspnea and severe regurgitation of mitral, aortic, and tricuspid valves, with left ventricular ejection fraction of 30%. We performed aortic and mitral valve replacements (with bioprostheses), and tricuspid valve repair. Massive bleeding unresponsive to transfusion of blood products (6 units of red blood cells, 6 units of fresh frozen plasma, 4 units of platelets, and 20 units of cryoprecipitates) occurred in the operating room. After reopening and re-exploration in the operating room, diffuse bleeding with coagulation parameters close to normal was observed, and a total dose of recombinant activated factor VII (90 μg/kg) was infused; bleeding stopped immediately. Upon transfer to the post-operative recovery area, the patient presented increased right atrial pressure (from 8 to 22 mmHg) in the next two hours, though preserving adequate mean blood pressure (70 mm Hg), a cardiac index of 2.3 L/min/m2, mixed venous oxygen saturation (SVO2) of 60%, and stable lactate levels between 1.5 and 2.5 mM. The transthoracic echocardiography showed an image compatible with thrombus over the compressed right atrium.

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After analyzing the problem, the surgeon and the postoperative staff decided to place a transesophageal echocardiography probe for continuous hemodynamic monitoring, and initially adopt a cautious approach, depending on the hemodynamic status.

Under this technique, a 32 mm-diameter hematoma on the compressed right atrium, in addition to an excellent biventricular function and hypovolemic left ventricule were clearly observed (Figure 1 A and B). Continuous monitoring was maintained in the following 12 hours, during which neither the hematoma increased in size (in fact, its diameter was reduced) nor tamponade occurred, and a good ventricular function was preserved both by hemodynamic monitoring and echocardiography (Figure 2 A and B). The patient evolved to a stable condition, with elevated right atrial pressure, responding to intermittent volume input monitored by echocardiographic left ventricular filling level.

Given the outcome, the patient was extubated the following midday (20 hours after transfer to postoperative recovery). After 48 hours of clinical and hemodynamic assessment, the patient was transferred to a hospital room, where he progressed satisfactorily. Prior to hospital discharge, a new echocardiography and a chest CT scan were performed, which showed partial resolution of the hematoma.

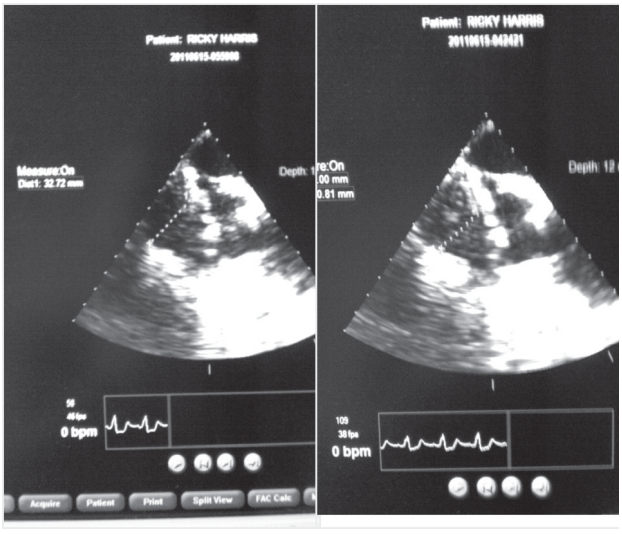

Fig. 1. A and **B.** Follow-up of right atrial compressive hematoma

DISCUSSION

Unlike other medical conditions, the development of postoperative cardiac tamponade after cardiac surgery is often the result of a localized compression (hematoma, thrombus or other fluid collection) over one or more cardiac chambers, and it may involve the superior vena cava, the right atrium (the most commonly singly affected cavity), the right ventricle, the left atrium, the left ventricle or the pulmonary artery. (1, 2)

Clinical and hemodynamic features of isolated compression are often variable and nonspecific, since it may not involve –at least initially– the normal functioning of other chambers, as occurs in our patient. (3)

Transthoracic echocardiography is an important diagnostic tool, whose usefulness may be restricted in the postoperative scenario due to pericardial air, dressings, difficulty in moving the patient (lateral decubitus positions), type of chest (emphysematous), thoracic drainage, mechanical ventilation, etc. In turn, transesophageal echocardiography is not affected by these limitations, becoming the diagnostic procedure

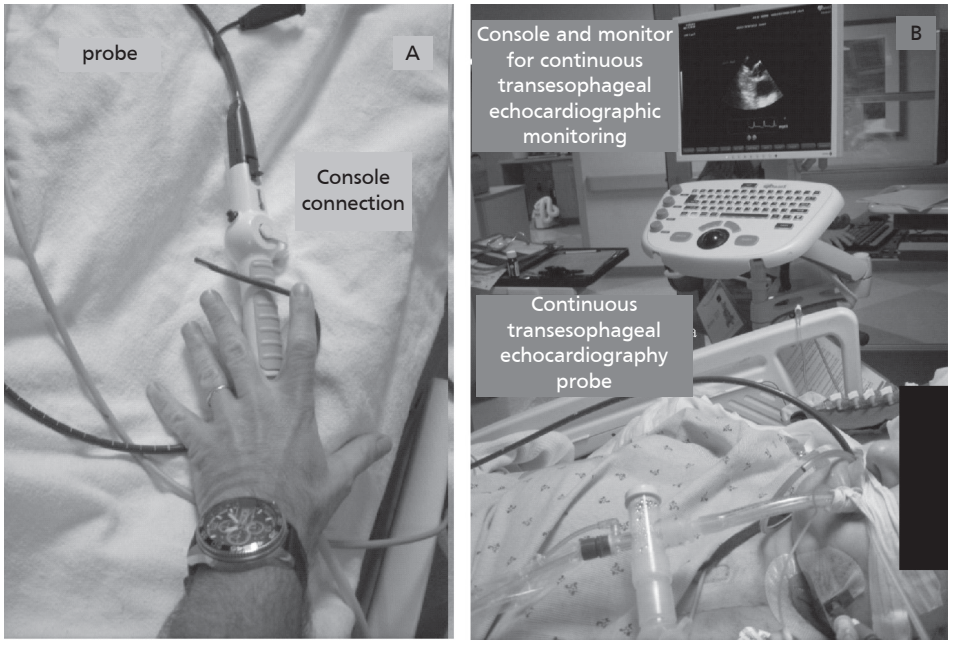

Fig. 2. Connectable / Disconnectable transesophageal probe for continuous hemodynamic monitoring (**A**), and device console (**B**).

of choice in cases of clinical or hemodynamic suspicion of compression and/or tamponade. However, it requires specialized equipment and an available operator especially during critical periods such as evenings or weekends. Another constraint is the difficulty for repeated or episodic use –and, even more, continuous use– on an actually or potentially critical patient. (4)

History of previous surgery and a formerly irradiated chest in a patient with massive coagulopathic bleeding and responsiveness to factor VII after reopening in the operating room, posed the alternative of avoiding a new re-exploration provided the patient presented appropriate blood pressure and ventricular function parameters. The resulting problem was how to adequately monitor the situation, and the option was to use a miniaturized transesophageal probe for continuous direct visualization of the hematoma, degree of filling, and ventricular function, in order to guide management and allow patient follow-up. This type of device (see Figure 2) was approved by the FDA for use during a continuous period of up to 72 hours, and due to its simplicity, it can easily be used by operators with no expertise in transesophageal echocardiography (of which the author is an example). It also allows connection of multiple probes to a single console for simultaneous evaluation of different patients. The use of the miniaturized probe (5.5 mm in diameter) enables the visualization of all the monoplane views (transverse, 0 degrees), including the four-chamber view and the transgastric short axis. (5)

Avoiding an unnecessary reoperation is associated with a series of clinical and financial advantages. The former includes restriction of morbidity associated with re-exploration, increased risk of infection, kidney failure, prolonged mechanical ventilation, and prolonged stay in the intensive care unit, among others. Regarding economical advantages, Spier et al point out that reoperation due to bleeding and prolonged mechanical ventilation are the two complications associated with greater increased cost adjusted for risk per operated patient. (6-8) Along the same lines, Hasting and Roth refer a series of 46 postcardiac surgery patients in whom continuous echocardiography monitoring with the same type of device avoided reoperation in 5 patients and guided changes in fluid and vasoactive drug administration in 23 patients, proving the usefulness of this type of monitoring. (9)

The use of continuous transesophageal echocardiography can represent the beginning of a new era of monitoring following cardiac surgery, similar to the way its use in the operating room has changed intraoperative management by direct visualization of intravascular volume status (instead of inferring it indirectly from pressure measurements), right and left ventricular function (both systolic and diastolic), presence of extrinsic compression, and in the case of patients with valvular heart disease, functional assessment of grafting or valve repair. The possibility of maintaining an active observational approach on fluid collection with cardiac compression in the postoperative period of cardiac surgery, avoiding –as in the case of our patient– an unnecessary reoperation, appears as an added benefit.

Conflicts of interest

None declared.

RESUMEN

Manejo conservador de un hematoma compresivo sobre la aurícula derecha en el posoperatorio de cirugía cardíaca

La compresión sobre cavidades derechas en el posoperatorio temprano de cirugía cardíaca en un paciente total o parcialmente estable implica un desafío respecto de la conducta a adoptar, especialmente acerca del mejor modo de monitorizar la situación.
En esta presentación se describe el caso de un paciente de 54 años con múltiples antecedentes clínicos, entre ellos cirugía de revascularización previa, que fue sometido a reemplazo valvular aórtico y mitral (con prótesis biológicas) y plástica tricuspídea. Debido a sangrado masivo en la intervención sin respuesta a la transfusión de hemoderivados, fue reexplorado en quirófano; ante la observación de sangrado difuso, se administró una dosis de factor VII recombinante activado. En el posoperatorio presentó elevación de presiones en la aurícula derecha, en la que se detectó compresión aislada por un hematoma; inicialmente se planteó una conducta conservadora. El paciente fue monitorizado mediante ecocardiograma transesofágico continuo y la conducta estuvo guiada por parámetros de llenado y función ventricular, además de la observación directa y continua del hematoma.

Palabras clave > Taponamiento cardíaco - Ecocardiografía Doppler - Monitoreo - Cirugía torácica

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