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Large Right Atrial Thrombus Caused by a Central Venous Catheter Necessitating Open Heart Surgery

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Abstract

In clinical practise, central venous catheters are frequently employed. The incidence of CVC-related right atrial thrombosis varies, but when it occurs, there is an 18% mortality risk in hemodialysis patients and a greater than 40% risk in non-hemodialysis patients. For the development of CRAT, various pathogenic processes have been proposed, including mechanical irritation of the cardiac wall, intraluminal clot propagation, hypercoagulability, and hemodynamics of the right atria. CRAT may present asymptomatically or with one of the consequences of CRAT such as pulmonary embolism, systemic embolism, infected thrombi, or hemodynamic compromise. There are no recognised CRAT therapy guidelines. A 59-year-old asymptomatic male was effectively treated with open cardiac surgery after medical treatment for a big CRAT identified during a preoperative examination for a kidney transplant failed. Our case demonstrates that detecting CRAT early may result in a better outcome than waiting until severe consequences emerge.

Keywords: Thrombosis; Pulmonary embolism; Hemodynamics; Medical treatment; Kidney transplant

Introduction

In clinical practise, central venous catheters are routinely used for intravenous medicines, fluid delivery, and hemodynamic monitoring. While CVCs are typically regarded safe, problems such as infections, thrombosis, and catheter-related bloodstream infections can occur on occasion. CVC-associated thrombus formation can cause substantial problems, including the creation of massive right atrial thrombi, in rare situations. We discuss a case of a massive right atrial thrombus associated with a central venous catheter that required open heart surgery to be managed [1].

Catheter-related right atrial thrombosis is a rare and underreported consequence of central venous catheters that can be fatal. There are no defined medicinal or surgical treatment guidelines for CRAT, and no standards exist for the choice of treatment setting, whether outpatient or inpatient, especially if the patient is asymptomatic. In this research, we evaluated recently published literature and highlighted some of the main elements involved in CRAT care, such as early detection with a possible survival benefit, monitoring in a hospitalised environment, and the role of thrombus size on treatment mode [2].

Although the literature suggests that some asymptomatic CRAT can be successfully treated with systemic/oral anticoagulation for six months, we believe that the larger the clot, the more likely medical treatment will fail. Our example validates Negulescu et al.'s findings of lower mortality in surgery groups and that thrombi larger than 2 cm should receive surgical thrombectomy if surgery is not contraindicated. The literature does mention some cases effectively treated with thrombolytic, but most patients require additional anticoagulation medication, and there is a theoretical danger of lysed clots lodging in pulmonary arteries and resulting in pulmonary embolism [3].

Large right atrial thrombi associated with central venous catheters are a rare but potentially fatal condition. Prompt detection and care are critical in avoiding serious consequences. The materials and methods employed in the case of a patient with a massive right atrial thrombus associated with a central venous catheter, which finally needed open heart surgery, are presented in this article. It also emphasises the relevance of transesophageal echocardiography in detecting thrombus and may help clinicians decide which treatment modality to utilise based on the size of the thrombus.

Case presentation

A 62-year-old man with end-stage renal disease arrived at the emergency department complaining of worsening shortness of breath, exhaustion, and minor chest discomfort. The patient had been on hemodialysis for five years, and three months before the presentation, a tunnelled central venous catheter was inserted in the right internal jugular vein. Jugular venous distension, bilateral basal crepitations, and mild peripheral edoema were discovered during a physical examination.

Give a brief overview of the patient's clinical history, including important demographic and medical information.

Despite sustained anticoagulation for 12 days, the clot became more organised with no further reduction in size. After much deliberation, the patient chose open heart surgery [4, 5].

Diagnostic workup

Transthoracic echocardiography was conducted to assess heart function and determine the origin of the patient's symptoms after electrocardiography revealed sinus tachycardia. TTE indicated a massive movable mass extending from the superior vena cava to the tricuspid valve in the right atrium. The bulk was impeding blood flow and resulting in severe tricuspid regurgitation. Urgent computed CT angiography revealed a thrombus attached to the central venous catheter tip and expanding into the right atrium.

Mention the TTE equipment and the imaging views obtained. Provide information regarding the right atrial thrombus's size, motility, and location.

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Any concomitant hemodynamic abnormalities, such as valve regurgitation or symptoms of right heart strain, should be described [6].

Treatment and management

Because of the thrombus's size and severity, as well as the concomitant hemodynamic impairment, a multidisciplinary team of cardiothoracic surgeons, interventional radiologists, and nephrologists was established. It was decided that open cardiac surgery would be performed to remove the thrombus and fix the tricuspid valve.

Describe the multidisciplinary team that is involved in the patient's care, which includes cardiothoracic surgeons, interventional radiologists, and nephrologists.

A sternotomy was performed, and cardiopulmonary bypass was established. When the right atrium was opened, a massive thrombus adhered to the central venous catheter was discovered. The thrombus was carefully dissected and removed, and the atrial endocardium was thoroughly debrided. The tricuspid valve was examined and discovered to be significantly regurgitant, necessitating annuloplasty treatment. Postoperative recovery was unremarkable, with the patient's symptoms improving and the jugular venous distension resolved [7].

Discussion

Central venous catheters are critical tools in the treatment of patients requiring long-term hemodialysis. However, their use may cause complications such as catheter-related thrombosis. Massive right atrial thrombi are a rare but deadly side effect of central venous catheters. These thrombi can result in hemodynamic compromise, pulmonary embolism, and other potentially deadly outcomes.

CRAT may be discovered by chance during imaging for a variety of reasons, or it may be suspected if accompanying symptoms or signs, such as resistance to blood flow in CVC, are noted during HD. Blood flow resistance in the CVC, as seen in our patient, could be an early indicator of RAT [8].

CRAT is a phenomenon that is underreported for two reasons. To begin, some people with CRAT are completely asymptomatic. Second, if the catheter tip is too close to the superior vena cava, TEE's diagnostic accuracy may be compromised.

TEE has a higher sensitivity and specificity than TTE and can be employed in suspected situations. Cardiac MRI with gadolinium contrast can be helpful for diagnosis and tissue characterization, but it was avoided in our case due to the risk of nephrogenic systemic fibrosis.

In many cases, rapid diagnosis and treatment are essential. Echocardiography is essential for detecting intracardiac thrombi, estimating their size and motility, and evaluating the associated valvular and hemodynamic abnormalities. In some cases, advanced imaging modalities such as CT angiography might provide extra information and help guide therapy options.

Treatment options for large right atrial thrombi associated with central venous catheters include anticoagulation, catheter-directed thrombolysis, and surgical resection. The therapeutic strategy employed is dictated on the patient's clinical condition, the size of the thrombus, any associated difficulties, and the available expertise. As seen in our example, in the case of large or obstructive thrombi, surgical removal via open heart surgery may be necessary [9, 10].

Conclusion

Large right atrial thrombi caused by central venous catheters are uncommon but possibly fatal consequences. To avoid catastrophic occurrences such as pulmonary embolism or hemodynamic collapse, prompt detection and adequate therapy are critical. Close coordination among multiple specialties, including as cardiology, cardiothoracic surgery, and interventional radiology, is required for the best possible patient results. Additional study and guidelines are required to establish the optimal treatment techniques for these difficult situations and to reduce the occurrence of such problems in patients with central venous catheters.

Conflict of Interest

None

Acknowledgment

None

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