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Case Report

Diagnostic Dilemma of a Superior Vena Cava Mass: A Case of Spontaneous Resolution Without Intervention

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Abstract

Background: Superior vena cava (SVC) masses are rare and diagnostically challenging, often representing thrombus or vegetation, each with distinct therapeutic implications.

Case Summary: We present an 80-year-old male admitted for acute right middle cerebral artery (MCA) stroke who was later found to have an SVC mass of uncertain aetiology. Imaging raised concern for thrombus versus vegetation. Multimodal evaluations including transthoracic and transoesophageal echocardiography, cardiac CT, and blood cultures were inconclusive. Management required interdisciplinary discussion between internal medicine, neurology, endovascular neurosurgery, cardiology, cardiothoracic surgery, infectious disease, and nephrology teams.

Discussion: This case highlights the diagnostic and therapeutic challenges in distinguishing thrombus from vegetation within the SVC and underscores the need for multimodal imaging and clinical correlation in management decisions. Remarkably, the SVC mass resolved spontaneously before intervention, further raising questions about its true nature.

Take Home Message: This case highlights the diagnostic uncertainty inherent in differentiating thrombus from vegetation.

Introduction

Superior vena cava (SVC) thrombus is an uncommon but clinically significant condition, with an incidence of approximately 3.5 per 100,000 emergency department visits in the United States, most often associated with malignancy or indwelling venous devices [1]. SVC vegetation, in contrast, is exceedingly rare; in a series of infective endocarditis cases evaluated by transthoracic (TTE) and transoesophageal echocardiography (TEE), vegetations had a median size of 30 mm (IQR 20–35 mm) and were predominantly located on native valves (45/49), bioprosthetic valves (4/4), or cardiac implantable electronic devices (20/22), with only a minority reported in unusual sites such as catheters, caval veins, or the right atrial free wall (12/49), underscoring the exceptional nature of SVC involvement [2]. The distinction between thrombus and vegetation can be challenging. On echocardiography, thrombi are generally immobile, avascular, and adherent to the vessel wall, while vegetations appear mobile, irregular, and often associated with valvular or device-related infection [3-8].

TEE and contrast-enhanced modalities improve diagnostic sensitivity and help guide management [9,10]. Management of SVC thrombus depends on aetiology and symptom severity.

Anticoagulation is typically first-line, with catheter removal when feasible [11]. Catheter-directed thrombolysis or endovascular stenting may be indicated for persistent or symptomatic obstruction, offering rapid symptom relief and high technical success.12 In contrast, SVC vegetation resolution timelines vary from thrombotic lesions and may resolve within days to weeks with medical or interventional therapy, whereas vegetation generally requires 2 weeks to 6 months of antibiotics, depending on the organism [12].

Case Report

The patient presented to the emergency department at an outlying facility from his skilled nursing facility (SNF) with right flank and right lower quadrant pain that had been ongoing for several days. He denied dysuria, fever, chills, or gastrointestinal symptoms. On arrival, he was afebrile but hypertensive (BP 154/54) and noted to be alert but confused, consistent with his baseline mental status per SNF report. Notably, he missed his scheduled haemodialysis session earlier that day (Wednesday). Past medical history includes end-stage renal disease (ESRD) on haemodialysis (MWF), heart failure with reduced ejection fraction (HFrEF) with ejection fraction (EF) of 20%, coronary artery disease (CAD) status post coronary artery bypass graft (CABG), type 2 diabetes mellitus, hypertension (HTN), hyperlipidaemia (HLD), alcohol abuse, and poor baseline mentation. At the time of presentation, differential diagnosis included pyelonephritis, acute kidney injury in the setting of ESRD, and bacteraemia/sepsis.

Initial labs were significant for a white blood cell count of 20.3, creatinine 9.3, BUN 83, procalcitonin 27.0, and troponin 123 trending down to 115. Urinalysis was negative for leukocyte esterase, nitrites, and bacteria, though it did show fine granular casts. Imaging included a CT of the abdomen and pelvis without contrast, which showed no acute pathology, no hydronephrosis or renal calculi, and extensive vascular calcifications that limited assessment for small stones; chest X-ray revealed no acute cardiopulmonary findings but noted mild cardiomegaly. The electrocardiogram was unremarkable. Due to concerns for sepsis of unclear source, the patient was admitted. Blood cultures were obtained, and empiric IV ceftriaxone and vancomycin were initiated. Cultures later grew gram-positive cocci in clusters in 2/2 specimens. A MRSA swab and dialysis catheter tip culture were obtained; there was no sign of catheter infection or tenderness on exam.

The patient was restarted on dialysis, and cardiology and nephrology were consulted given ESRD and HFrEF. TTE this admission showed EF 30-35% (prior EF 20%) with thickened aortic and mitral valves and a hyperechoic structure in the right atrium consistent with the dialysis catheter. The patient remained on home medications, amlodipine, carvedilol, and atorvastatin. Supportive care included subcutaneous heparin three times a day (TID) for DVT prophylaxis, with physical therapy (PT), Occupational Therapy (OT), and speech therapy. Five days into admission, a stroke alert was called for new left-sided weakness, facial droop, and drift. CT imaging showed a right MCA occlusion, and the patient was transferred to our facility for emergent cerebral angiography with thrombectomy of the right MCA followed by ICU admission. In the ICU, a left internal jugular (IJ) central line was placed due to thrombosis of the right IJ. Repeat blood cultures grew MSSA, and neuro-endovascular surgery recommended holding anticoagulation and aspirin pending evaluation for infective endocarditis.

A TEE showed a large mobile right atrium thrombus (5.19 cm) extending from the SVC with no valvular vegetations. The patient was treated with vancomycin for staph aureus bacteraemia, tunnelled catheters were deferred until cultures cleared, and dialysis was continued via left IJ catheter with post-dialysis Ancef. After TEE review, anticoagulation was started with heparin infusion. After the large right atrial thrombus was identified, cardiothoracic surgery was consulted to evaluate candidacy for surgical removal. Given the patient's significant comorbidities, conservative management of the thrombus with continuous heparinization was elected. Vascular surgery was also consulted and recommended anticoagulation without acute intervention, as Angiovac was not available at the time. Neurology obtained an MRI brain without contrast to assess the safety of anticoagulation given the concern for septic emboli and ultimately recommended continuation of heparin with planned transition to direct oral anticoagulation. Blood culture remained positive with MSSA for six days.

Given continuously positive cultures, permanent dialysis catheters continued to be deferred. A bone scan of the spine was performed to rule out spinal infection as a source of bacteraemia, but it was not suggestive of any infection. At this point, it was suggested the bacteraemia is unlikely to clear without removal of the thrombus. After a multidisciplinary discussion, Cardiology was agreeable to perform an Angiovac for removal of the thrombus. Throughout this time, one blood culture bottle grew coagulase negative staph species, likely s. epidermidis. The following day, blood cultures were negative. On the 10th day of admission, the culture grew s. epidermidis again. The patient's antibiotic regimen was changed to Ancef with vancomycin for synergy. At this point, the care team was hopeful for a permanent dialysis catheter after the angiovac. Blood cultures continued to remain positive for MSSA for six days, so placement of permanent dialysis catheter continued to be deferred. A spine bone scan was obtained to rule out an infectious source and was negative. Given persistent bacteraemia, it felt that clearance was unlikely without removal of the thrombus.

After a multidisciplinary discussion, cardiology was agreeable to perform an Angiovac thrombectomy. Throughout this time, one blood culture grew coagulase negative staph species, likely staphylococcus epidermidis. Blood cultures subsequently cleared, though a repeat blood culture on the 10th day of admission grew staphylococcus epidermidis, prompting adjustment of antibiotic regimen to cefazolin with vancomycin for synergy. At this point, the care team was hopeful for a permanent dialysis catheter after the angiovac. The decision to perform an angiovac was made based on a TEE that showed a 5.19 cm large, mobile thrombus in the right atrium, originating from the SVC. On the day of the procedure, repeat TEE was performed before obtaining access and did not show any clot in the SVC/RA/RV/PA. Only a small shadow high in SVC was seen, possibly representing a small thrombus. Subsequently, the angiovac was cancelled. Following negative blood cultures,

disappearance of the thrombus, and improvement in the patient's mentation, a permanent haemodialysis catheter was placed in the left IJ vein. The patient was discharged with five additional weeks of cefazolin and Apixaban.

Discussion

This case is important because it highlights a clinically underrecognized diagnostic scenario with meaningful implications for patient management. A multidisciplinary management requiring expertise of cardiologist, infectious disease, neurologist and radiologist is imperative.3 SVC masses are uncommon findings, and when identified in the setting of acute neurologic events or systemic infection, they can immediately alter clinical decision-making.12 The rarity of indeterminate SVC lesions, particularly those that resolve without invasive intervention, limits available guidance for clinicians. As a result, management decisions are often extrapolated from small case series or based on expert consensus rather than robust evidence. The principal contribution of this case lies in its demonstration that not all large, mobile SVC masses require urgent procedural intervention when the patient remains clinically stable. In practice, diagnostic uncertainty frequently drives aggressive therapy, including thrombolysis, prolonged anticoagulation, or surgical removal, each of which carries inherent risk. 12 By documenting spontaneous resolution under careful observation, this case supports a more individualized, physiology-driven approach in select patients.

It reinforces the importance of reassessing presumed pathology over time rather than anchoring to an early, incomplete diagnostic impression. Additionally, this report contributes to the limited body of literature addressing the natural history of SVC thrombotic processes. Most published cases focus on device-associated thrombi, septic thrombophlebitis, or persistent vegetations requiring intervention. The documentation of rapid resolution expands understanding of potential clinical trajectories and suggests that endogenous fibrinolytic mechanisms or transient hemodynamic factors may play a larger role than previously appreciated. Recognition of this possibility may help refine risk stratification and avoid overtreatment. From a systems perspective, the case underscores the value of multidisciplinary deliberation in situations where imaging findings and clinical context do not align cleanly with established diagnostic categories. Collaborative evaluation can mitigate premature escalation of care while maintaining vigilance for complications. This approach is particularly relevant in vascular and endovascular pathology, where therapeutic decisions often carry high morbidity.

Finally, this case encourages further investigation into the optimal management of indeterminate central venous masses. Prospective data are lacking, and standardized algorithms do not exist. By adding to the limited published experience, this report helps build the foundation for more evidence-based guidance and highlights the need for future study examining predictors of spontaneous resolution, recurrence risk, and embolic potential. In summary, the importance of this case lies not merely in the unusual imaging finding, but in its implications for diagnostic restraint, multidisciplinary management, and the evolving understanding of central venous thrombotic disease.

Conclusion

This case emphasizes the diagnostic uncertainty that can arise when distinguishing between thrombus and vegetation within the superior vena cava and demonstrates the importance of integrating multimodal imaging with clinical and laboratory data. The spontaneous resolution of the SVC mass prior to intervention underscores the potential for transient thrombotic events and supports a cautious, multidisciplinary approach to management. Clinicians should consider short interval repeat imaging and collaborative decision-making before pursuing invasive therapies when faced with equivocal intravascular findings.

Take Home Message

SVC masses of indeterminate origin pose significant diagnostic and therapeutic challenges, particularly when imaging findings and clinical presentation overlap between a thrombotic process and a vegetation. This case highlights the importance of clinical context, multidisciplinary collaboration, and short-term repeat imaging as spontaneous thrombotic resolution may occur and can help avoid unnecessary invasive measures in patient care.

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Consent to participate

Written informed consent for participation in this case report was obtained from the patient's legal guardian.

Consent for publication

Written informed consent for publication was obtained from the patient's legal power of attorney.

Data availability

Data sharing is not applicable. No new data was generated in this study.

Ethical considerations

Our institution does not require ethical approval for reporting individual cases or case series.

Declaration of conflicting interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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