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Cover Page Footnote

This paper was presented at the Australian and New Zealand Society of Cardiac and Thoracic Surgeons Annual Scientific Meeting 2019, in Hobart, Tasmania, Australia, 7-10 November 2019 AS POSTER PRESENTATION.

Massive Hemoptysis and Recurrent Infective Endocarditis in Intravenous Drug user: A Case Report[☆]

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Abstract

Intravenous drug use (IDU) poses a high risk of serious complications such as infective endocarditis (IE), which carries high morbidity and mortality rates. Mycotic pulmonary artery aneurysms (MPAA) are rarely associated with right-sided IE, especially in the setting of IDU. It is a potentially fatal complication as it can lead to severe hemorrhage if the aneurysm ruptures. We report the case of a young male with a history of current IDU and tricuspid valve replacement post complicated IE 2 years ago. The patient initially presented with massive hemoptysis and fever. Chest computed tomography (CT) showed a lobulated lesion in the right lower lobe with clear continuation to the pulmonary vessels. We aim to draw attention to the magnitude of complications of active IDU, including massive hemoptysis due to MPAA which should be promptly identified and emergently managed with embolization or surgery, followed by counseling and rehabilitation to minimize the risk of recurrence and save these patients.

Keywords: Intravenous drug use, Infective endocarditis, Mycotic pulmonary artery aneurysms

1. Introduction

Infective endocarditis (IE) is a major cause of morbidity and mortality in the setting of intravenous drug use (IDU). The right side of the heart is more commonly affected, with a specific predisposition for tricuspid valve involvement. Septic emboli can form and dislodge to the pulmonary artery causing potentially serious complications. This includes pneumonia, pulmonary abscess, pulmonary infarction and mycotic pulmonary artery aneurysm (MPAA). In rare cases, rupture of a MPAA can lead to fatal hemorrhage – unless detected early and managed appropriately. We report a case of recurrent IE in a patient with an active history of IDU, presenting to our

hospital with massive hemoptysis due to a ruptured MPAA.

2. Case Presentation

A 37-year-old male with an active history of IDU and alcoholism presented with a two day history of low-grade fever and an episode of massive hemoptysis. The hemoptysis was characterized as being bright red in color and approximately 350 mL in volume. Surgical history was significant for open-heart surgery two years prior for tricuspid valve replacement due to infective endocarditis. On admission, he was febrile (38.4 °C), but hemodynamically stable. On general inspection, the patient was jaundiced with a visible sternotomy scar on the chest. Basal lung crackles were appreciated on auscultation.

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The patient was admitted with the impression of recurrent IE versus tuberculosis or pneumonia as top differentials. Laboratory results were remarkable for anemia with a hemoglobin level of 8 g/dL, prolonged prothrombin time at 16.8 s, elevated C-reactive protein (CRP) level at 160.5 mg/L, elevated erythrocyte sedimentation rate (ESR) at 90 mm/h and elevated serum procalcitonin at 4.49 ng/mL. Blood cultures grew *Staphylococcus aureus* colonies. Serologic tests were positive for hepatitis B virus (HBV) and hepatitis C virus (HCV), but negative for human immunodeficiency virus (HIV). A chest x-ray showed patchy areas of reticulation with ground-glass opacities in both lower lung zones and mild obliteration of the left costophrenic angle (Fig. 1). An echocardiogram was obtained and showed normal systolic function, normal ejection fraction of 55–60% and no regional wall motion abnormality. Remarkable findings included multiple vegetations attached to the tricuspid bio-prosthesis, the largest of which was attached to the valve ring on the ventricular side measuring 25 mm in length. Moreover, another mobile vegetation was attached to the right ventricular outflow tract wall measuring 20 mm in length. Computed tomography (CT) of the chest revealed a 2.7 × 2.4 cm lobulated lesion in the right lower lung lobe, with an iso-dense attenuation to the contrast medium and apparent topographic continuity with the pulmonary vessels (Fig. 2). The diagnosis of recurrent infective endocarditis of the tricuspid valve with ruptured right lower lobe pulmonary pseudoaneurysm was made.

A multi-disciplinary team meeting was convened, and it was decided to manage the case with coiling of the pulmonary artery aneurysm followed by a re-

Abbreviations

IDU	Intravenous drug use
IE	Infective endocarditis
MPAA	Mycotic pulmonary artery aneurysms

do tricuspid valve replacement. Two days into the admission, the patient successfully underwent aneurysm coiling by interventional radiology through a right transfemoral approach, using the Seldinger technique with an 18G needle and subsequent insertion of a 5F arterial sheath. Coils (Interlock™, Boston Scientific) were inserted into the aneurysm and stasis was achieved (Fig. 3). Eight days later, the patient underwent scheduled open cardiac surgery under general anesthesia for a re-do tricuspid valve replacement. Intracardiac vegetations were found on the previously implanted artificial tricuspid valve and two other larger ones on the ventricular aspect. The whole 29 mm prosthetic valve (Pericarbon More, Sorin Group) was removed along with the vegetations (Fig. 4) and replaced with a 27 mm biological valve (MOSIAC 310 CINCH, Medtronic). The valve was secured to the anulus by a 2/0 non-absorbable suture (polyester suture) and closure of the right atriotomy was achieved using a 4/0 suture (polyester suture), followed by removal of the aortic cross clamp. The patient was subsequently weaned off cardiopulmonary bypass with no complications and transferred to the cardiac care unit in stable condition. Post-surgery, the patient had a normal sinus rhythm with a heart rate of 80/minute and blood pressure of 110/70 mmHg, and he was started on gentamicin, cefazolin and rifampicin

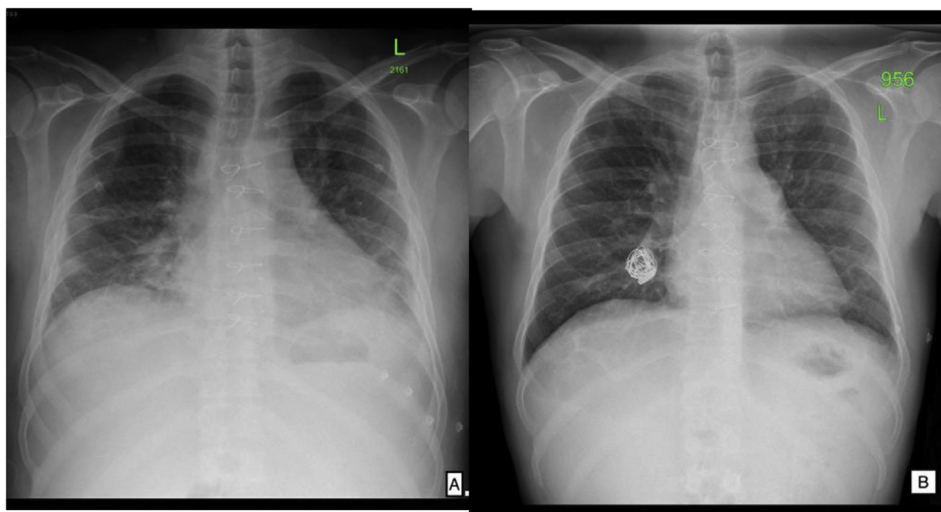


Fig. 1. (A and B) Chest x-ray pre and post-aneurysm coiling, showing the coils in the right lower lobe.

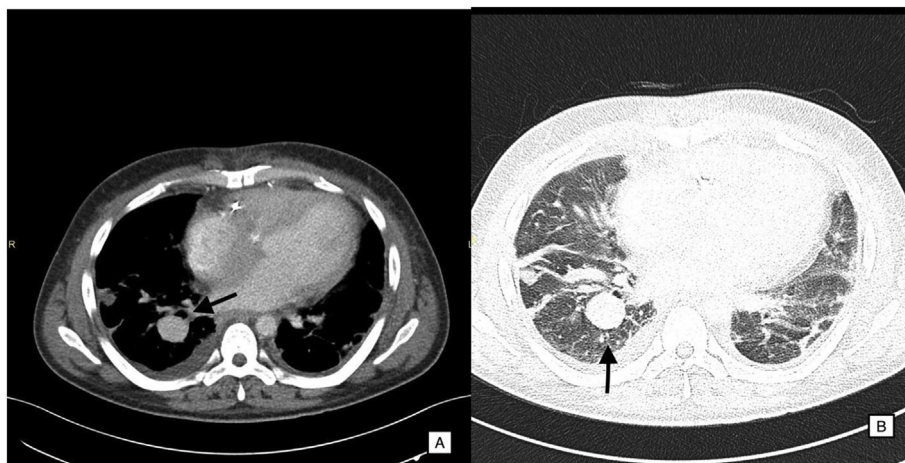


Fig. 2. (A and B) Computed tomography (CT) scans of the chest showing a right lower pulmonary artery aneurysm and multiple pulmonary nodules.

for six weeks. After 14 days, patient recovered successfully, and his laboratory tests were within reference range (CRP 0.40 mg/L, ESR 35 mm/h, procalcitonin <0.02 ng/mL) and was subsequently discharged after clinical and radiological improvement. He was followed up in the cardiac surgery clinic, and enrolled in a rehabilitation program to manage his drug addiction. After one year of follow-up, the patient is currently doing well from a clinical standpoint, no recurrence of hemoptysis or fever. Follow-up by echocardiograph and chest x-ray showed no vegetations, good cardiac function and no changes or issues were noted with the intra-aneurysmal coils.

3. Discussion

IE can lead to both native and prosthetic valve endocarditis with an overall incidence ranging from

1.5 to 20 cases per 1000 drug users per year, which makes this an important clinical situation encountered in daily practice¹. Right-sided IE is more common than left-sided IE in IDU, with the majority of cases involving the tricuspid valve mainly². *S. aureus* is believed to be the most common organism implicated in of IE cases in IDU, representing about 70% of all cases³. Blood cultures, needed to detect these organisms, are positive in a high proportion of right-side IE. When culture is negative, it is usually due to antibiotic therapy prior to obtaining the blood samples, or infection with other organisms such as *Bartonella*, *Coxiella burnetii*, *Chlamydia*, *Brucella* and fungi⁴.

Acute signs and symptoms of infection are responsible for 60% of hospital admissions among IDU patients, and IE is involved in 5–15% of these cases⁵. A recent study on IDU patients revealed that



Fig. 3. (A and B) Digital subtraction pulmonary angiogram revealed right basal pulmonary artery focal aneurysmal dilatation, with subsequent insertion of coils within the aneurysm. A post coiling completion arteriogram revealed complete coiling of the right basal arteries.

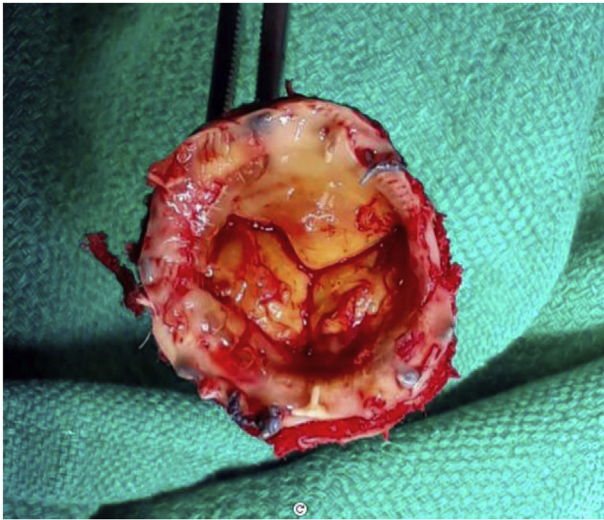


Fig. 4. The old infected prosthetic valve which was removed from the patient.

IE accounts for 5–20% of hospitalizations and 5–10% of total deaths⁶. The most effective management of IE in IDU patients is antimicrobial therapy, but surgical intervention is indicated if the patient has refractory heart failure, persistent or recurrent infections, or prosthetic valves. However, there is an ongoing ethical debate on whether to withhold re-replacement cardiac valve surgery in an active, noncompliant drug user after the first valve surgery⁷.

The association between MPAA and IDU was first reported in 1970⁸. While very rare, the exact incidence of MPAA in IDU is unknown. A study published in 1985 estimated the incidence of MPAA as a complication of IE as 10%–15%⁹. To confirm the diagnosis of MPAA, a high index of suspicion is required due to the often nonspecific presenting symptoms; such as cough, dyspnea, chest pain, fever and hemoptysis¹⁰. MPAA carries a devastating mortality rate reaching up to 54% of the cases. Therefore, early embolization, surgery, or both after a confirmed MPAA diagnosis is recommended as soon as possible as the likelihood of spontaneous resolution can only be expected in small size MPAA^{10,11}.

Our patient presented to the hospital with massive hemoptysis, and coiling was immediately performed owing to the easily accessible location of the aneurysm by interventional radiology. Nevertheless, lobectomy is the standard, if more invasive, option to control the bleeding¹².

4. Conclusion

We report this case with an aim to draw attention to the magnitude of potential complications of active IDU. Particularly, it is crucial to recognize the early signs and symptoms of MPAA developing in the setting of patients with IDU and a history of IE. While this complication can be life threatening, various therapeutic and potentially life-saving management options exist when detected at an early stage. For that, individualized management plan must be devised with options including immediate embolization and/or surgery, followed by counseling and rehabilitation. The latter are essential additional steps that should be taken seriously to overcome the root cause, illicit drug use, and save these patients from developing such life-threatening complications.

Declarations of Interest

The authors have no conflicts of interest relevant to this article.

Role of the Funding Source

No funding sources.

Consent and Ethical Approval

Written informed consent was obtained from the patient for publication of this case report and any accompanying images, and this case approved by Intuitional Review Board.

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