Case Report

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Infective Endocarditis Complicated by a Brachial Artery Mycotic Aneurysm: The Importance of Clinical Examination

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Abstract

Although uncommon, infective endocarditis is fatal if left unrecognised and untreated. It often presents ambiguously, as a diagnostic dilemma, and for this reason careful history and examination is essential. Early diagnosis and prompt treatment of infective endocarditis and its sequelae is the cornerstone of successful management. We report a case of infective endocarditis complicated by a brachial artery mycotic aneurysm. Although a rare complication if infective endocarditis, an unruptured peripheral mycotic aneurysm threatens both the patient's life and limb. It is a pathology that can generally be identified through careful history and evaluation. As is often the case in modern medicine, the clinicians involved in this case relied more heavily on medical imaging modalities than they did on history and bedside examination. This case can serve as a reminder of the clinical features of a peripheral mycotic aneurysm. A mycotic aneurysm is a complication that should be, at the very least, considered in all cases of infective endocarditis.

Keywords: Infective endocarditis; Mycotic aneurysm; Physical examination

Abbreviations: IV: Intravenous; ED: Emergency Department; MRI: Magnetic Resonance Imaging; MCA: Middle Cerebral Artery; CT-IVP: Computer Tomography Intravenous Pyelogram; TTE: Transthoracic Echocardiogram; TOE: Transoesophageal Echocardiogram; PICC: Peripherally Inserted Central Catheter; AKI: Acute Kidney Injury; ICU: Intensive Care Unit

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Introduction

There is a significant mortality associated with infective endocarditis, with over one third of patients dying within the first year of diagnosis [1]. Peripheral mycotic aneurysms are rare and potentially life-threatening complication. A proactive approach to an unruptured mycotic aneurysm, with early intervention, is essential to lower patient morbidity and mortality [2]. For this reason, early diagnosis of infective endocarditis and its sequelae, through thorough history and examination, is vital for good patient outcomes. However, it has been suggested that shortcomings in examination skills amongst junior doctors has contributed to poor patient outcomes [3]. Physical examination skills require regular implementation and practice to increase diagnostic yield [4]. Here, we present a case of a right brachial artery mycotic aneurysms secondary to infective endocarditis. Through this case, we highlight the importance of thorough history and physical examination to guide timely management of infective endocarditis and its complications.

Case Report

A 64-year-old-male presented with a three-day history of fevers and mild confusion on a background of four months of fatigue, 10 kg of weight loss and night sweats. He denied headache, visual disturbances, weakness, sensory disturbance or dysphagia. He described a chronic cough but denied any symptoms in keeping with a respiratory tract pathology or heart failure. He denied abdominal pain and nausea but reported a few days of watery stool without melena or frank blood. The patient had presented to the ED a week prior due to an episode of haematuria for which he was prescribed a course of amoxycillin for a presumed UTI. Following this presentation, he denied any further urinary tract symptoms.

The patient's past medical history included dyslipidaemia, hypertension, previous renal calculi and a right total hip replacement ten years prior. He was a generally fit and well ex-policeman from home with family and had no smoking history. He denied any recent dental procedures, overseas travel, agricultural

exposure and had not used any intravenous or illicit drugs.

In the regional ED, the patient received 1 g stat of IV Ceftriaxone prior to the acquisition of blood cultures. Following multiple temperatures over 40 degrees Celsius, antimicrobial therapy was upgraded to IV Piperacillin/Tazobactam (4.5 g three times a day) and IV Vancomycin (1 g BD). An MRI cerebral angiogram demonstrated an acute right frontotemporal MCA infarct. A CT-IVP indicated a small renal calculus without associated renal infarction or intra-abdominal pathology. A TTE demonstrated a large (11 x 17 mm) anterior mobile mitral valve vegetation with severe mitral regurgitation. The patient was then transferred to a Melbourne tertiary centre for ongoing care under the general medical unit for presumed subacute infective endocarditis.

From a neurological standpoint, the patient was largely asymptomatic of his frontotemporal infarct aside from some mild left sided facial droop. The stroke team concluded that the infarct was secondary to septic emboli. The patient was reviewed by the cardiology team and was felt to have an ongoing risk of septic emboli. A TOE was conducted which confirmed an isolated mitral valve vegetation measuring 16 mm x 18 mm. The case was discussed at the cardiology conference and deemed appropriate for medical management. Under consultation with the infectious disease team the patient was initiated on a combination of IV Flucloxacillin (2 g 4 hourly), IV Vancomycin (500 mg BD) and IV Ceftriaxone (2 g daily). After clinical stabilisation demonstrated by improving inflammatory markers and over forty-eight hours without fevers, the antibiotic regime was rationalised to IV Ampicillin (2 g 4 hourly) and IV Ceftriaxone (2 g BD). However, following antibiotic rationalisation further febrile episodes were recorded. After almost two weeks of hospitalisation the patient had remained blood culture negative (6 sets in total) and no focal source of infection had been identified. Abdominal imaging remained outstanding due to a, presumedly multifactorial, AKI.

The patient had intermittently reported 'joint arthralgia' however specific location was not documented. He also began to report left arm pain and swelling. This was worsened by the insertion of a left arm PICC to facilitate a protracted course of IV antibiotics. A subsequent ultrasound demonstrated an occlusive brachial vein thrombus and non-occlusive cephalic vein thrombus with an associated brachial artery aneurysm. A completion ultrasound of the lower limb arterial system excluded any other aneurysmal disease. As the patient has been stable since his cerebral infarct, anticoagulation to manage the thrombosis was deemed appropriate. He received three days of therapeutically dosed enoxaparin and was noted to have two episodes of epistaxis during this time.

A CT angiogram of the left arm was recommended by the Vascular Surgical unit to further characterise the brachial artery aneurysm. During a left upper limb CT angiogram an incidental right sided intracranial haemorrhage was identified. A clinical deterioration occurred with a drop in GCS, vomiting and a new left sided hemiparesis. A stroke call was initiated, and a CT brain demonstrated an extensive volume of intra-axial and intraventricular acute blood products centred on the previous right MCA infarct in keeping with a haemorrhagic transformation with associated marked mass effect [5]. The patient was taken to the ICU and following neurosurgical review and extensive family discussion a decision was made for palliation and comfort care. The patient returned back to the ward where he died later that night.

Discussion

Infectious endocarditis is a complex disease often requiring a team of health providers with a range of expertise [6]. Although an uncommon infectious disease, it continues to have an increasing morbidity and mortality, now the fourth most life-threatening infectious syndrome behind sepsis, pneumonia and intra-abdominal abscess [2]. Presentation is usually non-specific, as with this case, and can include fevers, chills, anorexia, myalgia and dyspnoea. The most common clinical sign of infective endocarditis is a heart murmur. The peripherals signs can be useful to aid in diagnosis but are less commonly examined for due to advancement in diagnostic modalities [7].

Despite a prolonged course of broad-spectrum antibiotics, the patient continued to have high grade fevers. Multiple specialty units were involved including general medicine, cardiology, neurology, renal, infectious disease and vascular surgery. Over a period of days, recommendations were made for further imaging, which was delayed in light of the patients AKI, likely to be exacerbated by a contrast load. At no point was a thorough clinical examination documented in an attempt to clinically diagnose the cause of the patient's ongoing systemic symptoms. During this period the patient had been reporting myalgia and arm pain. This raises concerns that time pressures and an increasing reliance on technology is contributing to less reliable clinical examination1. Notedly, the diagnosis of an infected aneurysm is initially reliant on history and physical examination which should then be followed by appropriate laboratory and imaging studies [5].

Mycotic aneurysms are an uncommon complication of infective endocarditis, resulting from septic embolization and subsequent spread of infection through vessel intima and outward through the vessel wall. Mycotic aneurysms are most frequently located in the intracranial arteries, less commonly in the visceral arteries and rarely in the arteries of the upper and lower extremities [2]. As with the above case, ultrasound, CT or a combination of both is used to diagnose peripheral mycotic aneurysms [8].

Brachial artery mycotic aneurysms are rare [9]. A literature review conducted in 2020 demonstrated 61 cases of brachial artery mycotic aneurysms since 1950 with a majority of patients being male and aged 23-67 years [9]. In the 61 cases, 22 cases were in the setting of IVDU and only 14 in relation to infective endocarditis. In general, peripheral limb mycotic aneurysms occur in IVDU's with staphylococcus aureus being the causative organism. In a relatively well, 64 year-old man, without significant risk factors, the occurrence of a brachial artery mycotic aneurysm was unexpected.

An infected aneurysm typically presents as an expanding, pulsatile, tender mass usually in conjunction with systemic features of infection, such as fever [5]. As with this case, the classic features of a mycotic aneurysm may be masked by overlying inflammation and can be easily misdiagnosed as cellulitis, an abscess or thrombophlebitis. Therefore, the presence of a soft tissue

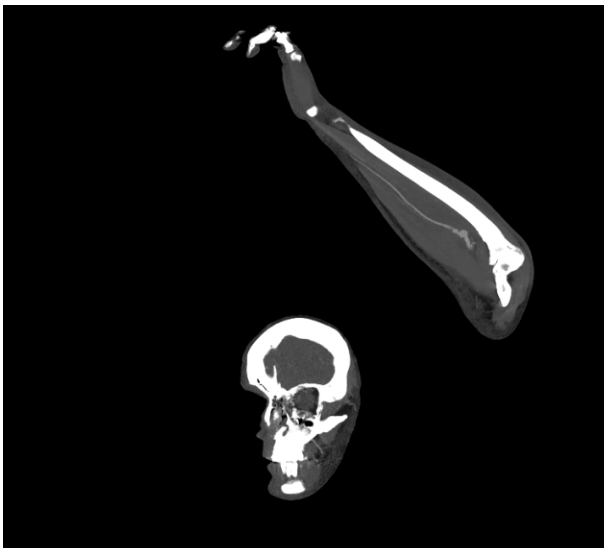

Figure 1 Coronal slice demonstrating a saccular aneurysm of the distal brachial artery at its bifurcation.

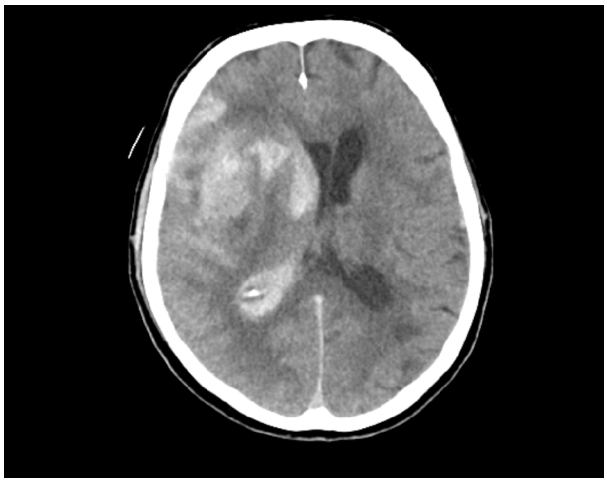

Figure 2 Axial CT scan demonstrating right sided intracranial and intraventricular haemorrhage with significant mass effect.

inflammation in association with a major blood vessel should raise suspicion of a mycotic aneurysms, especially in the setting of infective endocarditis [5]. In this case, the diagnosis of a brachial artery aneurysm was further complicated by the concurrent brachial vein thrombosis. This raised the issue of a potentially traumatic aneurysm as opposed to a mycotic aneurysm. However, it is recognised that, arterial intima is generally highly resistance to infection, areas of intimal disruption are seen in regions of atherosclerotic plaques, bifurcations and immediately distal to coarctations [10]. Therefore, the typical saccular shape of the aneurysms and its location immediately distal to the coarctation (**Figures 1 and 2**) is in keeping with a mycotic aneurysm.

Conclusion

Infective endocarditis is a rare but potentially lethal pathology requiring carful and considered evaluation. Although an uncommon complication a peripheral mycotic aneurysm must be considered as it can threaten the patient's life or limb. In patients with, persistent fevers despite antibiotics or with limb pain or swelling, a peripheral mycotic aneurysm must be excluded. Careful history and examination in conjunction with well rationalised medical imaging is encouraged.

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