Acute Upper Limb Ischemia “Goshh My Limb is Blue”- A case Report and Literature Review

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ABSTRACT

Acute upper limb ischemia (AULI) is a surgical emergency that is infrequently reported thus resulting in fewer literature/guidelines for its management. We are reporting a case of an elderly Malay gentleman who is a chronic smoker that presented with sudden onset severe right upper limb pain. On examination of his right upper limb showed features of Rutherford Grade 1 of acute limb ischemia. We proceeded with Computed tomography angiogram (CTA) and noted there was a short segment thrombosis of right brachial artery just before the branching into radial and ulnar artery which is the most frequent site. Electrocardiography (ECG) and Echocardiography is suggestive of recent ischemic heart disease. We would like to advocate that Surgical management is the main stay of treatment modality however due recent cardiac event and the clinical staging, we managed him conservatively. Patient was discharged well with oral novel oral anti-coagulant (NOAC). This review intends to share our experience in managing this patient in a district hospital and hope it will provide a brief idea with regards to acute upper limb ischemia.

Keywords: Acute upper limb ischemia (AULI), Rutherford, Novel oral anti-coagulant (NOAC), Embolectomy.

1. Introduction

Acute limb ischemia (ALI) is a common emergency warranting immediate evaluation and treatment. However the incidence of upper limb involvement is significantly less compared to the lower limb with an incident rate of less than five percent [1]. Due to scarcity of cases fewer guidelines has been published for the management of acute upper limb ischemia. We would like to share our experience in managing this infrequent case in district hospital with the hope that it will broaden the knowledge of our reader thus improving patient's outcome as swiftness is key in managing this case.

2. Case Report

A 65 years old Malay gentleman who is a chronic smoker with presented to our emergency department with a sudden onset of right upper limb pain and numbness, which started 3 hours back. The pain characterised as pricking and tingling in nature and was confined towards the whole right upper limb. However, he denies any claudication or rest pain. On right upper limb vascular examination, limb coldness till elbow region with radial and ulnar arteries were not palpable with monophasic doppler signals. The brachial artery was palpable (2+) with triphasic signal on pulse wave doppler. Otherwise, no skin discolouration, loss of sensation or motor deficits which is suggestive of ALI with Rutherford Grade I. The right upper limb was clinically unremarkable. Blood investigations were within the normal limits. However, the electrocardiography (ECG) was suggestive of coronary artery disease (Sinus rhythm, Q wave V1-V4 and T inversion I, aVL, v2-v6) with non-significant troponin T. We proceed with Echocardiograph showed impaired systolic function with Ejection fraction of 42% with evidence of regional wall motion abnormality (RWMA) over the anterior septal wall which is suggestive of ischemia. No left ventricular clots detected. An urgent CT angiography of upper limb was performed and shows a short segment of thrombosis measuring 1.8 cm at right brachial artery just before the branching into radial and ulnar artery as shown in Figure 1. Taking into consideration the clinical staging of the ALI with Rutherford Grade I and the history of recent cardiac

event, this patient was started on intravenous infusion anti-coagulant therapy (heparin) as per protocol. Patient was monitored clinically and Biochemically (INR) closely. Patient showed improvement on symptoms such as the distal pulses over the right upper limb started to be palpable with triphasic doppler signals. The intravenous infusion of heparin was continued for 3 days and patient was discharge well with novel oral anti-coagulant (NOAC) T. Dabigatran 150mg.

Figure 1

Figure 2

Figure 1 and 2 shows CTA of right upper limb with short segment non-opacification over the brachial artery

3. Discussion

Acute limb ischaemia refers to patient with a sudden decrease in limb perfusion which is less than 2 weeks duration causing an immediate threat to limb viability. It is a common emergency warranting immediate evaluation and treatment. However acute upper limb ischaemia (AULI) is far less common than acute lower limb ischaemia with incidence rate of <5% and relatively fewer cases has been reported.

Miju Bae et al., and Tolia J et al., published a single centre retrospective study in which patients who underwent treatment for acute and chronic upper limb ischaemia were analysed and they found that the most common etiology was embolism followed by thrombosis secondary to trauma [1,2]. Often the source emboli are atrial fibrillation. Other sources include valvular heart disease, ischaemic heart disease, atrial myxoma, ventricular aneurysm, cardiac failure and paradoxical emboli. This is in contrary with the lower limb where atherosclerosis is the main culprit.

AULI is slightly commoner in the right arm which may reflect the proximity of the brachiocephalic artery to the heart. Haemovici reported that site of occlusion is mainly brachial artery (61%) followed by radial (23%), axillary (21%), subclavian (11.7%) and ulnar (1.6%) arteries [3]. In clinical context the shoulder and elbow are much more tolerant to ischaemia due to their well-developed collateral circulation thus it is more common to observe ischaemic symptoms with lesions below the elbow.

Angiography remains the diagnostic gold standard as it permits therapeutic intervention but may not be readily available. Spinelli et al., reported that duplex ultrasonography is the most widely used diagnostic tool [4] as it is widely available, has a low cost, is non-invasive, non-irradiant and it takes a relative short time to perform. In our

case, Computed tomography (CTA) was done as it was useful in locating the lesions, discovering multiple lesions and assessing the correlation of the lesion with the surrounding structures. It has a sensitivity and specificity of 96 and 98% respectively [5]. Other imaging modalities include intravenous digital subtraction angiography and magnetic resonant angiography.

The management of AULI is challenging due to its rarity and lack of evidence based guidelines. The treatment of choice is surgical intervention either via open or endoscopic repair. Open repair such as embolectomy or revascularization using Fogarty balloon catheter with incision over the antecubital fossa providing the best window for removing brachial emboli. Revascularisation with upper limb bypass is another procedure with excellent outcomes but is infrequently preferred as it requires highly trained personnel. In recent advances, the use of endovascular treatment such as percutaneous aspiration thromboembolectomy and thrombolysis has grown exponentially as it provides the advantage of fairly short recovery time with the absence of operative wound. However it requires more time for revascularisation, involves a longer ischemic time and haemorrhagic complications are more frequent thus it should only be limited to stage I and IIa cases of AULI.

Wong et al., did a systemic review on non-operative management of AULI found that the limb salvage rate for medical treatment is 95.8% but poor functional outcome which includes decreased motor or sensory function, persistent pain and tingling sensation over palm and fingers is more commonly reported [6]. In patients with significant comorbidities or minimal symptoms this modality that includes anticoagulation and/or medical therapy may be opted. Importantly, anticoagulation plays a critical role in preventing recurrence of thromboembolic disease.

Following successful revascularization therapy, the patient needs to be anti-coagulated and the underlying cause need to be treated. Novel anti-coagulants provides a more predictable anti-coagulant response, low drug and food interaction, rapid onset and offset, wide therapeutic window and no need for laboratory monitoring [7]. It acts specifically on coagulation factor either factor IIa (dabigatran) or factor Xa (Rivaroxaban, Apixaban, Edoxaban) as compared to vitamin K agonist (VKA) which indirectly inhibits the vitamin K dependant clotting factors (Factors II, VII, IX, X).

Given the lack of evidence based guidelines, the evaluation and management of AULI remains largely based on expert opinion, surgeon training and institutional resource. Early decision whether the ischemia is acute or chronic is paramount as early AULI is more amenable to non-surgical intervention.

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