Digital gangrene in an elderly patient

Introduction

This article presents an elderly patient found to have an unusual cause of digital ischaemia. The case highlights the need to consider a comprehensive list of differential diagnoses and tailor treatment according to the patient's wishes and comorbidities.

Discussion

Digital ischaemia is caused by an occlusion of the artery supplying that particular digit by an embolus or vasculitis. Emboli carried by the circulation lodge in a vessel whose diameter is small enough to prevent their further passage. The clinical outcome is determined by the territory supplied by that vessel and the presence or absence of a collateral circulation. Over 90% of major emboli are derived from thrombi and the most common sites of origin are the heart and/or atheromatous plaque.

This patient presented with bilateral digital ischaemia suggesting multiple emboli occluding small peripheral arteries of the fingers. This classically presents as the sudden onset of pain which may be severe (only partially relieved by analgesia), paralysis, paraesthesia, pallor, perishing cold and the absence of pulses.

The upper limb is only affected in 15% of cases of arterial emboli and 70% are of cardiac origin; the dyskinetic atrium in atrial fibrillation is thought to be a source in 80% of cases of emboli of cardiac origin. Emboli may arise from a mural thrombus associated with a myocardial infarction or a thrombus lodged within a ventricular aneurysm. These emboli consist of platelet thrombus. Until 30 years ago rheumatic valvular disease resulting in a dilated left atrium was a common source of cardiac emboli. Emboli may also arise from valve vegetations in infective endocarditis.

Miss Jolene Witherspoon *is ST6 in General Surgery,* **Miss Anna Mainwaring** *is CT2 in General Surgery,* **Dr Owen Morley** *is FY1 in General/Vascular Surgery and* **Mr Michael Lewis** *is Consultant Vascular and General Surgeon. Royal Glamorgan Hospital, Llantrisant, Pontyclun CF72 8XR*

Correspondence to: Miss J Witherspoon (Jolene.witherspoon@nhs.net)

Upper limb emboli may also arise from proximal ulceration or plaque, aneurysmal disease or from the subclavian artery at the thoracic outlet as a result of compression from scalene fascial bands, cervical or anomalous first ribs. These cases have a worse prognosis as the embolism includes atherosclerotic plaque or cholesterol-rich emboli and is more difficult to treat by embolectomy.

The differential diagnoses included rarer sources of emboli such as fat, gas and tumours. There was no history of severe trauma resulting in long bone fractures to suggest the presence of fat emboli. This patient had not undergone recent invasive vascular procedures and was not a diver which made gas emboli very unlikely.

Tumour emboli can break off and cause dissemination although these rarely cause immediate physical problems. Because of this and its very poor prognosis, surgically removed emboli should be sent for histology (Morris-Stiff and Lewis, 2010). Digital

Figure 1. Bilateral necrotic areas on the finger tips consistent with digital gangrene.

Case Report

A 91-year-old man presented with a 10-day history of painful black areas on the fingers of both hands. There was no history of trauma and he denied palpitations or chest pain. His past medical history included inguinal hernia repair, hypertension and arthritis. His medications were a beta blocker and paracetamol. He was an ex-smoker of 60 pack years and lived with his son, but was independently mobile.

On examination, he was apyrexial, his heart rate was 86 bpm, blood pressure was 142/80 mmHg and heart sounds were normal. Respiratory examination and fundoscopy were unremarkable. He had a full complement of upper limb pulses which were regularly regular and bilateral digital gangrene as shown in *Figure 1*.

The abdominal was soft and non-tender on examination and there was a palpable liver. Bowel sounds were normal, there were no groin herniae and digital rectal examination was normal.

A full blood count revealed a haemoglobin of 8 g/dl with a mean cell volume of 74 fl (normal range 76–96 fl). Renal and liver function were normal. A random glucose level and erythrocyte sedimentation rate were within normal limits. Fundoscopy was unremarkable and urinalysis did not reveal any protein. An electrocardiograph showed normal sinus rhythm and an echocardiogram did not reveal any source of emboli. An arterial duplex of the upper limb showed that the subclavian, axillary, brachial, radial and ulnar arteries were patent with good triphasic flow. No significant stenoses or occlusions were identified.

An ultrasound of the upper abdomen revealed a mass in the liver which was further investigated by computed tomography. *Figure 2* is an axial slice image of a computed tomogram of the upper abdomen, showing a large hypodensity within the right lobe of the liver consistent with diffuse metastatic disease.

Figure 2. Axial slice image of a computed tomogram of the patient's abdomen showing a large hypodensity replacing most of the right lobe of the liver consistent with diffuse metastatic disease.

ischaemia has been reported with various types of cancer, especially gastrointestinal. Elderly women are most commonly affected and the most common symptom is a gangrenous finger or fingers. The presence of digital ischaemia without other rheumatological stigmata or vascular predisposition in an elderly patient should raise clinical suspicion of a paraneoplastic phenomenon (Chow and McKenna, 1996).

The prothrombotic mediators and mechanisms implicated in malignancy-associated hypercoagulability are summarized elsewhere (Linenberger and Wittkowsky, 2005). Patients with an underlying malignancy are in a procoagulative state because of the significantly higher levels of plasma soluble fibrin monomer complex, fibrinogen and fibrin degradation products (D-dimer) in patients with malignant disease compared with patients with non-malignant disease and healthy controls (Nakashima et al, 1995; Verheul et al, 2000; Kim et al, 2004; Kvolik et al, 2010). Such patients are at risk for thrombotic events.

Acute myelogenous leukaemia, non-Hodgkin's lymphoma, and renal cell, ovarian, pancreatic, gastric and lung cancer are associated with a significantly elevated incidence of thrombosis (Kvolik et al, 2010). Malignancy-associated thromboembolic complications usually occur in the venous system but sometimes affect the arterial tree.

Vasculitis must be excluded by checking erythrocyte sedimentation rate which may be raised, renal function as creatinine levels may be raised in renal failure, and urinalysis which may show proteinuria, haematuria and casts on microscopy. Anti-neutrophil cytoplasmic antibodies may be positive.

Arrhythmias can be diagnosed with an electrocardiogram and an echocardiogram can identify mural thrombus or ventricular aneurysm following a myocardial infarction or endocarditis, which may also result in an embolic process. A chest X-ray may identify a cervical rib or underlying malignancy. An upper limb arterial duplex will diagnose arterial stenoses or occlusions which may reduce blood flow although these alone would rarely present with bilateral digital ischaemia. More important is the detection of plaque or aneurysm which may be a source of emboli. This patient's symptoms were bilateral suggesting a source proximal to the upper limb arteries.

A microcytic anaemia characterized by a low haemoglobin concentration of <13.5 g/dl for men and <11.5 g/dl for women and a low mean cell volume of <76 fl can be the result of iron deficiency. Digital gangrene, an iron deficiency in the presence of a normal electrocardiogram, echocardiogram and arterial duplex raised the suspicion of an underlying malignancy in this patient.

The liver is the most common site of metastases from the colon, stomach, pancreas, breast and lung. The primary malignancy was not obvious. As a result, several differential diagnoses needed to be considered; hypovascular metastases have to be differentiated from focal fatty infiltration, abscesses, atypical hypovascular hepatocellular carcinoma and cholangiocarcinoma. Hypervascular metastases have to be differentiated from other hypervascular tumours that can be multifocal such as haemangiomas, focal nodular hyperplasia, adenoma and hepatocellular carcinoma. BJHM

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Further reading

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LEARNING POINTS

- Digital ischaemia with iron deficiency should raise clinical suspicion of a paraneoplastic phenomenon.
- Bilateral digital gangrene suggests a source proximal to the upper limb arteries.
- The upper limb is only affected in 15% of all cases of arterial emboli and 70% are of cardiac origin.