

Editorial

Localized livedo reticularis and retiform purpura. Diagnostic considerations based on a clinical case

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Abstract

Retiform purpura is a sign of occlusion of medium-size vessels which can be secondary to vasculitis, thrombosis, emboli, or infection. Most cases are medical emergencies and carry poor prognosis. Emergent diagnosis and management can help to improve outcome in some patients.

Key words: Livedo reticularis; retiform purpura; skin necrosis; vasculitis

Introduction

Localized livedo reticularis and retiform purpura are signs of occlusion of medium-size vessels of the skin. (1,2) Critical occlusion of medium-size vessels of the skin can result in retiform purpura and skin necrosis as well as necrosis of the fingers and toes. These medium size vessels are located in the hypodermis or deep dermis. Ischemia, thrombosis of small vessels, and hemorrhagic necrosis can occur distal to this occlusion, which can be due to vasculitis, thrombosis, emboli, or infection.(1,2) Diagnosis of the primary pathology requires a thorough history and physical exam, laboratory evaluation, and in some cases histopathology. Many internists, hospitalists, rheumatologists and dermatologists are not experts in this field, which may result in delay in diagnosis and unfavorable outcomes. In this article, we present an example of a complicated case of skin necrosis that was a diagnostic challenge and we discuss the approach to diagnostic evaluation.

Clinical scenario

An 85 year old female with history of Raynaud's syndrome, diabetes mellitus, and hypertension presented to the hospital with

blue and black discoloration and cool temperature of the second through fifth digits of the left hand. Subsequent work up revealed necrosis of the tip of her third and fourth fingers of right hand, a blanchable, erythematous area in a reticular pattern on the left foot, preserved radial pulses on both upper extremities, and a new splenic infarction.

Previous evaluation of her Raynaud's syndrome had not shown any etiology. However, two weeks before presentation, the patient had worsening discoloration of the left third, fourth and fifth digits. She underwent left upper extremity angiogram that revealed proximal left subclavian artery high grade stenosis and a left subclavian artery stent was placed with resultant improvement in finger discoloration.

The constellation of findings including digital necrosis, localized livedo reticularis of the left foot and segmental splenic infarction led us toward the diagnosis of medium-size vessel occlusion as the underlying pathology. However, identifying the cause of this pathology was a challenge.

Diagnostic challenge

Medium-size vessel occlusion can be caused by inflammation (vasculitis), thrombosis, emboli, or infection (Table 1). (2) Pure small vessel vasculitis can cause large areas of skin purpura and necrosis; however, the pattern of skin lesions is not retiform.

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Table 1. Common pathologies and causes of retiform purpura.

Pathology	Potential causes
Medium vessel vasculitis	Polyarteritis Nodosa Kawasaki disease Granulomatosis with Polyangiitis Churg–Strauss syndrome Microscopic polyangiitis Mixed cryoglobulinaemia Vasculitis in rheumatoid arthritis, systemic lupus erythematosus , Sjogren's syndrome Drugs Infection (e.g. Human Immunodeficiency Virus)
Microvascular platelet plugs	Heparin necrosis Thrombocytosis Paroxysmal nocturnal hemoglobinuria Thrombotic thrombocytopenic purpura
Cold-related gelling or agglutination	Type I cryoglobulinemia Cryofibrinogenemia Cold agglutinins
Other causes of medium-sized vessel occlusion	Hypercoagulable states (e.g. protein C or S deficiency, antiphospholipid antibody, disseminated intravascular coagulation) Calciphylaxis Oxalosis Cholesterol emboli Fat or air emboli Sickle cell disease, malaria Malignant atrophic papulosis Livedoid vasculopathy
Infections including angio-invasive organisms	Fungi (mucormycosis, aspergillus, candida, fusarium, absidia and rhizopus) Ecthyma gangrenosum (gram negative bacilli, pseudomonas, Staph aureus) Endocarditis Necrotizing fasciitis Disseminated strongyloidiasis Meningococcal infection Rickettsial infection (e.g. Rocky Mountain Spotted Fever) Viral hemorrhagic fevers

Vasculitic processes that involve medium as well as small vessels can present with skin findings typical of both conditions. (3) Past medical history and other

Findings in history and physical exam can be clues to differentiate the potential causes. Unless the cause is obvious using history and physical exam, the patient should undergo skin biopsy as soon as possible. The skin biopsy should be large and include hypodermis. It should include an area of purpura and normal surrounding skin. The aim is finding the affected medium-size vessels that are typically located in the hypodermis and deep dermis and supply the purpuric area.

Histopathologic exam

Histopathologic findings of medium-size vessels within the first few hours of the appearance of the rash can help with forming a diagnosis. The presence of vasculitis, an embolic particle, fungal

elements, hyaline material, or pure thrombus in medium-size vessels can be clues to diagnosis. A few hours after occlusion of medium-size vessels, the area of skin distal to the occluded vessels shows evidence of ischemia including changes in eccrine glands. Small vessels develop thrombosis and red blood cell extravasation occurs. After 24 to 48 hours, there will be inflammatory infiltrate around the thrombosed vessels. This may cause confusion with a primary vasculitis. (2, 3)

It is important to note that thrombosis of small vessels in the affected area can be secondary to ischemia and is not a clue to the primary pathology.

Laboratory evaluation

Laboratory work up varies depending on the clinical scenario and is directed based on differential diagnoses. A typical case of cholesterol emboli in a typical setting with cholesterol particles visible in retinal

vessels on ophthalmoscopy may not need any additional labs for diagnosis. A patient with pure thrombosis in medium vessels may need work up for hypercoagulable states. (2) A vasculitic process may need an immunofluorescent exam of tissue as well as extensive work up for underlying etiologies of the vasculitis.

Case Discussion

In our case, the temporal association with the stent placement suggested cholesterol emboli as the cause, but there were some atypical features such as presence of Raynaud's syndrome that raised suspicion for vasculitis. Unfortunately, the patient and family decided to pursue a comfort care approach, foregoing further workup of the underlying etiology. However, follow up of the patient did not reveal progression of the skin lesions, favoring diagnosis of cholesterol emboli.

Conclusion

Localized livedo reticularis and retiform purpura can be

signs of a severe and serious systemic disease. Most cases need emergent diagnosis in order to control the disease if possible. Skin biopsy in the first few hours may help with diagnosis. Interpretation of histopathological findings needs expertise in this field. Good communication between internist, rheumatologist, dermatologist and dermatopathologist is essential for emergent diagnosis.

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