ISO 9001 - 2015

ISSN 2349 - 4891

Monthly

IJRRAS

IF
4.665

Volume 4,Issue 6, June 2017

International Journal of
Recent Research and Applied Studies

SURRAGH PUBLICATIONS

ISSN: 2349 - 4891

International
Journal of Recent Research and Applied Studies
(Multidisciplinary Open Access Refereed e-Journal)

Case Report: Development of Leukocytoclastic Vasculitis after Cardiac Stress Test with Technetium 99 Sestamibi

Alex Manuel[1], Dr. Nabil Badro MD[2] & Ahmed Al-Jehani[3]

[1]*Trinity School of Medicine 5755 North Point Parkway, Suite 230 Alpharetta, GA US.*
[2]*University of Maryland Baltimore Washington Medical Center 301 Hospital Dr, Glen Burnie, MD 21061*
[3]*All Saints University School of Medicine Hillsborough St, Roseau, Dominica.*

Received 13th May 2017, Accepted 5th June 2017

Abstract

Leukocytoclastic vasculitis (LCV) is a small vessel vasculitis that presents most commonly as palpable purpura. In our case report we note a patient that develops LCV which progressed from purpura to painful necrotic ulcers after exposure to technetium 99 sestamibi. It has been hypothesized as a potential trigger but this case is the first to document it as such. We also propose that our patient's extensive allergy history may have predisposed her to developing LCV.

Keywords: Leukocytoclastic vasculitis, Cardiac stress test, technetium 99 sestamibi.

Introduction

Vasculitis is defined as inflammatory disorder of blood vessels characterized by pathological change in structure and function leading to narrowing, weakening and scarring of the vessel wall.[1] Leukocytoclastic vasculitis (LCV) is a small vessel vasculitis, most commonly postcapillary venules, that usually presents as a palpable purpuric skin rash on the legs.[2] It has an incidence rate of 30 cases per million people per year.[3] The pathogenesis is believed to be due to circulating immune complexes that deposit in vessel walls leading to the activation of the complement pathway. [4] This leads to neutrophilic transmural inflammation ultimately resulting in fibrinoid necrosis of the vessel wall. [5] Although 50% of cases are idiopathic, drugs can cause up to 10-24%, most predominantly beta lactam antibiotics. [5] In our case report, we note the onset of LCV in a patient after the use of Technetium 99m sestamibi (^{99m}Tc-S) for a nuclear stress test, an etiology trigger that has been hypothesize but not documented in the literature.[2]

Case

A 68 year-old caucasian female presented to Emergency Department with complaints of painful bilateral lower extremity ulcers. She notes that initially the lesions began as small red purpuric lesions on the thighs that spread distally. The lesions began after she had nuclear stress test 3 weeks prior to presentation as part of the workup for a left carotid endarterectomy. The lesions on her lower extremities progressed becoming larger, more painful and draining with black with eschar (Figure I). She visited a dermatologist 1 week prior to presentation where she had punch biopsy of the lesions, which was later determined to be leukocytoclastic vasculitis, and was prescribed doxycycline and wound cream for a staphylococcus infection. However, she was not compliant with her doxycycline since she could not tolerate the associated nausea and vomiting. Her past medical history is significant for hypertension, hyperlipidemia, lung cancer, pelvic fracture and stroke. Her past surgical history include cholecystectomy, hysterectomy, right lower lobe lobectomy 2010, open reduction internal fixation of right tibia in 2015, left carotid endarterectomy in 2017. She currently takes aspirin 81mg qid, gabapentin 300mg tid, nebivolol 10mg qid, and tramadol 50mg prn tid. She has a history of allergies to codeine, iodinated contrast dyes, penicillins, shellfish and sulfa antibiotics. On presentation her vitals were BP 148/65, Pulse 77, Temperature 36.7 C, Respiratory rate 20, Height 157.5cm, and Weight 51.3kg. Upon physical exam, her legs had multiple non-blanching purpura on both thighs and legs. There were also visible varicosities on the feet and lower legs. There were multiple ulcers on both legs that were covered in necrotic tissue or eschar. The distal pulses are palpable bilaterally with good capillary refill. Duplex ultrasound of the lower extremities revealed bilateral lower extremity arterial occlusive disease with mild ischemia. The patient underwent surgical debridement for her wounds. The wounds were clean without obvious infection and wet to dry dressings were placed to be changed three times a day. The wound cultures grew Klebsiella and proteus. She was initially started on vancomycin but was switched to ciprofloxacin after

Correspondence
Alex Manuel
E-mail: alexmanuel91@gmail.com

obtaining the culture data. She was also given a 10 day course of prednisone 20mg/day to then be tapered off to treat the leukocytoclastic vasculitis. She was discharged to subacute rehab with follow up scheduled for 1 week later.

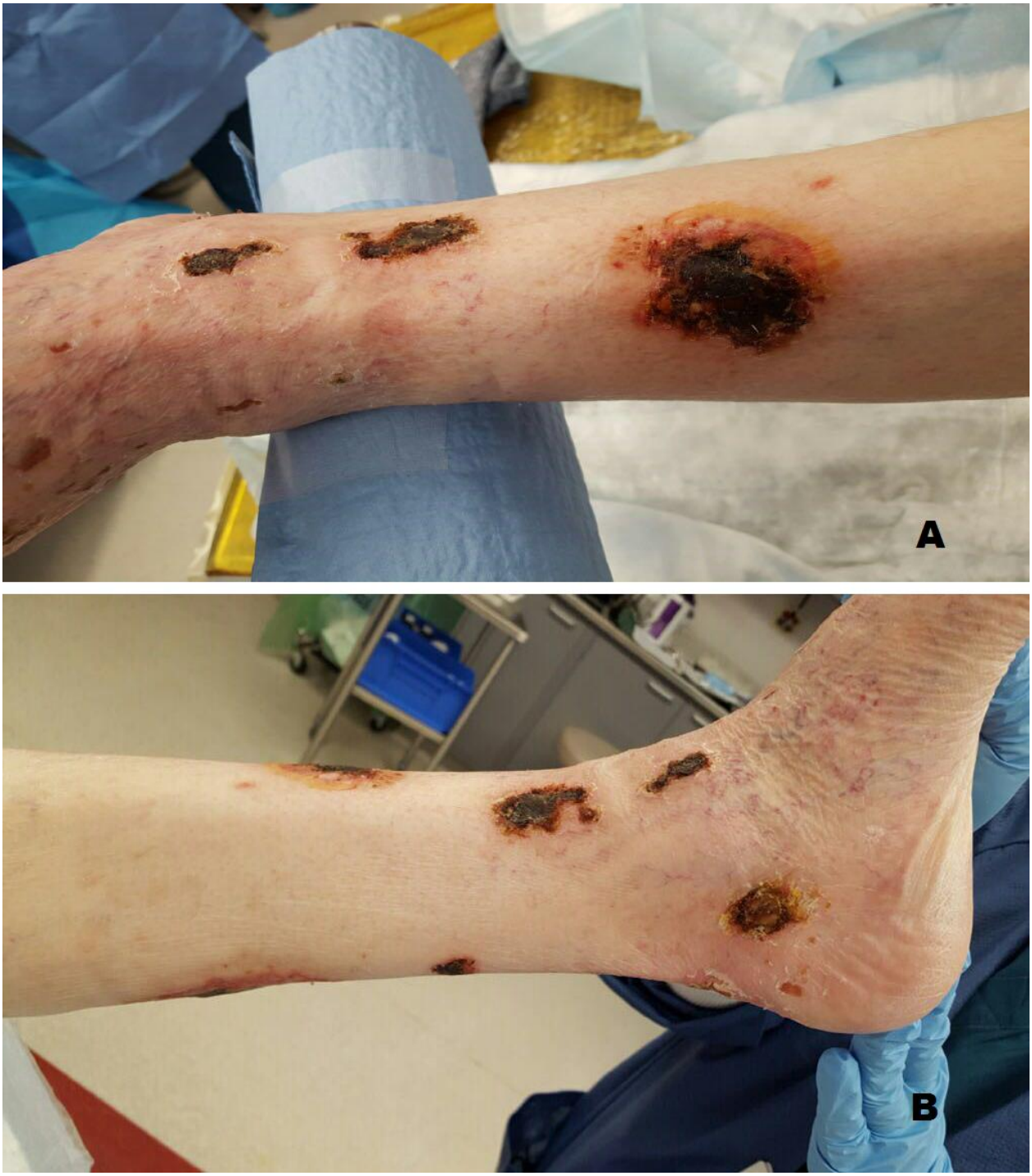

Figure I. a: Right leg showing distended veins, progressive stages of leukocytoclastic vasculitis. Small purpura proximally progressing to ulcerative black lesions b: Same presentation on left leg

Discussion

Vasculitis is the inflammation of blood vessel walls and manifests in multiple forms. Vasculitides are categorically defined based on different criteria including blood vessel size and organ system involvement.[5] Leukocytoclastic vasculitis, also called hypersensitivity vasculitis, refers to the inflammation of small blood vessels.[6] Leukocytoclastic denotes the debris of white blood cells within the wall, specifically neutrophils.[7] It can present as systemic disease process, potentially affecting the kidneys, heart, nervous system, lung, and GI tract.[8] However, the most common finding of

leukocytoclastic vasculitis is cutaneous, typically palpable purpura, as demonstrated in our patient with multiple purpuric lesions on her thighs that spread distally. The prognosis in cases of isolated skin involvement is generally good, resolving in a matter of weeks to months.[9] It is paramount to rule out systemic involvement by closely observing patients for signs of sinus congestion, hemoptysis, shortness of breath, abdominal pain, hematuria, paresthesia, and other indications of pathology.[5] To rule out other forms of vasculitides and identify related disorders, physicians should order laboratory tests such as ESR and biochemistry profile with liver and renal function.[6]

It is likely our patient's LCV is a result of an adverse reaction to the ^{99m}Tc-S or some other agent in the radiotracer. ^{99m}Tc-S adverse effects are noted in 1 to 6 reactions per 100 000 injections.[10] The adverse effects generally include nausea, erythema, diffuse rash, pruritus, and nausea. [10] Thus, the initial rash the patient had after the use of ^{99m}Tc-S could possibly be an adverse reaction to other agents in that manifested into LCV. Previously, technetium was hypothesized to play a synergistic role in induction of LCV[3], but this case provides evidence that ^{99m}Tc-S may induce LCV by itself.

Our patient's extensive history of allergies most likely predisposed her to an adverse reaction to the ^{99m}Tc-S.Though there is limited data on the overlap between allergic reactions to technetium radiopharmaceuticals and other allergic reactions, there is prominent data on associations between contrast dyes and other allergens. Studies have found that the risk of reaction to contrast dye increases by a factor of 3 when a patient has a history of extensive allergies.[11] Shellfish and sea food allergies, present in our patient, have been particularly associated with adverse contrast reactions.[11]

Conclusion

Leukocytoclastic vasculitis is a rare disease process where the majority of cases are idiopathic. There is the potential that the use of radiopharmaceuticals, like Technetium 99m Sestamibi, can induce this vasculitis.[7] Further study is required into relation between extensive allergy history and adverse reactions to technetium. In addition, for effective management and treatment, physicians must be aware of increased risk of allergic reactions in patients with extensive allergy history in order to promptly recognize any adverse reaction that may arise.

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