# Livedo racemosa secondary to hyaluronic acid injection

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## Abstract

Iatrogenic vascular occlusion secondary to filler injection, such as with hyaluronic acid, is a known but rare, entity. It typically occurs in the setting of facial cosmetic procedures but has also been described in the setting of osteoarthritis. We present a patient with ankle osteoarthritis who developed an asymmetric, reticular, livedoid eruption after intra-articular injection with hyaluronic acid. She was diagnosed with livedo racemosa secondary to vascular occlusion and placed on low-molecular weight heparin. Later, a transition to low-dose daily aspirin maintained the improvement.

*Keywords: livedo racemose, osteoarthritis*

## Introduction

Livedo racemosa (LRC) is an irregular, reticular pattern of violaceous mottling of the skin secondary to hypoperfusion that differs from the well-known livedo reticularis (LR) by its asymmetrical presentation and the pathological setting in which it occurs [1,2]. Livedo racemosa is a classic marker for Sneddon syndrome, and antiphospholipid syndrome (APS), occurring in roughly a quarter of patients with primary APS and 70% of patients with lupus-associated APS [2].

Iatrogenic causes of LR and LRC can also occur, as LR has been reported in the setting of vascular occlusion secondary to various procedures [3]. Currently, fillers such as hyaluronic acid (HA), which are used for the management of osteoarthritis and for cosmetic interventions [4], are a rare cause of vascular occlusion leading to LR. Herein, we describe the first reported case, to the best of our knowledge, of LRC secondary to vascular occlusion from an intra-articular HA injection for ankle osteoarthritis. The patient was initially managed successfully with heparin and later transitioned to low-molecular weight heparin (enoxaparin), and finally, to low-dose daily aspirin.

## Case Discussion

A 72-year-old woman presented to the emergency room with a three-day history of a progressively worsening, burning, painful rash on her right foot (**Figure 1A)**. Twelve hours prior to the onset of her rash, she had received a high concentration

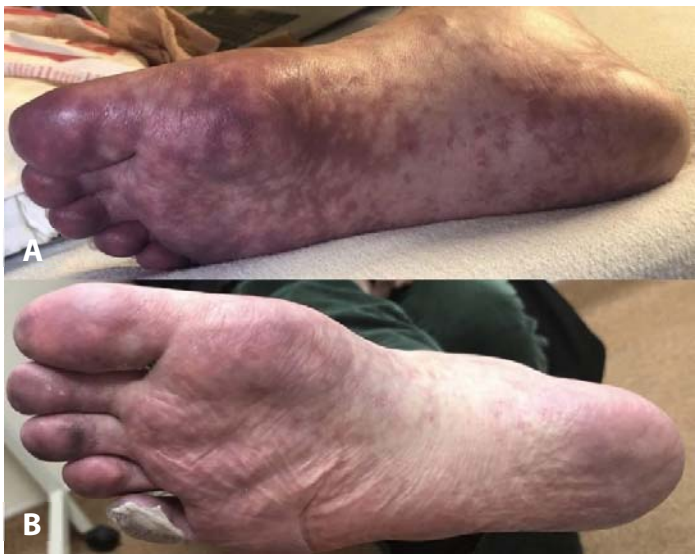


**Figure 1**. ***A)*** *Livedo racemosa secondary to vessel occlusion from hyaluronic acid injection in a patient with ankle osteoarthritis.* ***B)*** *After treatment with heparin, enoxaparin, pentoxifylline and now, aspirin, the patient has improved.*

hyaluronic acid (HA) injection (Durolane) in her right ankle for long-standing osteoarthritis, for which she had previously tolerated low concentration HA. Her examination was notable for non-palpable, non-blanching, broken-net retiform purpura, extending from the plantar aspect of her right foot to her ankle (**Figure 1A)**. She was diagnosed with iatrogenic LR, secondary to vessel occlusion from HA. Laboratory workup (blood count, sedimentation rate, prothrombin time, and partial thromboplastin time) was unremarkable. Ankle-brachial index was within normal limits. Upon admission, she was placed on a heparin drip with noted improvement. Heparin was continued throughout her hospitalization for a total of three days. At discharge, she was started on enoxaparin 60mg daily for 14 days and 300mg pentoxifylline three times daily to prevent necrosis. She continued to improve on this therapy for two months, at which time she was transitioned to aspirin 81mg daily. At three months of follow-up, the livedo pattern had improved (**Figure 1B)**. She continues on low-dose 81mg aspirin daily.

## Discussion

Vascular occlusion from HA injections is a known, but rare, entity, that can progress to tissue necrosis and arterial injury if not identified early [5]. It typically occurs when filler is either injected into a vessel or causes compression of a nearby artery [6]. This lack of perfusion gives rise to a blotchy, reddish-blue, retiform, cyanotic pattern on the skin. The most commonly reported site of involvement is the face, particularly, the nasolabial folds and glabella, where cosmetic fillers are injected [5]. HA injections are a routine cosmetic procedure for reducing wrinkles on the face and soft tissue augmentation. They are considered the fastest and most popular dermal fillers in the United States [7].

Hyaluronic acid is also used for osteoarthritis management, as hyaluronate is a naturally occurring molecule within cartilage and synovial fluid that serves as lubricant within joints [8]. For osteoarthritis, HA can be ingested or injected. When injected, it enhances extracellular matrix protein synthesis, shifts degradation pathways, and maintains cartilage thickness, among other actions within the joint [8]. Intra-articular HA injections are generally recommended over chronic nonsteroidal anti-inflammatory use owing to their favorable safety profile [8]. In fact, vascular occlusion secondary to intra-articular HA injection is rarely reported.

To our knowledge, three cases of intra-articular HA-induced vascular occlusion have been reported in the literature [9-11]. All three involved the knee and manifested as a pattern of retiform venodilation that most authors described as livedo reticularis (LR), not LRC [9,10].Two of the three cases led to eventual skin necrosis. One case was managed with low-molecular weight heparin [9], another with analgesics [10], and a third with topical fusidic acid [11].

While LR and LRC are similar in appearance, the terms are not interchangeable. Both LR and LRC are secondary to deoxygenation, which leads to subsequent venodilation of the venous plexus in the skin. However, LR can result from either a physiological or pathological state and is symmetric in its reticular pattern. On the other hand, LRC is always secondary to a pathological state and is asymmetric, broken, and discontinuous in presentation. In our case, the patient presented with broken-net retiform purpura, indicating a diagnosis of LRC over LR. As a result, to our knowledge, ours is the first to describe LRC in the setting of HA-mediated vascular occlusion within the ankle in the setting of osteoarthritis.

When vascular occlusion secondary to HA is suspected, a many treatment options exists to minimize damage and decrease the risk of further clotting. These options include topical nitroglycerin, hyperbaric oxygen, phosphodiesterase inhibitors, and anticoagulants [12]. If a patient is seen immediately after or during a procedure in which occlusion is suspected, hyaluronidase can be used to degrade the remaining HA [13]. Alternatively, anti-coagulation with a phosphodiesterase inhibitor or low molecular weight heparin can be used [12,14]. Massaging and warming the area are also recommended, as is applying topical nitroglycerin to the area [13,14]. Finally, patients are typically transitioned to anti-platelet therapy with 81mg

aspirin [13], until resolution or satisfactory improvement. In our case, the patient presented three days after the incident and was therefore no longer a candidate for hyaluronidase treatment. Instead, she was immediately started on reperfusion therapy with heparin. When her LRC improved with no evidence of continued ischemia, she was transitioned to enoxaparin and pentoxifylline. She was eventually transitioned to low-dose daily aspirin, which she continues to take with improvement. Based on cases of facial and intra-articular HA occlusion, time to recovery for these patients can range from four weeks to 6 months [9,15].

## Conclusion

We describe a case of LRC secondary to vascular occlusion in the setting of intra-articular HA injection for the management of osteoarthritis. Although rare, we encourage clinicians to be aware of this possible adverse event so that appropriate therapy, including reperfusion therapy with heparin, low-molecular weight heparin, and/or aspirin, may be initiated with favorable outcomes.

## Potential conflicts of interest

The authors declare no conflicts of interests.

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