# Case Report

DOI: http://dx.doi.org/10.18203/issn.2455-4529.IntJResDermatol20193248

# Nicolau syndrome appearing approximately one-year post bicillin injection treated with excision

Mary K. Dick<sup>1</sup>\*, Robert A. Elmore<sup>2</sup>, Poonam K. Sharma<sup>2</sup>

Received: 05 March 2019 Accepted: 09 May 2019

# \*Correspondence: Mary K. Dick,

E-mail: MaryDick@creighton.edu

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### **ABSTRACT**

Nicolau syndrome (livedoid dermatitis, embolia cutis medicamentosa) is a unique and painful reaction post intramuscular injection that often ends with necessary necrotic debridement and scarring. We present a case of a 25-year-old female who developed a tender golf ball size lesion with fat necrosis, confirmed by pathology, approximately one year after a Bicillin injection in the buttock. Excision of the mass was necessary for symptomatic relief. To our knowledge, there has never been a report entailing a slow development of Nicolau syndrome over an extended period of time. The pathophysiology of this condition has been attributed to a myriad of causes such as vascular trauma, drug embolism, inflammation, or inappropriate needle length. This syndrome often progresses through three generalized stages before ending in a necrotizing plaque. While there is no current standardized treatment to Nicolau syndrome there are methods for prevention making this important information across the medical field.

Keywords: Nicolau syndrome, Injection reaction, Fat necrosis

# INTRODUCTION

The earliest description of Nicolau syndrome came after an intramuscular injection of bismuth salts to treat syphilis in 1920. Presently, additional drugs have been implicated: NSAIDs, lidocaine, steroids, and interferon, along with a variety of injection sites with the most common being the buttocks. This condition involves a range of reactions, pain, abscesses, tissue proliferation, tissue necrosis, and compartment syndrome, stemming from the injection site. Despite the increasing frequency of this syndrome, the actual pathogenesis has remained unclear. Recent hypotheses have been proposed including injecting with an incorrect needle length (important in overweight patients), same site repetitive injections, and inflammation post injection.<sup>1</sup>

# **CASE REPORT**

A 25-year-old female presented with presumed streptococcus pharyngitis confirmed by culture three days post visit. Her primary care physician initially ordered one dose of intramuscular Bicillin administered in the gluteus muscle at the time of presentation. Her BMI at this time was 34.6 kg/m². The needle length used for the injection is unknown. Almost 1 year after receiving the injection, the patient reported a golf ball size mass in the site of injection that was intermittently warm and tender. Massaging the area and providing warm compresses provided no relief. On imaging, an MRI with contrast showed a 4.6 cm area of subcutaneous fat compatible with fat necrosis. The peripheral enhancement of the fatty nodule was not of concern for cancer. Excision of the right gluteal mass measuring 7 cm×7 cm was done to

<sup>&</sup>lt;sup>1</sup>Creighton School of Medicine, Omaha, Nebraska, USA

<sup>&</sup>lt;sup>2</sup>Department of Pathology, CHI Health Creighton University Medical Center, Omaha, Nebraska, USA

provide symptomatic relief (Figure 1). Histopathology displayed nodular aggregates of lymphocytes and plasma cells infiltrating adipocytes confirming the diagnosis. To our knowledge, there has never been a report entailing the slow development of Nicolau syndrome over an extended period of time.



Figure 1: Excised subcutaneous tissue 7 cm×7 cm in a 25-year-old female presenting one-year status-post streptococcus pharyngitis treated with gluteal bicillin injection.

## DISCUSSION

Current hypotheses concerning the pathophysiology of Nicolau syndrome attribute the underlying cause to unintentional intra-arterial injections, trauma vasculature. acute vasospasm, drug embolism compressing blood flow, or inflammatory infiltration and thrombotic occlusion. A study conducted by Dadci et al observed that repeated same-site injections and usage of short needles that only penetrate the fat and did not extend into the muscle held an increased risk for fat necrosis.1 This study also noted small steps toward prevention such as aspiration prior to injection to confirm needle location and use of the "Z technique" consisting of pulling adipose tissue downward in order to provide a thinner layer of fat allowing for easier muscle penetration. Diagnosis of this condition can be completed with imaging and confirmed with histopathology identifying the condition by vascular thrombosis and cutaneous necrosis with a lack of vasculitis.2

A 2015 literature review outlines the three typical phases of this syndrome: initial, acute, and necrotic coloration. The initial phase happens at the time of injection presenting with extreme pain and blue or purple discoloration. Acute phase follows presenting with a painful, erythematous, non-necrotic livedoid or reticular

plaque due to vessel occlusion. The final necrotic stage exhibits a crusted purple necrotizing plaque with tender edema or ulceration.<sup>3</sup> At this point surgical debridement is necessary.

Due it its rarity, there is no universal standardized treatment for this syndrome. Timely debridement, antibiotics in accordance with positive cultures, ruling out cellulitis as a diagnosis, and avoidance of cold compresses due to stimulation of vasospasm have shown to be successful steps to recovery. Reports of treatment have included IVIG infusions, Pentoxifylline, bariatric oxygen, reconstructive surgery, corticosteroids, antibiotics, NSAIDs, acetaminophen, and heparinization with positive results.<sup>2,4</sup>

## **CONCLUSION**

Awareness of Nicolau syndrome is needed to allow for preventative measures, quicker diagnosis, and to determine the treatment(s) providing the best patient outcomes. The three basic progressive stages should be able to be easily identified but should also allow for abnormal presentations as in the prolonged development in this case. Allowing Nicolau syndrome to go untreated can lead to compartment syndrome and widespread disfiguring necrosis making this an important differential diagnosis.

Funding: No funding sources Conflict of interest: None declared Ethical approval: Not required

#### REFERENCES

- Dadaci M, Altuntas Z, Ince B, Bilgen F, Tufekci O, Poyraz N. Nicolau syndrome after intramuscular injection of non-steroidal-anti-inflammatory drugs (NSAID). Bosn J Basic Med Sci. 2015;15(1):57-60.
- 2. Tabor D, Bertram C, Williams A, Mathers M, Biswas A. Nicolau syndrome (embolia cutis medicamentosa): A rare and poorly recognized iatrogenic cause of cutaneous thrombotic vasculopathy.

  Am J Dermatopathol. 2018;40(3):212-5.
- 3. Kwang-Kyoun K, Dong-Sik C. Nicolau syndrome: A literature review. World J Dermatol. 2015;4(2):103-7.
- 4. Enshaei A, Afshar A. Compartment syndrome of the calf due to nicolau syndrome. Arch Bone Jt Surg. 2016;4(1):87-9.
- 5. Nischal K, Basavaraj H, Swaroop M, Agrawal D, Sathyanarayana B, Umashankar N. Nicolau syndrome: an iatrogenic cutaneous necrosis. J Cutan Aesthet Surg. 2009;2(2):92-5.

Cite this article as: Dick MK, Elmore RA, Sharma PK. Nicolau syndrome appearing approximately one-year post bicillin injection treated with excision. Int J Res Dermatol 2019:5:662-3.