

Cold Panniculitis: Delayed Onset in an Adult

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Practice Points

- Cold panniculitis is a form of traumatic panniculitis.
- Cold panniculitis often appears on the cheeks and chin, areas that are exposed to cold weather or wind because they are not covered with protective clothing, in infants and small children.
- Treatment of cold panniculitis is based on the prevention of further insult.

The panniculitides are a complex dermatologic entity for both dermatologists and dermatopathologists. Panniculitis is an inflammation of the subcutaneous adipose tissue and can be associated with systemic diseases. We present a case of cold panniculitis, a form of traumatic panniculitis, in a 37-year-old woman that was caused by a cold therapy unit. Our patient did not develop lesions until 10 days following initiation of therapy, which is a unique presentation of cold panniculitis, as lesions usually develop 1 to 3 days after cold exposure.

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The panniculitides can be a complex dermatologic entity for both dermatologists and dermatopathologists. The history, clinical examination, and histology need to be correlated to arrive at a differential diagnosis that will ultimately

provide a diagnosis for the subcutaneous lesions. Panniculitis is an inflammation of the subcutaneous adipose tissue and can be associated with systemic diseases. According to Peters and Su,¹ “Anatomic location of lesions, presence or absence of ulceration, occurrence of lipoatrophy, history of trauma, association with immunologic or metabolic disorders, and age of the patient are important clinical data to consider in conjunction with the microscopic features.” The panniculitides histologic differences may be subtle because they all include septal and lobular components, but one is usually more dominant in leading to a diagnosis along with the clinical findings.²

Cold panniculitis is a form of traumatic panniculitis. We present a unique case of this condition that was caused by use of a cold therapy unit following surgery to relieve pain.

Case Report

A 37-year-old woman presented for a routine postoperative visit 15 days following arthroscopic repair of a superior labrum anterior posterior tear in the left shoulder with a single suture anchor. The patient reported a rash that had developed 10 days postoperatively on the left upper arm. The rash started as red dots that progressively became larger, painful, and warm to the touch. The rash did not spread anywhere else on the patient’s body, and she denied fever, chills, and pruritus. She had tried using diphenhydramine without relief. The only new medication the patient had started prior to the eruption was oxycodone, which was initiated immediately following

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surgery. Prior to surgery, the entire left upper extremity including the shoulder had been prepared with a preoperative surgical skin antiseptic. There were no visible signs of the antiseptic on the skin at the time of presentation. The patient reported that she had applied a cold therapy unit to the left upper arm over her clothing for 1 hour every night since surgery. The cold therapy unit frequently is used to help decrease postoperative pain, swelling, inflammation, and narcotic use following surgical procedures.

Physical examination revealed multiple well-defined, erythematous, tender, indurated, warm nodules on the lateral aspect of the left upper arm (Figure 1). No other areas of eruption were noted on the body, and there was no swelling of the left elbow, forearm, wrist, or hand. The left upper extremity demonstrated intact sensation, rapid capillary refill, and a palpable radial pulse. Her weight was 230.1 lb with a body mass index of 35.5.

A 5-mm punch biopsy from a nodule on the left upper arm was performed, and pathology demonstrated vacuolar interface changes with patchy parakeratosis, spongiosis, and dyskeratosis on staining



Figure 1. Multiple well-defined, erythematous, tender, indurated nodules presented on the lateral aspect of the left upper arm.

with hematoxylin and eosin. Pandermal and subcutaneous perivascular, periadnexal, and mild interstitial lymphohistiocytic infiltrate with occasional neutrophils and eosinophils were noted (Figure 2). The inflammation extended to the subcutaneous fat involving both septae and lobules with a primarily lobular distribution.

Clinical and pathologic correlation was required to arrive at a definitive diagnosis of cold panniculitis. The epidermal and dermal changes were consistent with a pernio or chilblains type of insult, and the septal and lobular panniculitis was indicative of cold panniculitis. The patient was advised to discontinue use of the cold therapy device as well as any other form of icing of the left shoulder or arm. She continued the oxycodone for pain control. Four weeks postoperatively, only desquamation remained where the nodules had previously appeared, which also eventually resolved.

Comment

Infants and small children are more predisposed to cold panniculitis than adults. In their 2008 review, Quesada-Cortés et al³ found the first report of cold panniculitis by Hochsinger in 1902 in a German pediatric journal, followed by reports from Lemez in 1928 and Haxthausen in 1941, which subsequently described similar cases in infants. Adult cases were not reported until 1963 by Solomon and Beerman⁴ and then in 1980 by Beacham et al.⁵

Etiologies for children have included popsicles, ice packs applied to the face to control supraventricular tachycardia or to the lower extremities

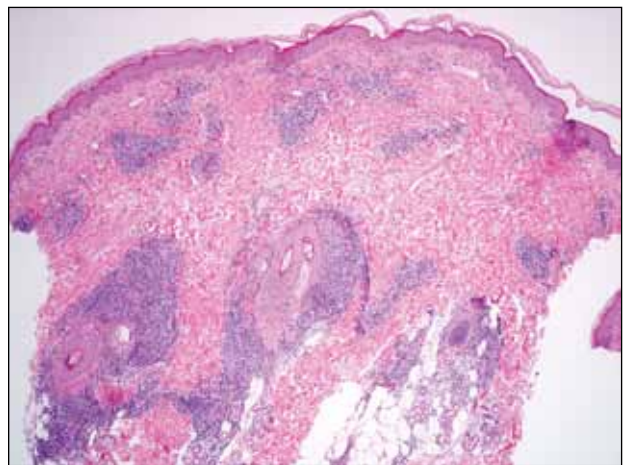


Figure 2. Punch biopsy showed a superficial and deep perivascular and periadnexal lymphoid infiltrate with involvement of the subcutis (H&E, original magnification $\times 40$).

after vaccinations, and cold weather exposure.⁶ The chemical composition of fat tissue plays a role in pediatric patients. According to Quesada-Cortés et al,³ subcutaneous fat in newborns is rich in saturated oils such as palmitic and stearic acids that have a higher solidification point. A small decrease in an infant's temperature may result in crystallization of fat. The subcutaneous fat tends to become more unsaturated with aging with more oleic acid, and the solidification temperature diminishes.⁷

Cryoglobulins and cold agglutinins have not been demonstrated to be a cause of cold panniculitis in infants.⁷ Severe cold exposure or predisposition to certain conditions such as cryofibrinogenemia may occur in some adult patients. Gender does not seem to be a factor in children; however, in adults, women tend to be more predisposed to cold panniculitis secondary to obesity and participation in activities such as cycling, motorcycling, or horseback riding in cold conditions.³

On clinical examination, cold panniculitis features erythematous, firm, tender nodules on the cheeks and chin in infants and small children.² These areas often are exposed to cold weather or wind because they typically are not covered with protective clothing.³ Nodules generally occur 1 to 3 days following exposure to cold and usually resolve spontaneously within 2 weeks.⁸ Popsicle panniculitis is characterized by a reddish discoloration on both cheeks 1 or 2 days after sucking on popsicles or ice cubes. This reaction can be reproduced in a half day by applying an ice cube to the volar forearm for 2 minutes, which can help diagnose and differentiate this subset of cold panniculitis.³ The red area in cold panniculitis eventually turns purple, becomes less indurated, and fades in approximately 3 months, but occasionally residual hyperpigmentation will last for a few months. Ice packs used as treatment of congenital cardiac arrhythmias in some cardiac surgeries and as surface cooling for management of birth asphyxia can produce a similar physical presentation.³

Equestrian panniculitis is characterized by erythematous, violaceous, tender plaques on the upper lateral thighs of young females who participate in horseback riding in the winter while wearing tight-fitting pants.^{2,5} These plaques typically occur within several hours and over the next week become painful, violaceous, and indurated or develop red nodules or plaques that can ulcerate or become crusted.³ These lesions usually will spontaneously resolve within 3 weeks, but new areas may occur again during the winter on further exposure with occasional persistent hyperpigmentation. These areas usually disappear at the end of winter with warmer weather or when

horseback riding is discontinued. Perniosis also needs to be considered in the differential diagnosis due to the location and appearance of the lesions.³

It is important to obtain the correct specimen for biopsy. According to Peters and Su,¹ a deep excisional biopsy that includes multiple fat lobules in addition to dermis and epidermis is critical. On histology, cold panniculitis usually demonstrates a primarily lobular inflammation. There typically is a superficial and deep perivascular lymphocytic infiltrate in the papillary dermis with edema noted in the connective tissue around the eccrine glands that can appear similar to perniosis on histopathology.⁹ Deposition of mucin, focal panniculitis surrounded by fatty tissue without inflammatory changes within the same field, and fat necrosis with pseudocysts and numerous lipophages also are characteristic features of cold panniculitis.¹⁰ Needlelike clefts are not present in cold panniculitis but appear in subcutaneous fat necrosis of the newborn.¹

Different treatments have been tried, but no substantial impact on the rate of dissipation of the lesions has been noted. The plaques slowly resolve without scarring over 2 to 3 weeks if the cold source is removed.² Application of a heating pad to the affected area has been used with limited success. Vasodilators such as nifedipine have been used but have not been found to be effective.³ Antihistamines also have failed to control the lesions.¹¹

Treatment of cold panniculitis is based on the prevention of further insult versus trying to cure the condition. Avoidance of cold and wind exposure as well as direct contact with ice are key methods in preventing cold panniculitis.

Our patient's presentation of this condition was unique. Although cold panniculitis lesions usually develop 1 to 3 days after cold exposure, our patient did not develop lesions until 10 days following surgery. The cold therapy unit used by our patient was evaluated in our office and also by the manufacturer and was found to be functioning normally with no defects. The late onset of the lesions was attributed to limited application of the cold therapy unit; our patient used it for only 1 hour every night, whereas application for 6 to 8 hours continuously is normally recommended. The lesions may have occurred sooner had the patient been using a solid ice pack versus the continuous cold circulating water of the cold therapy unit. Pathology was consistent with the patient's history and physical examination indicating a diagnosis of cold panniculitis. The challenge of treatment was to alleviate the pain of the lesions as well as the post-operative shoulder pain without the aid of any form of cold therapy. The patient only needed a tincture of time, as the lesions resolved after 4 weeks. Patient

education was provided on future prevention of this condition by avoiding exposure to cold or applying cold packs directly to the skin.

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