

Physiologic Anemic Macules

Pooja Khera, MD; Joseph C. English III, MD

Anemic-appearing macules of the extremities that fluctuate with temperature and position have been referred to as Bier spots. After review of the literature and innumerable clinical presentations, we propose that the best description and better nomenclature is physiologic anemic macules. We present the case of a 27-year-old woman with physiologic anemic macules and review the history of this condition.

Cutis. 2008;81:477-478.

Bier¹ first described a reproducible experimental vascular phenomenon in 1898. By modifying blood flow and creating tissue hypoxia of an extremity, he observed transient cutaneous white macules.¹ Similar lesions occurring in the clinical setting have been referred to by the eponym Bier spots. Since then, these hypopigmented lesions have been given several names, including Bier spots, speckled mottling of the limbs, and nevus anemicus. Confusion in the literature appears to exist regarding the nomenclature of these transient white macules. We suggest the term *physiologic anemic macules* for patients presenting with this phenomenon because it better reflects the nature of the lesions.

Case Report

A 27-year-old woman presented to our dermatology clinic with a 2-year history of asymptomatic white spots on her extremities. She stated that the lesions were transient and denied a family history of similar lesions. On physical examination, she had multiple 3- to 5-mm hypopigmented macules on the extensor surfaces of her upper and lower extremities (Figure 1). Upon raising her arms for several seconds or warming her skin, the lesions would dissipate. We have incidentally noted this finding in several of our patients in the past several years, suggesting that this phenomenon is relatively common.

Accepted for publication October 2, 2007.

From the Department of Dermatology, University of Pittsburgh, Pennsylvania.

The authors report no conflict of interest.

Correspondence not available.

Comment

Bier spots were first described in 1898.^{1,2} In a series of experiments on peripheral vascular pathology, he occluded the blood supply to the forearm using a rubber tourniquet. Bier¹ observed that the arm became uniformly cyanotic and white spots that gradually increased in size and number subsequently appeared on the forearms, hands, and fingertips. The arm eventually became mottled. If the blood supply was restored, the spots disappeared; however, they recurred in the same place if the artery occlusion was repeated. These white macules that occurred secondary to decreased blood flow and tissue hypoxia in the cubital regions have been referred to as Bier spots. They were considered to be an exaggerated vasoconstrictive physiologic response induced by venous stasis–induced hypoxia.^{1,2}

Since then, Gniadecki and Gniadecka³ have argued that Bier spots are secondary to a lack of vasoconstriction of ascending arterioles in response to venous filling. Thus, the mechanism for the formation of Bier spots is still debated in the literature. Regardless of the underlying physiology, Bier spots were initially described in a laboratory setting and represent experimental nonphysiologic vascular occlusion. Thus, we propose that the expression *Bier spots* be replaced by another term that better reflects the physiologic and clinical nature of the transient lesions, namely *physiologic anemic macules*.

In 1985, Graham and James⁴ described a female patient with a clinical presentation similar to our patient. Their studies revealed that the white



Figure 1. Physiologic anemic macules on the extensor forearm.

macules were not caused by an enhanced sensitivity of the blood vessels to circulating catecholamines or an increase in sympathetic tone. Instead, the macules most likely represented an exaggerated physiologic response of the arterioles to changes in local temperature. They called this phenomenon physiologic speckled mottling of the limbs.⁴ Similarly, Bland et al⁵ described diffuse mottled erythema involving the entire palmar surface with a speckling of pale areas at least one millimeter in diameter. This pattern varied with elevation of the limb as well as changes in temperature and pressure of the palm (Figure 2). In our opinion, the term *physiologic anemic macules* should be used for these clinical presentations.

In one case report, numerous and large anemic macules occurring over cyanotic skin on the abdominal wall were described in a woman in the eighth month of pregnancy.⁶ The lesions were fixed and completely asymptomatic. The patient had an otherwise uneventful pregnancy and delivery, and the lesions gradually disappeared postpartum. The authors stated that these lesions were Bier spots directly related to pregnancy and represented an exaggerated physiologic response of the small cutaneous vessels to venous hypertension, which is common in pregnancy.⁶ Another case report described a patient who presented with multiple ivorylike spots over an erythrocyanotic trunk and abdominal wall.⁷ The lesions ranged in diameter from 1 mm to 10 cm and were arranged in a symmetric pattern. Laboratory studies revealed a type II mixed cryoglobulinemia with a monoclonal IgM κ component together with polyclonal IgG. The authors reported for the first time Bier spots associated with a pathologic condition and suggested they were caused by hyperviscosity secondary to elevated cryoglobulins.⁷ Because in these 2 cases the lesions were fixed, they would not be considered physiologic anemic macules, and the lesions were likely secondary to the underlying conditions.



Figure 2. Physiologic mottling of the palm.

Most recently, Miura et al⁸ and Sarifakioglu and Erdal⁹ described multiple anemic macules occurring on the arms of several patients. Although initially reported as a variant of nevus anemicus, these lesions were later found to be more consistent with exaggerated speckled mottling of the limbs.¹⁰ We agree that these lesions are neither Bier spots nor variants of nevus anemicus. Nevus anemicus should be reserved for a congenital nonfamilial anomaly of the skin color secondary to reduced blood flow. It is most typically found on the trunk and is corymbiform, with surrounding smaller pale macules. The lesion is thought to have a locally increased vascular reactivity to catecholamines.⁸ Unlike physiologic anemic macules, the lesions are permanent.

Therefore, we believe that the term *physiologic anemic macules* best describes the clinical phenomenon that Bier experimentally produced. Although a completely benign process, the dermatologist will see this condition often in consultation from referring physicians. This entity can be easily diagnosed and should not be considered a secondary disease from any underlying pathology and is certainly not the same as nevus anemicus. Since physiologic anemic macules are asymptomatic and transient, patients should be reassured that no treatment is needed.

REFERENCES

1. Bier A. Die Entstehung des Kollateralkreislaufs, II: Der Rückfluss des Blutes. aus ischämischen Körpertheilen. *Arch Pathol Anat.* 1898;153:306-334.
2. Wilkin JK, Martin H. Bier's spots reconsidered: a tale of two spots, with speculation on a humerus vein. *J Am Acad Dermatol.* 1986;14:411-419.
3. Gniadecki R, Gniadecka M. Constitutive speckled vascular mottling of the skin resembling Bier white spots: lack of venoarteriolar reflex in dermal arterioles. *Arch Dermatol.* 2000;136:674-675.
4. Graham RM, James MP. Exaggerated physiologic speckled mottling of the limbs. *Arch Dermatol.* 1985;121:415-417.
5. Bland JH, O'Brien R, Bouchard RE. Palmar erythema and spider angiomas in rheumatoid arthritis. *Ann Intern Med.* 1958;48:1026-1032.
6. Schoenlaub P, Dupré D, Redon JY, et al. Numerous and large Bier's spots associated with pregnancy. *Eur J Dermatol.* 1999;9:230-231.
7. Bessis D, Dereure O, Rivire S, et al. Diffuse Bier white spots revealing cryoglobulinaemia. *Br J Dermatol.* 2002;146:921-922.
8. Miura Y, Tajima S, Ishibashi A, et al. Multiple anemic macules on the arms: a variant form of nevus anemicus? *Dermatology.* 2000;201:180-183.
9. Sarifakioglu E, Erdal E. Multiple anaemic macules of the arms: a variant of Bier's spots or naevus anemicus? *J Eur Acad Dermatol Venereol.* 2006;20:892-893.
10. Grosshans E. Multiple anemic macules or Bier's spots [letter]? *Dermatology.* 2001;202:272.