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# Pressure-induced vasodilation mimicking vasculopathy in a pediatric patient

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***Key words:*** Lichtenberg figures; pediatric dermatology; pressure-induced vasodilation.

## CASE REPORT

A 9-year-old girl presented with a 1-day history of an asymptomatic, erythematous, blanching eruption on her bilateral posterior thighs and buttocks in the shape of lightning streaks and coinciding with the anatomy of the superficial gluteal arteries (Fig 1, *A* and *B*). The patient had no symptoms, and her mother incidentally observed the rash during a bath. On the day of onset, the child had been sitting at a school desk for several hours completing a prolonged standardized test. At the time of presentation in the emergency department, she denied associated symptoms of pain, arthralgias or myalgias, fevers, or prodromal illness. Additionally, pertinent medical history included a hemangioma of the head and neck that was treated as an infant with no further sequelae.

Skin examination was significant for a blanchable, erythematous eruption starting on each buttock that extended down the posterior thighs symmetrically in an arborescent, vascular distribution. There was no tenderness with palpation, and the child was otherwise well. Laboratory evaluation found normal C-reactive protein and antinuclear protein levels, complete blood count, and urinalysis results. Bedside abdominal and aortic ultrasound scan did not find any vascular flow anomalies. Administration of oral diphenhydramine had no impact on the rash.

When examining the child's clothing, her pants contained pockets where the pressure points of the superior horizontal seam corresponded with the origin of each branching vascular lesion. The eruption began to fade after 24 hours and fully resolved after approximately 1 week with no intervention (Fig 1, *C*).

*Abbreviation used:*

PIV: pressure-induced vasodilation

## DISCUSSION

Pressure-induced vasodilation (PIV) has been described as a rare pediatric dermatologic condition resultant from nonpainful mechanical pressure on the skin overlying the superior gluteal artery.[1] The increased blood flow downstream of the pressure point creates an erythematous arborescent vascular pattern similar to Lichtenberg figures seen in lightning strikes. Although the mechanism for hyperemia in PIV is not completely understood, it is thought to be multifactorial. Previous studies found that shear stress of increased blood flow through cutaneous vessels induces capsaicin-sensitive nerve fibers to stimulate endothelial release of vasodilatory nitric oxide, prostaglandins, and acetylcholine, which causes vascular smooth muscle relaxation.[2,3] Similar mechanisms have been observed in skeletal muscle vasculature in response to direct vascular compression by actively contracting muscle and subsequent nitric oxide—mediated vasodilation.[4] Neural mechanosensitivity in the vasculature is thought to mediate PIV and is hypothesized to be a protective autoregulatory mechanism in response to direct external non-nociceptive vasculature compression that may prevent tissue ischemia and play a role in the formation of pressure ulcers, particularly in diabetics.[5,6]

The phenomenon of PIV in the pediatric population secondary to pockets, buttons, or other decorative accessories on the buttocks area of tight-fitting

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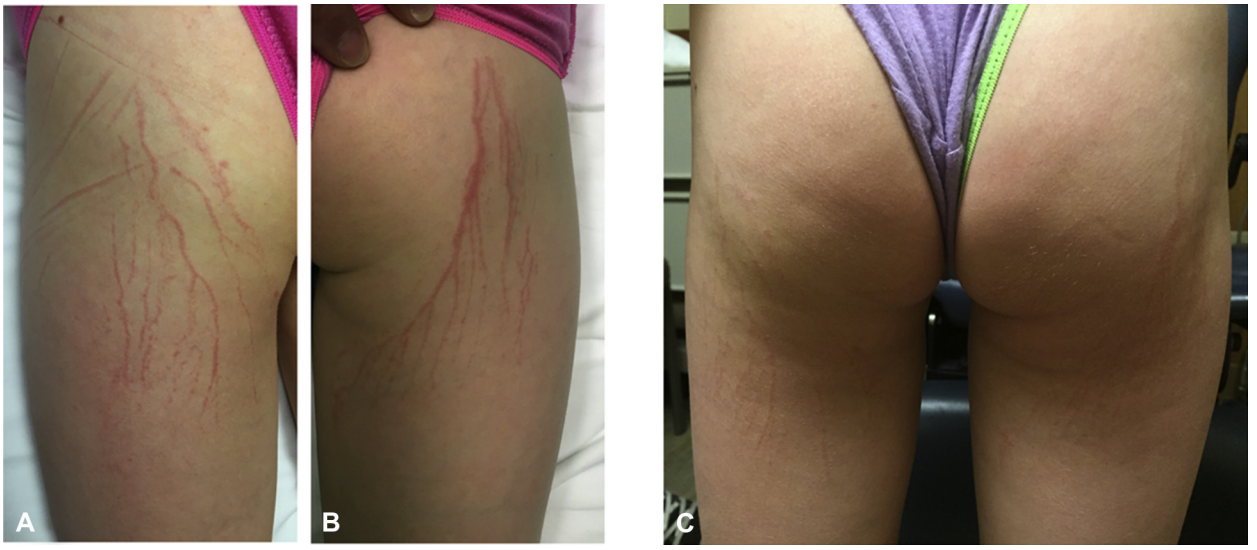


**Fig 1. A** and **B**, Buttocks and posterior thighs on day 1 with erythematous blanching arborescent eruption. **C**, Buttocks and posterior thighs 1 week after presentation with near complete resolution of arborescent eruption.

clothing is self-limited and resolves without sequelae. It is important to understand the pathogenesis to avoid unnecessary testing for vascular pathology in the pediatric population.

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