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CASE REPORT

Why Methylene Blue Should be Blacklisted in Neonatology

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ABSTRACT

We here present a case of neonatal skin damage due to application of methylene blue (MB) on a newborn's skin. MB use should be completely eliminated in neonatal intensive care units and nurseries, because of three potentially dangerous adverse effects of this compound: (1) It may act as an irritant when applied topically on intact skin, leading to skin reddening up to deep full-thickness eschars; (2) Is possesses photosensitizing properties, and may produce skin reddening followed by blisters and peeling after UV phototherapy; (3) It is a proscribed substance in patients affected by glucose-6-phosphate dehydrogenase deficiency, a condition not easily detected in the very first days of life.

Key words: Methylene blue; Neonatology; Dermatology

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CASE REPORT

A late preterm female newborn with unremarkable pre- and perinatal course was evaluated at day of life eight for a worsening bilateral buttock lesion, which rapidly progressed to the state of a deep eschar (Figure 1). After performing cultural swabs of the lesions, topical therapy with fusidic acid and clotrimazole, as well as systemic antibiotic treatment with amoxicillin/clavulanic acid was started. Swabs turned out positive for low-level presence of *Serratia marcescens*, considered as a contaminant. C-reactive protein was negative at two consecutive controls. Given the negativity of lab tests and the overall good conditions of the baby, antibiotics were stopped after 72 hours. Eschars slowly healed, eventually evolving into scar lesions (Figure 2).

A review of the patient's history revealed that methylene blue was applied for bilateral buttock hyperemia at day of life seven as a local antiseptic solution. In all probability, this produced the buttock lesions, acting as an irritant and causing skin necrosis and deep eschars.

DISCUSSION

Since its discovery in the 19th century, Methylene blue (MB) has been employed for several indications in medicine: microbiological staining, antimalarial treatment, sentinel lymph node tracing, methemoglobinemia, postoperative vasoplegia and, more recently, hemodynamic support in severe refractory septic shock[1].

The irritative properties of this compound are well documented in literature. If injected as a lymph node tracer in surgical oncology, it may cause subcutaneous tissue necrosis potentially requiring surgical

incision and multiple debridement manoeuvres[2]; furthermore, radiological characteristics of MB-related fat necrosis may mimic those of metastatic tissue, requiring tissue biopsy to make the differential diagnosis[3].

Similar subcutaneous necrosis has been documented secondarily to the bone marking with MB as part of the procedure of cochlear implantation[4], as well as during MB infusion as a last resort vasopressor treatment in the context of refractory septic shock[1].

Topical application of MB in our patient led to the formation of deep skin eschars, initially managed as a skin infection. The use of MB in the newborn (even more if preterm) should be completely proscribed since, apart the above-mentioned irritating and necrotizing properties, it is also a photosensitizer (ie, capable of producing skin reddening followed by blisters and peeling after UV phototherapy) and a must-avoid substance in patients affected by glucose-6-phosphate dehydrogenase deficiency, which –albeit comprised into the newborn screening tests- is a condition not easily detected in the very first days of life.

CONCLUSIONS AND FINAL REMARKS

MB use should be completely eliminated in neonatal intensive care units and nurseries, because of three potentially dangerous adverse effects of this compound: (1) It may act as an irritant when applied topically on intact skin, leading to skin reddening up to deep full-thickness eschars; (2) Is possesses photosensitizing properties, and may produce skin reddening followed by blisters and peeling after UV phototherapy; (3) It is a proscribed substance in patients affected by glucose-6-phosphate dehydrogenase deficiency, a condition not easily detected in the very first days of life.

Contributorship Statement

Valeria Silecchia wrote the first draft of the manuscript; Enrico Valerio, Daniele Merazzi, Lorenzo Iantorno, and Maria Chiara Laguardia produced the iconographic documentation and contributed to the critical revision of the manuscript; Mario Cutrone contributed to the critical revision of the manuscript.

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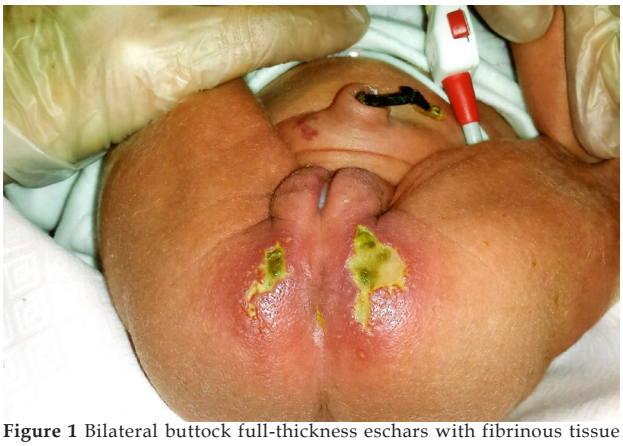

Figure 1 Bilateral buttock full-thickness eschars with fibrinous tissue on the wound bed. A plain hemangioma is visible on the right side of umbilicus.

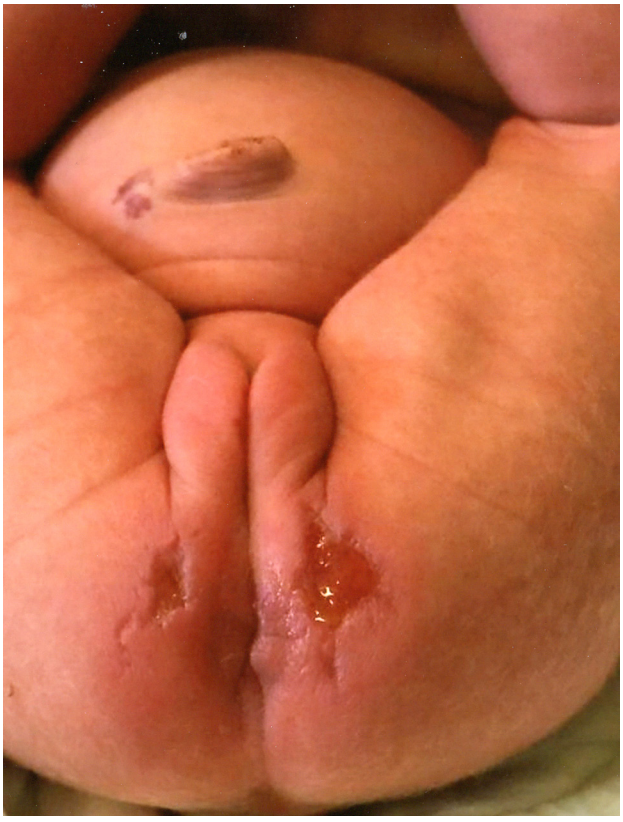

Figure 2 Late evolution towards scarring of the eschars depicted in Figure 1. Parallel early rapid growth (representing normal evolution) of the para-umbilical hemangioma can be seen.