Why Methylene Blue Should be Blacklisted in Neonatology

Valeria Silecchia1, Enrico Valerio2, Daniele Merazzi3, Lorenzo Iantorno3, Maria Chiara Laguardia3, Mario Cu-trone4, Ramon Grimalt

1 Department of Woman and Child Health, University of Padua, Padova, Italy;
2 Pediatric Intensive Care Unit, Ospedale San Bortolo, Vicenza, Italy;
3 Neonatal Intensive Care Unit, Ospedale Valduce, Como, Italy;
4 Pediatric Dermatology Unit, Ospedale Dell’Angelo, Venezia, Italy;

Conflict-of-interest statement: The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/

Correspondence to: Enrico Valerio, Pediatric Intensive Care Unit, Ospedale San Bortolo, Vicenza, Italy.
Email: enrico.valerio.md@gmail.com
Telephone: +39 0444 75 2887
Fax: +39 0444 75 2796

Received: July 30, 2019
Revised: August 6, 2019
Accepted: September 1, 2019
Published online: September x, 2019

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) It 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

© 2018 The Author(s). Published by ACT Publishing Group Ltd. All rights reserved.

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.

**REFERENCES**