CASE REPORT

Anaphylaxis Following Patent Blue Dye in Sentinel Lymph Node Mapping

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ABSTRACT

Blue dyes are commonly used for sentinel lymph node mapping. Although rare, a minority of patients develop sensitivity to these agents. Here, we report a case of a grade 1 hypersensitivity reaction following the administration of patent blue dye in a patient undergoing melanoma excision and lymph node biopsy. The timing of the reaction and results of skin testing suggest patent blue to be the causative agent.

Keywords: Anaphylaxis, Patent blue dye, Anaesthesia.


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Conflict of interest: None declared

INTRODUCTION

Vital blue dyes are used increasingly in lymphangiography and intraoperatively for sentinel lymph node mapping. Blue dyes are also commonly used in foods and cosmetics. Because other dyes have similar structures and nomenclature, the literature surrounding adverse reactions to these compounds is confusing. However, the estimated incidence of anaphylaxis to patent blue dye is 0.6 to 2.7%\(^1\) and this may become more common with increasing exposure. We report a case of anaphylaxis following patent blue dye (CAS 129-17-9) administration in a patient undergoing melanoma excision and sentinel node biopsy. Cases such as the one described here, highlight the need to remain vigilant for adverse reactions following the administration of vital blue dyes.

DISCUSSION

Although anaphylactic reactions to drugs given during anaesthesia are rare, the increasing use of compounds with a propensity to elicit anaphylaxis, requires an increased awareness of the possibility of sensitisation and increased likelihood of anaphylaxis. Drugs most commonly associated with anaphylaxis during anaesthesia include muscle relaxants, antibiotics, and latex.\(^2\) However, the risk of developing hypersensitivity to blue dyes should also be considered, particularly since their use is becoming more common.\(^3\)

Here, we present a case of a grade 1 anaphylaxis which commenced 20 minutes following administration of patent blue dye for sentinel lymph node biopsy. Factors supporting the association between the patient’s clinical course and patent blue use include the timing of the reaction, clinical signs, and positive intradermal testing to patent blue. Although the patient also tested positive for morphine and rocuronium, no initial reaction was observed following anaesthetic induction during this surgery and no reaction was observed during previous surgery, which also used morphine and rocuronium. Other than the positive skin tests for morphine and rocuronium reported here, this patient had no history of allergies to opiates or non-depolarising muscle relaxants, both of which are known to produce physical mast cell degranulation and complicate the use of skin testing as a means of evaluation.\(^3\)

Due to their small molecular size, vital blue dyes function as haptons in the development of allergic reactions.\(^5\) The incidence of IgE-mediated hypersensitivity to patent blue dye is 1.6%, with severe reactions in 0.5% of cases.\(^1\) A similar incidence of reactions to isosulfan blue may be attributable to cross-reactivity between these two agents.\(^5\)
in which case, patients who develop anaphylaxis to patent blue should not receive isosulfan blue during subsequent procedures.

The nomenclature of vital blue dyes is confusing and can be misleading. Further aggravating the situation is the complicated chemical schematics of these compounds. This leads to confusion in the literature regarding allergic reactions to blue dyes. However, appropriate identification of vital blue dyes is necessary and important for intraoperative use. Given the prevalence of blue dyes in foods, cosmetics, and textiles, sensitisation can occur without prior operative exposure, leading to unpredictable hypersensitivity reactions.

This case highlights the potential for anaphylactic reactions to patent blue and addresses its management. Prophylactic treatment with antihistamines and corticosteroids may decrease the severity of allergic reactions to patent blue and should be considered in patients requiring its use. Some clinicians recommend the pre-operative preparation for the treatment of anaphylaxis with appropriate solutions and equipment.

REFERENCES


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