



Severe anaphylactic shock due to methylene blue dye



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ABSTRACT

To identify the sentinel lymph node in melanoma patients, intradermal injection of a radiocolloid tracer and a blue dye are commonly used. Life-threatening side effects of isosulfan blue and Patent Blue V have been well described. However, to the extent of our knowledge, only two life-threatening events with intradermal methylene blue dye have been reported, and none has been reported in the pediatric population. We report a case of a 6-year-old white girl with spitzoid melanoma on her right forearm. She had lymphoscintigraphy under general anesthesia and was taken to the operating room intubated. Intradermal methylene blue (0.2 ml) was injected around the lesion, and after 5 min, wide complex bradycardia was noted and progressed to asystole within less than 1 min. Cardiopulmonary resuscitation was started. Multiple doses of resuscitative drugs were administered, and electrical cardioversion was given twice as well. She recovered completely and transferred to the intensive care unit.

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Sentinel node biopsy is usually performed with the aid of radiotracers and blue dyes in combination. Despite its proven benefit for the patients, sentinel node mapping using blue dyes has some fatal complications, such as an anaphylactic reaction [1–5]. Anaphylaxis during anesthesia is a potentially life-threatening syndrome involving multiple organ systems [6–8]. Symptoms may range from mild (urticaria or erythema) to severe (pulmonary edema, hypotension, or vascular collapse).

1. Case report

A 6-year-old, healthy white girl had a diagnosis of spitzoid melanoma on her right forearm. Her history was insignificant for atopy or allergic reaction. She had used oral cephalosporins and amoxicillin in the past without any problem. After her parents gave written informed consent, she was prepared for wide local excision of the lesion and sentinel lymph node biopsy. On the day of surgery, she had lymphoscintigraphy with Tc-99m sulfur colloid under general anesthesia and then was taken to the operating room intubated. Intradermal methylene blue (0.2 ml) was injected

around the lesion on her right forearm for sentinel node mapping. At the same time, she was receiving cefuroxime intravenously. After 5 min, wide complex bradycardia was noted and progressed to asystole within less than 1 min. There were no local signs of inflammation at the injection site. Cardiopulmonary resuscitation was started immediately, and she received multiple doses of resuscitative drugs. She also received electrical cardioversion twice. She recovered and was transferred to the intensive care unit intubated. After 2.5 h, she was extubated, and she was discharged from the hospital the next day. Echocardiography was done, and the results were normal. She was referred to an allergist/immunologist, and skin prick testing was done for anesthetic drugs. Those results were negative.

The allergist suspected the causative agent to be methylene blue. However, other drugs, including fentanyl, propofol, and cefuroxime, cannot be excluded. The allergist recommended pretreatment with diphenhydramine, prednisone, and albuterol nebulization. Two weeks later, the procedure was performed safely following the recommendations and not using methylene blue dye or an antibiotic.

2. Discussion

Several kinds of blue dyes are in use for sentinel node mapping, such as Patent Blue V [9], isosulfan blue [10], and methylene blue [11]. Methylene blue is widely used in medicine [12] and has been used for sentinel node biopsy mapping since 2001 with generally

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favorable results [11,13]. However, several adverse reactions have been reported, such as interference with pulse oximetry [14] and skin complications (necrosis) [15–17].

Methylene blue is generally considered safer and is cheaper than other dyes being used in sentinel node biopsy [5,12,18]. Despite its widespread use in medicine, anaphylaxis resulting from methylene blue has been very rarely reported in the medical literature. To the extent of our knowledge, there have been only two reports of anaphylaxis after methylene blue dye was used for sentinel lymph node mapping in adults. In 2010, Jangjoo et al. [19] reported a case of anaphylactic reaction to methylene blue during a sentinel lymph node procedure, and the reaction was confirmed by a prick test. In 2011, Oomah et al. [20] reported an anaphylactic reaction to methylene blue in a 62-year-old woman, and it was also confirmed by a prick test.

In 2008, Teknos et al. [21] reported pulmonary edema after methylene blue was used during sentinel node mapping for breast cancer. Apart from intradermal methylene blue injection, Dewachter et al. [22] in 2005 reported anaphylaxis during intra-uterine injection of 1% methylene blue for determination of tubal permeability. There have been no cases reported so far in the pediatric population. Our case is the first one in this regard and underscores the importance of considering the possibility of an anaphylactic reaction to methylene blue while performing sentinel node biopsy.

3. Conclusion

In conclusion, although methylene blue is considered safer than other kinds of blue dye, life-threatening anaphylaxis can occur with this compound as well, and facilities to handle this possibility should be readily available.

Disclosure of potential conflicts of interest

The authors indicated no potential conflicts of interest.

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