

Effect On Oximetry Of Isosulfan Blue Used For Sentinel Lymph Node Biopsy In Breast Surgery

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Citation

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Abstract

Isosulfan blue 1% is a dye used in medical procedures such as lymphangiography and sentinel lymph node biopsy. Besides anaphylaxis, isosulfan blue dye may cause discoloration of a patient's serum making the use of pulse oximetry useless by mimicking true intraoperative hypoxia. A 70-year old woman was scheduled to undergo a left sided simple mastectomy with sentinel lymph node mapping of the left axilla for infiltrating ductal carcinoma. The SpO₂ began to decrease 20 min. after dye injection, reaching a minimum of 86-90% 30 min after the injection. SaO₂: %97 (Blood gase analyses). There were no episodes of hypotension, no required vasopressors, ventilatory support. The most recent report showed that the incidence of allergic reactions to isosulfan was 1.6 %, whereas a severe hypotensive reaction occurred in 0.5% of patients. Another observation of interest for anesthesiologists is that isosulfan dye may interfere with pulse oximetry monitoring.

INTRODUCTION

Sentinel lymph node biopsy has been proven to be successful and accurate in predicting the nodal status in melanoma and breast cancer⁽¹⁾. Blue dyes used for lymphatic mapping in sentinel lymph node biopsy cause intraoperative anaphylactic reactions in up to 2.7% of patients^(2,3). Isosulfan blue 1% is a dye used in medical procedures such as lymphangiography and sentinel lymph node biopsy.

Besides anaphylaxis, isosulfan blue dye may cause discoloration of a patient's serum making the use of pulse oximetry useless by mimicking true intraoperative hypoxia⁽⁴⁾. Early recognition and aggressive hemodynamic interventions can reduce morbidity and mortality⁽⁵⁾.

CASE REPORT

A 70-year old woman was scheduled to undergo a left sided simple mastectomy with sentinel lymph node mapping of the left axilla for infiltrating ductal carcinoma. Her past medical history included Romatoid arthritis and hypertension. Her most recent steroid use was 4 months before the scheduled surgery date. She had no known any drug allergies. Her preoperative laboratory workup and electrocardiogram was normal. On physical examination she was noted to have a Mallampati 3 airway, normal heart and lung examination. After induction of anesthesia with fentanyl (50 µg) and

propofol (150 mg), a laryngeal mask airway was placed without adverse reaction. Isosulfan blue (5 ml) was injected in the area of the tumour in the left breast. The SpO₂ began to decrease 20 min. after dye injection, reaching a minimum of 86-90% 30 min after the injection. SaO₂: %97 (Blood gase analyses)

The systolic pressure declined from 160 to 110 mmHg. The heart rate remained stable. Neither brochospasm nor urticaria were noted. The anesthetics were discontinued, oxygen was increased to 100%, the LMA removed and the trachea intubated. The patient was resuscitated with crystalloid (2lt) and given methylprednisolone (125 mg). Although the lymph node biopsy was performed, the remainder of her surgical procedure was canceled. She was extubated in the operating room and was found to be neurologically intact. She was transferred to intensive care unit for observation and was discharged from the ICU the day after. Her cardiac workup was negative for any cardiac ischemic injury. She was discharged from the hospital third postoperative days. Skin testing was positive to the isosulfan blue dye at 1:10 concentrations.

DISCUSSION

Isosulfan blue is an aniline dye used to stain lymphatic channels before lymphangiography.⁽⁶⁾ The most recent report showed that the incidence of allergic reactions to isosulfan was 1.6 %, whereas a severe hypotensive reaction

occurred in 0.5% of patients^(4,7). There were no episodes of hypotension, no required vasopressors, ventilatory support in our patient. Another observation of interest for anesthesiologists is that isosulfan dye may interfere with pulse oximetry monitoring. Our patient had desaturation, as determined by pulse oximetry (SpO₂ of 86%) whereas directly measured SaO₂ was 97% in arterial blood gas analysis.

Laurie et al. showed that Isosulfan blue may be a cause of anaphylactic reactions and this seems to be an immunoglobulin E-mediated event as confirmed by positive skin tests⁽⁸⁾. Also, the skin test which was done later in our patient, was found to be positive.

Raut et al. in their study, applied glucocorticoid, diphenhydramine, and famotidine intravenously just before or at induction of anesthesia of all the patients. Preoperative prophylaxis was found to reduce the severity, but not the overall incidence, of adverse reactions to isosulfan blue dye. No life-threatening reactions were noted in patients treated with preoperative prophylaxis. Based on these results, the authors now routinely recommend administration of prophylaxis to patients receiving isosulfan blue for lymphatic mapping and sentinel lymph node biopsy⁽⁹⁾.

Our patient had been previously treated with methyl prednisolone due to Rheumatoid arthritis. As she had not taken the drug for the last 4 months, methyl prednisolone was not given preoperatively, but when some symptoms occurred 20 minutes after the application of isosulfan, 125 mg methyl prednisolone was given as the changes in the clinic might be due to allergic reaction of isosulfan.

Sandhu et al. reported that postoperative workup revealed a high tryptase level indicative of an intraoperative anaphylactic reaction most probably related to the IB dye⁽³⁾. Tryptase level in our case was also high.

CONCLUSIONS

The increasing utilization of the sentinel lymph node technique will make these complications more common. During sentinel lymph node biopsy, isosulfan application can cause anaphylactic reactions without serious hypotension. Clinicians must be aware of the artificial effect when isosulfan blue dye has on SpO₂ monitoring, to assess accurately the oxygenation status of the anesthetized patient.

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