

# Anaphylactic shock after isosulfan blue administration during sentinel lymph node biopsy

Sabrina S. Sam, Karel T.S. Valenta

## ABSTRACT

**Introduction:** Isosulfan blue is commonly used for sentinel lymph node mapping for breast cancer staging. It has the capability of producing allergic reactions, ranging from mild skin reactions to severe anaphylaxis. **Case Report:** Our patient is a 68-year-old female diagnosed with grade 3 ductal carcinoma in situ who was scheduled for a sentinel lymph node biopsy and partial mastectomy. Within five minutes of isosulfan blue administration she experienced anaphylactic shock that required resuscitation with vasopressors, ventilatory support and intensive care. **Conclusion:** We recommend utilizing both isosulfan blue and radiolabeled colloid for sentinel lymph node mapping regardless of the level of experience of the surgeon. We believe that preoperative prophylaxis with a glucocorticoid and anti-histamines could become the standard of care pending further studies.

**Keywords:** Anaphylactic shock, Breast cancer, Isosulfan blue dye, Sentinel lymph node biopsy

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## INTRODUCTION

Sentinel lymph node mapping with isosulfan blue in conjunction with radiolabeled colloid is now common practice for breast cancer staging. Literature has shown that isosulfan blue has the capability of producing allergic reactions, ranging from mild skin reactions to severe anaphylaxis. According to a chart review at Memorial Sloan-Kettering Cancer Center, 1.6% of patients undergoing lymph node mapping had an allergic reaction. Mild skin reactions encompassed 69% of these reactions. Out of 2392 patients, the incidence of patients who suffered from hypotensive reactions was 0.5% [1]. Another review completed at the University of Texas found the incidence of anaphylactic reactions to be 1.1% [2]. Although no deaths have been reported secondary to isosulfan blue dye injection in the literature and severe anaphylactic reactions are uncommon, anesthesiologists and surgeons need to be prepared for the possibility of allergic reactions.

## CASE REPORT

Our patient is a 68-year-old female who was diagnosed with grade 3 ductal carcinoma in situ (DCIS) of the breast. Due to the high grade, sentinel lymph node biopsy was recommended in conjunction with partial mastectomy. She had previous allergic reactions to statins, but had no previous history of allergies to antibiotics or latex, nor any reactions to anesthesia.

Preoperative vital signs were within normal limits. General anesthesia was induced with midazolam, propofol with lidocaine, fentanyl, and rocuronium

followed by endotracheal intubation and maintenance with desflurane. Subsequently, 2.5 mL of isosulfan blue dye was injected into the subareolar plexus. Within five minutes of administration of isosulfan blue, our patient experienced cardiovascular collapse, demonstrated by severe hypotension and tachycardia. Anaphylactic shock was diagnosed after blue hives were noticed along the lateral aspect of the breast. At this point the surgery was terminated. Shortly thereafter, our patient's lips, tongue, and hands were noted to be enlarged.

She was initially resuscitated with epinephrine, IV fluids, dexamethasone and diphenhydramine. A central line and an arterial line were required before she was transferred to the intensive care unit (ICU). She remained intubated until the next morning and was discharged the following day.

## DISCUSSION

Preoperative prophylaxis with a glucocorticoid and anti-histamines has been shown to decrease the severity of allergic reactions to isosulfan blue, but not the incidence. Raut et al. implemented a prophylactic combination of 100 mg of hydrocortisone, 50 mg of diphenhydramine, and 20 mg of famotidine intravenously. Out of 488 patients who received prophylaxis, three experienced adverse reactions to isosulfan blue. In those patients experiencing an allergic reaction, symptoms were limited to blue urticarial and facial edema, but no anaphylactic shock occurred. There were no life-threatening complications associated with preoperative prophylaxis and the increase in wound complications was not statistically significant [3].

It has been hypothesized that a decreased amount of isosulfan blue dye would result in fewer or less severe allergic reactions. A smaller volume of dye has been shown to be equal in regards to sensitivity of detecting spread of cancer to the lymph nodes. Although a trend towards fewer allergic reactions was seen, it was statistically non-significant [4].

A combination of blue dye with radiolabeled colloid for sentinel lymph node mapping has a sensitivity of 97%. While radioisotope mapping alone has a sensitivity of 86% for inexperienced surgeons, that number increases to 94% for experienced surgeons [5]. For surgeons who have performed less than 500 sentinel lymph node biopsies, the addition of isosulfan blue to radiolabeled colloid has significant benefit in sentinel lymph node mapping, with an increase in sensitivity of 11%. Surgeons who have performed over 500 sentinel lymph node biopsies have a less dramatic benefit from the use of isosulfan blue. However, even the experienced surgeon will still find an additional three positive lymph nodes per 100 procedures that would have been missed with the use of radiolabeled colloid alone [5].

## CONCLUSION

Sentinel lymph node mapping with isosulfan blue dye in conjunction with radiolabeled colloid for breast cancer staging is still recommended despite the risk of allergic reaction. Although experienced surgeons find more positive nodes than inexperienced surgeons with the radioisotope mapping alone, we recommend continuing to use blue dye adjunctively for detection of positive nodes. The severity of allergic reactions to isosulfan blue can be reduced by prophylaxis with a glucocorticoid and anti-histamines. Further studies are required to determine whether prophylactic drugs should become the standard of care for all patients or only those with a previous history of isosulfan blue allergy.

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## Author Contributions

Sabrina S. Sam – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Karel T. S. Valenta – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

## Guarantor

The corresponding author is the guarantor of submission.

## Conflict of Interest

Authors declare no conflict of interest.

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