



RESEARCH ARTICLE

ANAPHYLAXIS FOLLOWING CHROMOPERTUBATION WITH METHYLENE BLUE DYE IN TUBAL FACTOR INFERTILITY: A CASE REPORT

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ABSTRACT

Anaphylaxis following chromopertubation with methylene blue is rare and can be associated with serious complications. This case report discusses a 32-year-old nulliparous woman with primary infertility due to bilateral tubal blockage, who developed anaphylaxis following chromopertubation with methylene blue during a tuboplasty procedure. Immediate recognition, resuscitation with epinephrine, intravenous fluids, oxygen supplementation and close monitoring is crucial in these cases. The case highlights the potential risks associated with methylene blue dye during diagnostic and therapeutic interventions in infertility management.

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INTRODUCTION

Anaphylaxis is a life-threatening hypersensitivity reaction that requires immediate recognition and management. Chromopertubation is commonly employed to assess tubal patency in women with tubal factor infertility, typically using methylene blue dye (1,2). While various triggers of anaphylaxis are well-documented, adverse reactions to methylene blue dye during chromopertubation remain exceedingly rare. This case highlights a critical but rare complication of methylene blue and contributes to existing literature by documenting a rare but serious event, reinforcing the importance of early recognition of anaphylaxis and prompt intervention to improve patient safety.

Case Presentation: A 32-year-old nulliparous woman with a history of primary infertility presented for tuboplasty to treat suspected tubal factor infertility. The patient had undergone a thorough fertility workup, which included a hysterosalpingogram revealing bilateral tubal blockage. The decision was made to proceed with open tubal surgery, including chromopertubation with methylene blue dye. The procedure commenced uneventfully and intraoperatively, dense adhesions were noted on the posterior wall of the uterus and the fallopian tubes were adhered to the adnexal structures.

Adhesiolysis of the tubes was done bilaterally with methylene blue dye injected to assess the patency of the fallopian tubes. Shortly after chromopertubation, the patient developed sudden onset of cyanosis, difficulty in breathing, a drop in blood pressure to 60/30 mmHg and significant decrease in oxygen saturation ranging between 65-78%. The clinical team immediately recognized the signs of anaphylaxis and initiated resuscitation measures. Epinephrine and intravenous fluids were immediately administered to stabilize her hemodynamics and oxygen was administered via a facemask to support her respiratory function. The patient's oxygen saturation levels gradually improved following these interventions. The patient was monitored for the next several hours in the high dependency unit and later transferred to the ward when her vital signs stabilized.

DISCUSSION

Anaphylaxis following chromopertubation with methylene blue dye is uncommon but a serious complication (3). The incidence is 1 in 3500 with a mortality rate of 3 to 6 % (4). Methylene blue, although generally well tolerated, can induce an allergic reaction, manifesting as difficulty in breathing, hypotension and hypoxia (5). The mechanism behind

methylene blue-induced anaphylaxis is thought to be related to IgE-mediated hypersensitivity reactions. Methylene blue also has a unique property of oxidation-reduction function and can convert the ferrous iron of reduced haemoglobin to the ferric form and produce methemoglobin (6). Methemoglobinemia classically presents with cyanosis like in our patient. Other signs and symptoms include mental status changes, shortness of breath, headache, fatigue, dizziness, loss of consciousness, dysrhythmias, seizures, coma and death (7). In a case report by Veerendrakumar *et al*, the patient developed tachypnoea, hypotension, bilateral basal crepitations and bluish-coloured urine 5 hours after having 20 mL of 1% methylene blue injected. The patient was transferred to intensive care unit, treated with oxygen, inotropes and furosemide. They found out that the patient had developed methemoglobinemia of 26.4%(8). In another case by Trikha *et al.*, the patient developed oxygen desaturation, crepitations and cyanosis 2-5 minutes after administration of methylene blue. They noted that the anaphylactoid reaction occurred due to the methylene blue causing intrapulmonary vasospasm, a generalized vasoconstriction and hypoxia (7). Herath *et al* reported the possibility of an anaphylactic reaction to methylene blue dye as their patient developed bluish discolouration immediately after injection of 20 mL of the dye intracervically (9). In a case by Millo *et al.*, patient was shifted to the recovery room after diagnostic laparoscopy for infertility with methylene blue dye and about 15 minutes later, developed restlessness, cyanosis, oxygen desaturation and despite resuscitation, she died(10). Dewachter *et al.* observed severe immunoglobulin E-mediated hypersensitivity reaction to 1% methylene blue cutaneous test further confirming anaphylactic reaction to methylene blue (11). Robert and Barbieri recommended using 10mg of methylene blue in 150 mL of NS to reduce the symptoms of anaphylaxis (12).

CONCLUSION

This case highlights the importance of vigilance during fertility procedures such as chromopertubation, which, although generally safe, can lead to a rare but severe complication of anaphylaxis. Early recognition, appropriate resuscitation and supportive care are essential for successful management of such events. Surgeons and anaesthetists should be aware of this potential risk when using methylene blue in patients.

Consent: Written informed consent was given for publishing this case report.

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