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Atypical anaphylaxis using ‘dual technique’ during sentinel lymph node biopsy

Veronika Pronisceva¹ and Elizabeth Sharp²

¹Department of General Surgery, QEOM Hospital, Kent CT9 4AN, UK

²General Surgical Department, QEOM Hospital, Kent CT9 4AN, UK

Corresponding author: Veronika Pronisceva. Email: vpronisceva@yahoo.com

A better understanding of typical and atypical anaphylaxis and, early treatment is key in reducing morbidity and mortality.

Case report

A 45-year-old perimenopausal patient was admitted for elective mastectomy and sentinel node biopsy. She was diagnosed with a symptomatic multifocal, invasive ductal carcinoma grade 2 with ductal carcinoma in situ (DCIS) of her right breast. Her medical history included a history of depression, iron deficiency anaemia and mild asthma. She was taking antidepressants and varenicline. She had no known allergies.

During general anaesthetic induction, she received several medications: Propofol, Fentanyl, Droperidol, Paracetamol and Cefuroxime. Fifteen minutes later, after positioning her for surgery, 2 mL of 2.5% Patent Blue V sodium chloride was administered. Mastectomy was commenced. Thirty minutes from the time of injection of Patent Blue dye, the patient developed a tachycardia of 120, a systolic blood pressure of 40 mmHg and did not respond to IV boluses. The procedure was abandoned and urgent intensive care team support was requested. Literature search showed that one case report published in the *Annals of the Royal College* (about first atypical anaphylactic reaction to the Patent Blue V in 2008) has described very much what was observed during our resuscitation. There were no skin changes, rashes, blisters or urticaria at the site of the injection of the Patent Blue and no angioedema, pulmonary oedema or bronchospasm. The patient was given adrenalin and hydrocortisone. Later, she required noradrenaline infusion in ITU where she was intubated and ventilated for 4 h and gradually improved. After she recovered, she attended the Allergy clinic and skin prick tests confirmed a positive reaction to Patent Blue.

Discussion

Sentinel lymph node biopsy (SLNB) is the gold standard for staging the ultrasound negative axilla in invasive breast cancer. A dual technique for SLN identification using radioactive isotope and Patent Blue V is an accepted practice. Anaphylaxis is a very serious complication. It can be fatal if not recognized promptly, with a mortality of 3.5–4.7%.¹ As patients are under drapes and mostly unconscious or sedated, the early cutaneous signs of anaphylaxis are often unrecognized, leaving bronchospasm and cardiovascular collapse as the first recognized signs of anaphylaxis. In our case, the only presentation of the anaphylaxis was cardiovascular collapse, which makes our case report only the second case reporting atypical anaphylaxis in a patient during SLNB using Patent Blue. Anaphylaxis was not our first differential diagnosis. This prompted us to perform a literature review and ask a lot of questions. What is the chance of anaphylaxis during general anaesthetic? What is the chance of an atypical anaphylactic reaction to Patent Blue V sodium chloride? What can we do to prevent it? What can make our practice safer?

A survey of anaphylaxis during anaesthesia demonstrated that cardiovascular symptoms represented 73.6%, cutaneous symptoms 69.6% and bronchospasm 44.2% (all these are very late signs) and anaphylaxis was not the first differential diagnosis in simulated anaphylaxis scenarios.^{2,3} Some literatures report that the best way to reduce incidence of anaphylaxis is by identifying at-risk patients and putting them into at-risk groups, for example, atopic individuals with increased IgE are at risk of allergic reactions to *propofol* and *latex*, health care workers and patients with multiple prior surgical procedures can be sensitized to *latex*. Apparently, females are more likely than males to have anaphylaxis during anaesthesia, with a 3:1 ratio.^{4,5}

We looked at the potential causative agents for anaphylaxis during general anaesthesia: Patent Blue

was used in food (E131) until 1974. Moreover, it has been used in agriculture and medicine. Some papers describe that the median interval between administration and allergic reaction was 15 min; in our case, it was 30 min.^{2,6} Muscle relaxants account for 69.2% of anaphylactic reactions. The overall incidence of anaphylaxis is 1 in 6500 patients undergoing anaesthesia with a muscle relaxant.^{7,8} Anaphylactic reactions to opioids are rare. Morphine is a tertiary amine that causes non-immunological histamine release.^{7,8} Fentanyl belongs to the phenyl piperidine group and does not cause non-immunological histamine release, but there are a few reported cases of IgE-mediated anaphylaxis to fentanyl.^{7,8} Propofol² (diisopropylphenol⁶) – the incidence of anaphylactic reactions with the new formulation is 1 in 60,000, although it has been reported to cause 1.2% of cases of perioperative anaphylaxis in France.^{7,8} Droperidol – not much information is available, or case reports, regarding anaphylaxis to Droperidol. In total, 1112 people were reported to have side effects when taking Droperidol in 2011. Among them, 18 people (1.62%) had an anaphylactic shock.^{7,8} Paracetamol is a widely prescribed analgesic–antipyretic drug throughout the world, which is available without prescription in most countries. Allergy like reactions to this drug, including urticaria, angioedema and anaphylactic reactions have only rarely been reported.^{1,9}

Can we prevent it? Most literatures report that avoiding drugs that produced the anaphylaxis and allergy testing prevents recurrence of anaphylaxis. There is little benefit in pre-medicating allergic patients with antihistamines or corticosteroids before surgery or anaesthesia. These drugs should be reserved for the early treatment of anaphylaxis.^{4,7,8}

It is important to recognize anaphylactic reactions perioperatively because they are rare, frequently overlooked and poorly managed. A better understanding of their causes, typical and atypical presentations (like our case) and early treatment is a key to reducing the significant morbidity and mortality with which they are associated. Early administration of the correct treatment is crucial – atypical anaphylaxes do not respond to only fluid resuscitation! This experience made us change our practice by creating a theatre protocol in addition to the WHO safety check list. We spread awareness of atypical anaphylactic reactions, SLNB procedure was declared as high

risk. Theatre personnel should be of a certain level of experience, never understaffed, and procedure should not be performed out of hours. Awareness has an important role in patient safety during SLNB. Early recognition of anaphylactic reaction, specifically atypical, and timely administration of correct treatment have a major impact on patient survival.

Declarations

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