

Recent Updates on Perioperative Anaphylaxis Management in the Operating Theatre

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Introduction

Antibiotics, neuromuscular blocking agents (NMBAs), chlorhexidine, latex, and dyes are the most common causes of perioperative anaphylaxis, which can be life-threatening. However, any medication or substance utilized can be the cause. Anaphylaxis perioperatively typically presents abruptly and frequently with severe symptoms that necessitate prompt diagnosis and treatment. Anaphylaxis is a severe systemic hypersensitivity reaction that manifests rapidly. Only a follow-up examination by an allergist can help clarify the diagnosis of anaphylaxis, which is an exclusionary diagnosis. Due to the numerous influencing factors, including sterile drapes concealing cutaneous changes, patients' inability to describe their symptoms while sedated or anesthetized, and the application of anesthetics resulting in sympathetic blockade, which manifests as a decrease in blood pressure, it is difficult to identify during the perioperative period. Perioperative anaphylaxis is difficult to identify and treat right away for all of the aforementioned reasons, which are partly to blame for the high mortality rate. An allergic or non-allergic anaphylaxis can occur. Allergic reactions involve specific immunologic processes that may or may not be mediated by IgE. Without a specific immunological response, non-allergic anaphylaxis involves a variety of processes, such as the direct activation of mast cells and complement system activation with the generation of anaphylatoxins, arachidonic acid metabolism malfunction, and non-allergic anaphylaxis. When IgE binds to high-affinity FcRI receptors on mast cells and basophils, it typically mediates anaphylaxis.

Studies on Perioperative Anaphylaxis Management

The sensitization period is silent clinically. By cross-linking two distinct IgE receptors, the allergen creates a bridge between two IgE upon subsequent exposure. This initiates a cascade of signal transduction that results in the release of both previously formed and newly formed inflammatory mediators and the onset of clinical symptoms. Non-allergic causes, such as direct non-specific activation of mast cells, calcium and phospholipase-

dependent processes, or activation of the mast-related G protein-coupled receptor X2, can also cause perioperative anaphylaxis. In young, atopic, and stressed patients, non-allergic immediate hypersensitivity, such as histamine release induced by NMBA, propofol, or both, is typically mild to moderate, whereas vancomycin flushing syndrome, also known as "vancomycin flushing syndrome," may resemble anaphylaxis. Respiratory symptoms brought on by NSAIDs only affect the upper airways or cause severe asthma, angioedema, or both. All studies on perioperative anaphylaxis management that were conducted worldwide, reported in English, and had searchable full texts were included in this systematic review. Case reports, unrelated articles, and articles without full texts or attempts to contact the author were excluded. The candidate paper's titles and abstracts, which were exported into the Endnote reference management software to avoid duplicates, were evaluated by three authors independently for the study. A third author facilitated conversations that resolved any differences. The two independent authors evaluated the study's standards using the AMSTAR 2 methodological quality rating checklist. Any inconsistencies were discussed and resolved by the third author. The critical analysis checklist has 16 parameters. Perioperative anaphylaxis manifests itself in rapidly developing skin rashes, urticaria, flushing, erythema, angioedema, gastrointestinal symptoms nausea, vomiting, diarrhea, respiratory symptoms rhinoconjunctivitis, bronchospasm, tachycardia, and hypotension. In perioperative anaphylaxis, skin manifestation may be less common than in more than 90% of anaphylactic patients, making the diagnosis more difficult. Skin symptoms are also difficult to identify because the patient is covered and anesthetized, so they cannot complain of itching.

Significance of Carefully Titrating Doses

Despite the fact that it does not take into account the pathophysiological causes of perioperative acute hypersensitivity, the Ring and Messmer severity scoring scale is the method that is most frequently used to define clinical presentations. Tachycardia, cardiovascular collapse, and skin manifestations make up a typical pattern. Additionally, it may be accompanied by lip, tongue, or both swelling. It is possible to move quickly from tachycardia to bradycardia. A Grade IV

response is defined as circulatory arrest. An acute symptom of anaphylaxis may be Pulseless Electrical Activity (PEA), which is most likely brought on by severe hypovolemia. The patient must be immediately stabilized and the culprit agent must be identified as part of the treatment. Distinguishing proof is fundamental to forestall repeat of the occasion in ensuing medical procedures and to keep away from superfluous marking of medication sensitivity. The Ring and Messmer scale is useful for directing urgent care based on the clinical presentation. The general and therapeutic measures must be implemented immediately. In the event of anaphylaxis following NMBA, the airway should be quickly secured if it has not already been done. The most important therapeutic techniques include a large volume infusion of fluids, titrated intravenous adrenaline, and maintaining the airway with 100% oxygen. When anaphylaxis occurs while under regional anesthesia, such as after antibiotics, the best course of action is to administer oxygen through a face mask and manage the reaction according to the requirements of the clinical condition. To compensate for peripheral vasodilation

and significant capillary leakage, large amounts of intravenous fluids should be administered as soon as anaphylaxis is detected. Inside 15 min of the occasion's onset, up to 73% of the blood volume might extravasate into the interstitial space. Overdosing on adrenaline has been linked to pulmonary oedema, cardiac arrhythmia, myocardial ischaemia, and mortality. Delaying or failing to administer adrenaline has also been linked to fatal outcomes. This highlights the significance of carefully titrating doses. IgE-mediated perioperative anaphylaxis, which is typically associated with antibiotics, is primarily caused by NMBA and antibiotics. Different clinical features can lead to a missed diagnosis when the onset is particularly abrupt. Management decisions are informed by clinical presentation. The main treatments are adrenaline and intravenous fluids. Tryptase concentrations and skin tests are helpful in retrospect for determining the cause of the reaction; however, the patient's medical history should be compared to the results of these tests. Patient safety in future anesthetics is ensured by an in-depth evaluation, which reveals the culprit drug and safe alternatives.