Management of Allergy and Anaphylaxis During Oral Surgery

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KEYWORDS

• Allergy • Anaphylaxis • Anaphylactoid • Epinephrine

KEY POINTS

- Minor and major allergic reactions occur during oral and maxillofacial treatment.
- Immediate diagnosis and pharmacologic intervention are imperative.
- Signs and symptoms may be variable.
- The early administration of epinephrine is critical.

Allergic reactions can and do occur during routine oral and maxillofacial surgery and dental treatment.[1] These reactions can vary from mild to life threatening, and the clinical manifestations of a reaction to an antigen may vary from mild (with minor skin manifestations occurring over time) to those requiring immediate diagnosis and aggressive treatment to prevent ultimate respiratory and cardiovascular collapse, leading to death.

MILD ALLERGY

Mild allergic reactions that are slow in onset and consist primarily of itching, hives, and/or rash and are not associated with respiratory or cardiovascular issues are usually initiated by the body's histamine release response. As with any medical emergency, consciousness should be ascertained and vital signs monitored. Treatment is symptomatic and involves the administration of a histamine blocker, such as diphenhydramine by the intramuscular (IM), intravenous (IV), or oral route. Because drugs given via the oral route are slow in onset, the parenteral route is preferred for immediate relief. It is imperative to appreciate that even after initial treatment, histamine may continue to circulate for 3 or more days and an oral prescription of diphenhydramine should be prescribed to manage this time period. A verbal and written warning of the sedating effects of histamine blocking drugs must be given to the patient.

SEVERE ALLERGY (ANAPHYLAXIS/ ANAPHYLACTOID REACTIONS)

Anaphylaxis is an acute life-threatening systemic reaction with varied mechanisms, clinical presentations, and involvement of multiple organ systems. It has recently been defined "as a serious allergic reaction that is rapid in onset and may cause death."[2] Anaphylaxis occurs when antigen-specific IgE molecules, which are bound to mast cells and basophils, are cross-linked by the specific antigen and on antigenic re-exposure causes these cells to degranulate. It takes an extremely small

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amount of antigen to trigger the releases of a combination of biochemical mediators, such as histamine, neutral proteases, prostaglandins, leukotrienes, and other chemokines and cytokines.[3] These mediators are responsible for the signs and symptoms of anaphylaxis. Anaphylactoid reactions are not IgE related, but they release similar mediators and can cause identical symptoms and pathology. Symptoms usually occur with 20 minutes to an anaphylactic or anaphylactoid reaction, but the time course may be variable.

Although many drugs and substances (**Table 1**) can trigger acute hypersensitivity reactions, the most commonly involved substances and drugs during perioperative anaphylaxis are neuromuscular blocking agents, antibiotics, and latex.[4] Data concerning the incidence and severity of anaphylaxis are limited; the estimated incidence during anesthesia ranges from 1 in 10,000 to 1 in 20,000 anesthesia cases.[5] Anaphylaxis reactions triggered by antibiotics are of special concern to oral and maxillofacial surgeons and primarily involve penicillins and cephalosporins, which contain a β-lactam ring. Reactions from the rapid IV administration of vancomycin are rare and should be differentiated from red man syndrome that is a nonallergic phenomenon.[6] Publication of the Federal Drug Administration medical alert on this documented the increasing number of allergic reactions to medical products composed of latex during the perioperative period.[1]

Certain subsets of patients have a higher risk of latex allergy and can exhibit any of the 3 types of reactions to natural rubber products. The first type is a nonallergic irritant dermatitis; the second is a type IV T cell-mediated delayed hypersensitivity reaction, is due to the chemicals added to the latex during manufacturing, and is usually a delayed localized dermatitis; and the most serious one—type I—is an immediate hypersensitivity reaction mediated by IgE antibodies specifically toward low molecular weight antigens in latex and can range from mild to severe. Populations at risk include (1) patients with histories of myelodysplasia, bladder extropy, and multiple surgeries; (2) health care workers; (3) atopic individuals (those with asthma, rhinitis, eczema, or food allergies, especially tropical ones); and (4) workers in the rubber industry.[7] There is a growing trend in creating latex-free oral surgical environments to reduce the incidence of latex issues relating to both the surgical team and patients.[8]

The clinical signs of an anaphylaxis/anaphylactoid reaction usually occur within minutes after the agent is injected IV. The clinical signs can be varied and either cascade from one system to another or appear simultaneously in many organs. The primary target organs are the skin, mucous membranes, gastrointestinal tract, and cardiorespiratory systems. Clinical cutaneous-mucous signs may include erythema, pruritus, and edema, with or without angioedema. Moderate multivisceral signs include hypotension, tachycardia, dyspnea, and gastrointestinal disturbances. The most serious manifestations involve swelling of the airway, severe bronchospasm, cardiac dysrhythmias, and cardiovascular collapse (**Table 2**).

The appearances of signs can also be classified and graded on a clinical severity scale:

Grade I, involving cutaneous-mucous features
Grade II, having cutaneous-mucous features with accompanying cardiovascular and/or respiratory signs
Grade III, cardiovascular collapse with multivisceral signs
Grade IV, cardiac arrest[9]

The rapid, initial diagnosis of an anaphylactic/anaphylactoid reaction is critical and early intervention is the key to successful management. The immediate removal or discontinuing of the triggering agent, early administration of epinephrine, maintenance of the airway and ventilation with 100% oxygen, and calling for help are fundamental. Epinephrine is the primary and first drug of

Table 1
Triggering agents of anaphylactic and anaphylactoid reactions

Common	Food (eg, peanuts, fish, shellfish, milk, eggs, bisulfites) Insect stings Medications: antibiotics, nonsteroidal anti-inflammatory drugs, aspirin, opioids, general anesthetic agents, radiocontrast dye, protamine, neuromuscular blocking agents Latex Exercise
Uncommon	Local anesthetics
Rare	Nitrous oxide, benzodiazepines, antihistamines