

CORRESPONDENCE

Anaphylaxis and Angioedema: A of ABC means Adrenaline First: Airway comes Later

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Sir,

Hypersensitivity reactions are of 4 types, *Anaphylaxis* or *Angioedema* is a type I hypersensitivity reaction.

Type I: Immediate hypersensitivity reaction mediated by CD4 TH2 cells, with increased serum IgE, seen after bee venomation, penicillin injections, vaccines, drugs and as food allergies (groundnuts, tree nuts, milk, egg, soy, wheat, fish, and shellfish).

Type II: Antibody mediated reaction characterised by opsonization, seen in autoimmune hemolytic anemia, Goodpasture syndrome, Pemphigus, Myasthenia, Insulin resistant diabetes mellitus, Pernicious anemia, rheumatic fever and Blood transfusion reactions.

Type III: Immune complex mediated reaction with activation of the complement system, seen as acute serum sickness following anti snake venom/ diphtheria serum, or as local Arthus reaction.

Type IV: Delayed hypersensitivity reaction mediated by Helper T type 1 cell seen in Tuberculosis, Transplant rejection and contact dermatitis.

Anaphylaxis is a serious, multistystem allergic reaction, rapid in onset and potentially fatal, caused by sudden release of mediators from mast cells and basophils, leading to respiratory (bronchospasm, laryngeal edema), cardiovascular (hypotension, dysrhythmias, myocardial ischemia), cutaneous (urticaria, angioedema, flushing) and gastrointestinal (nausea, colicky abdominal pain, vomiting, diarrhea) symptoms. Most patients with angioedema will present with labial, tongue or facial swelling. Patients with hoarseness, lingual edema, and oropharyngeal swelling are at particular risk for respiratory compromise and hypoxemia.

Hence it requires urgent intervention in the form of adrenaline injection (1:1000 solution as 1 mg/mL) in dose of 0.01 mg/kg (maximum adult dose 0.5 ml), repeated after 5-15 minutes, 2-3 doses if necessary.¹ Adrenaline or Epinephrine autoinjectors (0.15 or 0.30 mg) can be given through clothing also.¹ However they are not easily available in India.

Adrenaline can be given by Intramuscular (IM) or Subcutaneous (SC) route. For intramuscular injection, preferred site is anterolateral aspect of thigh near midpoint upto a depth of 16 mm. Repeat after 5-15 minutes if necessary. IM adrenaline has several advantages like faster and higher peak plasma concentration (6-10 mins) vs SC (20-45 mins), and more reliable absorption, whereas the subcutaneous route induces intense vasospasm preventing its further absorption.²

Adrenaline can also be administered by intravenous, intratracheal or intraosseous routes. However, these routes are difficult to access in an emergency, and can cause fatal overdose arrhythmias.

Other drugs used in the treatment of anaphylaxis include Isoproterenol (β agonist), Phosphodiesterase inhibitors (Aminophylline), Antihistaminics (Diphenhydramine, Chlorpheniramine, Cimetidine, Ranitidine) and Corticosteroids (Hydrocortisone, Methylprednisolone).

In previously affected individuals, recurrence can be prevented by oral prednisolone (upto 50 mg) or injection diphenhydramine (50 mg).

Despite the obvious advantages of *immediate IM adrenaline*; SC adrenaline or delayed IM injection continues to be practiced leading to suboptimal treatment and avoidable morbidity and delay in response.^{3,4} Also, it is dosed suboptimally, and is underprescribed for potential future self-administration to at-risk individuals such as bee-hive workers.

Severe laryngeal and tongue edema may occur so rapidly during anaphylaxis, that endotracheal intubation becomes difficult and time consuming. Attempts at endotracheal intubation may only further increase laryngeal edema or cause trauma to

the airway. Thus, any attempts at intubation should be made *only after* giving the first dose of *intramuscular adrenaline injection*.⁵

Prompt administration of IM adrenaline for the treatment of Anaphylaxis is recommended [even before securing airways] as first line therapy.

References

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