



## Correspondence

**Gadolinium induced anaphylaxis under general anesthesia in a patient with sickle cell disease**

Anaphylaxis is a rare disease state marked by its rapid onset and predisposition to catastrophic respiratory and cardiovascular collapse without immediate treatment. Most anaphylactic reactions in the perioperative setting are caused by neuromuscular blocking drugs, beta-lactam antibiotics, and latex containing products. Gadolinium based contrast agents (GBCAs) used for MRI have also been implicated in anaphylaxis, and occurrence in a patient with sickle cell disease (SCD) is discussed. The patient's family provided written consent to publish this letter to the editor.

A 27-year-old, 72 kg female with past medical history significant for SCD, acute chest syndrome, sacroilitis, and osteomyelitis presented with malaise, worsening left hip pain and bacteremia. Contrast MRI of the pelvis was ordered. Medical history was negative for atopic disease, bronchial asthma, drug sensitivity reactions and prior reactions to MRI contrast media. The patient underwent anesthetic induction with propofol and atraumatic size 3 LMA placement. Gadobutrol was administered by the MRI technologist, and the patient remained hemodynamically stable throughout.

Upon study completion, removal of the LMA revealed significant lingual edema and airway obstruction. Oxygen saturation declined rapidly as attempts to resume ventilation were unsuccessful. Tracheal intubation was not possible due to diffuse oropharyngeal edema. An LMA was immediately replaced and the patient was transported to MRI zone 2. Scleral edema and diffuse wheezing prompted a diagnosis of GBCA induced anaphylaxis. The patient received epinephrine 0.01 mg/kg intramuscularly, diphenhydramine 50 mg intravenously, dexamethasone 8 mg intravenously, and albuterol via the anesthesia circuit. Ventilation and oxygen saturation improved markedly and the LMA was subsequently removed. The patient was transported to the ICU in stable condition. An official allergy consult revealed positive serum tryptase levels.

Severe reactions associated with GBCAs including diffuse edema with dyspnea, erythema with hypotension, laryngeal edema with hypoxia, wheezing, bronchospasm, and anaphylaxis warrant immediate intervention. Anaphylactic reactions are exceedingly rare however, occurring at a rate of 0.001%–0.01% [1]. The World Allergy Organization (WAO) recommends anaphylaxis be categorized as either immunologic or non-immunologic. Immunologic anaphylaxis includes IgE and IgG-mediated reactions as well as immune complex-complement mediated reactions. Non-immunologic anaphylaxis is caused by agents that induce sudden mast cell or basophil degranulation in the absence of immunoglobulins, such as vancomycin, opioids, ACE inhibitors, and

over sulphated chondroitin sulphate [2].

Inflammatory mediators responsible for anaphylaxis symptoms include histamine, tryptase, tumor necrosis factor, interleukins, bradykinin, leukotrienes, prostaglandins, and platelet activating factor [3]. Anaphylactic reactions to GBCAs are in large part non-immunologically mediated.

MRI is frequently used to monitor SCD patients for disease related complications. Brain MRI is used to assess for sickle cell vasculopathy secondary to Moyamoya disease or stroke, and MRI of the musculoskeletal system is used to diagnose osteomyelitis. Although patients with SCD have not been shown to be at higher risk for anaphylaxis in the literature, the use of GBCAs is controversial in this population. It has been hypothesized that GBCAs may potentiate sickle erythrocyte alignment perpendicular to the magnetic field and increase the risk of vaso-occlusive crises [4].

Clinical diagnosis of anaphylaxis is supported with elevated concentrations of serum tryptase and plasma histamine levels. If elevations of tryptase are seen greater than 24 h post-symptom onset, systemic mastocytosis or mast cell activation syndrome must be considered. Epinephrine, 0.01 mg/kg, administered intramuscularly is the treatment of choice. Inhaled beta agonists may be useful in the setting of wheezing and bronchospasm. Aggressive fluid resuscitation is warranted in cases of hypotension and antihistamines are most useful for attenuating cutaneous manifestations. In a patient with prior reaction to MRI contrast, an alternative GBCA with a different molecular structure as well as a premedication regimen including prednisone and diphenhydramine has been indicated [5].

**References**

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