

**Reminder of important clinical lesson****Intravenous radiocontrast induced anaphylactoid reaction: a rare cause of death**

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Abstract

Anaphylactoid reaction after the injection of iodinated contrast media can be life threatening. A 23-year-old woman presented to the emergency room with abdominal pain and fever, for couple of days duration. After completion of a computed tomography (CT) scan of the abdomen and pelvis with intravenous contrast, the patient complained of feeling hot and shortness of breath. She became unresponsive, cyanotic, and developed asystole. The patient was successfully intubated without any laryngeal oedema or bronchial spasm. Despite all resuscitation efforts the patient died. The patient had undergone CT scans with contrast three times in the past. An autopsy could not reveal any obvious cause and the serum tryptase concentration was 211 ng/ml (normal <9 ng/ml).

BACKGROUND

Cardiopulmonary arrest after the intravenous administration of iodinated radiocontrast media (RCM) is extremely rare.¹ We present a case of cardiopulmonary arrest secondary to anaphylactoid reaction following exposure to intravenous iodinated contrast.

CASE PRESENTATION

A 23-year-old woman presented to the emergency room with abdominal pain and fever for 2 days. Significant past medical history included only peanut allergy. She had received intravenous RCM three times in the past without any adverse reactions. On examination the patient had a blood pressure of 161/103 mm Hg, pulse of 124/min, respiration of 19/min, and a temperature of 103.5°F (39.7°C). Clinical examination was remarkable for mild suprapubic tenderness only. She underwent a computed tomographic (CT) scan of the abdomen and pelvis with RCM. Intravenous fluids were given before 100 ml of intravenous ioversol administration. Soon after, she complained of feeling hot and shortness of breath, developed hypoventilation and became unresponsive. She was pale, comatose and pulseless on examination with asystole on rhythm analysis.

INVESTIGATIONS

Pre-cardiopulmonary arrest haemogram, serum electrolytes, and liver and kidney profile were normal. Chest radiograph, and CT scan of the abdomen and pelvis were normal. Blood cultures were sterile and urine culture later grew *Escherichia coli*.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis included cardiopulmonary arrest due to pulmonary embolism, anaphylaxis, anaphylactoid

reaction.

TREATMENT, OUTCOME AND FOLLOW-UP

Resuscitation using advanced cardiac life support (ACLS) protocol was started. She was given 1 mg of epinephrine, 1 mg of atropine, 50 mg of Benadryl, 125 mg of solumedrol, sodium bicarbonate and calcium chloride intravenously. No signs of airway obstruction such as bronchospasm or laryngeal oedema were noted during endotracheal intubation. She could not be resuscitated and she died. An autopsy report did not reveal any pulmonary embolism. Serum tryptase concentration was elevated at 211 ng/ml (normal <9 ng/ml).

DISCUSSION

Adverse reaction to non-ionic RCM is common and occurs in 1–3% of all contrast enhanced radiological examinations.^{2,3} These adverse reactions are of two types: chemotoxic type which are dose dependent, or anaphylactoid type which are dose independent.³ Most of anaphylactoid reactions are mild and secondary to vasodilatation.¹ Severe anaphylactoid type reactions are uncommon and occur in 0.03% of cases, with cardiopulmonary arrest being rare.^{1,4} Death has been reported in 1 to 3 per 100 000 RCM administrations (both ionic as well as non-ionic).⁵

Although unpredictable, proposed risk factors include history of allergy, asthma, age between 20–50 years, female gender, cardiovascular disorder, and use of β -adrenergic receptor antagonists, with history of allergy or asthma being the most important.^{1,6,7}

Exact pathophysiology of these reactions is not known but they are mediated by mast cell reactivation.³ Mast cells have a neutral protease (tryptase) in the secretory granules which is a specific marker of their activation and its concentration varies linearly with histamine release.⁸ It is believed that concentrations >20 ng/ml are indicative of an anaphylactoid or anaphylactic reaction.⁸

Despite prior exposure to RCM, our patient developed a severe anaphylactoid reaction leading to cardiopulmonary arrest, as the autopsy failed to show alternate cause of death with elevated serum tryptase values. The only possible risk factors included history of peanut allergy, female gender and the patient's age group.

Although rare, life threatening anaphylactoid reactions can occur after intravenous RCM; therefore, in-hospital emergency support should be available for timely resuscitation, in addition to radiologists and radiology technicians who are well trained to recognise and respond promptly to these reactions.

LEARNING POINTS

- Though very rare, anaphylactoid reaction can happen after administration of intravenous radiocontrast media.
- Radiologists and radiology technicians should be well trained to recognise and respond promptly to these reactions which can potentially save a precious life.

Footnotes

Competing interests: none.

Patient consent: Patient/guardian consent was obtained for publication

REFERENCES

1. Nakamura I, Hori S, Funabiki T, et al. Cardiopulmonary arrest induced by anaphylactoid reaction with contrast media. *Resuscitation* 2002; 53: 223–6.
2. Hobbs BB. Adverse reactions to intravenous contrast agents in Ontario 1975–1979. *J Can Assoc Radiol* 1981; 32: 8–10. [PubMed: 7217176]

3. Cochran ST. Anaphylactoid reactions to radiocontrast media. *Curr Allergy Asthma Rep* 2005; 5: 28–31. [PubMed: 15659260]
4. Caro JJ, Trindade E, McGregor M. The risk of death and of severe nonfatal reactions with high- vs low-osmolality contrast media: a meta-analysis. *AJR Am J Roentgenol* 1990; 156: 825–32. [PubMed: 1825900]
5. Cashman JD, McCredie J, Henry DA. Intravenous contrast media: use and associated mortality. *Med J Austral* 1991; 155: 618–23. [PubMed: 1943961]
6. Bush WH, Swanson DP. Acute reactions to intravascular contrast media: types, risk factors, recognition, and specific treatment. *Am J Roentgenol* 1991; 157: 1153–61. [PubMed: 1950858]
7. Lieberman PL, Seigle RL. Reactions to radiocontrast material. Anaphylactoid events in radiology. *Clin Rev Allergy Immunol* 1999; 17: 469–96. [PubMed: 10829816]
8. Schwartz LB, Metcalfe DD, Miller JS, et al. Tryptase level as an indicator of mast cell activation in systemic anaphylaxis and mastocytosis. *New Engl J Med* 1987; 316: 1622–6. [PubMed: 3295549]

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