Hypersensitivity to Contrast Media and Dyes

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KEYWORDS

• Hypersensitivity • Radiocontrast media • Gadolinium-based contrast media • Dyes • Fluorescein • Blue dyes • Diagnostic procedure • Management

KEY POINTS

- Increasing use leads to an increased incidence of hypersensitivity reactions to diagnostic contrast media and dyes.
- Immediate clinical manifestations are those of anaphylaxis and urticaria/angioedema, although with radiocontrast media nonimmediate exanthems also may occur.
- Skin tests (and possibly laboratory tests) are helpful for the confirmation of allergy and the exclusion of skin-test–positive alternative preparations for future procedures in those patients with positive test results.
- In all other patients, consideration of the necessity, premedication, selection of a preparation as structurally different as possible, and preparedness for emergency is recommended.

HYPERSENSITIVITY REACTIONS TO IODINATED RADIOCONTRAST MEDIA

Iodinated radiocontrast media (RCM) are concentrated solutions of tri-iodinated benzene derivatives used for diagnosis and treatment of vascular disease by enhancement of radiographic contrast. Although the risk of an adverse reaction after a single RCM administration is low, RCM are among the most common elicitors of anaphylaxis and exanthemas, owing to the administration of more than 75 million procedures per year worldwide.[1] Reactions may be classified into immediate (<1 hour) or nonimmediate (>1 hour after administration) hypersensitivity reactions, or toxic reactions related to the well-known toxicity of the compounds (eg, nephrotoxicity, neurotoxicity), or may also be caused by factors totally unrelated to RCM, such as chronic idiopathic urticaria (**Fig. 1**).[2] Four structurally different RCM (monomeric and dimeric, ionic and

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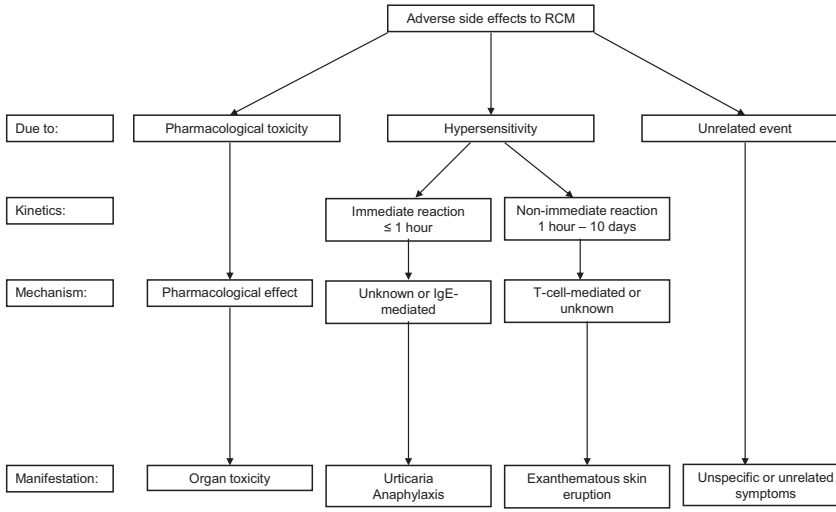

Fig. 1. Classification of adverse reactions to radiocontrast media (RCM). IgE, immunoglobulin E. (*Adapted from* Brockow K, Christiansen C, Kanny G, et al. Management of hypersensitivity reactions to iodinated contrast media. Allergy 2005;60:157; with permission.)

nonionic) are on the market, with nonionic monomers as the most commonly sold products, whereas ionic monomers for intravenous use have been withdrawn in most countries.

Incidence and Risk Factors

Immediate hypersensitivity reactions (IHRs) have been reported in 0.7% to 3% of patients receiving nonionic RCM, severe reactions in 0.02% to 0.04% of intravenous procedures, and fatal IHRs in 0.00001% to 0.0003% of contrast media applications.[3] Exanthematic nonimmediate hypersensitivity reactions (NIHR) affect 0.5% to 3% of RCM-exposed patients; higher frequencies have been reported, but seem to be less reliable.[1,4] There is a higher incidence of nonimmediate exanthemas associated with dimeric nonionic RCM.[5]

The main risk factor for IHR and NIHR is previous severe reactions.[6] Further less prominent predisposing factors reported were female gender, renal insufficiency, a history of doctor-diagnosed asthma, drug allergy, food allergy, contact allergy (for NIHRs), and interleukin-2 treatment (for NIHRs).[6–9] Repeated exposures to RCM increase the risk of IHRs.[10] An immediate reaction is not a risk factor for developing NIHR, and vice versa.[1]

Clinical Manifestations

The onset of IHR is rapid. About 70% occur within 5 minutes after injection, and 96% of severe reactions manifest within 20 minutes.[11,12] Pruritus and urticaria/angioedema occur in about 70% of patients with IHR.[3,13] Heat sensation, nausea, and vomiting may occur but also may be rather toxic reactions when not accompanied by other symptoms, such as abdominal pain and diarrhea. Severe reactions of the respiratory and cardiovascular systems are dyspnea, bronchospasm or tachycardia, and hypotension, sometimes with loss of consciousness.[1] Fatal reactions may occur.

Maculopapular exanthems occurring hours to several days after the RCM administration are typical NIHRs.[1] Other, less frequent manifestations of nonimmediate skin