

## Premedication for Contrast Medium Allergies FactFinder

*Committed to providing helpful information to International Spine Intervention Society members about key patient safety issues, the Society's Patient Safety Committee has developed a FactFinder series. FactFinders will explore and debunk myths surrounding patient safety issues. The intent of this FactFinder is to present the evidence regarding the effectiveness of premedication for contrast medium allergies that impact the delivery of spinal procedures.*

**Myth #1: In patients with radiocontrast media (RCM) allergy, it is safe to proceed with RCM injection as long as the patient is premedicated with steroids and antihistamines.**

**Fact: Although premedication likely reduces the risks associated with injecting RCM, no premedication regimen has been proven safe for a RCM allergic reaction.**

### Conclusions & Recommendations

The International Spine Intervention Society Guidelines recommend the use of RCM for nearly all spinal diagnostic and treatment procedures.<sup>1</sup> An understanding of the severity and frequency of reactions to RCM is paramount prior to discussing premedication. Reactions to RCM are immediate, defined as within the first hour, with 70% occurring within the first five minutes; or late, occurring between one hour and one week later. The late reactions are typically cutaneous.<sup>2</sup> There are three types of immediate reactions: mild, moderate, and severe.

Mild reactions: include nausea, vomiting, and mild urticaria. These signs and symptoms appear self-limited without evidence of progression. Treatment usually entails only observation and reassurance, however, these reactions may progress into a more severe category.

Moderate reactions: include moderate urticaria, vasovagal reaction, mild bronchospasm, and tachycardia. These reactions require treatment, but are not immediately life threatening. Prompt treatment with close observation is indicated.

Severe reactions: include hypotension, moderate to severe bronchospasm, laryngeal edema, diffuse urticaria, and cardiopulmonary arrest.<sup>2</sup> These reactions require immediate treatment, usually with hospitalization.

Delayed reactions occur anywhere from three hours to seven days following RCM administration. With the exception of contrast-induced nephropathy, the more common reactions include cutaneous xanthem, pruritus without urticaria, nausea, vomiting, drowsiness, and headache. For the most part these reactions are self-

limited. Delayed cutaneous reactions are more common in patients who have had a previous contrast reaction.

Contrast media are usually classified as “ionic” or “non-ionic”. Ionic RCM typically, but not always, have higher osmolality and more side effects. Examples of ionic RCM include: Diatrizoate (Hypaque), Metrizoate (Isopaque), and Ioxaglate (Hexabrix). Non-ionic RCM have lower osmolality and tend to have fewer side effects. Ionic RCM ionize in water while non-ionic RCM dissolves in water, but does not ionize. Examples of non-ionic RCM include: Iopamidol (Isovue), Iohexol (Omnipaque), Ioxilan (Oxilan), Iopromide (Ultravist), and Iodixanol (Visipaque).

When ionic RCM is administered, mild immediate reactions occur in 3.8%-12.7% of patients, while 0.7%-3.1% of patients have mild immediate reactions when non-ionic RCM is administered. In intravenous procedures, severe immediate reactions to ionic RCM occur at a rate of 0.1%-0.4%. It is estimated that fatal reactions occur in 1-3/100,000 RCM injections.<sup>3</sup> Given these differences in complication rates, most physicians tend to preferentially utilize non-ionic contrast.

There are two types of reactions to RCM: anaphylactoid and chemotoxic. The most common reactions to RCM are anaphylactoid. Even though they have anaphylactic features such as immediate onset, vasodilatation, increased vascular permeability, edema, and bronchospasm, the reaction is not initiated by an allergen-IgE complex. The pathway by which mast cells become stimulated has not been clarified. These reactions are not dose and concentration dependent above the minimum threshold. That threshold has not been defined for interventional spine procedures.

There are three types of nonanaphylactoid reactions. Chemotoxic reactions are organ specific and include nephrotoxicity, cardiovascular toxicity, and neurotoxicity. Chemotoxic reactions are based on the pharmacology of the contrast molecule and are typically more severe and are related to dose and concentration.<sup>2</sup> The other two nonanaphylactoid reactions are vasovagal and idiopathic.

In an attempt to avoid allergic reactions to RCM, two different approaches to premedication have been proposed:

- oral prednisone (50mg) at 13, seven and one hour prior to the procedure with diphenhydramine 50mg (intravenous, intramuscular or oral) one hour before the procedure, or
- oral methylprednisolone (32 mg) at 12 and two hours before the procedure; with the addition of diphenhydramine left up to the treating physician.<sup>2</sup>

In addition to the aforementioned protocol, adding an H2 blocker one hour before the procedure has also been suggested. Do not add an H2 blocker if the patient has not already had an H1 blocker.<sup>4</sup>

These protocols are for elective procedures and should not be used to treat a reaction.

Premedication is not universally successful. In a large study of intravenous contrast medium injections, there were reactions in 0.75% of injections. Of the 0.75% reactions, 18% were breakthrough reactions. Of those breakthrough reactions, only 1.6% were severe.<sup>5</sup>

In patients who received steroid premedication, the incidence of respiratory symptoms secondary to iodinated contrast media was reduced from 1.4% to 0.4%. The incidence of respiratory symptoms with hemodynamic instability was reduced from 0.9% to 0.2%.<sup>6</sup>

The literature cited above is limited to intravenous injections of RCM. With that caveat, since premedication prior to injection of RCM can only reduce the risks of a severe reaction, the risks and benefits of the proposed injection in addition to the risks and benefits of injecting RCM must be carefully weighed.

**Myth #2: A history of seafood allergy prevents the injection of RCM.**

**Fact: Individuals with anaphylactic reactions are at a mildly increased risk of developing an adverse reaction to RCM.**

Based on a written survey of academic radiologists and interventional cardiologists, 37.2% of responders reported that they would withhold RCM based on a history of seafood allergy.<sup>7</sup> That decision doesn't match the science. Iodine/iodide is not the primary cause of anaphylactoid reactions to iodinated contrast media; it is postulated that overload of the mast cells by the large contrast molecule is the primary cause of this type of reaction.<sup>2</sup> While shellfish do contain iodine, tropomyosins are the major allergen in shellfish allergies. These proteins are important in muscle contraction and are not related to iodine.<sup>2</sup>

However, patients with shellfish allergies may not be perfectly safe either. They could have increased atopic susceptibility and therefore need to be questioned about all other allergies, as the other allergies could predispose them to an anaphylactoid reaction.<sup>2</sup>

The risks and benefits of the proposed injection, in addition to the risks and benefits of injecting RCM in a patient with a seafood allergy must be carefully considered.

**References:**

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