Question of the Week #35
Preoperative assessment

You are interviewing your patient, Ms. C., who is scheduled for a laparoscopic cholecystectomy with possible cholangiogram. When you ask her about any allergies to foods or drugs, Ms. C. tells you that she cannot eat shrimp because she is “deathly allergic to them.” What implications does this information have on your development of a plan of care for Ms. C?

Response:

Any history of an allergic or adverse response to a drug or food should be taken seriously, especially since many of the signs and symptoms of an allergic response (e.g. itching, difficulty breathing) can be masked during a general anesthetic. The American College of Radiology (2010) recommends that “any patient who describes an ‘allergy’ to a food or contrast media should be questioned further to clarify the type and severity of the ‘allergy’ or reaction, as these patients could be atopic (allergy-prone) and at increased risk for reactions.” Patients considered to be at risk include those with a previous reaction to contrast media and patients with asthma, thyroid diseases, renal failure, and those on certain medications, including metformin, Beta-blockers, interleukin, and NSAIDS (Messenger, 2009; Morcos et al, 2008; Schabelman & Witting, 2010).

A cross reactivity between a shellfish allergy and an allergy to products containing iodine can safely be placed in the “sacred cow” category. This myth was propagated by studies done in the early to mid-1970's that linked an acute reaction to iodinated contrast media to patients with shellfish allergies, even though the percentages associated with reactions to contrast media were equal to or greater in patients with other types of food allergies or asthma (Schabelman & Witting, 2010).

Iodine is an essential mineral without which the body cannot survive. It is found in thyroid hormones and amino acids (Wykoff et al, 2011). A true allergy to iodine does not exist and as such it cannot be considered an allergen. People reacting to shellfish, contrast media or a skin preparation agent are actually reacting to other components in these substances.

An allergic reaction to shellfish is in response to proteins in the fish called tropomysins. These proteins do not contain iodine. Tropomysins are specific to shellfish, so people who are allergic to shellfish can generally safely eat scaled fish, which do not contain tropomysins.

Povidone-iodine (PI), a popular skin preparation agent, is composed of polyvinylpyrrolidone (povidine) and iodine. Anaphylaxis to PI is rare; of those reported, most involved a reaction to povidine; none reported a positive reaction to iodine. Shellfish allergy does not equate to an iodine allergy and is not a contraindication to topical PI (Wykoff et al, 2011). The chemical structure of povidine, with or without iodine, is not similar to contrast media, and a direct cross-reactivity has not been demonstrated. A reported allergy to contrast media is not a contraindication to use topical PI.

Reactions to contrast media containing iodine are not due to the iodine, but are thought to be caused by the hyperosmolarity of the solution. This reaction is not attributed to IgE, even though the end result (degranulation of mast cells and basophils with the resulting histamine response) mimics that of a true IgE Type I anaphylactic reaction (Schabelman & Witting, 2010). The older generation of contrast media had a very high ionic content, but any hyperosmolar fluid, regardless of its content, is very irritating to the body. Most hospitals now use low osmolarity or non-ionic contrast agents which are better
tolerated by the body, with a concurrent reduction in adverse reactions. Thomsen (2006) recommended that a low osmolarity or non-ionic contrast media drug be used for high-risk patients.

A review of the literature found that many physicians are still holding on to the shellfish allergy/iodine myth. A study done by Beaty et al (2008) of 113 physicians found that 65.3% of radiologists and 88.9% of cardiologists replied “yes” to the question “Do you or someone on your behalf inquire about a history of seafood or shellfish allergy prior to the administration of contrast media?” 34.7% of the radiologists and 50% of the cardiologists answered “Yes” to the question, “Would you withhold radiocounter media administration, or recommend premedication with corticosteroids/antihistamines based on a history of seafood or shellfish allergy?” Interestingly enough, Draganov and Formark (2008) included an allergy to shellfish as a factor thought to be associated with increased risk for reaction to contrast media (p. 1100).

Almost as controversial is the prophylactic use of corticosteroids for premedicating high-risk patients. Although it seems like a good idea, this practice has been shown to be of limited benefit during severe events. Studies show that the greatest benefit for high-risk patients is in the administration of 40-60mg of prednisone po begun 12-24 hours prior to the procedure, and repeated with diphenhydramine po the day of surgery (Messenger & Casserly, 2009). Some investigators question the efficacy of this practice (Draganov & Forsmark, 2008; Schabelman & Witting, 2010). Hubbard et al (2008) states that there is no proof that prophylactic use of steroids at the time of injection of contrast media has any effect at all. Continuing physician education will help prevent withholding a necessary diagnostic study or needless prophylactic treatment.

In the case of our patient, Mrs. C., conducting a thorough pre-operative assessment should include inquiring about a history of any allergies and the type of reactions encountered with each to determine whether it was a true life-threatening anaphylaxis as opposed to other adverse reactions which may be uncomfortable or annoying but are self-limiting. Allergic responses as well as other undesirable reactions should be documented in the patient record and communicated to the appropriate caregivers. Mrs. C should be asked about all medications she is currently taking, including over-the-counter, and she should be assessed for risk factors for contrast media reactions. The article by Morcos et al (2008) contains a questionnaire for iodine-based contrast media administration. It is comforting to note that an allergy to seafood is not on the list of risk factors.

Mrs. C. should be educated that her allergy to shellfish does not mean she is allergic to iodine and does not change the risk of reaction to contrast media any more than any other allergy. Although a cholangiogram does not involve intravascular injection of a contrast media, the drug may be absorbed into the bloodstream from the common bile duct.

All patients receiving a contrast media drug should be monitored for 20 minutes after the administration of the radiocontrast for adverse reactions. Resuscitative equipment and drugs should be readily available. A severe reaction should be treated in the same way as a severe anaphylactic reaction.

Now might be a good time to review the treatment protocols at your facility for adverse reactions/anaphylactic responses. Talk with your rapid response team or ED department about recognizing early signs and symptoms of an allergic response, and consider partnering with them to develop a mock drill related to an adverse response to a drug.
Resources and references:


