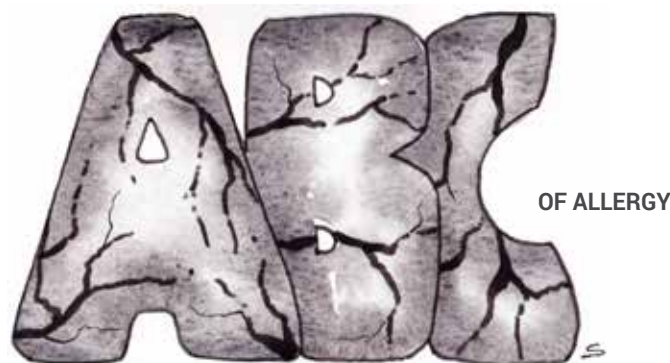




RADIOGRAPHIC CONTRAST MEDIA, IODINE AND FISH ALLERGY

Shaunagh Emanuel and Di Hawarden

Dr Do-a-lot presents a case to her students:

Mrs Cross, a 58-year-old woman with mild, chronic cardiovascular disease, is being prepared for a **coronary angiogram with contrast**. She is generally well and does not suffer from asthma, diabetes or kidney disease. She is on no chronic medications.



Coronary angiogram with contrast

It is planned that she will receive an intravenous infusion of a **non-ionic radiocontrast medium** prior to the procedure in order to enhance the image obtained. The contrast medium contains **iodine**. Iodine is used for this purpose because it readily absorbs X-rays thereby improving the clarity of the image. The higher the concentration of iodine in the medium, the brighter and clearer the contrasted image appears.

Mrs Cross is known to be **allergic to shellfish and codfish**. Over the past few years she has experienced two episodes of severe, generalised, intensely itchy urticaria that occurred within minutes of consuming seafood. She did not develop anaphylaxis on either occasion. Results of specific immunoglobulin-E tests for both types of fish were highly positive.

Is it safe to have contrast if you are allergic to fish?

Dr Do-a-lot asks her students: 'Considering the fact that there is iodine in fish and shellfish, do you think that it is wise to go ahead with an iodine-containing infusion in the case of Mrs Cross?'

The students huddle and confer, then reply: 'Yes, the infusion can go ahead. There is **no contra-indication** to giving Mrs Cross intravenous iodine.'

'Oh?' asks Dr Do-a-lot looking surprised. 'It is widely believed that people who are allergic to fish and seafood cannot have imaging studies using iodine-containing radiocontrast media. Why are you suggesting such a reckless course of action?'

'Mrs Cross is allergic to the **protein** in fish,' they reply. 'She is not allergic to iodine. If she were, she would not be able to consume iodised table salt, or other foods that contain iodine such as eggs, milk or seaweed.'

'Well,' says Dr Do-a-lot with a satisfied smile, 'I believe my work is done! You are correct. Immunoglobulin E-mediated hypersensitivity reactions usually involve protein allergens such as food proteins, pollens or moulds. Iodine is not a protein and is therefore not typically involved in this sort of reaction.'

Symptoms and reactions

'Next question,' says Dr Do-a-lot. 'Having established that fish allergy does not play a role in reactions to radiocontrast media, is it possible that Mrs Cross might still have a reaction related to undergoing the angiogram?'



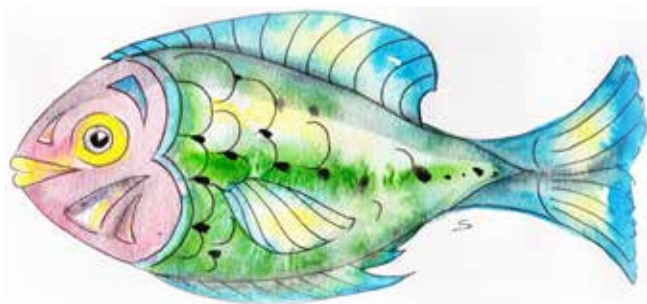
Imaging studies are enhanced by the use of radiocontrast media

‘Yes,’ the students agree, ‘she could have various symptoms or reactions.’

Dr Do-a-lot requests a list, which they provide after having undertaken some research.

Symptoms and reactions that individuals may experience during and after receiving intravenous radiographic contrast media:

- The dose of nitrites that the radiologist gives Mrs Cross prior to the procedure to dilate her blood vessels might cause her to feel dizzy, warm and flushed, and could give her a headache.
- Some patients experience intense anxiety and feel claustrophobic as the procedure often takes place in a confined space, and in an unfamiliar clinical environment.
- As a result of the infusion, patients may experience mild systemic effects. These may include a feeling of lightheadedness, flushing, warmth, headache, nausea, vomiting and/or arm pain. These are typically non-serious, acute, vasomotor or vagal symptoms.
- Patients may develop an acute reaction (within the first hour of receiving the infusion) that appears to be a typical allergic hypersensitivity reaction. The presentation may include flushing, urticaria, angio-oedema, bronchospasm and hypotension. The episode may (rarely) progress to anaphylaxis. It may be the result of a non-immunological process, occurring as a direct result of infusing a hyperosmolar substance into the bloodstream, or it may have an immunological basis.
- Cardiovascular manifestations can be severe or life-threatening resulting in cardiac arrhythmia, cardiac shock or cardiac arrest. There is debate regarding the causal mechanisms of cardiovascular events.
- Patients may experience a delayed (usually T-cell-mediated) hypersensitivity reaction that typically presents with a (macular or macular–papular) skin rash hours to days after the infusion that may last for a week to ten days.



Iodine is found in fish

About contrast media

Most intravascular radiocontrast media are derivatives of tri-iodobenzoic acid. Contrast media have evolved from ionic, highly osmolar formulations (that create large numbers of charged particles in the blood causing increased blood osmolality), to non-ionic, low osmolality formulations. The non-ionic contrast media are more widely used today. This may play a role in decreasing the risk of reactions.

Who is at risk of reactions?

The most significant risk factor for an acute hypersensitivity reaction to radiocontrast media is a previous reaction. Other risk factors include asthma, cardiac disease, dehydration and other endocrine or metabolic conditions.



Iodine is used in radiocontrast media to absorb X-rays

Prophylaxis

Individuals at high risk of developing a reaction may require treatment with glucocorticosteroids and antihistamines prior to procedures using a contrast dye.

Treatment

Treatment of reactions to radiocontrast media depends on the symptoms and suspected pathophysiology of the episode. Clinical alertness and recognition of typical symptom-complexes is key to appropriate and timely treatment. In some cases no action is taken. In other cases full resuscitation with oxygen, adrenaline, fluid replacement, bronchodilators, antihistamines and glucocorticosteroids is required. A fully stocked emergency trolley and staff trained in cardiopulmonary resuscitation should always be available before embarking on procedures using radiocontrast media.

Delayed reactions usually resolve spontaneously, but management with antihistamines (and, if necessary, systemic glucocorticosteroids) may alleviate symptoms and speed recovery.

Contra-indications

Procedures using dyes are contra-indicated in individuals who have had previous Stevens Johnson Syndrome, Toxic Epidermal Necrolysis or DRESS (Drug rash with Eosinophilia and Systemic Symptoms).

Take-home message:

- Individuals that are known to be allergic to fish may have radiographic procedures using radiocontrast media.
- Individuals that report an acute or delayed reaction during or after a procedure using radiocontrast media do not require testing for fish allergy. They can safely eat fish, seaweed and other iodine-containing foods.
- Iodine is not a protein and is therefore not a 'true allergen'.
- Individuals who are allergic to fish make specific immunoglobulin-E to the proteins in fish, and not to the iodine in fish.

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Allergy News



Pieter De Waal (center) is looking proud and relieved after passing his exams for the subspecialist certificate in allergology. With him are Claudia Gray, Mike Levin, Jonny Peter and Candice Royal, who served as the panel for his oral exams held on 10th October 2019. Ahmed Manjra convened the exam and Sarah Karabus served on the examiners panel for the written component.