

Ask EuroSafe Imaging

What Patients Should Know CT Working Group

Iodine-Based Contrast Media: Facts and Myths

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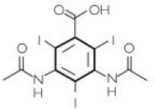
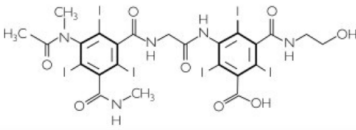
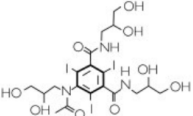
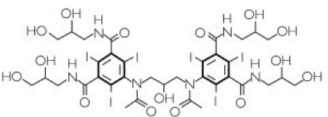
Introduction

- The rapid increase of medical imaging during the last few decades has resulted in an equal increase in the use of radiological contrast media.
- Iodine-based contrast media are used on a daily basis in most radiological practices.
- They are essential for providing accurate diagnoses.
- They are safe and effective when administered correctly, but their use is not completely without risk.

Composition of iodine-based contrast agents

- Iodinated contrast agents have been in use since the 1950s.
- Different iodinated contrast agents vary greatly in their properties, uses, and toxic effects.

**ACUTE ADVERSE REACTIONS
ARE VERY LOW**

Ionization	Polymer	Structure	Example	Osmolarity
Ionic	Monomer		Diatrizoate (Hypaque)	1400-2400 mOsm/L
Ionic	Dimer		Ioxaglate (Hexabrix)	600 mOsm/L
Nonionic	Monomer		Isohexol (Omnipaque)	290-860 mOsm/L
Nonionic	Dimer		Iodixanol (Visipaque)	280 mOsm/L

Acute Adverse Reactions – AAR

- Some adverse side effects are acute (sudden onset)
- These are classified as AAR:

AAR

Nephrotoxicity (toxic to the kidney)

Anaphylaxis
(anaphylactic/allergic shock)

Urticaria (recurrent hives)

Acute Adverse Reactions

Physiologic Reactions

depend on dose and volume contrast,
Pre-medication not required

Mild:

Flushing, warmth, sneezing, nasal congestion, hypertension, mild nausea, anxiety, vasovagal reaction (loss of consciousness)

Moderate:

Chest pain, moderate nausea, vasovagal reaction requiring treatment

Severe :

Seizures/spasms, hypertensive crisis, arrhythmia, unconsciousness

Hypersensitivity Reactions

Mild:

Urticaria, itching, skin edema, sneezing, nasal congestion, hypertension, nausea

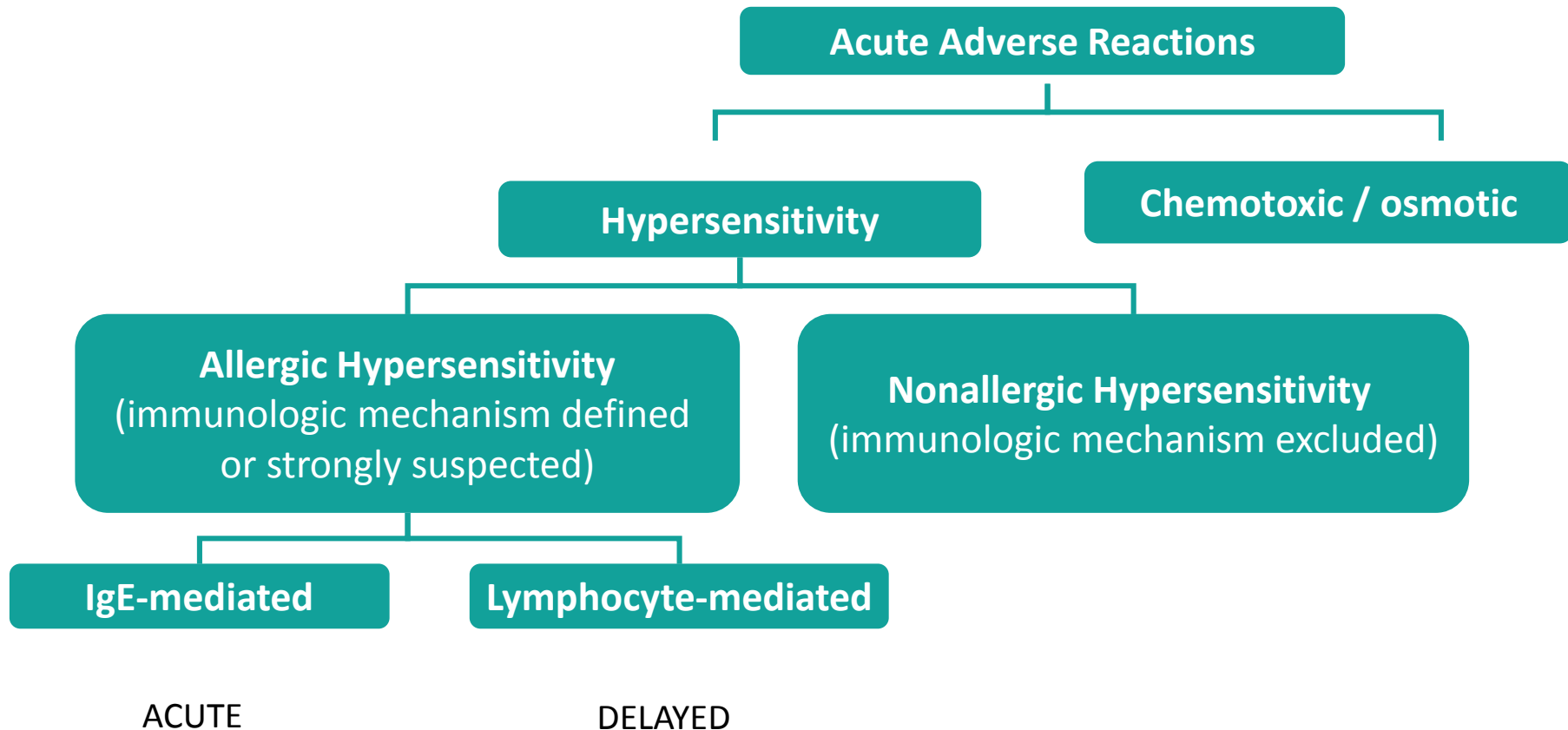
Moderate:

Urticaria, pruritus/itching, edema, hoarseness, wheezing with mild hypoxia

Severe:

Facial and laryngeal edema

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Research Paper

Immediate Hypersensitivity to Contrast Agents: The French 5-year CIRTACI Study

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CT Diagnostic Procedure-Screening

Patient selection and preparation strategies before contrast administration

- For any diagnostic procedure, the referring physician and the radiologist should consider the risk-to-benefit profile of the proposed contrast material-enhanced examination and other imaging alternatives that provide the same diagnostic information.
- Obtaining the informed consent of the patient for contrast injection is advisable and may be subject to local regulations.
- The professionals should provide information about the exam and, at the same time, consult with the patient, prior to examination, to identify factors that contraindicate the use of contrast.

CT Diagnostic Procedure-Screening

Questions to the patient

- 1. Are you fasting?**
- 2. Are you pregnant?**
- 3. Have you had any prior reactions to the contrast agent?**
- 4. Do you have any allergies?**
- 5. Do you have diabetes?**
- 6. Do you have a history of renal disease?**

Questions to the patient

1. Are you fasting?

Fasting is not necessary for IV injection.

2. Are you pregnant?

Pregnancy might contraindicate CT examination; the risk-to-benefit ratio has to be considered.

3. Have you had any prior reactions to the contrast agent?

If a history of hypersensitivity reaction after injection of a contrast media is reported by the patient,

- reassessment of the risk / benefit ratio by the radiologist
- consultation by an allergologist should be organized

Questions to the patient

4. Do you have any allergies?

Minor allergies are common and do not appear to increase the overall risk.

- History of poorly controlled asthma, bronchospasm or atopy may increase the risk for acute reactions. If the patient presented an asthma crisis during the last 7 days, the examination should be postponed
- **shellfish allergies:** Although there is an increased risk of adverse reactions to contrast agents and patients with any history of allergy, there is no specific link between shellfish allergy and allergy to contrast media.

Minor allergies do not contraindicate the injection of iodinated contrast.

5. Do you have diabetes?

Metformin interruption for 48 hours after intravenous administration of iodinated contrast media is recommended if the diabetic patient shows impaired renal/kidney function ($eGFR < 30 \text{ ml/min/1,73 m}^2$).

6. Do you have a history of renal disease?

Renal function should be assessed in all patients where its impairment is possible or probable. The value of $eGFR < 30 \text{ ml/min/1,73 m}^2$ indicates an increased risk of contrast-induced nephropathy.

Other considerations

- **Pregnant and lactating patients:** Iodine-based contrast crosses the human placenta, but teratogenic effects (causing disturbed development in the fetus) and hypothyroidism (a thyroid disease) have not been reported.

Only a small percentage of contrast is excreted in breast milk and absorbed by the baby. There is no report of cases of toxicity or allergic sensitivity. Suspension of lactation is not necessary.

- **Children:** The incidence of reactions to iodinated contrast media in children is difficult to estimate, due to a lack of prospective studies and consensus regarding what constitutes a true allergic reaction. Guidelines for prevention and treatment of allergic reactions are similar to those for adults.

Other considerations

- **Thyroid disease:** Patients with untreated Graves disease or active hyperthyroidism should NOT be injected with iodinated contrast media.

Patients with multinodular goiter, and those who living in areas where dietary iodine deficiency is common, should consult a endocrinologist before administration of contrast to avoid thyrotoxicosis (excess production of thyroid hormones) though excess iodine absorption.

- **Interaction with other procedures:** Use of iodine-based contrast should be avoided immediately before planned radioactive iodine imaging or therapy, because the iodine may reduce radioactive iodine uptake .

Other considerations

- **Extravasation:** Occurs when contrast material escapes through the blood vessel border. This can cause pain and burning. All patients with extravasation should be observed for a period in the radiological department.
- **Breakthrough reactions:** are hypersensitivity reactions occurring despite premedication. These patients are highly likely to be truly allergic to one or more contrast media and should consult an allergologist for skin testing.

Conclusions

- Although the use of iodine contrast media is considered safe, adverse reactions may occur.
- Proper patient screening and adequate prophylactic measures can prevent some adverse reactions.
- Radiological staff know how to identify the various types of contrast adverse reactions and how to treat them promptly.

→ The decision to use iodinated contrast in a given patient is the result of an individualised, case-by-case analysis and always implies a thorough risk-to-benefit ratio assessment.

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