



Iodinated contrast media allergy revisited

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Introduction:

- Iodinated contrast media have been in use since the 1950's
- Since the 1980's: non-ionic, low osmolarity.
- It is estimated that 75 million doses of ICM are given worldwide each year.
- Adverse effects: minor - rash, vomiting minor hemodynamic changes; major - nephropathy, allergic reactions.
- In patients at risk for acute reaction, pretreatment with corticosteroids \pm anti-histamines is a common practice (???)

Mechanisms that underlie ICM allergy

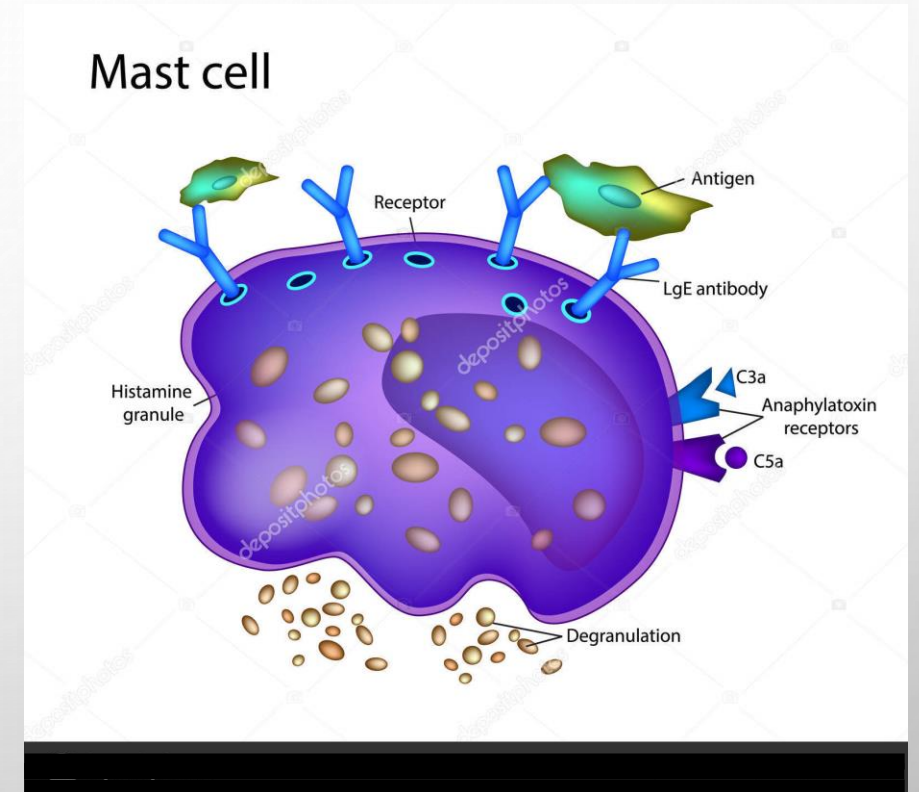
No single mechanism

Direct mast cell degranulation (allergoid)

IgE mediated mast cell degranulation

Activation of complement system

Activation of the kinin-kallikrein system



CT QUESTIONNAIRE/AUTHORIZATION

(office use)

Name: _____ Date of Exam: _____

Date of Birth: _____ Age: _____ Sex: _____ Height: _____ Weight: _____

1. Why are you having this exam?

2. Do you have an allergy to Latex? ☐ Yes ☐ No

3. Do you have an allergy to iodine? ☐ Yes ☐ No

4. Do you have a history of Diabetes Mellitus? ☐ Yes ☐ No
If YES, are you on any medication? ☐ Yes ☐ No

5. Do you have a history of kidney disease, kidney failure, transplant kidney tumor and/or kidney surgery/ interventional procedure of any kind? ☐ Yes ☐ No

6. Do you have high blood pressure (also known as hypertension)? ☐ Yes ☐ No

7. Have you been told by your doctor that you have protein in your urine? ☐ Yes ☐ No

Your imaging procedure may require the administration of an X-ray dye/contrast (these are two commonly used names for the same thing) which helps the physician interpret your examination.

8. **Have you ever had an injection of x-ray dye/contrast? If YES, please answer the following:** ☐ Yes ☐ No

Have you ever had hives following x-ray dye/contrast? ☐ Yes ☐ No

Have you ever had shortness of breath following x-ray dye/contrast? ☐ Yes ☐ No

Have you ever fainted/collapsed following x-ray dye/contrast? ☐ Yes ☐ No

9. **FEMALE PATIENTS**

Is there any possibility that you are pregnant? ☐ Yes ☐ No

Are you breastfeeding? ☐ Yes ☐ No

When was your last menstrual cycle? _____

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The purpose of these details:

Verification of ICM allergy + risk stratification

Would add: how long ago was the allergic reaction?

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9. **FEMALE PATIENTS**

Is there any possibility that you are pregnant? ☐ Yes ☐ No

Are you breastfeeding? ☐ Yes ☐ No

When was your last menstrual cycle? _____

3. Do you have an allergy to iodine?

☐ Yes ☐ No

When should the answer be “yes”?

What is the significance of a positive answer (premedication ?? Delayed imaging/procedure??)

“Iodine Allergy”



- An erroneous diagnosis of “iodine allergy” is common and may entail delayed treatment and unnecessary administration of steroids.

Shellfish and Iodine

- Origins of this association unclear
- Likely *created by physicians* linking history of shellfish allergy and iodinated contrast
- **Iodine is not and cannot be an allergen**
 - Present throughout all of our bodies
 - Too small to cross link IgE = cannot cause allergy
 - Present in table salt
- Fish and shellfish contain iodine, but this is not the source of allergens
 - Muscle proteins cause IgE mediated reactions
 - Tropomyosin and parvalbumin

Revisiting iodinated contrast media allergy

Study 1

Objective:

Primary: To assess the prevalence and severity of allergic reactions during percutaneous coronary intervention in patients admitted for investigation of chest pain.

Secondary: evaluate the real-life significance of a previous “ICM allergy” diagnosis and pre-medication for patients at risk.

PATIENTS AND METHODS

A retrospective analysis of 13652 patients who were hospitalized with chest pain during the years 2010-2016

Patient records were screened for demographic data, laboratory values, medical procedures

During the study period all PCI procedures were carried out with nonionic ICM (ULTRAVIST 370, iopromide)

Study design:

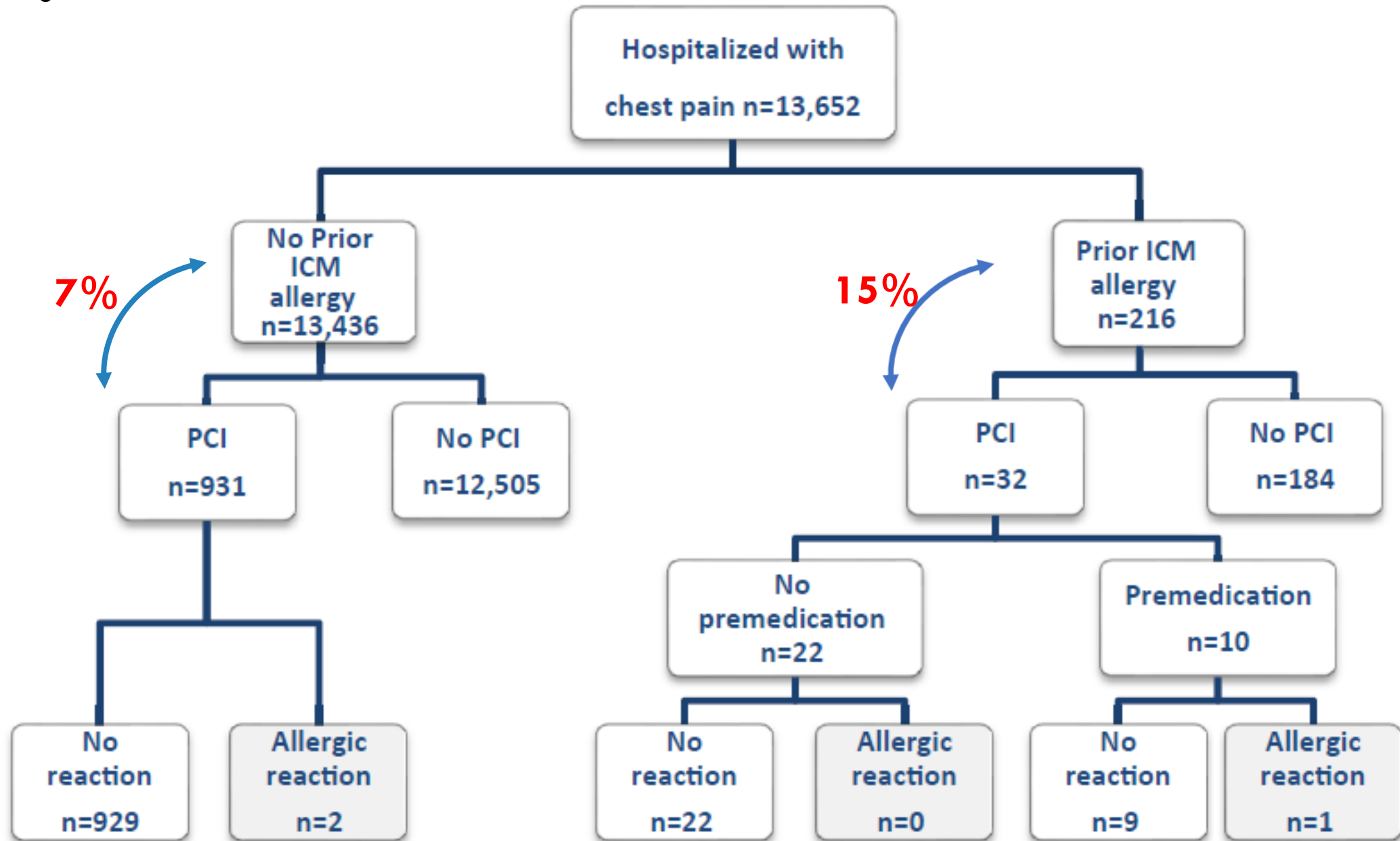


TABLE II. Characteristics and outcomes of patients who were referred for PCI with prior or new-onset ICM allergy

Patient	Sex	Age (y)	Prior ICM allergy	Type of prior allergic reaction	Pre-PCI medication	Post-PCI adverse reaction	Type of allergic reaction	30-d mortality
1	F	72	+	Rash	+	—		—
2	M	44	+	Dyspnea	+	—		—
3	M	75	+	NA	+	—		—
4	F	69	+	NA	+	—		—
5	M	55	+	Hypotension	+	—		—
6	F	68	+	NA	+	—		—
7	F	76	+	NA	+	—		—
8	M	67	+	NA	+	—		—
9	F	58	+	Anaphylaxis	+	+	Hypotension	—
10	M	53	+	NA	+	—		—
11	M	73	+	NA	—	—		—
12	M	67	+	NA	—	—		—
13	F	77	+	Rash	—	—		—
14	M	63	+	Dyspnea	—	—		—
15	M	71	+	Dyspnea	—	—		—
16	F	77	+	Dyspnea	—	—		—
17	M	70	+	NA	—	—		—
18	F	56	+	NA	—	—		—
19	M	58	+	NA	—	—		—
20	M	40	+	Rash	—	—		—
21	M	73	+	NA	—	—		—
22	F	64	+	NA	—	—		—
23	F	71	+	NA	—	—		—
24	F	70	+	Dizziness	—	—		—
25	M	68	+	Dyspnea	—	—		—
26	M	64	+	Dyspnea	—	—		—
27	F	71	+	Dyspnea	—	—		—
28	M	75	+	NA	—	—		—
29	F	58	+	Pruritus	—	—		—
30	M	68	+	NA	—	—		—
31	M	58	+	NA	—	—		—
32	F	65	+	Anaphylaxis	—	—		—
33	F	59	—	—	—	+	Rash	—
34	M	63	—	—	—	+	Hypotension	—

ICM, Iodinated contrast material; PCI, percutaneous coronary intervention.

Conclusions:

PCI does not appear to induce clinically significant allergic reaction, regardless of presence or absence of a previous of ICM allergy.

In more than half of the subjects with “ICM allergy” there is no justification for the diagnosis.

This study could not demonstrate any advantage for premedication, and therefore it should not cause delays in imaging or medical procedures.

Original Article

**Iodinated Contrast Media Allergy in Patients
Hospitalized for Investigation of Chest Pain**

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ALLERGIC REACTIONS TO IODINATED
CONTRAST MEDIA ARE RARE

Published online: April 12, 2018

Revisiting iodinated contrast media allergy

Study 2

Objective: To characterize subjects with allergic reactions to ICM and possible risk factors.

Methods

Screening of 36920 outpatient CT scans with ICM for allergic reactions.

Retrieval of clinical and laboratory data from medical records

Definition of a severe reaction*

TABLE V. Grading system for generalized hypersensitivity reactions

Grade	Defined by
1—Mild (skin and subcutaneous tissues only)*	Generalized erythema, urticaria, periorbital edema, or angioedema
2—Moderate (features suggesting respiratory, cardiovascular, or gastrointestinal involvement)	Dyspnea, stridor, wheeze, nausea, vomiting, dizziness (presyncope), diaphoresis, chest or throat tightness, or abdominal pain
3—Severe (hypoxia, hypotension, or neurologic compromise)	<u>Cyanosis or $\text{SpO}_2 \leq 92\%$ at any stage, hypotension ($\text{SBP} < 90$ mm Hg in adults), confusion, collapse, LOC, or incontinence</u>

SBP, Systolic blood pressure; *LOC*, loss of consciousness.

*Mild reactions can be further subclassified into those with and without angioedema (see text).

Study design

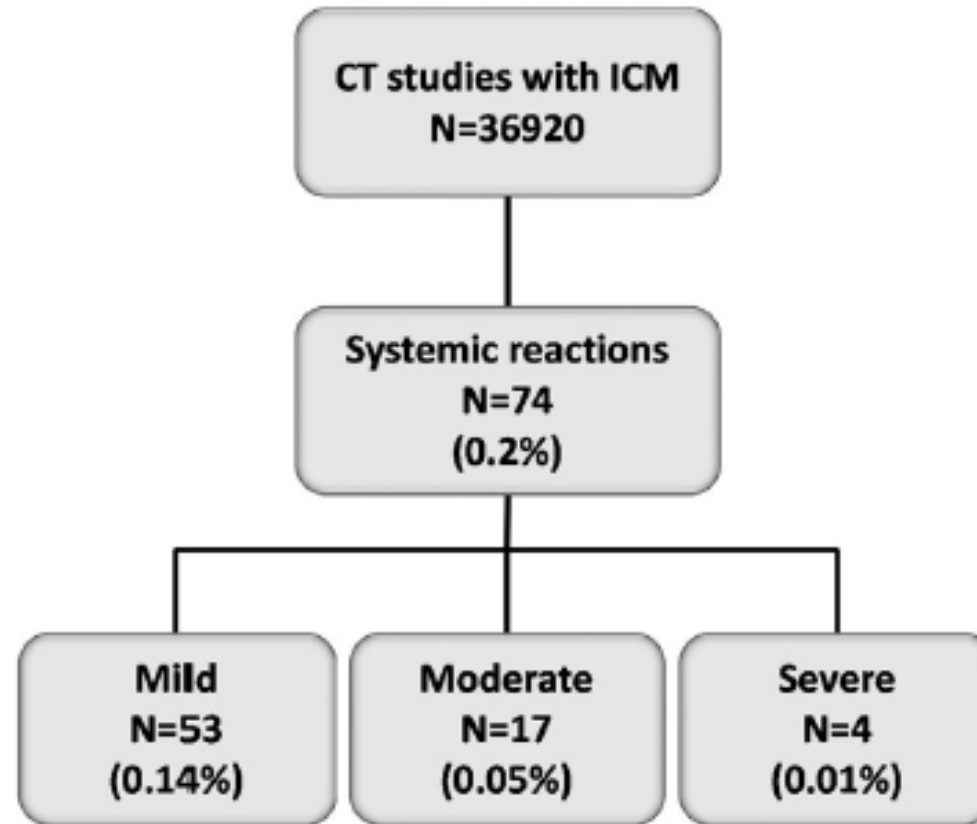


Figure 1 Distribution of allergic reaction severity among the study population.

Patients with severe allergic reactions to iodinated contrast media.

Gender/age (years)	CT indication	Severity determined by radiologist	Validated severity	Signs and symptoms	O ₂ saturation (%)	Pulse rate (beats/min)	Blood pressure (mmHg)	Treatment
F/38	Cancer	Severe	Severe	Rash, dyspnoea dysphagia	86	90	145/80	Anti histamine Steroids Epinephrine
M/40	Headache	Severe	Severe	Dyspnoea syncope	96	66	105/64	Epinephrine
M/70	Cancer	Severe	Severe	Facial- angioedema convulsions	91	107	97/64	Steroids epinephrine
F/80	Liver abscess	Mild	Severe	Dyspnoea chest pain diaphoresis	90	82	166/85	None
F/29	Hypertension, tachycardia	Severe	Moderate	Rash dyspnoea vomiting	96	96	135/85	Anti-histamine
M/34	Headache	Severe	Moderate	Dyspnoea hoarseness vomiting	100	100	133/80	Anti-histamine steroids epinephrine
F/41	Cancer	Severe	Moderate	Rash angioedema dizziness	100	100	103/55	Anti-histamine steroids epinephrine
M/69	Cancer	Severe	Mild	Rash	97	97	157/89	Steroids epinephrine

Allergic reactions in patients with prior iodinated contrast media allergy.

Gender/age (years)	Reaction	O ₂ saturation (%)	Pulse rate (beats/min)	Blood pressure (mmHg)	Severity	Pre-medication	Treatment of anaphylaxis
F/29	Rash	98	78	105/76	Mild	None	Anti-histamine
F/33	Periorbital oedema, pruritus	97	75	121/80	Mild ^a	Steroids; anti-histamine	Anti-histamine
M/43	Rash, cough	NA	NA	NA	Mild ^a	Steroids; anti-histamine	Anti-histamine
F/46	Rash	NA	NA	NA	Mild	None	Anti-histamine
F/53	Rash	99	66	147/88	Mild	None	Steroids; anti-histamine
F/58	Rash	96	79	125/78	Mild	Steroids; anti-histamine	Anti-histamine
F/60	Dizziness	99	79	150/93	Moderate ^a	Steroids	None
F/69	Rash	NA	NA	NA	Mild ^a	Steroids	Anti-histamine
F/74	Rash	98	65	130/87	Mild	Steroids	Anti-histamine
F/77	Rash	96	60	190/100	Mild ^b	Steroids; anti-histamine	Steroids; anti-histamine

^a Similar severity as a previous reaction.

^b Previous reaction: moderate.

The number of validated severe reactions is lower than reported in the medical records (no previous allergy).

Patients with previous ICM allergy had mild allergic responses (regardless of premedications?).



ELSEVIER

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Clinical impact of allergy and pre-medication in CT studies with low-osmolality intravenous iodinated contrast media

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Summary:

Severe allergic reactions to ICM are rare.

There is no “iodine allergy”.

The role of premedication warrants further validation
(corticosteroids?)

In many cases a previous diagnosis of ICM allergy/iodine allergy does not justify delays in imaging and medical procedures (advisable to consult with an allergist).



Clinical impact of allergy and pre-medication in CT studies with low-osmolality intravenous iodinated contrast media

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אלרגיה

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רדיולוג

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סגן מנהל

מנהל