

# How to treat contrast media reactions

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## 1 DIAGNOSIS

Adverse reactions to contrast agents can be:

- Immediate (<1 hour) or ● Delayed (>1 hour to 1 week)
- Non-allergy-like
  - Cardiovascular  
(*vagal reaction, angina, pulmonary oedema*)
  - Renal  
(*contrast-induced nephropathy, acute renal failure; semi-delayed*)
  - Neurological  
(*seizure owing to severe hypotension or intrathecal injection*)
- Allergy-like or anaphylactoid
- Diagnosis (Table 1)
  - Cutaneous (erythema, urticaria, angio-oedema, pruritis)
  - Haemodynamic (hypotension, tachycardia)
  - Respiratory (laryngeal oedema, bronchospasm, wheezing)
  - Gastrointestinal (vomiting, diarrhoea)
- Pathophysiology
  - Non-specific histamine release
  - Type 1 allergy: IgE-mediated anaphylaxis

## 2 GENERAL MANAGEMENT

Be calm, diagnose before you treat, eliminate hypoglycaemia

ALWAYS

- Stop injection/infusion
- Call for help
- Note time of reaction, product/concentration/volume injected
- Take pulse (bradycardia=vagal, tachycardia=anaphylactic shock)
- Take blood pressure
- Check IV lines
- Give oxygen (good in all cases: asthma, angina, vasovagal, anaphylaxis...)

## 3 CUTANEOUS SYMPTOMS

- URTICARIA, with a few scattered hives  
Do nothing; watch the patient until resolves
- URTICARIA, severe, extensive
  - Diphenhydramine IV, IM (30 mg adults, 1.25 mg/kg children), or
  - Cimetidine (300 mg diluted in 20 mL IV adults, 5–10 mg/kg for children), or
  - Ranitidine 50 mg diluted in 20 mL IV
- CONSIDER ADRENALINE IF DETERIORATION WITH HYPOTENSION OR BRONCHOSPASM

## 4 RESPIRATORY SYMPTOMS

Oxygen : 6–10 L/min

- LARYNGEAL ANGIO-OEDEMA  
*Diagnosis: inspiratory stridor*
  - Epinephrine (adrenaline):
    - 0.3 mg SC up to 1 mg
    - 0.1 mg IV repeat as necessary (see 5 dilution/titration)
  - Steroids:
    - Methylprednisolone 50 mg IV
    - or prednisolone 250 mg IV
- BRONCHOSPASM  
*Diagnosis: expiratory wheezes*
  - $\beta_2$ -agonist dose inhaler:
    - 2–3 deep inhalations
  - Steroids:
    - Methylprednisolone 50 mg IV
    - or prednisolone 250 mg IV
  - Epinephrine (adrenaline) :
    - 0.3 mg SC up to 1 mg
    - 0.1 mg IV repeat as necessary (see 5 dilution/titration)

## 5 GENERALIZED ANAPHYLACTOID REACTION

Oxygen : 6–10 L/min

*Diagnosis: hypotension (<80 mm Hg, tachycardia >100/min, dyspnoea, cutaneous signs, diarrhoea, vomiting)*

SUPINE POSITION, ELEVATED LEGS

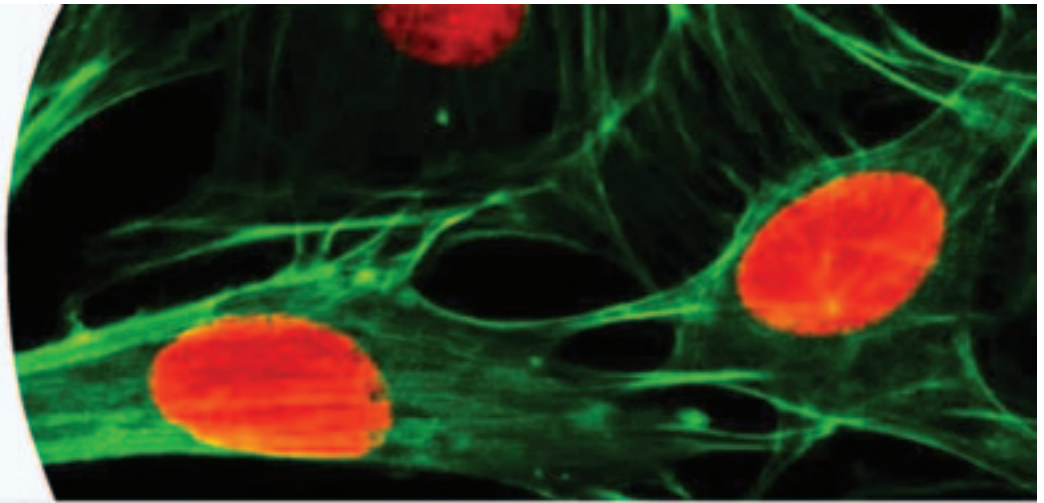
EPINEPHRINE (ADRENALINE) DILUTION AND TITRATION

- Effect and dose of epinephrine (adrenaline) depend on the patient, and must be tested in the patient.  
A very large range of dose might be needed for the same effect.
- Dilution 1/10 (1 mg epinephrine plus 9 mL saline)
- Do not inject epinephrine undiluted IV except during cardiac arrest
- Injection 1 mL by 1 mL IV of the diluted solution every few minutes until an effect occurs
- Short plasma half-life: repeat the doses every 3 min based on the clinical symptoms

VOLUME SUBSTITUTION

- Crystalloids (saline or Ringer's) 30 mL/kg IV, then
- Colloids 30 mL/kg IV

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## 6 OTHER SYSTEMIC REACTIONS

- VASOVAGAL REACTION Oxygen : 6–10 L/min
  - Volume substitution, crystalloids (saline or Ringer's solution) 30 mL/kg IV
  - Atropine 0.5–1 mg IV repeated if necessary to 3 mg total (adult), 0.02 mg/kg IV up to 2 mg total (children)

If no effect, treat as an anaphylactic shock

- CARDIAC ARREST Oxygen : 6–10 L/min
  - Cardiopulmonary resuscitation
  - Epinephrine (adrenaline) 1 mg IV repeated every 3 min
  - Volume substitution
- ANGINA Oxygen : 6–10 L/min
  - Nitroglycerin spray or sublingual
- PULMONARY OEDEMA Oxygen : 6–10 L/min
  - Furosemide 20–40 mg IV
- SEIZURE Oxygen : 6–10 L/min
  - Diazepam 5 mg, IV
- HYPOGLYCAEMIA (symptoms of confusion)
  - Glucose IV, PO

## 7 BEFORE THE REACTION : be prepared

- Have resuscitation trolley ready with valid drugs and equipment
- Provide information for personnel
- Keep phone numbers posted
- Exercises, continuing medical education

## 8 AFTER THE REACTION : investigate

- Blood test for measurement of histamine and tryptase immediately after the reaction (proves anaphylaxis compared with other mechanisms)
- Follow up the patient for 12–24 hours
- Specialised allergological consultation 4–8 weeks later to prove potential allergy to one specific contrast or to try to explain the reaction that occurred

### REFERENCES

- <http://www.resus.org.uk/siteindx.htm>  
[http://circ.ahajournals.org/content/vol102/suppl\\_1/](http://circ.ahajournals.org/content/vol102/suppl_1/)  
<http://www.sfar.org>

Table 1: Ring and Messmer classification for allergic reactions

Grade	CUTANEOUS & MUCOSAL	GASTROINTESTINAL	RESPIRATORY	CARDIOVASCULAR
I	Erythema Urticaria Facial oedema Mucosal oedema			
II	" " "	Nausea important AFTER the injection	Cough Dyspnoea	Tachycardia >30 % Hypotension (drop in systole >30%)
III	" " "	Vomiting and/or diarrhoea	Bronchospasm Cyanosis	Shock (BP syst<80 and HR >100 if no β-blockers)
IV	" " "	" " "	Respiratory arrest	Cardiovascular arrest