SAWA UNIVERSITY

SPECIAL RADIOLOGICAL PROCEDURES

CONTRAST MEDIA

Sawa University — جامعـــة ســـــاوة الاهلية

College of health and medical techniques — كليـــة التقنيـــات الصحية والطبية

Department of Radiology Tech. — قسم تقنيات الاشعة والسونار

Stage second — المرحلـــــــة الثانية

الجانب النظري محاضرة رقم 2

Theoretical Lecture No.2

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Practical information at a glance

Proper storage of contrast media

1- in a dark place (e.g. in a cupboard)

2- at room temperatures (15-25° C)

3- in a warming cabinet at 37° C for no longer than 3 months

Observation of expiry dates :

- shelf-life of established contrast medium products usually is up to 5 years.

Examination of the CM solution before use :

1- remove outer packing only shortly before use

2- check clearness of solution (no discoloration, no cloudiness, no precipitates)

Risks of microbial contamination :

Do not keep opened vials and ampoules longer than one working day after first use; discard all remains at the end of the day.

Adverse Reactions

Acute adverse reactions are defined as reactions occurring within the first hour following the contrast medium injection. divided into

Allergy-like reactions, which are unpredictable and unrelated to the amount of contrast medium

Non-allergy-like (chemotoxic) reactions, such as pain, a sensation of heat, or pulmonary edema produced by the increased osmotic load, which are dose dependent.

Toxicity of contrast media

The toxicity of contrast media is a function of osmolarity, ionic charge (ionic contrast agents only), chemical structure (chemotoxicity).

Adverse reactions after administration of non-ionic iodinated contrast media are rare, occuring in less than 1% of all patients.

The vast majority are mild and self-limiting.

The incidence of moderate or severe non-ionic contrast reactions is less than 0.001%

TOXIC EFFECTS ON SPECIFIC ORGANS

Vascular toxicity

1- Pain at the injection site.

2- Pain extending up the arm– due to stasis of contrast medium.

3- Delayed limb pain– due to thrombophlebitis

Soft-tissue toxicity

1- Pain, swelling, and even sloughing of skin may occur from extravasation of contrast medium.

2- Treatment should consist of the application of cold packs and elevation of the limb. Systemic steroids, non-steroidal anti-inflammatory drugs and antibiotics have all been shown to be useful.

Cardiovascular toxicity

1- bradycardia or asystole.

2- Arrythmia (if Intracoronary injection).

3- systemic hypotension.

Haematological changes

1- Haemolysis and haemoglobinuria have been reported following angiocardiography.

2- Red cell aggregation and coagulation may occur in the presence of a high concentration of contrast medium,

3- Contrast media have a potentiating effect on the action of heparin

4- Transient eosinophilia may occur 24–72 h after administration of contrast medium

Nephrotoxicity(most important) Contrast-induced nephropathy

1- is one of the most serious adverse effects associated with the use of intravascular contrast media and is defined as an impairment of renal function (increase in serum creatinine >25% baseline value) occurring within 3 days of contrast administration in the absence of an alternative aetiology

2- In those affected, the serum creatinine concentration starts to rise within the first 24 h, reaches a peak by 2–3 days and usually returns to baseline by 3–7 days.

3- In rare cases patients may need temporary or permanent dialysis

predisposing factors in CIN

1-The single most important risk factor is pre-existing impairment of renal function; patients with normal renal function are at very low risk.

2- Diabetes mellitus

3- Dehydration

4- Sepsis

5- Age > 70 years

6- large doses of contrast medium

7-Multiple myeloma

8- Concomitant use of nephrotoxic drugs

9- Vascular disease.

Guidelines for prophylaxis of renal adverse reactions to iodinated contrast medium

- check if there is pre-existing renal impairment
- serum creatinine should be measured within 1 week before the administration of contrast

If the patient known case of renal failure so

1- Consider an alternative imaging method

2- 48 h before the procedure stop any treatment with metformin

3- 24 h before the procedure stop all nephrotoxic drugs, mannitol and loop diuretics

4- Start hydration

5- Use the lowest dose of contrast

6- Use low- or iso-osmolar contrast medium

Neurotoxicity…

Intravenous contrast medium may rarely provoke convulsions in patients with epilepsy

Thyroid function

1- Iodinated contrast media may rarely cause thyroid dysfunction either hyperthyroidism or

Hypothyroidism

2- But those with goitre or proven detectable serum antibodies are likely at increased risk

IDIOSYNCRATIC REACTIONS

Adverse reactions can be classified in terms of severity as

1- Mild: Nausea, vomiting, urticaria

2- Moderate: Mild bronchospasm, vasovagal reaction, tachycardia, diffuse erythema

3- Severe: Cardiovascular collapse, moderate or severe bronchospasm, laryngeal oedema, loss of consciousness or seizure.

Fatal reactions…

Deaths caused by iodinated contrast agents are very rare, occurring at a rate of 1.1–1.2 per million contrast media packages distributed. Most are attributed to renal failure, anaphylaxis or allergic reaction.

Non-fatal reactions…

- Flushing, metallic taste in the mouth, nausea, sneezing, cough
- a desire to empty the bladder or rectum
- Urticaria , Rigors.
- Bronchospasm (increased if history of asthma and by therapy with ß-blockers)
- Hypotension.
- Abdominal pain.

General safety issues are

1- A doctor should be immediately available in the department to deal with any severe reaction

2- facilities for treatment of acute adverse reaction should be readily Available

3- A patient must not be left alone or unsupervised for the first 5 min following injection of the contrast agent

Important

It is essential that before administration of iodinated contrast every patient must be asked whether they have a history of :

1- Previous contrast reaction

2- Asthma

3- Previous allergic reaction requiring medical treatment

Iodinated contrast in pregnancy and lactation

1-During pregnancy it is not recommended for a pregnant to exposed to x- radiation nor contrast media .

2- During lactation It is considered safe for both mother and infant to continue breast feeding after iodinated contrast administration

Premedication Strategies

No known premedication strategy that will eliminate the risk of a sever adverse reaction

Patients at high risk should be premedicated with corticosteroids and possibly antihistamines 12 to 24 hours before and after .

1- Prednisone—50 mg PO at 13 hr, 7 hr, and 1 hr before contrast media injection.

2- Plus diphenhydramine —50 mg IV, IM, or PO 1 hr before contrast medium injection.


Thank
you