

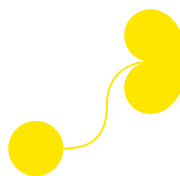


ESUR Guidelines on **Contrast Media**

version 6.0



www.esur.org



ESUR Guidelines on **Contrast Media**

European Society of Urogenital Radiology

version 6.0



PREFACE

It is a great honor for the Contrast Media Safety Committee of the European Society of Urogenital Radiology (ESUR) to present version 6.0 of its Contrast Media Guidelines. Since 1996 the intention of the Committee has been to cover all the safety aspects of contrast media and now that goal has been reached. Today these are the most comprehensive guidelines available. Our key aim has always been to come up with simple practical guidelines and over the years our work has been well received. The guidelines have been translated into 6 languages other than English.

In version 6.0 our new questionnaires for iodine-based and MR contrast media administration to be completed by the referring clinician have been added. We have also reorganized the formal structure of our guidelines, so they are more readable and therefore more useful in your daily practice. You can see the electronic version on www.esur.org, where it is also possible to submit comments and questions through our E-mail address NSF@esur.org. Please, be aware of the fact that things may have changed rapidly after this booklet was printed (e.g. in the case of nephrogenic systemic fibrosis and gadolinium based contrast agents).

The European Society of Urogenital Radiology hopes that the guidelines will help in your daily practice and benefit all patients.

ESUR Contrast Media Safety Committee
February 2007



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1. AN OVERVIEW

This overview summarizes some of the most important parts of the Guidelines and is intended for quick reference only. For specific problems, always refer to the relevant Guideline. Please notice the statement about gadolinium contrast agents at the end of the guideline.

NON-RENAL ADVERSE REACTIONS

IODINATED CONTRAST MEDIA

GADOLINIUM CONTRAST MEDIA

(non-organ specific)

At time of referral, identify patients at increased risk of reaction*

Patients with a history of

- Previous moderate or severe acute reaction to iodine contrast agent.
- Asthma.
- Allergy requiring medical treatment.

Patients with a history of

- Previous moderate or severe acute reaction to gadolinium contrast agent.
- Asthma.
- Allergy requiring medical treatment.

Before the examination

For patients at increased risk of reaction:

- Consider an alternative test not requiring an iodinated agent
- Consider the use of premedication. Clinical evidence of the effectiveness of premedication is limited. If used, a suitable premedication regime is prednisolone 30 mg (or methylprednisolone 32 mg) orally given 12 and 2 hours before contrast medium.

For patients at increased risk of reaction:

- Consider an alternative test not requiring a gadolinium agent
- Consider the use of premedication. There is no clinical evidence of the effectiveness of premedication. If used, a suitable premedication regime is prednisolone 30 mg (or methylprednisolone 32 mg) orally given 12 and 2 hours before contrast medium.

*The referring physician should complete the appropriate questionnaire (p.30, 31)



At the time of examination

- Use a non-ionic contrast medium.
 - Use a different iodinated agent for previous reactors to contrast medium
 - Keep the patient in the Radiology Department for 30 min after contrast medium injection.
 - Have the drugs and equipment for resuscitation readily available.
- Use a different gadolinium contrast agent for previous reactors to contrast medium
 - Keep the patient in the Radiology Department for 30 min after contrast medium injection.
 - Have the drugs and equipment for resuscitation readily available.

After the examination, delayed adverse effects may occur

Late adverse reactions

Mainly skin rashes

None described

Very late adverse reactions

Thyrotoxicosis

Nephrogenic systemic fibrosis

Pregnant patients

Iodinated contrast medium may be given. Thyroid function (TSH) of the neonate should be checked during the first week of life.

Gadolinium contrast medium may be given. No precautions are necessary for the neonate

Lactating patients

Breast feeding may continue normally when iodinated agents are given to the mother.

Breast feeding may continue normally when gadolinium agents are given to the mother.

Laboratory tests

Avoid laboratory tests for 24 hrs after contrast medium administration.

Avoid laboratory tests for 24 hrs after contrast medium administration.

Radioisotope tests and/or treatment

Avoid thyroid radio-isotope tests and treatment for 2 months after iodinated contrast medium administration.

No special precautions are necessary



RENAL ADVERSE REACTIONS

IODINATED CONTRAST MEDIA

GADOLINIUM CONTRAST MEDIA

(non-organ specific)

At time of referral*

Identify patients with raised serum creatinine and inform the Radiology Department.

Serum creatinine should be measured within 7 days of contrast medium administration in patients

- With previously raised serum creatinine
- Who are diabetics taking metformin
- Who will receive intraarterial contrast medium
- Who have a history suggesting the possibility of raised serum creatinine
 - Renal disease
 - Renal surgery
 - Proteinuria
 - Diabetes mellitus
 - Hypertension
 - Gout
 - Recent nephrotoxic drugs

Identify patients who are on dialysis or who have a GFR < 30 ml/min and inform the Radiology Department.

*The referring physician should complete the appropriate questionnaire (p.30, 31)



Before the examination

In patients with a raised serum creatinine:

- Consider an alternative imaging method not using iodinated contrast media
- 48 hours before the examination, stop metformin intake
- 24 hours (at least) before the examination, stop nephrotoxic drugs, mannitol and loop diuretics
- 6 hours before the examination, start hydrating the patient

At the time of the examination

In patients with normal serum creatinine:

- Stop metformin intake
- Use the lowest dose necessary

In patients with raised serum creatinine:

- Use low- or iso-osmolar contrast media
- Use the lowest dose necessary
- Continue hydration

In patients with normal serum creatinine:

- Use the lowest dose necessary

In patients with raised serum creatinine:

- Use the lowest dose necessary
- Gadolinium agents should not be used for radiographic examinations

After the examination

- In patients with raised serum creatinine, continue hydration for at least 6 hours.
- In patients taking metformin, measure serum creatinine at 48 hours after contrast medium administration to check if metformin can be restarted.
- Dialysis immediately after contrast medium administration is unnecessary.

- Dialysis immediately after contrast medium administration is unnecessary



2. NON-RENAL ADVERSE REACTIONS

ACUTE ADVERSE REACTIONS

Definition: An adverse reaction which occurs within 1 hour of contrast medium injection.

Classification

Mild	Nausea, mild vomiting Urticaria Itching
Moderate	Severe vomiting Marked urticaria Bronchospasm Facial/laryngeal edema Vasovagal attack
Severe	Hypotensive shock Respiratory arrest Cardiac arrest Convulsion

Iodinated Contrast Media

RISK FACTORS FOR ACUTE REACTIONS

Patient related	Patient with a history of: <ul style="list-style-type: none"> • Previous moderate or severe acute reaction (see “Classification” above) to an iodinated agent. • Asthma. • Allergy requiring medical treatment.
Contrast medium related	High osmolality ionic agents.

TO REDUCE THE RISK OF AN ACUTE REACTION

For all patients	<ul style="list-style-type: none"> • Use a non-ionic contrast medium. • Keep the patient in the Radiology Department for 30 min after contrast medium injection. • Have the drugs and equipment for resuscitation readily available (see “Management of Acute Reactions”, p.13).
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<p>For patients at increased risk of reaction (see “Risk factors” above)</p>	<ul style="list-style-type: none"> • Consider an <u>alternative test</u> not requiring an iodinated contrast agent. • Use a <u>different iodinated agent</u> for previous reactors to contrast medium. • Consider the use of premedication. Clinical evidence of the effectiveness of <u>premedication</u> is limited. If used, a suitable premedication regime is prednisolone 30 mg (or methylprednisolone 32 mg) orally given 12 and 2 hours before contrast medium.
<p>Extravascular administration of iodinated contrast media</p>	<p>When absorption or leakage into the circulation is possible, take the same precautions as for intravascular administration.</p>

Gadolinium Contrast Media (non organ specific)

Note: The risk of an acute reaction to a gadolinium contrast agent is significantly lower than the risk with an iodinated contrast agent.

RISK FACTORS FOR ACUTE REACTIONS

<p>Patient related</p>	<p>Patients with a history of</p> <ul style="list-style-type: none"> • Previous acute reaction to gadolinium contrast agent. • Asthma • Allergy requiring medical treatment.
<p>Contrast medium related</p>	<p>The risk of reaction is not related to the osmolality of the contrast agent: the low doses used make the osmolar load very small.</p>

TO REDUCE THE RISK OF AN ACUTE REACTION

<p>For all patients</p>	<ul style="list-style-type: none"> • Keep the patient in the Radiology Department for 30 min after contrast medium injection. • Have the drugs and equipment for resuscitation readily available (see “Management of Acute Reactions”).
<p>For patients at increased risk of reaction (see “Risk factors” above)</p>	<ul style="list-style-type: none"> • Consider an <u>alternative test</u> not requiring a gadolinium agent • Use a <u>different gadolinium agent</u> for previous reactors to contrast medium



- Consider the use of premedication. There is no clinical evidence of the effectiveness of premedication. If used, a suitable premedication regime is prednisolone 30 mg (or methylprednisolone 32 mg) orally given 12 and 2 hours before contrast medium.

MANAGEMENT OF ACUTE REACTIONS

First line emergency drugs and instruments which should be in the examination room.

Oxygen

Adrenaline 1:1,000

Antihistamine H1 – suitable for injection

Atropine

β 2-agonist metered dose inhaler

I.V. Fluids – normal saline or Ringers solution

Anti-convulsive drugs (diazepam)

Sphygmomanometer

One-way mouth “breather” apparatus

Simple guidelines for first line treatment of acute reactions to contrast media

Nausea/Vomiting

Transient: Supportive treatment

Severe, protracted: Appropriate antiemetic drugs should be considered.

Urticaria

Scattered, transient: Supportive treatment including observation.

Scattered, protracted: Appropriate H1-antihistamine intramuscularly or intravenously should be considered. Drowsiness and/or hypotension may occur.

Profound: Consider Adrenaline 1:1,000, 0.1-0.3 ml (0.1-0.3 mg) intramuscularly in adults, 0.01 mg/kg intramuscularly up to 0.3 mg max. in children. Repeat as needed.



Bronchospasm

1. Oxygen by mask (6-10 l/min)
2. β -2-agonist metered dose inhaler (2-3 deep inhalations)
3. Adrenaline

Normal blood pressure

Intramuscular: 1:1,000, 0.1-0.3 ml (0.1-0.3 mg) [use smaller dose in a patient with coronary artery disease or elderly patient]

In pediatric patients: 0.01 mg/kg up to 0.3 mg max.

Decreased blood pressure

Intramuscular: 1:1,000, 0.5 ml (0.5 mg),

In pediatric patients: 0.01 mg/kg intramuscularly

Laryngeal edema

1. Oxygen by mask (6 – 10 l/min)
2. Intramuscular adrenaline (1:1,000), 0.5 ml (0.5 mg) for adults, repeat as needed.

Hypotension

Isolated hypotension

1. Elevate patient's legs
2. Oxygen by mask (6-10 l/min)
3. Intravenous fluid: rapidly, normal saline or lactated Ringer's solution
4. If unresponsive: adrenaline: 1:1,000 , 0.5 ml (0.5 mg) intramuscularly, repeat as needed

Vagal reaction (hypotension and bradycardia)

1. Elevate patient's legs
2. Oxygen by mask (6-10 l/min)
3. Atropine 0.6-1.0 mg intravenously, repeat if necessary after 3-5 min, to 3 mg total (0.04 mg/kg) in adults. In pediatric patients give 0.02 mg/kg intravenously (max. 0.6 mg per dose) repeat if necessary to 2 mg total.
4. Intravenous fluids: rapidly, normal saline or lactated Ringer's solution

Generalized anaphylactoid reaction

1. Call for resuscitation team
2. Suction airway as needed
3. Elevate patient's legs if hypotensive
4. Oxygen by mask (6 – 10 l/min)
5. Intramuscular adrenaline (1:1,000), 0.5 ml (0.5 mg) in adults. Repeat as needed. In pediatric patients 0.01 mg/kg to 0.3 mg (max. dose)
6. Intravenous fluids (e.g. normal saline, lactated Ringer's)
7. H1-blocker e.g. diphenhydramine 25-50 mg intravenously



LATE ADVERSE REACTIONS

Definition: An adverse reaction which occurs 1 hour to 1 week after contrast medium injection.

TYPE OF REACTION

Iodinated contrast media

- A variety of late symptoms (e.g. nausea, vomiting, headache, musculoskeletal pain, fever) have been described following contrast medium, but many are not related to contrast medium.
- Skin reactions of similar type to other drug eruptions are true late adverse reactions. They are usually mild to moderate and self limiting.

Gadolinium contrast media

No late reactions have been reported

SKIN REACTIONS FOLLOWING IODINATED CONTRAST MEDIUM ADMINISTRATION

Risk factors

- Previous contrast medium reaction
- Interleukin-2 treatment

Prophylaxis

Generally not recommended
Patients who have had a previous serious late adverse reaction can be given steroid prophylaxis (see “To reduce the risk of an acute reaction”, p. 12)

Management

Symptomatic and similar to the management of other drug induced skin reactions

Recommendation

Tell patients who have had a previous contrast reaction or who are on interleukin-2 treatment that a late skin reaction is possible and that they should contact a doctor if they have a problem.



VERY LATE ADVERSE REACTIONS

Definition: An adverse reaction which usually occurs more than 1 week after contrast medium injection.

TYPE OF REACTION

Gadolinium contrast media	Nephrogenic systemic fibrosis
Iodinated contrast media	Thyrotoxicosis

NEPHROGENIC SYSTEMIC FIBROSIS

At risk	Patients with severely reduced renal function (GFR < 30ml/min) or on hemodialysis or peritoneal dialysis
No risk	Patients with normal renal function
Recommendation	Please consult www.esur.org for the latest information or contact NSF@esur.org

THYROTOXICOSIS

At risk	<ul style="list-style-type: none">• Patients with untreated Graves' disease• Patients with multinodular goiter and thyroid autonomy, especially if they are elderly and/or live in area of dietary iodine deficiency
No risk	Patients with normal thyroid function
Recommendations	<ul style="list-style-type: none">• Iodinated contrast media should not be given to patients with manifest hyperthyroidism.• Prophylaxis is generally not necessary.• In selected high-risk patients, prophylactic treatment may be given by an endocrinologist; this is more relevant in areas of dietary iodine deficiency.• Patients at risk should be closely monitored by endocrinologists after iodinated contrast medium injection.• Intravenous cholangiographic contrast media should not be given to patients at risk.



3. RENAL ADVERSE REACTIONS

Definition: Contrast medium nephrotoxicity is a condition in which an impairment in renal function (an increase in serum creatinine by more than 25% or $44\mu\text{mol/l}$ (0.5 mg/dl)) occurs within 3 days following the intravascular administration of a contrast medium (CM) in the absence of an alternative etiology.

IODINATED CONTRAST MEDIA

RISK FACTORS FOR CONTRAST MEDIUM INDUCED NEPHROPATHY

Patient related

- Raised serum creatinine particularly secondary to diabetic nephropathy
- Dehydration
- Congestive heart failure
- Gout
- Age over 70
- Concurrent administration of nephrotoxic drugs e.g. non-steroid anti-inflammatory drugs.

Contrast medium related

- High osmolality agents
- Large doses of contrast medium

RISK OF IODINATED CONTRAST MEDIA IN PATIENTS TAKING METFORMIN

Lactic acidosis

Metformin is excreted unchanged in the urine. In the presence of renal failure, either pre-existing or induced by iodinated contrast medium, metformin may accumulate in sufficient amounts to cause lactic acidosis

Note

Metformin does not cause renal failure



Time of referral

ELECTIVE EXAMINATION

1) IDENTIFY PATIENTS WITH RAISED SERUM CREATININE

- Patients with known raised serum creatinine
- Patients taking metformin
- Patients who will receive intra-arterial contrast medium
- Patients who have a history suggesting the possibility of raised creatinine:
 - Renal disease
 - Renal surgery
 - Proteinuria
 - Diabetes mellitus
 - Hypertension
 - Gout
 - Recent nephrotoxic drugs

Measure serum creatinine within 7 days of contrast medium administration

2) IDENTIFY DIABETIC PATIENTS TAKING METFORMIN

Depending on serum creatinine level, metformin will have to be stopped either before or at the time of contrast medium administration (see “Before the examination”, page 19)

EMERGENCY EXAMINATION

- 1) Identify patients with raised serum creatinine if possible.
 - 2) Identify patients taking metformin
- Measure serum creatinine if the procedure can be deferred until the result is available without harm to the patient
 - In extreme emergency, if serum creatinine measurement cannot be obtained, follow the protocol for patients with raised serum creatinine as closely as clinical circumstances permit.



Before the examination

ELECTIVE EXAMINATION

Patients with raised serum creatinine and those at increased risk of nephrotoxicity (see “Risk factors above”)

- Consider an alternative imaging method not using iodinated contrast media
- Stop nephrotoxic drugs, mannitol and loop diuretics at least 24 hours before contrast medium administration
- Start hydration. A suitable intravenous regime is 1ml/kg b.w. per hour of normal saline for at least 6 hours before and after the procedure. In hot climates the volume should be increased.

Diabetic patients taking metformin

- If serum creatinine is normal stop metformin from the time of contrast medium administration for 48 hours. Only restart metformin if serum creatinine remains normal.
- If serum creatinine is raised stop metformin 48 hours before contrast medium administration and remain off metformin for 48 hours after contrast medium. Only restart metformin if serum creatinine is unchanged 48 hours after contrast medium.

EMERGENCY EXAMINATION

Patients at increased risk of nephrotoxicity

- Consider an alternative imaging method not using iodinated contrast media.
- Start intravenous hydration as early possible before contrast medium administration (See before “Elective Examination”).



Diabetic patients taking metformin

- If serum creatinine is normal, follow instructions for elective patients.
- If serum creatinine is abnormal (or unknown), weigh the risks and benefits of contrast medium administration and consider an alternate imaging method. If contrast medium is deemed essential take the following precautions:
 - Metformin therapy should be stopped.
 - The patient should be hydrated (E.g. at least 1 ml per hour per kg b.w. of intravenous normal saline up to 24 hours after contrast medium administration – In warm areas more fluid should be given).
 - Monitor renal function (serum creatinine), serum lactic acid and pH of blood.
 - Look for symptoms of lactic acidosis (vomiting, somnolence, nausea, epigastric pain, anorexia, hyperpnea, lethargy, diarrhea and thirst). Blood test results indicative of lactic acidosis: pH < 7.25 and lactic acid > 5 mmol.

Time of examination

In patients at increased risk of contrast medium induced nephropathy

- Use low or iso-osmolar contrast media
- Use the lowest dose of contrast medium consistent with a diagnostic result.

In patients with no increased risk of contrast medium induced nephropathy

- Use the lowest dose of contrast medium consistent with a diagnostic result.

After the examination

In patients with raised serum creatinine

Continue hydration for at least 6 hours.

In patients taking metformin

Measure serum creatinine at 48 hours after contrast medium administration. If it is within normal levels, metformin can be restarted.



Note: None of the **pharmacological manipulations** (with renal vasodilators, receptor antagonists of endogenous vasoactive mediators or cytoprotective drugs) has yet been shown to offer consistent protection against contrast medium induced nephropathy.

GADOLINIUM CONTRAST MEDIA (NON-ORGAN SPECIFIC)

MR Examinations

- The risk of nephrotoxicity is very low when gadolinium contrast media are used in approved doses.
- Please consult www.esur.org for the latest recommendations on avoiding nephrogenic systemic fibrosis.

Radiographic Examinations

- Gadolinium contrast media should not be used for radiographic examinations in patients with renal impairment.
- Gadolinium contrast media are more nephrotoxic than iodinated contrast in equivalent X-ray attenuating doses.

DIALYSIS AND CONTRAST MEDIUM ADMINISTRATION

All contrast media, iodinated and gadolinium, can be removed by hemodialysis or peritoneal dialysis. However, there is no evidence that hemodialysis protects patients with impaired renal function from contrast medium induced nephropathy.

PATIENTS ON DIALYSIS WHO RECEIVE IODINATED OR GADOLINIUM CONTRAST MEDIUM

Hemodialysis

- Avoid osmotic and fluid overload
- Correlation of time of the contrast medium injection with the hemodialysis session is unnecessary.
- Extra hemodialysis session to remove contrast medium is unnecessary.

Continuous ambulatory peritoneal dialysis

- Hemodialysis to remove the contrast medium is unnecessary



4. MISCELLANEOUS

CONTRAST MEDIUM EXTRAVASATION

TYPE OF INJURIES	<ul style="list-style-type: none">• Most injuries are minor.• Severe injuries include skin ulceration, soft tissue necrosis, and compartment syndrome
RISK FACTORS	
Technique related	<ul style="list-style-type: none">• Use of a power injector.• Less optimal injection sites including lower limb and small distal veins.• Large volume of contrast medium.• High osmolar contrast media.
Patient related	<ul style="list-style-type: none">• Inability to communicate• Fragile or damaged veins• Arterial insufficiency• Compromised lymphatic and/or venous drainage.• Obesity
TO REDUCE THE RISK	<ul style="list-style-type: none">• Intravenous technique should always be meticulous using appropriate sized plastic cannula placed in a suitable vein to handle the flow rate used during the injection.• Test injection with normal saline• Use non-ionic iodinated contrast medium
TREATMENT	<ul style="list-style-type: none">• Conservative management is adequate in most cases<ul style="list-style-type: none">• limb elevation• apply ice packs• careful monitoring• If a serious injury is suspected, seek the advice of a surgeon



PULMONARY EFFECTS OF IODINATED CONTRAST MEDIA

PULMONARY ADVERSE EFFECTS	<ul style="list-style-type: none">• Bronchospasm• Increased pulmonary vascular resistance• Pulmonary edema
PATIENTS AT HIGH RISK	<ul style="list-style-type: none">• History of asthma• History of pulmonary hypertension• Incipient cardiac failure
TO REDUCE THE RISK OF PULMONARY ADVERSE EFFECTS	<ul style="list-style-type: none">• Use low or iso-osmolar contrast media• Avoid large doses of contrast media

EFFECTS OF IODINATED CONTRAST MEDIA ON BLOOD AND ENDOTHELIUM

The clinically important adverse effect of iodinated contrast media on blood and endothelium is thrombosis.

It is recognized that:

- All contrast media have anticoagulant properties, especially ionic agents.
- High osmolar ionic contrast media may induce thrombosis due to endothelial damage, particularly in phlebographic procedures.
- Drugs and interventional devices that decrease the risk of thromboembolic complications during interventional procedures minimize the importance of the effects of contrast media.

Guidelines

- Meticulous angiographic technique is mandatory and is the most important factor in reducing thromboembolic complications.
- Low- or isoosmolar contrast media should be used for diagnostic and interventional angiographic procedures including phlebography.



CONTRAST MEDIA AND CATECHOLAMINE PRODUCING TUMORS (PHEOCHROMOCYTOMA AND PARAGANGLIOMA)

PREPARATION

Tumor localisation when catecholamine-producing tumor detected biochemically

a) Before intravenous contrast medium (iodinated or gadolinium): α and β -adrenergic blockade with orally administered drugs under the supervision of the referring physician is advised. Further α -blockade with intravenous phenoxy-benzamine is not necessary.

b) Before intra-arterial iodinated contrast medium: α and β -adrenergic blockade with orally administered drugs and α -blockade with intravenous phenoxy-benzamine under the supervision of the referring physician are recommended.

Characterisation of incidentally detected adrenal mass.

No special preparation

TYPE OF CONTRAST MEDIUM WHICH SHOULD BE USED

Iodinated: non-ionic agent.

Gadolinium: any agent, ionic or non-ionic

PREGNANCY AND LACTATION

	IODINATED AGENTS	GADOLINIUM AGENTS
Pregnancy	<p>a) In exceptional circumstances, when radiographic examination is essential, iodinated contrast media may be given to the pregnant female.</p> <p>b) Following administration of iodinated agents to the mother during pregnancy, thyroid function should be checked in the neonate during the first week.</p>	<p>a) When MR examination is necessary, gadolinium media may be given to the pregnant female.</p> <p>b) Following administration of gadolinium agents to the mother during pregnancy, no neonatal tests are necessary.</p>
Lactation	<p>Breast feeding may be continued normally when iodinated agents are given to the mother.</p>	<p>Breast feeding may be continued normally when gadolinium agents are given to the mother.</p>



Pregnant or lactating mother with renal impairment

See “Renal adverse reactions” (page 17). No additional precautions are necessary for the fetus or neonate.

See “Renal adverse reactions” (page 17). See www.esur.org for information about nephrogenic systemic fibrosis (NSF). There is no specific information about NSF in pregnant and lactating patients.

INTERACTION WITH OTHER DRUGS AND CLINICAL TESTS

GENERAL RECOMMENDATION

Be aware of the patients drug history
Keep a proper record of the contrast medium injection (time, dose, name)
Do not mix contrast media with other drugs in tubes and syringes

DRUGS NEEDING SPECIAL ATTENTION

Metformin

Refer to “Renal adverse reactions” (page 17)

Nephrotoxic drugs
Cyclosporine
Cisplatin
Aminoglycosides
Non steroid anti-inflammatory drugs

Refer to “Renal adverse reactions” (page 17)

β -blocker

β -blockers may impair the response to treatment of bronchospasm induced by contrast medium

Interleukin-2

Refer to “Late adverse reactions” (page 15)



BIOCHEMICAL ASSAYS

Recommendation

Do not perform non-emergency biochemical analysis of blood and urine collected within 24 hours of contrast medium injection.

ISOTOPE STUDIES AND/OR TREATMENT

Thyroid

Patients undergoing therapy with radioactive iodine should not have received iodinated contrast media for at least two months before treatment.
Isotope imaging of the thyroid should be avoided for two months after iodinated contrast medium injection.

Bone,
Red blood cell labeling

Avoid iodinated contrast medium injection for at least 24 hours before the isotope study

SAFETY OF ULTRASOUND CONTRAST MEDIA

Statement:

- Ultrasound contrast media are generally safe.

Contraindication

- Severe heart disease (e.g. New York class III/IV).

Type and severity of reactions:

- The majority of reactions are minor (e.g. headache, nausea, sensation of heat, altered taste) and self-resolving.
- Allergy-like reactions occur rarely.

To reduce the risk:

- Check for intolerance of any of the components of the contrast agent
- Use the lowest level of acoustic output and shortest scanning time to allow a diagnostic examination.

**Treatment:**

- If a serious event occurs – see “Non-renal adverse reaction” page (11).

SAFETY OF LIVER SPECIFIC MR CONTRAST MEDIA**Types of adverse reactions**

Similar to reactions observed with other types of contrast media such as nausea, vomiting, urticaria, rash, generalized anaphylactoid reactions. Back pain may also occur with superparamagnetic iron oxides. Serious life threatening reactions are rare.

Patients < 18 years old

Safety has not yet been established

Contraindications**Iron oxides**

Known allergy or hypersensitivity to parenteral iron or dextran

Manganese based contrast media

Known allergy to the preparation, Pregnancy, Lactation, Severe liver impairment

Gadolinium based contrast media

Known allergy to the preparation

Cautions**Iron oxides**

In patients with hemosiderosis or hemochromatosis: iron-overload may be aggravated.

Manganese based contrast media

Liver impairment and heart failure

Gadolinium based contrast media

- Agent with high hepatocyte uptake: Liver and renal failure
- Agent with low hepatocyte uptake: Renal failure



SAFETY OF BARIUM CONTRAST MEDIA

		RECOMMENDED ACTION
Contraindications	Integrity of gut wall compromised	Use iodinated water-soluble contrast media In neonates and patients at risk of leakage into mediastinum and/or lungs use low- or isoosmolar contrast media
	Previous allergic reactions to barium products	Use iodinated water-soluble contrast media and be prepared to treat a reaction
Cautions	Bowel strictures	Use only small amounts
	Extensive colitis	Avoid barium enemas
Complications	Reduced bowel motility	Encourage fluid intake
	Venous intravasation	<ul style="list-style-type: none">• Early identification and careful observation• Antibiotics and intravenous fluids• Emergency treatment may be needed
	Aspiration	<ul style="list-style-type: none">• Bronchoscopic removal for large amounts• Chest physiotherapy• Antibiotics



NOTES



QUESTIONNAIRE

to be completed by the referring clinician.

FOR IODINE-BASED CONTRAST MEDIA ADMINISTRATION

1. History of moderate or severe reaction to an iodinated contrast medium Yes No
2. History of allergy requiring treatment Yes No
3. History of asthma Yes No
4. Hyperthyroidism Yes No
5. Heart Failure Yes No
6. Diabetes Mellitus Yes No
7. History of renal disease Yes No
8. Previous renal surgery Yes No
9. History of proteinuria Yes No
10. Hypertension Yes No
11. Gout Yes No
12. Most recent measurement of serum creatinine
 - Value.....
 - Date
13. Is the patient currently taking any of the following drugs
 - Metformin for treatment of diabetes Yes No
 - Interleukin 2 Yes No
 - NSAIDs Yes No
 - Aminoglycosides Yes No
 - β -blockers Yes No

Completed by _____ Date _____



QUESTIONNAIRE

to be completed by the referring clinician.

FOR MRI CONTRAST MEDIA ADMINISTRATION.

1. History of moderate or severe reaction to a MRI contrast medium
 Yes No
2. History of allergy requiring treatment
 Yes No
3. History of asthma
 Yes No
4. Has the patient end-stage renal failure (eGFR < 30 ml/min/1.73m²) or is the patient on dialysis
 Yes No
5. History of hemosiderosis or hemochromatosis
 Yes No
6. Previous reaction to dextran
 Yes No

Completed by _____ Date _____



ESUR PUBLICATIONS

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