Department of Diagnostic Imaging

9.0  Procedure for the Administration of Intravenous (IV) and Oral Contrast Media.

9.1  Procedure for IV Injection by a Radiographer

1.  Explain procedure to patient and introduce yourself by name and professional title.

2.  Follow the ANTT procedure.

3.  Wash your hands.

4.  Use of gloves is recommended.

5.  Before the agent being drawn up in the syringe two members of staff should always the agent.

6.  Select an appropriate vein by use of a tourniquet in either the antecubital fossa or dorsum of the hand. Do not inject at any other site.

7.  The radiologist should be summoned if there are two failed attempts at securing intravenous access.

8.  Clean skin using a Alcohol wipe

9.  Introduce cannula into vein and secure.

10.  Flush the cannula with saline to ensure the line is opaque.

11.  For IV Cannulation attach to vented connecting tube which is in turn connected to the automatic intravenous contrast injection.

12.  When injecting contrast observe the injection site of the patient for any leakage.

   a. If any adverse reaction occurs stop injecting and seek advice.  DO NOT REMOVE THE CANNULA. Commence management of adverse reactions to contrast media.
   
   b. If contrast extravasation occurs, follow the extravasation protocol (section 9.5).

13.  Disconnect the connecting tube and place end-cap onto cannula.
14. Complete examination and remove cannula ensuring that the needle is disposed off safely. Place swab on injection site, check bleeding has stopped then cover with Elastoplast.

15. Note that the procedure should observe sterile precautions.

Department of Diagnostic Imaging

9.2 IV Non-Ionic contrast Injections by Radiographers

SCHEME OF WORK

The injecting Radiographer will have been formally approved and certified for the IV injecting of non-ionic contrast by attending an intravenous injection course certified by the College of Radiographers.

1. The injecting Radiographer plus one other staff member should always be present.
2. A Radiologist must be in the immediate vicinity i.e. the x-ray department, and aware that a contrast injection is being carried out by the radiographer.
3. The injecting radiographer must carefully check Patient ID and clinical details.
4. The radiographer is responsible for explaining the examination to the patient including the reason for the intravenous injection.
5. The patient must be questioned about known allergies and the intravenous injection form completed.
6. The patient renal function should be ascertained via Powerchart. Any renal impairment should be discussed with the referring clinician and Radiologist.
7. Radiographers must only inject on-ionic contrast as instructed by the supervising radiologist.
8. The radiographer should not inject in the following circumstances:

Exclusions

- Paediatric cases.
- Patients with a previous allergic reaction.
- Patients in renal failure or with significant dehydration.
- Patients with asthma or a history of allergy.
- Out of hours when not in the company of a doctor or a nurse.

9. The radiographers will regularly assess their own work. They will monitor first time accuracy for injections and contrast media reactions and the management of adverse effects of the examination. If the radiographer requires further training they should discuss this with their line manager.
Department of Diagnostic Imaging

9.3 Guidelines for Cannula Use in Patients

Flushing solution and frequency for maintaining patency
- Cannulas need to be flushed daily with sodium chloride solution 0.9%
- The volume of fluid should be at least equivalent to twice the volume of the cannula and add on devices – usually 5-10mls
- There is no requirement to withdraw blood prior to flushing (see separate policies for other flushing solutions and other infusion access devices).

Flushing solution and frequency before and after drug administration
- The required amount is 2ml before and 3ml after administering the drug (N.B. this lower amount of flush fluid is based upon a practitioner using the injection bung on the cannula itself, if using an add on device further flush should be added as above).

Technique
- The technique employed should employ a pulsatile flush, ending with positive pressure

Procedure

Equipment required:
- Clean trolley, receptacle or tray
- Bactericidal alcoholic hand rub
- Alcohol swab
- Gloves (optional)
- Injectable cap or Needleness injection cap
- Tape
- 10ml syringe containing 0.9% sodium chloride or other advised flushing solution
- 25g needle

Guidelines for flushing cannulas:

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The flushing solution is checked as per Medicines Administration policy for administration and/or patient group direction</td>
<td>To ensure safe administration practice</td>
</tr>
<tr>
<td>2 An explanation should be given to the patient, parents or guardians before it is flushed</td>
<td>To gain co-operations and consent</td>
</tr>
</tbody>
</table>
**Removal of peripheral IV cannula**

The cannula should be removed when:

- 72 hours have elapsed and/or IV therapy is no longer required
- There are signs of inflammation (phlebitis) or infection at the cannula site
- Leakage of infusion fluids/drugs from the exit site
- Extravasation of fluids/drugs into tissues
- The cannula has become displaced (cannulas should never be re-advanced following completion of initial insertion)

Contamination of the entry site is still possible therefore this should be an aseptic procedure. Dressings and tape should be removed carefully from the skin before cannula removal. The skin in older patients and premature babies may be fragile and tear easily so care should be taken. Dressings and/or tape should be discarded into a yellow plastic waste bag, and cannula discarded into a sharps bin to comply with Trust Infection Control and Waste Disposal policies.

A sterile gauze swab should be used to apply pressure to the puncture site immediately after (not during) removal of the cannula. Firm pressure should be applied (the patient may be able to do this) until the bleeding stops. The puncture site should be inspected for inflammation (if infection suspected consideration should be given to send the tip of the cannula for culture). If this is present a suitable wound dressing should be applied (Workman 2000), otherwise a small adhesive dressing should be applied to the puncture site. N.B relying on gauze and tape to stop bleeding is insufficient and may result in extensive bruising.

The date and time of removal, condition of the site on removal should be documented in the patient’s notes and the progression of healing monitored to ensure post-infusion phlebitis does not occur (Millam 1998 cited in Workman 2000). FOR INPATIENTS ONLY.

**NOTE:** It should be noted that patients have complained of pain from an IV insertion site for up to 5 months following hospital discharge (Lundgren Jordfeldt and Ek 1993).
Diagnostic Imaging Department

9.4 Intravenous Contrast Administration to Patients in CT and Interventional

- Please ensure that the current Urea & Creatinine levels from the patients’ blood results is written down on the request form or allergy form (This can accessed from Powerchart).
- The blood results should therefore be scanned into the patients’ electronic entry.
- All blood results showing a raised Creatinine level of more than 130µmol/L should be discussed with the referring clinician and the Radiologist authorising the CT / interventional examination.
- Either the referring clinician or the Radiologist should sign and date their consent for the Radiographer to administer the intravenous contrast media to the patient if their Creatinine level is abnormal. This should be recorded together with the current creatinine level either in the patient’s notes, on the request form or the allergy sheet.
- For patients with abnormal renal function the current Creatinine level and the quantity and type of the contrast media to be administered should be recorded.
- All CT scans performed out of normal working hours (Monday – Friday after 5pm, weekends, and Bank Holidays) should have a doctor or nurse present to oversee the administration of the intravenous contrast media.
- For addition information, please see sections 9.5 – 9.10.
9.5
Standards For Intravascular Contrast Agent Administration
To Adult Patients
2nd Edition

Please follow the link below:

http://www.rcr.ac.uk/docs/radiology/pdf/BFCR(10)4_Stand_contrast.pdf
9.6 ESUR Guidelines on Contrast Media

February 2007

Website link to whole document:


The document includes the following:

Non-renal adverse reactions
- Acute adverse reactions
- Late adverse reactions
- Very late adverse reactions

Renal adverse reactions
- Iodinated contrast media
- Gadolinium contrast media (non organ specific)
- Dialysis and contrast medium administration

Miscellaneous
- Contrast medium extravasation
- Pulmonary effects of contrast medium Effects of iodinated contrast media on blood and endothelium
- Contrast media and catecholamine producing tumours (Pheochromocytoma and Paraganglioma) Pregnancy and lactation
- Interaction with other drugs and clinical tests
- Safety of ultrasound contrast media
- Safety of liver specific MR contrast media
- Safety of barium contrast media

Questionnaire for iodine-based contrast media

Questionnaire for MRI contrast media

ESUR Publications

Contrast Media Safety Committee
Department of Diagnostic Imaging

9.7 Administration of Intravascular Contrast Media in Adults with Renal Impairment in CT (eGFR)

When a patient has abnormal renal function the estimated Globular Filtration rate (eGFR) should be calculated prior to the administration of intravascular contrast media. The following web link should be used to calculate the eGFR value:

http://www.renal.org/eGFRcalc/

The patients: Creatinine, age, sex and race should be submitted into the online calculator. This will give the eGFR.

eGFR = <60mls/min would indicate that maybe a CT examination with intravascular contrast media is incorrect, and the referring clinician should discuss the examination with the supervising Radiologist.

eGFR = <45mls/min would indicate a nephrotoxic risk for iodine based contrast and therefore intravascular contrast media should only be used if absolute necessary. A clinical assessment is needed before use of the contrast. If essential then good patient hydration is essential possible use Acetylcysteine.

All patients with abnormal renal function must have an eGFR calculated to be risk stratified before the administration of IV contrast.

This should be discussed with the Radiologist supervising the CT patient’s examination.
9.8 Guidelines for Intravenous Contrast Use in Diabetic Patients on Metformin

1. Serum Creatinine normal + \( \leq 100 \text{ml} \) contrast intravenously: no special precautions are required, (i.e. continue Metformin treatment.)

2. Serum Creatinine normal + \( >100 \text{ml} \) contrast intravenously or any intra-arterial injection: stop Metformin for 48 hours after the test.

3. Serum Creatinine raised: reassess need for the contrast injection: if it is deemed necessary, Metformin should be stopped for 48 hours before and 48 hours after contrast and the renal function reassessed before Metformin is reinstituted (if at all). This should be discussed with the referring clinician.
9.9 Intravenous Injections. Safety at Work Protocols

9.9.1 Health and Safety of IV Cannula Injections.

The following points must be adhered to when using IV Cannulas and/or Butterfly needles and Iodine contrast media.

- Only suitably trained persons will perform intravenous cannulation.
- Check for a history of allergies. Check for any previous history of allergic reaction to Iodine based contrast media. Ask Radiologist for advice before proceeding if the patient has a history of any of the above.
- The person administering the contrast will record the dose in the RIS entry for the CT test that was performed.
- Any reaction to contrast will be reported to the Consultant Radiologists immediately. Details must be recorded on the following.

1) RIS when completing
2) Request form
3) RIS on the comments
4) CT log book
5) Hospital case notes if available
6) IR1 form

- Ideally a named Consultant Radiologist must oversee all IV contrast administration in the department. If a CT scan is performed when there is no radiologist in the Imaging department then the Emergency Department will be able to respond to contrast reactions or extravasation events.
Department of Diagnostic Imaging

9.9.2 Health and Safety of IV Pump Injections.

The following points must be adhered to when using the IV pump injector:

- Only trained operators will lead and operate IV pump.
- One trained operator will load the syringe, set protocol and connect to patient.
- Air must be expelled from both syringe and connecting tubing before use.
- The pump must be used in the syringe position.
- The syringe must be removed immediately after use and discarded.
- All unused contrast and/or syringes must be discarded. Do not leave pump loaded over lunch or night time periods.
- All patients must be supervised at all times when connected to pump.
- A pressure limit of less than 125PSI must be used when connected central lines.
- Remember – Venflon Cannulas are NOT pressure rated.
9.10 Extravasation Procedure

- Record details of the accident with management advice in the RIS under the patient examination details.
- Elevate the affected limb
- Apply cold compress to the affected limb / area.
- Out-Patients should be sent to the Emergency Department for clinical assessment of extravasation site.
- For In-Patients, the referrer and the ward should be contacted to inform them of the extravasation, and to assess the site.
- Contrast extravasation can cause Skin blistering, parathesia, altered tissue perfusion and increasing or persistent pain > 4 hours. This may suggest severe injury. The patient should seek surgical/medical advice (plastic surgeons).
- A Datix IR1 should be filled out for every contrast extravasation, ensuring that the patient details are included.