Prevention of Contrast Induced Nephropathy (CIN) Guidelines

This procedural document supersedes: PAT/T 48 v.1 - Guidelines for Prevention of Contrast Induced Nephropathy (CIN)

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<table>
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<tr>
<th>Author/reviewer: (this version)</th>
<th>Dr Mohan Arkanath - Consultant Nephrologist</th>
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**Amendment Form**

Please record brief details of the changes made alongside the next version number. If the procedural document has been reviewed **without change**, this information will still need to be recorded although the version number will remain the same.

<table>
<thead>
<tr>
<th>Version</th>
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<th>Author</th>
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| Version 2 | July 2012  | • Major changes have been made throughout and it is recommended that you read this document in full.  
• Paragraph 2 removal of Administration of N-Acetylcysteine (NAC) is believed to reduce this complication although not proven. As this drug is relatively inexpensive, most clinicians administer this drug for prevention of CIN.  
• Replaced with: Due to lack of evidence and the logistical problems associated with prescribing an unlicensed medicine, the administration of N-Acetylcysteine is no longer recommended although the decision for this remains with the referring clinician.  
• References updated  
• **Appendix 1** updated  
• **Appendix 2** added | Dr M Arkanath |
| Version 1 | February 2010 | This is a new procedural document, please read in full.                                  | Dr M Arkanath |

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1. **INTRODUCTION**

Intravascular administration of radiographic contrast media may result in contrast induced nephropathy (CIN). This is usually self-limiting but may require a period of dialysis. The incidence of CIN is greatest in patients with an elevated serum creatinine (>130), in diabetic nephropathy with renal insufficiency, or in advanced heart failure etc. The risk is further increased by dehydration or concurrent exposure to other nephrotoxins but reduced by limiting the volume of contrast and the use of low osmolar non-ionic contrast medium.

Prevention of this complication is achieved by adequate hydration prior to and/or during the procedure. Due to lack of evidence and the logistical problems associated with prescribing an unlicensed medicine the administration of N-Acetylcysteine is no longer recommended although the decision for this remains with the referring clinician.

2. **PURPOSE**

The purpose of this document is to provide clear instruction on the correct operational procedure for at risk patients receiving intravascular contrast medium.

Every clinical team has the responsibility for ensuring that patients who are referred for a radiological investigation/procedure that requires intravascular contrast has checked the relevant U&E result recorded this on the x-ray request form and initiated the CIN protocol for at risk patients.

3. **DUTIES AND RESPONSIBILITIES**

Consultant medical staff are responsible for ensuring that their junior staff (including locum staff) read and understand this protocol and adhere to it at all times.

4. **PROCEDURE**

Patients in the at risk group include:
- Diabetes
- Multiple myeloma
- Heart failure
- Sepsis
- Volume depleted states – GI bleed, diarrhoea and vomiting, diuretics

Consider putting at risk patients on the protocol despite normal renal functions.

4.1 **Categories**

- **Low Risk** – Serum creatinine (Scr) < 130Umol/l or estimated glomelular filtration rate (eGFR) > 60mls/min
- **High Risk** – Scr > 130Umol/l or eGFR < 60mls/min
4.2 At risk patients pre procedure

☐ Consider stopping diuretics, ACE-I, metformin or any other nephrotoxic medication 48 hours before the procedure if there is no contraindication.

☐ Ensure that the most recent and dated U&E result is documented on the request card and sent to medical imaging.

☐ If the patient is in the high risk group the referrer should commence the CIN protocol.

☐ It is the responsibility of the Medical Imaging appointment clerk to inform the clinicians secretary of the time and date of the radiological procedure thus enabling the referring team to expedite the CIN protocol.

☐ A patient information leaflet will be sent to the patient to explain the need for hydration prior to their procedure.

☐ Use caution when using the guideline in patients with fluid overload.

☐ On the day of the procedure the patient will receive 1 litre of Sodium Bicarbonate 1.26% to be infused intravenously over 5 hours, ideally commenced 1 hour before the patients radiological procedure and for 4 hours after. Sodium Chloride 0.9% is a suitable alternative only if there is a stock availability issue with Sodium Bicarbonate 1.26%.

4.3 At risk patient peri procedure

Use low or iso osmolar non-ionic contrast media.

Use lowest volume of contrast media required for the study.

4.4 At risk patient post procedure

Recheck the U&E within 48 hours. If the renal function is at the baseline value or has improved, then there is no risk of CIN.

If the renal function is abnormal, repeat the U&E after a further 24 hours. If there is a 25% increase in the Scr or 25% decrease in the eGFR then consider a referral to a Nephrologist.

5. TRAINING/ SUPPORT

As the professional with overall clinical responsibility for patients the consultant will ensure that clinical standards are maintained and that any deviation from this protocol is documented in the clinical notes.
The consultant will supervise medical staff in training to ensure compliance with this protocol.

6. MONITORING COMPLIANCE WITH THE PROCEDURAL DOCUMENT

<table>
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<tr>
<th>NHSLA Criteria</th>
<th>Monitoring</th>
<th>Who</th>
<th>Frequency</th>
<th>How Reviewed</th>
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<tr>
<td><strong>Level 1:</strong></td>
<td>Audit of x-ray referrals with creatinine levels documented and instigation of inpatient pathway.</td>
<td>Medical Imaging</td>
<td>Annually</td>
<td>Discussed at departmental clinical governance meetings – with non compliance presented to PSRG</td>
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7. EQUALITY IMPACT ASSESSMENT

An Equality Impact Assessment (EIA) has been conducted on this procedural document in line with the principles of the Equality Analysis Policy (CORP/EMP 27) and the Fair Treatment For All Policy (CORP/EMP 4).

The purpose of the EIA is to minimise and if possible remove any disproportionate impact on employees on the grounds of race, sex, disability, age, sexual orientation or religious belief. No detriment was identified.

A copy of the EIA is available on request from the HR Department.

8. REFERENCES


CIN Protocol Flow chart

**Protocol**

**Low Risk**

1 litre of oral fluids pre procedure

**High Risk**

On the day of the procedure, prescribe 1 litre sodium bicarbonate 1.26% intravenously over 5 hours, starting 1 hour pre-procedure

Recheck U&Es 48hrs post procedure

Renal function at baseline value or improved

**No**

Recheck U&E in 24hrs

If > 25% rise in Scr or fall in eGFR, consider referral to nephrologists

**Yes**

No concern of CIN
MEDICAL IMAGING CLINICAL SERVICE UNIT

Standard Operating Procedure for investigations requiring administration of intravascular contrast media

| Name and title of author / reviewer: | Dr P Stannard – Clinical Director, Medical Imaging CSU  
MRS W Lee – Clinical Governance Lead, Medical Imaging CSU  
Mr M Greenwood – General Manager, Medical Imaging CSU |
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<tr>
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Standard Operating Procedure for investigations requiring administration of intravascular contrast media

Referrers have primary responsibility for testing and documenting creatinine levels for patients undergoing imaging examinations which require the administration of intravascular contrast agents. If creatinine is abnormal (> 130) the referrer should implement the Trust CIN Guideline.

- If a blood test has already been undertaken within the prescribed timescales (In Patient - 7 days, Out Patient - 3 months), the creatinine level and the date of result should be documented on the request by the referrer.

- If not, a blood test for U&E’s should be arranged by the referrer who should document this on the request.

- On receipt of all requests requiring contrast, the Medical Imaging appointment clerk will check for the most recent creatinine result on PAS and confirm it is ‘within date’. Requests with pending results will be withheld until the result is available (usually by the following day at the latest).

- If creatinine is > 130, the appointment clerk will contact the referring consultant’s secretary with the date and time of appointment, to ask them to arrange admission of the patient for hydration as per Trust CIN Guideline.

- If the referrer fails to document the creatinine results on the request, or to organise U&E’s, and there is no recent creatinine result available on PAS, the appointment clerk will inform the referring consultant’s secretary asking them to arrange a blood test.

- On the day of the examination, the radiographer will double check the creatinine results prior to administering the intravenous contrast agent, as a failsafe mechanism.

- When requests are sent for a deferred examination (e.g. 6 months / 12 months) such as surveillance CT scan for colorectal cancer, the referrer should provide the patient with a request for U&E’s and advise them to have the blood test on receipt of the CT appointment. If blood results are not available 1 week prior to the appointment, the appointment clerk will contact the referring consultant’s secretary.
Imaging request received in Medical Imaging

Creatinine level documented?

- Yes
  - Check creatinine level and date of blood test on PAS
    - Available and within specified timescale
      - I/P – 7 days
      - O/P – 3 months
        - Creatinine < 130
          - Book Appointment
        - Creatinine > 130
          - Contact referring Consultant's Secretary with the appointment date to arrange admission and prescription for hydration
    - Not available or outside specified timescale
      - I/P – 7 days
      - O/P – 3 months
        - Contact referring Consultant's Secretary to arrange U&E's
  - Retain x-ray request

- No
  - U&E's taken. Creatinine result pending