Doncaster and Bassetlaw Teaching Hospitals
NHS Foundation Trust

Prevention of Contrast Induced Nephropathy (CIN) Guidelines in Adults

This procedural document supersedes: PAT/T 48 v.2 - Guidelines for Prevention of Contrast Induced Nephropathy (CIN)

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Author/reviewer: (this version)	Julie Kay Jas Sawhney Ian Stott Wendy Lee
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Target audience:	Trust Wide

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.

Version	Date	Brief Summary of Changes	Author
Version 3	4 May 2018	• Major changes have been made throughout and it is recommended that you read this document in full • Use of eGFR rather than creatinine for assessment of CIN risk • Ensuring eGFR known prior to requesting scan so informed decision can be made as to risk and benefit of particular scan and where this is not the case mechanisms are in place to ensure clinical review of those deemed high risk prior to the scan. • Ensure details of risk/benefit in relation to those with renal impairment documented on request/referral	Julie Kay Jas Sawhney Ian Stott Wendy Lee
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

Contents

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 a decreased eGFR (<40ml/min/1.73²)), 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 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. The exception to this is when the benefit of very early imaging outweighs the risk of delaying the procedure. Where this is the case the referrer must ensure a senior doctor is involved in this decision and this is documented in the clinical records and on the referral form.

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

The risk of CIN should be assessed for individual patients as although presence of renal impairment is often the major determining factor for CIN other factors in addition to renal impairment can increase the risk greatly.
Patients in the at risk group include:

- Diabetes
- Multiple myeloma
- Heart failure
- Sepsis
- Volume depleted states – GI bleed, diarrhoea and vomiting, diuretics
- Age>75years
- Patient receiving nephrotoxic agents eg aminoglycosides, NSAIDs, amphotericin
- Patients needing scans requiring intra-arterial administration of contrast
- CKD eGFR <40ml/min/1.73²

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

4.1 Categories

Low Risk –estimated glomerular filtration rate (eGFR) > 40mls/min/1.73²
High Risk –eGFR < 40mls/min/1.73² or any current AKI alert

4.2 At risk patients pre procedure

☐ Consider suspending 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/ice referral form and sent to medical imaging. (eGFR should be in the last 7 days when a scan is needed as an in-patient and within 3 months for an outpatient). Where this is not possible for example for follow up scans where the scan may be in 6 months time clinicians should ensure they have systems in place to review the appropriateness of the scans in those patients subsequently found to be in the high risk category and organise the prescribing and admission necessary for the CIN protocol.

☐ If the patient is in the high risk group the referrer should commence the CIN protocol. Ensure you indicate on the request/referral that CIN is required and will be organised for administration prior to the scan.

☐ For any patient in the high risk group the referrer must indicate that the benefit of the scan outweighs the risk and that the CIN protocol will be needed. Without this information on the request the scan will be declined. Clinical teams/specialities should ensure adequate systems are in place to review any declined requests in a timely manner.

☐ For patients at the highest risk of CIN (eGFR<20ml/min/1.73² and /or AKI stage 2 or above,) the requesting team needs to consider the risk versus benefit of the scan and discuss with the radiologist where appropriate the possibility of an alternative imaging technique. Advice should also be sought as appropriate from the renal team. It is important these discussions are recorded on the referral form. If the above is not documented the request will be declined by the medical imaging team.

☐ For outpatient scans it is the responsibility of the Medical Imaging team to inform the clinician's secretary of the time and date of the radiological procedure thus enabling the referring team to expedite the CIN protocol. For in-patient scans the medical imaging team will contact the ward nursing staff with the time of the scan to allow the CIN protocol to be commenced at the appropriate time.

☐ Use caution when using the guideline in patients with fluid overload. Should your patient fall in the high risk category but be unsuitable for the usual CIN hydration regime the need for a contrast scan should be reviewed with the consultant in charge of the patient

/radiologist/renal team as appropriate. If a contrast scan is still deemed appropriate the referral should include details around the risk/benefit for the patient concerned

- ☐ 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%.

- ☐ The nurse organising the transfer of patients to the medical imaging department on the CIN protocol should ensure this has been administered as per CIN guidance and hand this over to the medical imaging team on transfer.

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 minimal risk of CIN and no further monitoring is usually required.

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

NHSLA Criteria	Monitoring	Who	Frequency	How Reviewed
Level 1:	Audit of medical imaging referrals with eGFR levels documented and instigation of inpatient pathway.	Medical Imaging	Annually	Discussed at departmental clinical governance meetings – with non compliance presented to PSRG

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. (see appendix 2).

8. REFERENCES

Katzberg R W Contrast Induced Nephropathy in 2010. *Journal of Applied Radiology (Sept 2010)* vol 39, No 9

Kshirsagar AV, Poole C, Mottl A, Shoham D,Fraceschini N, Tudor G, Agrawal M, Denu-Ciocca C, Magnus Oman E, Finn WF, N-Acetylcysteine for the prevention of radiocontrast induced nephropathy: a meta-analysis of prospective controlled trials. *J Am Soc Nephrology 2004 March*: 15(3): 761-9. Review

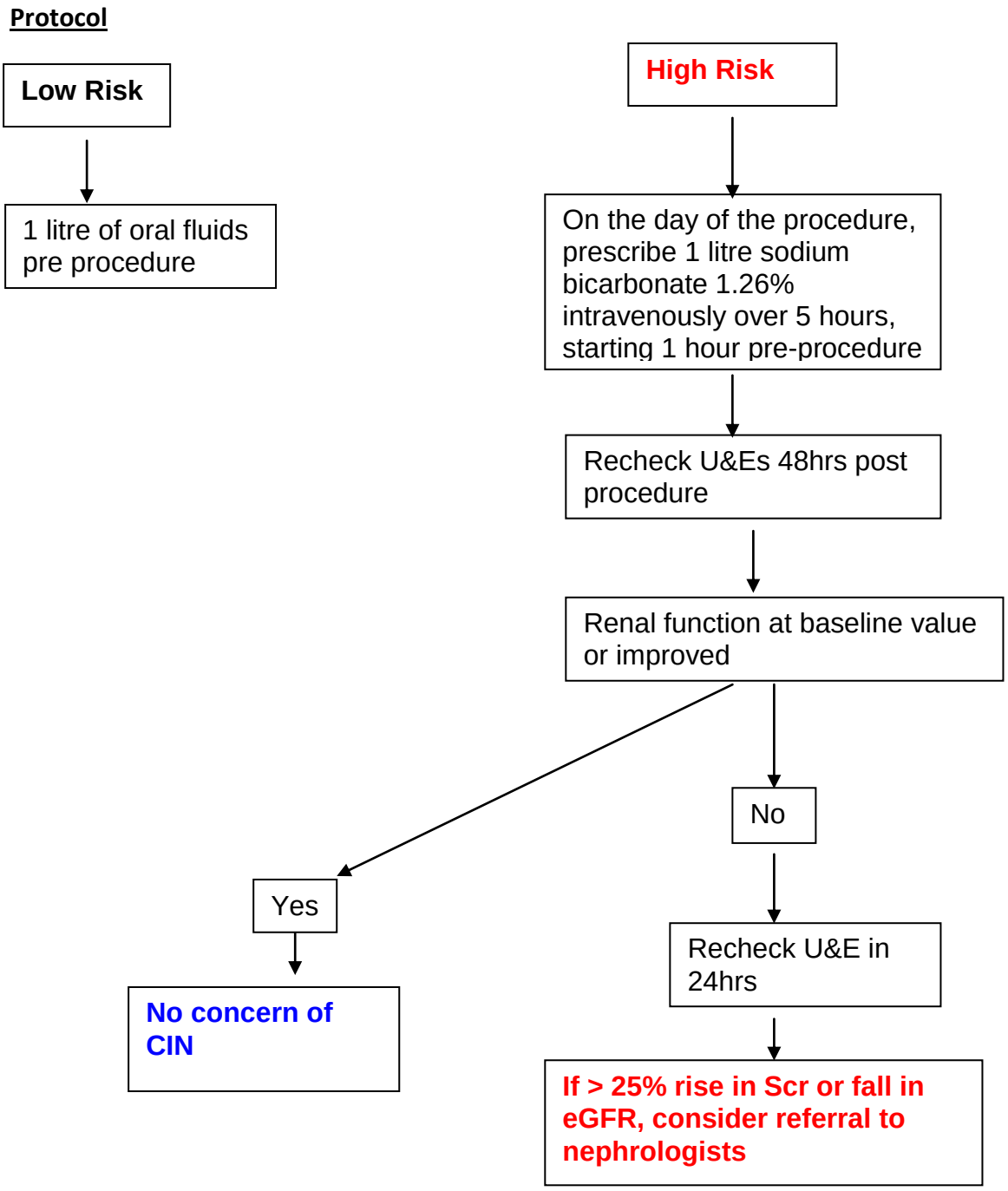
Navaneethan SD. Sodium Bicarbonate Therapy for Prevention of Contrast Induced Nephropathy: A Systematic Review and Meta-analysis: *American Journal of Kidney Diseases;* (April 2009); Vol 53, No 4: 617-27

Stacul F, Van der Molen AJ, Reimer P, Webb AJ Thomasen HS, Morcos SK, Almen T, Aspelin P, Bellin MF, Clement o, Hienz-Peer G Contrast Induced Nephropathy: update
EUSR Contrast Media Safety Committee Guidelines *Journal of European Radiology* 2011 Dec 21(12): 2527-41

RCR (2013)Prevention of contrast induced kidney injury in adult patients. On behalf of the renal association, British Cardiovascular Society and the Royal College of Radiologists.

APPENDIX 1

CIN Protocol Flow chart



APPENDIX 2 – EQUALITY IMPACT ASSESSMENT - PART 1 INITIAL SCREENING

Service/Function/Policy/Project/ Strategy	Care Group/Executive Directorate and Department	Assessor (s)	New or Existing Service or Policy?	Date of Assessment
Prevention of Contrast Induced Nephropathy (CIN) Guidelines in Adults	Diagnostics & Pharmacy Care Group	Julie Kay	Existing	November 2017

1) Who is responsible for this policy? Cross care group

2) Describe the purpose of the service / function / policy / project/ strategy? The purpose of this document is to provide clear instruction on the correct operational procedure for at risk patients receiving intravascular contrast medium Ensuring high risk patients are given appropriate hydration regime prior to receiving contrast will reduce the risk of contrast induced nephropathy

3) Are there any associated objectives? RCR guidance on this topic

4) What factors contribute or detract from achieving intended outcomes? Involves all care groups

5) Does the policy have an impact in terms of age, race, disability, gender, gender reassignment, sexual orientation, marriage/civil partnership, maternity/pregnancy and religion/belief? no

6) Is there any scope for new measures which would promote equality? no[any actions to be taken

7) Are any of the following groups adversely affected by the policy? no

Protected Characteristics	Affected?	Impact
a) Age	No	
b) Disability	No	
c) Gender	No	
d) Gender Reassignment	No	
e) Marriage/Civil Partnership	No	
f) Maternity/Pregnancy	No	
g) Race	No	
h) Religion/Belief	No	
i) Sexual Orientation	No	

8) Provide the Equality Rating of the service / function /policy / project / strategy – tick (✓) outcome box

Outcome 1 ✓	Outcome 2	Outcome 3	Outcome 4

Date for next review: November 2020

Checked by: Jas Sawhney **Date:** November 2017