BEAUMONT HOSPITAL

Beaumont Hospital
Department of Nephrology and Renal Nursing

Guideline Name:

GUIDELINES FOR THE PREVENTION OF CONTRAST INDUCED NEPHROPATHY (CIN)

Guideline Number: _____21_____

Guideline Version: _____A_____

Developed By:	Dr. Ciara Magee, Nephrology SpR
Approved By:	
Date Effective From:	June 2009
Review Date:	June 2011
Superseded Documents:	

Table of Contents

1.0 Introduction/Definition

CIN defined as a fixed (44μmol/L or 0.5mg/dL) or proportionate (25%) increase in serum creatinine levels 24-48 hours following exposure to contrast media.

Potential concomitant insults: surgery, shock (sepsis, circulatory), medications, atheroembolic disease.

CIN is usually transient, with serum creatinine peak ~3 days, returning to baseline ~10 days.

CIN is associated with prolonged hospital stay, adverse cardiac events and increased mortality (*cause/effect, associated acute kidney injury [AKI])

2.0 Review History

Date	Review No.	Change	Ref. Section
June 2009	**21a**		

3.0 Guideline

The objectives of this guideline are;

- To highlight the responsibilities and accountability of members of the multidisciplinary team

3.1 Identification of Risk Factors

Pre-existing Chronic Kidney Disease (CKD)
Diabetes Mellitus
Age > 75
Peri-procedural volume depletion
Heart failure
Intra-arterial injection (i.e. angiography)
Concomitant use NSAIDs/diuretics/RAAS blockade (i.e. ACEi/ARBs)
High doses contrast / high osmolar contrast
(Acute MI/PCI – *IABP*)

3.2 Evaluation of Risk

Serum creatinine measurement should be performed

- pre intra-arterial use contrast,
- in all patients with history of CKD, DM, HTN, gout

Table 1. Predicting the Risk of an Acute Decline in Kidney Function after Percutaneous Coronary Intervention.*

Risk Factor	Score
Systolic pressure <80 mm Hg for >1 hr and patient requires inotropic support or an intraaortic balloon pump within 24 hr after the procedure	5
Use of intraaortic balloon pump	5
Heart failure (New York Heart Association class III or IV), history of pulmonary edema, or both	5
Age >75 yr	4
Hematocrit <39% for men or <36% for women	3
Diabetes	3
Volume of contrast medium	1 for each 100 ml
Serum creatinine level >1.5 mg/dl (133 μmol/liter) or Estimated GFR† <60 ml/min/1.73 m² body-surface area	4 2, 40 to <60 ml/min/1.73 m² 4, 20 to 39 ml/min/1.73 m² 6, <20 ml/min/1.73 m²

Total Risk Score‡	Risk of an Increase in Serum Creatinine Levels of >0.5 mg/dl (44 μmol/liter) or >25 Percent	Risk of Dialysis
	percent	
≤5	7.5	0.04
6 to 10	14.0	0.12
11 to 15	26.1	1.09
≥16	57.3	12.6

* Adapted from Mehran et al.[7]
† Estimated glomerular filtration rate (GFR) = $186 \times (\text{serum creatinine in mg/dl})^{-1.154} \times \text{age}^{-0.203} \times 0.742$ if female $\times 1.21$ if black.
‡ The total risk score is determined by adding the scores for each factor.

3.2 General guidelines for ALL PATIENTS with eGFR <60ml/min:

Consider alternative imaging modalities where iodinated contrast media not required.

Ensure adequate volume repletion.

Hold diuretics/RAAS blockade/NSAIDs/ for 48 hrs prior to contrast.

Hold metformin 48 hours post contrast

Minimize contrast volume (e.g. ventriculogram).

Avoid high-osmolar contrast; ideally use low-osmolar contrast.

3.3 Guidelines for eGFR 30-60mL/min – Low-to-Moderate Risk for CIN:

Oral or IV saline volume repletion

Use Low Osmolar Contrast Medium

± hold metformin 48 hours **pre** contrast

N-acetyl cysteine*

3.4 Guidelines for eGFR <30 mL/min – Moderate-to-High Risk for CIN:

IV saline volume repletion

Iso-osmolar contrast media

N-acetyl cysteine*

Consider follow-up SCr and electrolytes 2 days post procedure

3.5 Peri-Procedural Saline Volume Repletion Protocols

Oral: high salt diet (e.g. soups) and liberal clear fluids the day prior to contrast media, continuing up to 2 hours prior to the study. Continue liberal intake of fluids for the next 24 hours

IV saline:

Inpatient: NaCl 0.9% 1ml/kg/hr for 12 hours pre and post contrast

Outpatient: NaCl 0.9% 1-2ml/kg/hr for 3-6 hours pre and post contrast

*NAC 600mg po bd day before and of procedure

*n.b.: Although termed **low-osmolar** contrast, it remains hyperosmolar to plasma.*

4.0. Distribution

A copy of the Guideline will be circulated to the relevant areas by the Divisional Nurse Manager. the clinical Nurse Manager in each area is responsible to ensure all staff access and read the Guideline. The Guideline will also be available on the medical guideline page of the intranet.

5.0 Filing

A copy will be filed in the policy and procedure book folder in each unit.

6.0 Review

This guideline will be reviewed in two years, June 2011.

7.0 Reference List

1. Mehran R, Aymong ED, Nikolsky E, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: development and initial validation. *J Am Coll Cardiol* 2004; 44: 1393-9
2. Barrett BJ, Parfrey PS. Preventing Nephropathy Induced by Contrast Medium. *N Engl J Med* 2006; 354: 379-86
3. Canadian Association of Radiologists (CAR): Guidelines for the Prevention of Contrast Induced Nephropathy
4. Aspelin P, Aubry P, Fransson SG, Strasser R, Willenbrock R, Berg KJ. Nephrotoxic effects in high-risk patients undergoing angiography. *N Engl J Med* 2003; 348: 491-9
5. Brar SS, Shen AY-J, Jorgensen MB et al. Sodium bicarbonate vs sodium chloride for the prevention of contrast medium-induced nephropathy in patients undergoing coronary angiography: a randomized trial. *JAMA* 2008;300(9):1038-1046
6. Alonso A, Lau J, Jaber BL, Weintraub A, Sarnak MJ. Prevention of radiocontrast nephropathy with N-acetylcysteine in patients with chronic kidney disease: a meta-analysis of randomized, controlled trials. *Am J Kidney Dis* 2004; vol. 43 (1) pp. 1-9.
7. Mueller C, Buerkle G, Buettner HJ, et al. Prevention of contrast media-associated nephropathy: randomized comparison 2 hydration regimens in 1620 patients undergoing coronary angioplasty. *Arch Intern Med* 2002;162:329-336