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Prevention of Contrast Induced Acute Kidney Injury (AKI) - Full Clinical Guideline

These guidelines are intended for use across all specialities and refer to all Imaging studies using intravascular iodinated contrast (CT scans, arteriograms, IVUs, venograms). They are intended to reduce the risk of developing contrast induced AKI (CI-AKI). **They are not a substitute for clinical judgement.**

1. Assessing risk

Before offering intravascular Iodine-based contrast media to adults, it is essential that the risks for the individual patient are considered. As well as considering the risks of adverse reactions, clinicians must assess their risk of acute kidney injury.

The risk of CI-AKI should be weighed against the risk of not performing or delaying a crucial diagnostic or therapeutic procedure. **Do not delay emergency Imaging (e.g. acute stroke, acute bleeding, trauma etc).** Intravascular iodinated contrast media should be considered for any patient regardless of renal function if the perceived benefit to the patient justifies its administration.

i) The most important risk factor for developing CI-AKI is pre-existing renal impairment. Those at highest risk at those with eGFR levels of <30ml/min. The risk of CI-AKI is very low when eGFR is >45ml/min.

ii) In those patients with eGFR levels of <45ml/min, higher risk of CI-AKI is conferred by the presence of one or more of the following:
- diabetes
- heart failure
- renal transplant
- hypovolaemia
- pre-existing proteinuria

iii) Inpatients who are acutely unwell may also be at increased risk of CI-AKI as well as being at risk of AKI from other causes. If a patient with AKI is being considered for a non-emergency Imaging study which requires intravascular iodinated contrast discuss with the on-call renal registrar, after initiating management for AKI.

2. Reducing risk:

The mainstay of reducing the risk of CI-AKI is through volume expansion (if there are no contra-indications to doing so). N-acetyl cysteine has been shown to be ineffective and is not recommended.

a) Emergency Settings

In the emergency setting, the risk of CI-AKI is likely to be offset by the risks associated with delayed diagnosis and treatment. Where a patient is at risk of 'loss of life or limb' Imaging with intravascular iodinated contrast agent should not be delayed to allow for the assessment of renal function or fluid therapy.

The requesting clinician has the responsibility for deciding whether the request constitutes an emergency, or not, and emergency settings should have systems in place to ensure senior clinical decision makers have been involved in the decision to request Imaging involving the

use of intravascular iodinated contrast agent without checks on renal function. The requesting clinician must ensure appropriate monitoring of the patient after contrast agent administration.

b) Inpatients

For inpatients, consider intravenous volume expansion with 0.9% sodium chloride if they are not at risk of fluid overload AND are at particularly high risk, for example, if:

- they have an eGFR <30ml/min.
- they have a renal transplant.
- a large volume of contrast medium will be used (for example, higher than the standard diagnostic dose, or repeat administration within 24 hours).
- they are receiving intra-arterial administration of contrast medium, e.g. having angiography.

For inpatients having intravenous volume expansion with 0.9% sodium chloride, prescribe 1 mL/kg/hour for 6 to 12 hours pre-procedure and for 6 to 12 hours post-procedure.

For inpatients at high risk of CI-AKI, monitor renal function daily following administration of IV contrast, for up to three days.

c) Outpatients undergoing angiography (intra-arterial contrast).

For outpatient procedures, consider intravenous volume expansion with 0.9% sodium chloride if they are not at risk of fluid overload AND they have an eGFR <30ml/min.

For outpatients having intravenous volume expansion with 0.9% sodium chloride, prescribe 3 mL/kg/hour for 1 hour pre-procedure, and then 1-1.5ml during the procedure and for 4 hours post-procedure.

For outpatients receiving intra-arterial iodinated contrast AND who have an eGFR <30ml/min, eGFR should be checked 48-72hrs after contrast administration.

d) Outpatients undergoing intravenous contrast (e.g. CT scanning)

Generally, the risk of CI-AKI is lower in this scenario. Patients without a known eGFR result can be screened using a simple questionnaire: “Do you have kidney problems or a kidney transplant?” OR “have you seen, or are you waiting to see a kidney specialist or urologist (kidney surgeon)?” Checking eGFR is only needed if the answer to one of these questions is “yes”.

For patients at higher risk of CI-AKI, oral hydration before and after the contrast administration can be recommended (total 1-2L of fluid).

For patients with an eGFR of <30ml/min, there is some uncertainty of the optimal approach. We suggest discussing the risks of CI-AKI with the patient, and for many patients with CKD stage 4 (eGFR 15-30ml/min) oral hydration can be recommended.

There may be a small number of patients at very high risk of CI-AKI (e.g., eGFR <15ml/min) where intravenous volume expansion with 0.9% sodium chloride may be recommended by the referring clinician. For this group, prescribe 3 mL/kg/hour for 1 hour pre-procedure, and then 1-1.5ml for 4 hours post-procedure.

Generally, there is no need for routine blood testing after outpatient intravenous contrast administration, although patients at high risk of CI-AKI should be instructed to seek medical attention and have eGFR tested if they develop increased shortness-of-breath, peripheral oedema, or note a marked decline in urine output in the days following the imaging test.

e) Dialysis patients

There is no role for dialysis following iodinated contrast administration. Patients receiving chronic dialysis do not need to have their dialysis schedule rearranged following contrast administration.

3. Metformin

When patients taking metformin are identified as being at high risk of CI-AKI, referring clinicians should discontinue their patient's metformin for 48 Hrs after intravascular iodinated contrast agent administration:

- Intravenous administration: Discontinue metformin for patients with an eGFR <30 ml/min/1.73m2 or <45 ml/min/1.73m2 with other risk factors.

- Intra-arterial administration: Discontinue metformin for patients with an eGFR <45 ml/min/1.73m2.

Referring clinicians should check eGFR before recommencing metformin.

4. References

Iodinated contrast media guideline - Faculty of Clinical Radiology, The Royal Australian and New Zealand College of Radiologists March 2018

Development of Guideline	Consultant Radiographer
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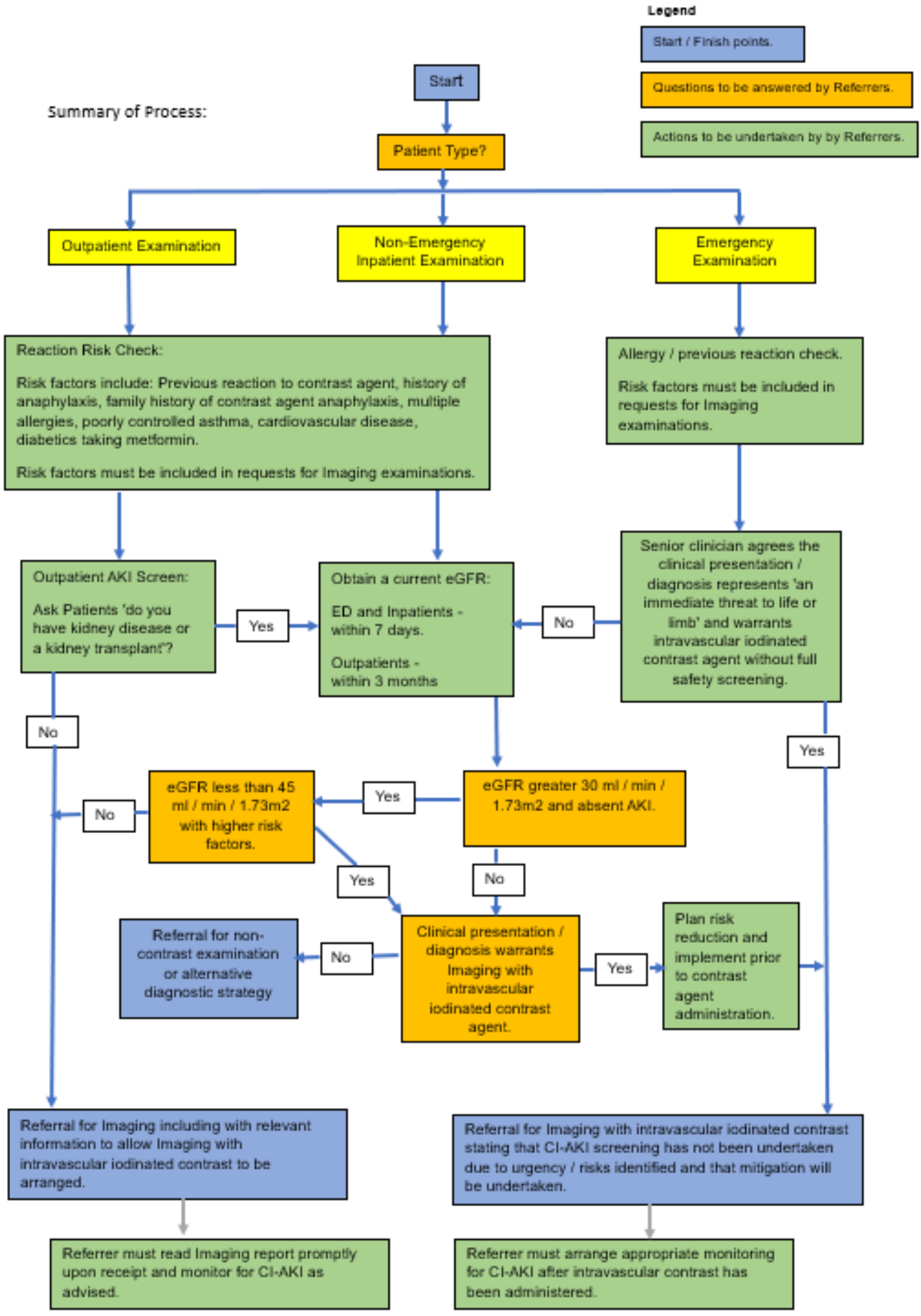

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