Contrast induced nephropathy
Myth or reality?

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Emergency imaging procedures requiring contrast media administration e.g. acute stroke, acute bleeding, trauma etc. should not be delayed in order to obtain renal function testing results prior to the procedure. Iodinated Contrast Media Guideline, 2016 Edition
80 yo male with sharp chest pain

BG/ Diabetes and hypertension

ECG non specific changes

No acute rise in serial troponins

eGFR 40
A 80 yo male with ill defined abdominal pain
BG/ Diabetes and hypertension
Lactate 2
eGFR 40
Pathophysiology
Intravenous contrast
vs
Intra-arterial (eg coronary angiography)
Does IV contrast cause renal impairment?

Intravenous contrast $\rightarrow$ Increased Creatinine $\rightarrow$ Patient outcome (Renal transplant, dialysis)
Contrast Induced Nephropathy (CIN) definition

absolute (44 mmol/L) or relative (25%) increase in baseline serum Cr concentration at 48-72 hours
Risk of Intravenous Contrast Material–mediated Acute Kidney Injury: A Propensity Score–matched Study Stratified by Baseline-estimated Glomerular Filtration Rate

McDonald et al
Radiology: Volume 271: Number 1—April 2014

Methods

All patients who underwent contrast-enhanced or unenhanced CT between 2000 and 2010 were identified and stratified according to baseline eGFR

12508 propensity score–matched patients

1:1 matching of patients in each eGFR sub-group
Risk of AKI Following Contrast-enhanced or Unenhanced CT

eGFR was associated with an increased risk of serum AKI following CT.

Risk of AKI was independent of contrast material exposure, even in patients with eGFR < 30
Risk of Acute Kidney Injury After Intravenous Contrast Media Administration
Hinson et al Ann Emerg Med. 2017 Jan

Methods

single-centre retrospective cohort study

17,934 ED visits

contrast-enhanced vs unenhanced or no CT
### Risk of acute kidney injury after IV contrast administration

**Rate of AKI by CIN criteria (%)**

<table>
<thead>
<tr>
<th>EGFR</th>
<th>CONTRAST ENHANCED CT</th>
<th>UNENHANCED CT</th>
<th>NO CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>766/7201 (10.6)</td>
<td>559/5499 (10.2)</td>
<td>569/5234 (10.9)</td>
</tr>
<tr>
<td>&gt;90</td>
<td>510/4127 (12.4)</td>
<td>261/2039 (12.8)</td>
<td>304/2360 (12.9)</td>
</tr>
<tr>
<td>60-89</td>
<td>179/2176 (8.2)</td>
<td>11/1337 (8.3)</td>
<td>304/2360 (9.7)</td>
</tr>
<tr>
<td>45-59</td>
<td>59/575 (10.3)</td>
<td>68/714 (9.5)</td>
<td>59/589 (10)</td>
</tr>
<tr>
<td>30-44</td>
<td>12/241 (5.0)</td>
<td>57/768 (7.4)</td>
<td>44/550 (8.0)</td>
</tr>
<tr>
<td>15-29</td>
<td>6/78 (7.7)</td>
<td>53/599 (8.8)</td>
<td>27/345 (7.8)</td>
</tr>
<tr>
<td>&lt;15</td>
<td>0/4</td>
<td>9/42 (21.4)</td>
<td>2/16 (12.5)</td>
</tr>
</tbody>
</table>
Results

rates of AKI were similar among all groups

contrast administration was not associated with increased incidence of AKI

contrast administration was not associated with increased incidence of CKD, dialysis, or renal transplant at 6 months
Do fluids make a difference?
Prophylactic hydration to protect renal function from intravascular iodinated contrast material in patients at high risk of contrast-induced nephropathy (AMACING): a prospective, randomised, phase 3, controlled, open-label, non-inferiority trial

The Lancet
February 20, 2017
Hypothesis:
That withholding prophylaxis would be non-inferior to the standard-of-care administration of intravenous normal saline
AMACING trial

Single centre study
Elective patients (IV and IA)
660 consecutive patients
“High risk” (eGFR 30-59)
Randomised to pre and post IV NS or no hydration
Results

Rate of Contrast-induced nephropathy

2.6% (8/307) no hydration
2.7% (8/296) hydration

5.5% (18/328) had complications associated with IV hydration
Take home messages

Risk of contrast induced nephropathy is overstated

Severe renal impairment is not a contra-indication to iodinated contrast media administration

Role of peri-procedural hydration is unclear
References

5. The High Risk of Contrast-induced Nephropathy in Patients with Suspected Pulmonary Embolism Despite Three Different Prophylaxis: A Randomized Controlled Trial Turdei et al Academic Emergency Medicine 2016;23:1136–1145
6. Prophylactic hydration to protect renal function from intravascular iodinated contrast material in patients at high risk of contrast-induced nephropathy (AMACING): a prospective, randomised, phase 3, controlled, open-label, non-inferiority trial The Lancet February 20, 2017
Trauma activation tier

Allows for urgent utilisation of urgent resources post identification of life threatening haemorrhage

Aim

Patient arrival in OT within 20 minutes of presentation to ED
Code Crimson activation criteria to identify acute life threatening haemorrhage needing immediate surgery

Uncontrolled haemorrhage

Gunshot wound to torso/neck

Systolic BP < 90mmHg

Administration of blood products
RPA Code Crimson audit 2010-16

78 activations

35% laparotomy

25% interventional radiology

10% thoracotomy

20% another surgical procedure
Questions