Update on the Prevention of Contrast-Induced Acute Kidney Injury Following Intravenous Contrast Media

Current evidence suggests that NAC (n-acetylcysteine, Mucomyst®) is not beneficial for the prevention of Contrast-induced Acute Kidney Injury (CI-AKI). As a result, use of NAC for this indication is no longer recommended. Hydration is proven effective for the prevention of CI-AKI and is recommended as outlined below.

CI-AKI is a significant complication of intravascular contrast media and is associated with increased morbidity and mortality. Current practice guidelines indicate that data does not support the use of NAC in the prevention of CI-AKI. Hydration, specifically intravenous volume expansion, with either isotonic sodium chloride (NaCl) or sodium bicarbonate (NaHCO₃) solutions is effective for prevention of contrast-induced acute kidney injury.

<table>
<thead>
<tr>
<th>In emergency situations imaging should not be delayed if this would compromise patient care</th>
</tr>
</thead>
<tbody>
<tr>
<td>*GFR Greater than 45 mL/min</td>
</tr>
<tr>
<td>IV Hydration not required</td>
</tr>
<tr>
<td>*GFR 30 – 45 mL/min</td>
</tr>
<tr>
<td>IV Hydration recommended</td>
</tr>
<tr>
<td>*GFR less than 30 mL/min</td>
</tr>
<tr>
<td>Patient specific IV hydration following clinical assessment of fluid status</td>
</tr>
</tbody>
</table>

**In-patient hydration options**

Hydrate patient with 0.9% NaCl at 1 mL/kg/hr IV for: 12 hours pre-procedure, and for 12 hours post-procedure OR NaHCO₃ - 150 mEq (mmol) in 850 mL D5W @ 3 mL/kg/hr IV for one hour pre-procedure and @ 1 mL/kg/hr IV for six hours post-procedure.

**Out-patient hydration options**

Give a minimum of 300 mL IV 0.9% NaCl OR NaHCO₃ - 150 mEq (mmol) in 850 mL of D5W. Infuse 3 mL/kg/hr IV for one hour pre-procedure, followed by 3 mL/kg/hr for three hours post-procedure.

Additional preventative measures for inpatients and outpatients:

1. Encourage oral hydration pre and post procedure.
2. For patients with impaired renal function, imaging requiring contrast media should be considered only after alternative imaging not requiring contrast media has been deemed inappropriate.
3. Contrast media volume and frequency of administration should be minimized.
4. High osmolar contrast media should be avoided; local practice and preference will dictate choice between low-osmolar and iso-osmolar contrast media.
5. Nephrotoxic medications (e.g., NSAIDS and vancomycin) should be reviewed and discontinued 48 hours prior to contrast administration if clinically appropriate.

---

1 For references please contact AHS.PharmacyDrugStewardship@albertahealthservices.ca
2 These guidelines are for adults only, for pediatric patients reference to specialist should be sought. As reported by AHS Labs
3 In emergency situations imaging should not be delayed if this would compromise patient care

For review of key paper: http://circ.ahajournals.org/content/124/11/1250.long

This document has been prepared for informational purposes for employees of Alberta Health Services. All rights reserved in relation to this document. Without limiting the reservation of copyright, no person shall reproduce, store in a retrieval system or transmit in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) part or the whole of this document without the prior written permission of Alberta Health Services. Requests or inquiries related to this document should be directed to: AHS.PharmacyDrugStewardship@albertahealthservices.ca
Update on the Prevention of Contrast-Induced Acute Kidney Injury Following Intra-Arterial Contrast Media

Current evidence suggests that NAC (n-acetylcysteine, Mucomyst®) is not beneficial for the prevention of Contrast-induced Acute Kidney Injury (CI-AKI). As a result, use of NAC for this indication is no longer recommended. Hydration is proven effective for the prevention of CI-AKI and is recommended as outlined below.

CI-AKI is a significant complication of Intra-Arterial Contrast Media and is associated with increased morbidity and mortality. Current practice guidelines indicate that data does not support the use of NAC in the prevention of CI-AKI.¹ Hydration, specifically intravenous volume expansion, with either isotonic sodium chloride (NaCl) or sodium bicarbonate (NaHCO₃) solutions is effective for prevention of contrast-induced acute kidney injury.

### Adult Hydration Guideline²,³ for prevention of Contrast-induced Acute Kidney Injury, Following Intra-arterial Contrast Media

<table>
<thead>
<tr>
<th>GFR greater than or equal to 60 mL/min</th>
<th>GFR 30 – 59 mL/min</th>
<th>GFR less than 30 mL/min</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IV Hydration not required</strong></td>
<td><strong>IV Hydration recommended</strong></td>
<td><strong>Patient specific IV hydration following clinical assessment of fluid status</strong></td>
</tr>
</tbody>
</table>

**In Patient Hydration options**

- 0.9% NaCl at 1 mL/kg/hr - intravenous for:
  - 12 hours pre procedure, and for 12 hours post procedure OR patient specific IV hydration following clinical assessment of fluid status.

**Out Patient Hydration options**

- A minimum of 300 mL IV is recommended
- Patient specific IV hydration following clinical assessment of fluid status.

### Additional preventative measures for inpatients and outpatients:

1. Encourage oral hydration pre and post procedure.
2. For patients with impaired renal function, imaging requiring contrast media should be considered only after alternative contrast media free imaging has been deemed inappropriate.
3. Contrast media volume and frequency of administration should be minimized.
4. High osmolar contrast media should be avoided, Local practice and preference will dictate choice between low-osmolar and iso-osmolar contrast media.
5. Nephrotoxic medications (e.g. NSAIDS, vancomycin) should be reviewed and discontinued 48 hours prior to contrast administration if clinically appropriate.
6. Monitor GFR 48 hr – 72 hr post contrast media injection.

¹For references please contact AHS.PharmacyDrugStewardship@albertahealthservices.ca ²These guidelines are for adults only, for pediatric patients reference to specialist should be sought ³As reported by AHS labs For full consensus guidelines see and www.content.onlinejacc.org/article.aspx?articleid=1147815 For review of key paper: http://circ.ahajournals.org/content/124/11/1250.long

This document has been prepared for informational purposes for employees of Alberta Health Services. All rights reserved in relation to this document. Without limiting the reservation of copyright, no person shall reproduce, store in a retrieval system or transmit in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) part or the whole of this document without the prior written permission of Alberta Health Services. Requests or inquiries related to this document should be directed to: AHS.PharmacyDrugStewardship@albertahealthservices.ca