Management of Acute Kidney Injury (AKI) in Cirrhosis Clinical Guideline

V4.0

January 2021
Summary

Algorithm for AKI in cirrhosis pathway
(Adapted from Angeli P, et al. Diagnosis and management of acute kidney injury in patients with cirrhosis: revised consensus recommendations of the International Club of Ascites Gut April 2015 Vol 64 No 4)

AKI Stage 1
(Increase in serum Cr > 26 umol/l within previous 48 hrs or by 1.5 -2 x baseline)

- AKI Bundle
- Assess volume status. May need to Reduce diuretics
- Stop NSAIDS, nephrotoxic drugs, vasodilators
- Treat sepsis

Resolution

Stable: Treat renal specific disease

Progression (see below)

AKI Stage 2  (Serum Cr > 2-3 x baseline) or

AKI Stage 3  (Serum Cr > 3 x baseline) or
(Serum Cr > 354 with >44 umol/l increase in 48 hrs) or
(Renal replacement therapy)

- Stop diuretics.
- May need to discuss escalation of care to High Dependency Unit
- Volume expansion with 20% HAS (1g/kg for 2 days)

Resolution

Non resolution
Treat AKI phenotype or
Treat HRS (if meets criteria)
1.  **Aim/Purpose of this Guideline**

1.1. To provide guidelines for medical staff when caring for patients with AKI in cirrhosis

1.2. This version supersedes any previous versions of this document.

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**Data Protection Act 2018 (General Data Protection Regulation – GDPR)**

Legislation

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We cannot rely on opt out, it must be opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the Information Use Framework Policy or contact the Information Governance Team

rch-tr.infogov@nhs.net

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2.  **The Guidance**

2.1. **Responsibility**

Medical staff caring for adult inpatients, or Accident & Emergency Department patients who are waiting for transfer to inpatient care, at the Royal Cornwall Hospital Trust.

2.2. **General Points**

2.2.1. Renal failure is a common complication of patients with advanced cirrhosis, and generally indicates a poor prognosis dependant on cause.

- 37% 3 month survival AKI associated with sepsis
- 15% 3 month survival AKI associated with hepatorenal syndrome (HRS)

2.2.2. Renal failure in cirrhosis is often due to aetiological factors that can also lead to renal failure in patients without liver disease:

- Severe dehydration
- Sepsis shock (haemorrhagic or septic)
- Nephrotoxic drugs
- Intrinsic renal parenchymal disease
2.2.3. AKI in cirrhosis is defined and staged
   • Stage 1: Increase in serum Cr >26.5 umol in the previous 48 hr or
     o 1.5 -2 x baseline or
   • Stage 2: Serum Cr > 2-3 x baseline or
   • Stage 3: Serum Cr > 3 x baseline or
     o Cr > 354 umol/l + increase 44 umol/l or
     o Renal replacement therapy instituted

2.2.4. Refer to the RCHT AKI guidelines as needed.

2.2.5. Hepatorenal syndrome (HRS) is a relatively rare cause of renal failure in cirrhosis (10-20% of cases), and is a diagnosis of exclusion, & defined as AKI in cirrhosis with ascites in the absence of:
   • Sepsis
   • Hypovolemia
   • Nephrotoxic drugs
   • Renal disease

2.3. Diagnosis & initial management

2.3.1. Diagnosis on the basis of elevation of serum creatinine compared to baseline

2.3.2. Baseline creatinine can be within 12 months of admission.

2.3.3. Check drug chart and stop:
   • NSAIDS
   • Nephrotoxic medication (e.g. aminoglycosides)
   • Vasopressor drugs
   • Diuretics (if AKI stage 1, reduce dose only)

2.3.4. Ensure adequate volume replacement (systolic BP > 100 mm Hg)
   • 20% HAS dosed at 1mg/kg if there is no cause for hypovolemia (if AKI stage 2)
   • Crystalloids for dehydration (e.g. D&V)
   • Blood transfusion – aim for Hb >80g/l if there has been a significant GI bleed as per “Acute Upper Gastrointestinal Bleeding Due to Gastro Oesophageal Varices Clinical Guideline”
   • Close monitoring of fluid status and urine output.
2.4. **Sepsis**

2.4.1. Screen for sepsis:
- Clinical examination of chest & CXR
- Urine dip & culture
- Diagnostic tap of ascites (no correction of INR needed). 10 ml for WCC in FBC bottle to be sent to haematology & universal container for culture to be sent to microbiology
- Blood culture

2.4.2. Low threshold for empirical therapy for sepsis (40% of cirrhotic patients develop sepsis during their inpatient stay). IV Tazocin 4.5g TDS or oral ciprofloxacin 500mg bBD 5 days (dose to be adjusted according to renal function)

2.5. **Consider intrinsic renal disease**

- Urine dip for blood and protein
- Urine protein:creatinine ratio
- Renal ultrasound
- AKI Bundle

2.6. **Treatment HRS**

2.6.1. No improvement in renal function despite 48 hours of volume replacement with 20% human albumin solution IV, 1g/kg day (usually x 4 bottles 100 ml HAS)

2.6.2. Excluded or treated:
- Renal disease excluded
- Sepsis treated
- Nephrotoxic drugs stopped

2.6.3. Treat with daily intravenous 0.5g/kg HAS 20%

2.6.4. Intravenous Terlipressin as below

2.7. **Terlipressin use**

2.7.1. HRS is a cause of acute kidney injury in cirrhosis with ascites, diagnosed after excluding other causes including sepsis, withdrawal of nephrotoxic medication, correction of pre renal causes of AKI and with no evidence of significant renal disease (proteinuria <500 mg/day, no haematuria and normal renal ultrasound). Thus Terlipressin should be only be used after treatment of sepsis, withdrawal of diuretics and correction of hypovolemia with human albumin solution (1g/kg/24hr).
2.7.2 No cardiac monitoring is required unless the patient has specific cardiac issues.

2.7.3 Terlipressin is relatively contra-indicated in patients with ischaemic heart disease or peripheral vascular disease.

2.7.4 Terlipressin can be administered as an intravenous bolus injection (0.5-2 mg) every four hours or as a continuous infusion over a 24 hour period (only if the Glypressin brand is available). For the continuous 24 hour infusion, the prescription MUST state the Glypressin brand, since this is the only product that stability information is available.

2.7.5 Bolus therapy (weight based):
- 0.5 mg < 50kg
- 1mg 50-70kg
- 2mg > 70kg

2.7.6 If prescribing terlipressin as a continuous infusion, initiate dosing at 2mg per 24 hour period.

2.7.7 Continuous infusion should be prepared in 50mls of 5% glucose i given over the 24 hours.

2.7.8 48hr review of the infusion rate:
- Increase by 2 mg/24hr if no initial fall in creatinine (<25 umol/L)
- Further dosing increments to 4mg, then 8mg, then 10mg, then 12 mg/hr every 48 hrs may be made if needed.
- Decrease by 0.5mg/24hr if side effects (DEPENDANT ON SEVERITY) with 4 hr review.
- Major side effects include digital ischaemia, intestinal ischaemia (diarrhoea), angina, myocardial infarction and also arrhythmias, and hyponatraemia.

2.7.9 Continue daily 20% HAS 0.5g/kg (usually x 2 100ml 20% albumin bottles).

2.7.10 Ideally mean arterial pressure > 80 mm Hg.

2.7.11 Duration of treatment:
- Up to 14 days.
- Complete Response:
  - Return of serum creatinine to a value within 26.5 umol/L of the baseline value.
  - Maintain therapy for 2 days to ensure stable renal function.
- Partial response:
  - Regression of AKI stage with a reduction of serum creatinine to ≥ 26.5 umol/L above the baseline value.
3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Audit of AKI in liver cirrhosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Dr SH Hussaini</td>
</tr>
<tr>
<td>Tool</td>
<td>Pharmacy Database</td>
</tr>
<tr>
<td>Frequency</td>
<td>Annual with report to GI Governance</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Monthly GI Governance meeting</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>GI Governance group</td>
</tr>
</tbody>
</table>

| Change in practice and lessons to be shared | Required changes to practice will be identified and actioned within 3 months. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders |

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Inclusion & Human Rights Policy’ or the Equality and Diversity website.

4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.
### Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Management of Acute Kidney Injury (AKI) in Cirrhosis Clinical Guideline V4.0</th>
</tr>
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<tbody>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Clinical Guideline for Management of Acute Kidney Injury in cirrhosis V3.0</td>
</tr>
<tr>
<td>Date Issued/Approved:</td>
<td>31&lt;sup&gt;st&lt;/sup&gt; December 2020</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>January 2021</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>January 2024</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Dr Hyder Hussaini, Consultant Gastroenterologist and Hepatologist</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252717</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>This document is intended to provide guidelines for medical staff when caring for patients with management of acute kidney injury in cirrhosis</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>AKI Cirrhosis</td>
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<tr>
<td>Target Audience</td>
<td>RCHT ✓ CFT KCCG</td>
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<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Approval route for consultation and ratification:</td>
<td>Gastrointestinal Governance Group</td>
</tr>
<tr>
<td>General Manager confirming approval processes</td>
<td>Roz Davies</td>
</tr>
<tr>
<td>Name of Governance Lead confirming approval by specialty and care group management meetings</td>
<td>Maria Lane</td>
</tr>
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<td>Links to key external standards</td>
<td>None</td>
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<tr>
<td>Related Documents:</td>
<td>1.) NICE guidelines - Gastrointestinal bleeding.</td>
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10.) Gerbes AL, Huber E, Gulberg V. Terlipressin for hepatorenal syndrome: continuous infusion as an alternative to i.v. bolus administration. Gastroenterology 2009;137:1179.


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<th>Training Need Identified?</th>
<th>No</th>
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<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet ✓ Intranet Only</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical / Hepatology</td>
</tr>
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### Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
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<tbody>
<tr>
<td>January 2017</td>
<td>V1.0</td>
<td>New document.</td>
<td></td>
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<tr>
<td>June 2017</td>
<td>V2.0</td>
<td>Changes made to drug company</td>
<td>Smita Bhikha Gastroenterology Pharmacist</td>
</tr>
<tr>
<td>June 2019</td>
<td>V3.0</td>
<td>Reformatted onto to latest trust template</td>
<td>Dr Hyder Hussaini, Consultant Gastroenterologist and Hepatologist</td>
</tr>
<tr>
<td>November 2020</td>
<td>V4.0</td>
<td>Corrections made to document</td>
<td>Smita Bhikha Specialist Pharmacist Gastroenterology</td>
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**All or part of this document can be released under the Freedom of Information Act 2000**

**This document is to be retained for 10 years from the date of expiry.**

**This document is only valid on the day of printing**

**Controlled Document**

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy for the Development and Management of Knowledge, Procedural and Web Documents (The Policy on Policies). It should not be altered in any way without the express permission of the author or their Line Manager.
## Appendix 2. Equality Impact Assessment

### Section 1: Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>Management of Acute Kidney Injury (AKI) in Cirrhosis Clinical Guideline V4.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Gastroenterology</td>
</tr>
<tr>
<td>Is this a new or existing Policy?</td>
<td>Existing</td>
</tr>
<tr>
<td>Name of individual/group completing EIA</td>
<td>Dr SH Hussaini</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252717</td>
</tr>
</tbody>
</table>

1. **Policy Aim**  
Who is the strategy / policy / proposal / service function aimed at?  
This document is intended to provide guidelines for medical staff when caring for patients with Clinical Guideline for Management of Acute Kidney Injury in cirrhosis

2. **Policy Objectives**  
Optimise management of Acute Kidney Injury in cirrhosis

3. **Policy Intended Outcomes**  
Minimise mortality and morbidity from Acute Kidney Injury in cirrhosis

4. **How will you measure the outcome?**  
As per section 3 of this guideline.

5. **Who is intended to benefit from the policy?**  
All patients who present with Acute Kidney Injury in cirrhosis  
Medical & Nursing staff

6a). Who did you consult with?  
Workforce

b). Please list any groups who have been consulted about this procedure.  
Gastrointestinal Governance Group

c). What was the outcome of the consultation?  
Agreed.
7. The Impact
Please complete the following table. If you are unsure/don't know if there is a negative impact you need to repeat the consultation step.

Are there concerns that the policy **could** have a positive/negative impact on:

<table>
<thead>
<tr>
<th>Protected Characteristic</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
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<tr>
<td>Sex (male, female non-binary, asexual etc.)</td>
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<td>Gender reassignment</td>
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<td>Race/ethnic communities /groups</td>
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<tr>
<td>Disability (learning disability, physical disability, sensory impairment, mental health problems and some long term health conditions)</td>
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<td>Religion/other beliefs</td>
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<td>Marriage and civil partnership</td>
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<tr>
<td>Pregnancy and maternity</td>
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<tr>
<td>Sexual orientation (bisexual, gay, heterosexual, lesbian)</td>
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If all characteristics are ticked ‘no’, and this is not a major working or service change, you can end the assessment here as long as you have a robust rationale in place.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

**Name of person confirming result of initial impact assessment:** Dr SH Hussaini, Consultant Hepatologist and Gastroenterologist

If you have ticked ‘yes’ to any characteristic above OR this is a major working or service change, you will need to complete section 2 of the EIA form available here: **Section 2. Full Equality Analysis**

For guidance please refer to the Equality Impact Assessments Policy (available from the document library) or contact the Human Rights, Equality and Inclusion Lead debby.lewis@nhs.net