**Prevention of Acute Renal Failure in ICU**

Iqbal Rahmani M.D.
Houston, Texas

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**Learning Objectives**

- Identify common risk factors associated with acute kidney injury in the critical care setting
- Discuss strategies for prevention of acute kidney injury in the ICU patient

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**No Financial conflict**

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"If there is a urine, there is a hope" – Dr. Oliveira Senior

"Urine is like an opinion! You got to have one – Strong or weak – as any is better than none" – Dr. Hedger

"Poor Man's Swan" – an African Anesthesiologist

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**"Time"**

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**RIFLE Criteria**

![RIFLE Criteria Diagram](image-url)
**Table 2: ARF classification**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Serum creatinine &gt; 1.5 mg/dL or 88.4 μmol/L or doubling or tripling in 48 hours</td>
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<tr>
<td>Stage 2</td>
<td>Serum creatinine &gt; 2 mg/dL or 176.8 μmol/L or doubling or tripling in 72 hours</td>
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<tr>
<td>Stage 3</td>
<td>Serum creatinine &gt; 3 mg/dL or 265.2 μmol/L or doubling or tripling in 96 hours</td>
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**Figure:** Incidence of renal dysfunction and mortality in patients


**BEST STUDY (JAMA 2005)**

- Approximately 4% of patients in the ICU receive renal replacement therapy (e.g., hemofiltration, hemodialysis).
- Hospital mortality in this group is 60%.
  - 29,629 patients
  - 54 centers
  - 23 countries

**Risk Factors**
- Age
- Sepsis
- Cardiac surgery
- Contrast
- Diabetes
- "Rhabdoto"
- Pre-existing renal insufficiency
- Hypovolemia
- Shock

**"Renal Perfusion Pressure"**

- "Optimum MAP"
- Is 65 a magic number?
- Use of Vasopressor
  - (NE is a foe or a friend?)
"Volume status"

**FACTT Trial (NEJM 2006)**
- Conservative arm: -36 mL (10% CRRT)
- Liberal arm: +692 mL (14% CRRT)

**Euvolemic**

**Which Volume?**

**SAFE Trial (NEJM 2004 – 7000 patients)**
- CRRT
- MV

**"Colloids may be harmful"**


**Contrast Induced Nephropathy**

Serum Cr 25% above baseline within 48 hours

**Is study really needed?**
Mucomyst

1. Controversial
3. It carries side effect
   - Nephrolithiasis
   - Bronchospasm
   - Hypomagnesemia
   - Seizure
   - Volume Overload

Normal Saline Vs Bicarb


Hemofiltration in very high risk patients


Choice of contrast medium

Hypo-osmolar or iso-osmolar contrast


MRI

Nephrogenic Fibrosing Dermopathy (NFD)
Nephrogenic Systemic Fibrosis (NSF)

Diuretic-Mania
And
Dopamine-Crania
**Dopamine**


![Dopamine Chart](image)

**Drugs in ICU**

*Renal Adjustments*

**Different Disease Processes**

- Liver Failure - *Hepatic Renal Syndrome*
- ARDS
- Tumor Lysis Syndrome and "Rhabdo"
- Abdominal compartment Syndrome

**Learning Assessment**

Which of the following are independent predictors of acute kidney injury in the critical care patient?

A. Initial plasma potassium level on admission
B. Older age
C. Higher APACHE II score on admission
D. All of the above

**Questions**