Acute Kidney Success: AKI-Dialysis

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Disclosures

- None

Educational Need

Hospitalized patients with acute kidney injury are a unique patient population who are exposed to increased risk of morbidity and mortality thus identification and careful treatment selection for this population is crucial.

Objectives

1. Define acute kidney injury
2. Recognize mortality risks associated with acute kidney injury
3. Define acute kidney disease
4. Recall prevention strategies for acute kidney injury


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Definition of Acute Kidney Injury

- KDIGO
- RIFLE
- AKIN

Definition of AKI (KDIGO)

Stage	Serum creatinine	Urine output
1	1.5–1.9 times baseline OR ⩾0.3 mg/dl (⩾26.5 μmol/l) increase	<0.5 ml/kg/h for 6–12 hours
2	2.0–2.9 times baseline	<0.5 ml/kg/h for ⩾12 hours
3	3.0 times baseline OR Increase in serum creatinine to ⩾4.0 mg/dl (⩾353.6 μmol/l) OR Initiation of renal replacement therapy OR, In patients <18 years, decrease in eGFR to <35 ml/min per 1.73 m^2	<0.3 ml/kg/h for ⩾24 hours OR Anuria for ⩾12 hours

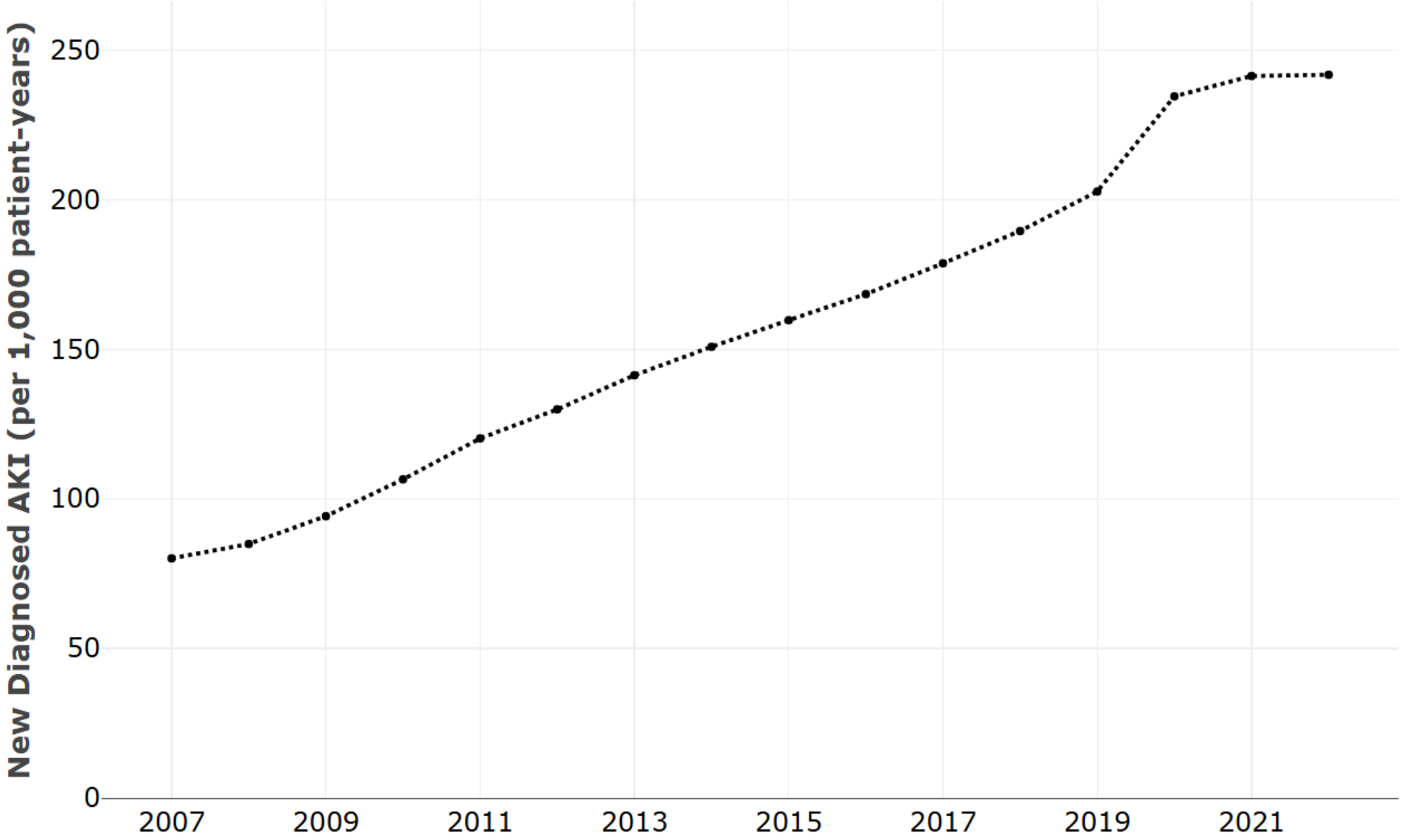
Patient Case #1

- JW is a 28 year-old male with history of decompensated ETOH cirrhosis admitted for hypervolemia and found to have severe AKI.
- MELD score > 30
- Patient is severely jaundiced and oliguric
- Undergoing Liver Transplant evaluation
- Decision made to initiate hemodialysis (HD)

Patient Case #1

- JW is a 28 year-old male with history of decompensated ETOH cirrhosis admitted for hypervolemia and found to have severe AKI.
- Deemed not a transplant candidate
- "Tolerates" HD in the hospital
- Discharges to outpatient HD unit
- Failed 1st outpatient HD session due to Hypotension
- Readmitted
- Transitioned to Hospice

Trends in Incidence Rate of Acute Kidney Injury by Diagnosis Code



Incidence of AKI

- Incidence in hospitalized patients is 5-7.5%
- Incidence in ICU patients is 50-60%
- *Increase of serum creatinine of 0.5 mg/dl or greater
  - -> 6.5 fold increase odds of death
  - -> 3.5 day increase in length of stay

AKI and Mortality

▸ Am J Nephrol. 2012 Apr 2;35(4):349–355. doi: 10.1159/000337487

Acute Kidney Injury and Mortality in Hospitalized Patients

Henry E Wang [a,*], Paul Muntner [b,c], Glenn M Chertow [d], David G Warnock [c]

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PMCID: PMC3362180 PMID: 22473149

AKI and Mortality (UAB 2012 Study)

- 19,249 hospitalizations
- Incidence of AKI (Stage 1 or higher) -> 22.7%
- 1st most common admitting diagnosis -> Circulatory Diseases (25.4%)
- 2nd most common admitting diagnosis -> Infection (16.4%)
- **In-hospital Mortality -> Adjusted Odds Ratio 4.43**

AKI and Mortality (UAB 2012 Study)

- Mortality Rates
  - Stage 1 AKI -> 6.3%
  - Stage 2 AKI -> 16.5%
  - Stage 3 AKI -> 23.7%

Patient Case #2

- RB is a 34 year-old male admitted with decompensated cirrhosis and ETOH hepatitis (s/p prednisolone course) found to have severe hyponatremia and AKI.

- Nephrology consulted inpatient
- Patient discharges with sodium 135 and eGFR 41
- Neph clinic follow up – stable kidney function
- Undergoing weekly paracentesis
- Undergoing Transplant evaluation

Patient Case #2

- RB is a 34 year-old male admitted with decompensated cirrhosis found to have severe hyponatremia and AKI.
- 2 months later – admitted for Hypervolemia
- Creatinine worsens to 6.7 from 1.5 last admission
- Transferred to ICU for Norepinephrine
- Becomes anuric
- Listed in-active for Transplant due to leukocytosis
- Cachexia present

Etiology of In-hospital AKI

1. ATN, 45%
2. Prerenal disease, 21%
3. AKI superimposed on CKD, 13%
4. Urinary tract obstruction, 10%
5. Glomerulonephritis or vasculitis, 4%
6. AIN, 2%
7. Atheroemboli, 1%

Etiology of In-hospital AKI

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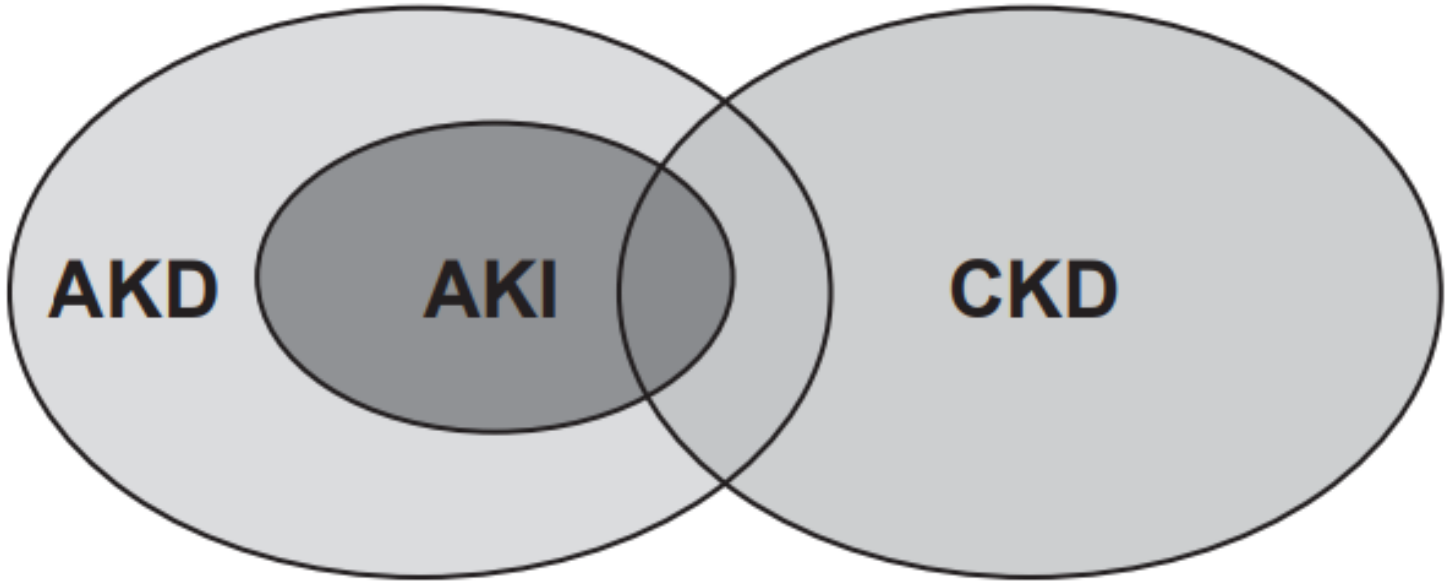
1. Intrinsic – 52%
2. Prerenal – 21%
3. Postrenal – 10%

Acute Kidney Disease (AKD)

- Days 7-90 after AKI event



AKI and Dialysis (AKI-D)

- Less than 1% of hospitalizations -> AKI-D
- About 2.5% of AKIs -> AKI-D
- Up to 30% of Survivors of AKI-D require outpatient dialysis
- At 3 months
  - ~30% recover kidney function
  - ~20% remain on dialysis
  - ~35% progress to ESKD
  - ~15% died

ASN Kidney Health Guidance on the Outpatient Management of Patients with Dialysis-Requiring Acute Kidney Injury

Vijayan, Anitha[1]; Heung, Michael[2]; Awdishu, Linda[3]; Babroudi, Seda[4]; Green, Gopa B.[5,6]; Koester, Lisa[7]; McCoy, Ian E.[8]; Menon, Shina[9]; Palevsky, Paul M.[10]; Proctor, Lorri A.[11]; Selewski, David T.[12]; Struthers, Sarah A.[13]; for the ASN Kidney Health Guidance Workgroup on Outpatient Dialysis for AKI

Author Information

Journal of the American Society of Nephrology 36(5):p 926-939, May 2025. | ***DOI:*** 10.1681/ASN.0000000646

ASN AKI-D Guidance

- High (>30%) recovery phenotype
- Moderate (10-30%) recovery phenotype
- Low (<10%) recovery phenotype

ASN AKI-D Guidance

- High (>30%) recovery phenotype
  - Baseline eGFR>60
  - <55 years-old
  - Minimal comorbidity burden
  - Dialysis dependence < 30 days

Comparative Study > Clin J Am Soc Nephrol. 2018 Jan 6;13(1):16-25. doi: 10.2215/CJN.03610417. Epub 2017 Nov 9.

Prognosis of Patients with Cirrhosis and AKI Who Initiate RRT

Andrew S Allegretti [1], Xavier Vela Parada [1], Nwamaka D Eneanya [1], Hannah Gilligan [1], Dihua Xu [1], Sophia Zhao [1], Jules L Dienstag [2], Raymond T Chung [2], Ravi I Thadhani [1]

- 472 patients
- 341 not listed for liver transplant with 131 listed
- Of the not listed patients 15% (51 out of 347) were alive at 6 months

Patient Case #2

- RB is a 34 year-old male admitted with decompensated cirrhosis found to have severe hyponatremia and AKI.

- Dialysis initiated via HD
- Patient switched to high dose IV diuretics
- Remains inpatient 6 weeks

Patient Case #2

- RB is a 34 year-old male admitted with decompensated cirrhosis found to have severe hyponatremia and AKI.
- Liver transplant 3 months after initial consult
- Experiences severe oliguria post-operatively
- Dialysis re-initiated 1 week after transplant
- Kidney recovery present again
- Dialysis discontinued

Patient Case #2

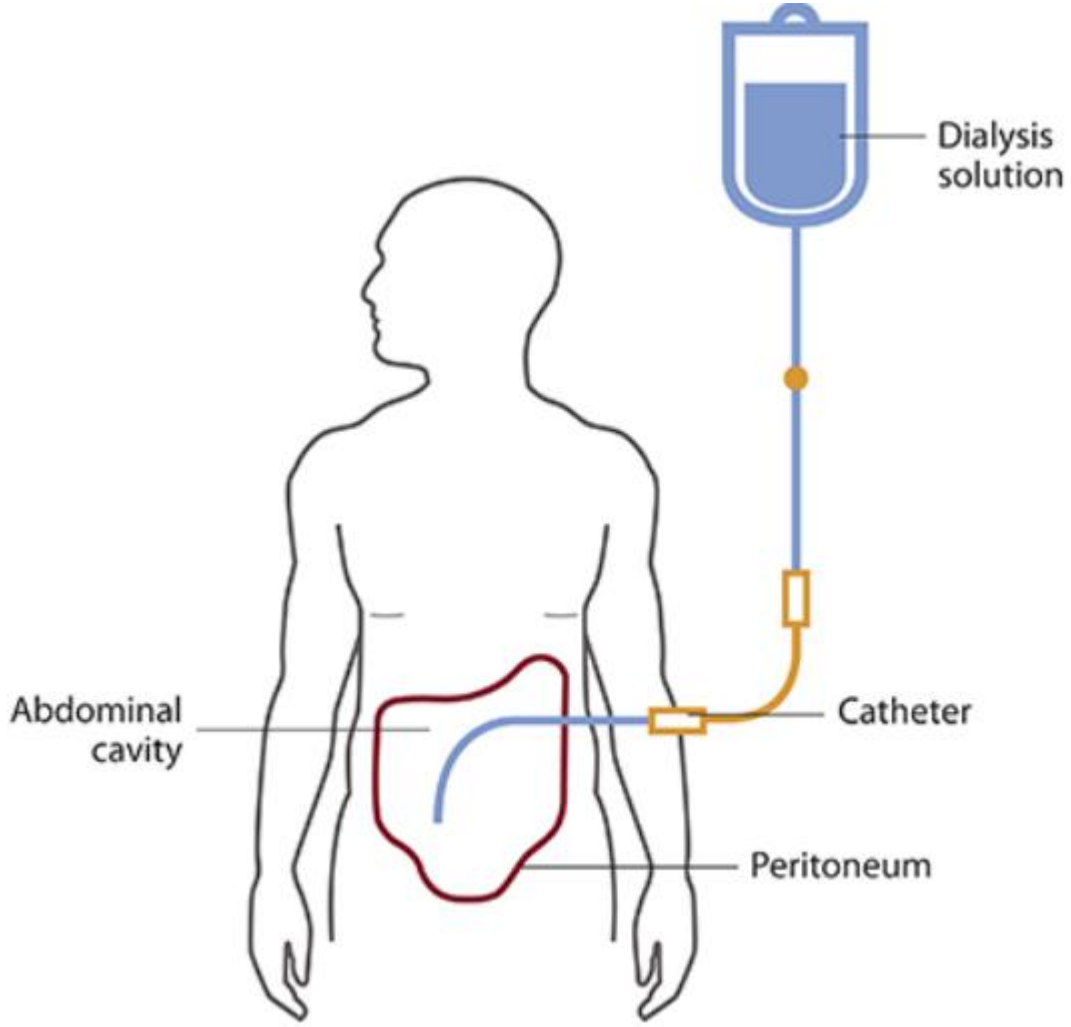
- RB is a 34 year-old male admitted with decompensated cirrhosis found to have severe hyponatremia and AKI.

- Follows up in clinic 4 months from time of initial consult
- Creatinine 1.6 and eGFR 57

ASN AKI-D Guidance

- Dialytrauma

AKI and Peritoneal Dialysis



A Few Words on IV Contrast and Urine Lytes

AKI Prevention

- Fluid resuscitation
- Monitoring of Urine Output
- Comorbid condition awareness
- Medication Review
- Amino acids administration?

Patient Case #2

- RB is a 34 year-old male admitted with decompensated cirrhosis found to have severe hyponatremia and AKI.

- 9 months after initial consult
- **Unrecognizable**
- Creatinine 0.8 with eGFR 114

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Expected Outcome

Recognize the role of dialysis in AKI with goal of identifying high and moderate chance phenotypes who have increased chance of kidney recovery to prevent further injury and promote recovery.

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Questions?