

Approach to minimizing renal risk in the perioperative period

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Nothing to disclose

64 year old male with DM, COPD, HLD, obesity, CKD

- Assessing CKD and likelihood of progression
- Minimizing risk of AKI in perioperative period

What are the best methods for prediction risk of progression to ESRD in CKD patients?

- 4 variable Kidney Failure Risk Equation
- Risk of ESRD within 2 and 5 years
 - Age, Sex, eGFR, microalbuminuria
 - Validated in multiple countries including USA
- Our patient:
 - 64 years old, male, 53 ml/min/1.73m² (based on Cr 1.4), microalbuminuria ?
 - Assuming no microalbuminuria: 2 yr risk 0.18%, 5 yr risk 0.58%
 - Assuming macroalbuminuria: 2 yr risk 0.8%, 5 yr risk 2.47%
- Need to assess albumin excretion (mg/g Cr) to predict ESRD

Albuminuria

- A biomarker of CKD, CVD and mortality regardless of the presence of DM
- Definitions
 - Microalbuminuria
 - UAE: 30-300 mg/day
 - ACR: 30-300 mg/g creatinine
 - Macroalbuminuria
 - UAE: > 300 mg /day
 - ACR: > 300 mg/g creatinine
- Correlates well with 24 hr albuminuria

Albuminuria

- Associated with myocardial infarction and stroke
 - Reflects endothelial damage
 - Part of the cardiovascular dysmetabolic syndrome
 - Progression of micro- to macroalbuminuria predicts progression of renal disease
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Proteinuria/albuminuria when, how, what

- At risk populations, dip stick trace or neg
- Spot urine albumin-creatinine ratio
 - First voiding if possible
 - Avoid testing with uti, after exercise, fever, ketosis, chf
- Repeat twice within 3-6 months (+ 2/3)
- Microalbuminuria, treat, repeat 6 months
- Macroalbuminuria, follow protein-creatinine ratio

CKD checklist for PCPs

- Slowing Progression
 - Bp<140/90
 - HbA1c < 7% in diabetic patients within 6 months
 - Annual screen for proteinuria with spot UAC
 - On ACEI or ARB if diabetes or micro albuminuria
 - Smoking cessation discussion
 - Discuss avoiding NSAIDS/ nephrotoxins
 - LDL , 100 as goal
 - 5 year pneumovax
 - Yearly influenza vaccine

Preventing AKI in perioperative period

- Defining Risk
- Impact of AKI on morbidity and mortality

Risk Factors For AKI

Patient Risk Factors⁸

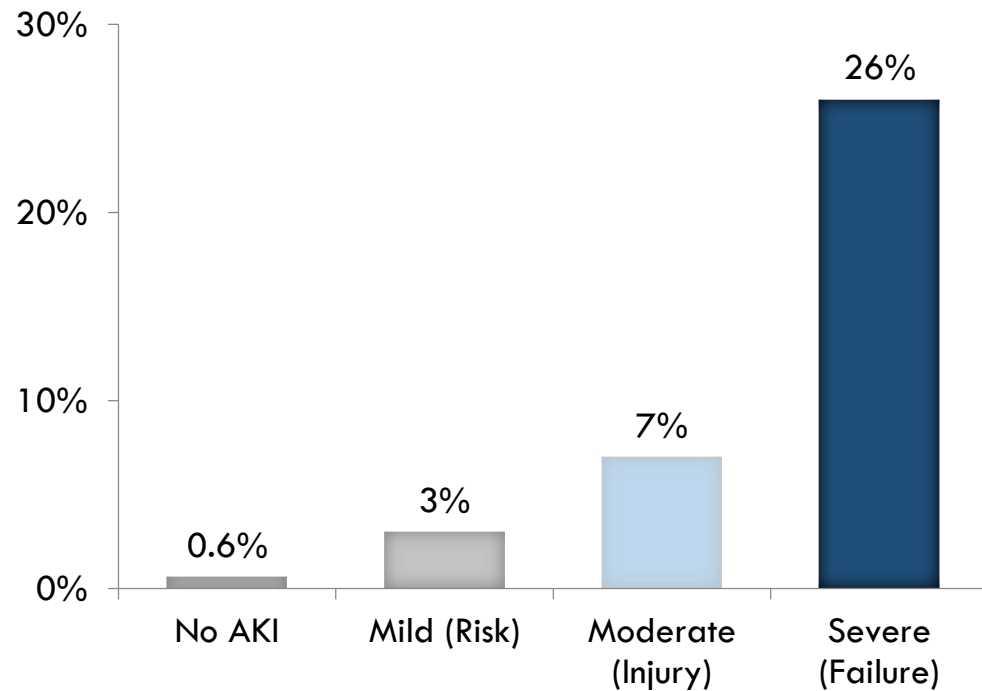
- Advanced Age
- Female gender
- Black race
- CKD
- Chronic Disease (heart, lung, liver)
- Diabetes Mellitus
- Cancer
- Anemia

Acute Risk Factors^{9-11,20}

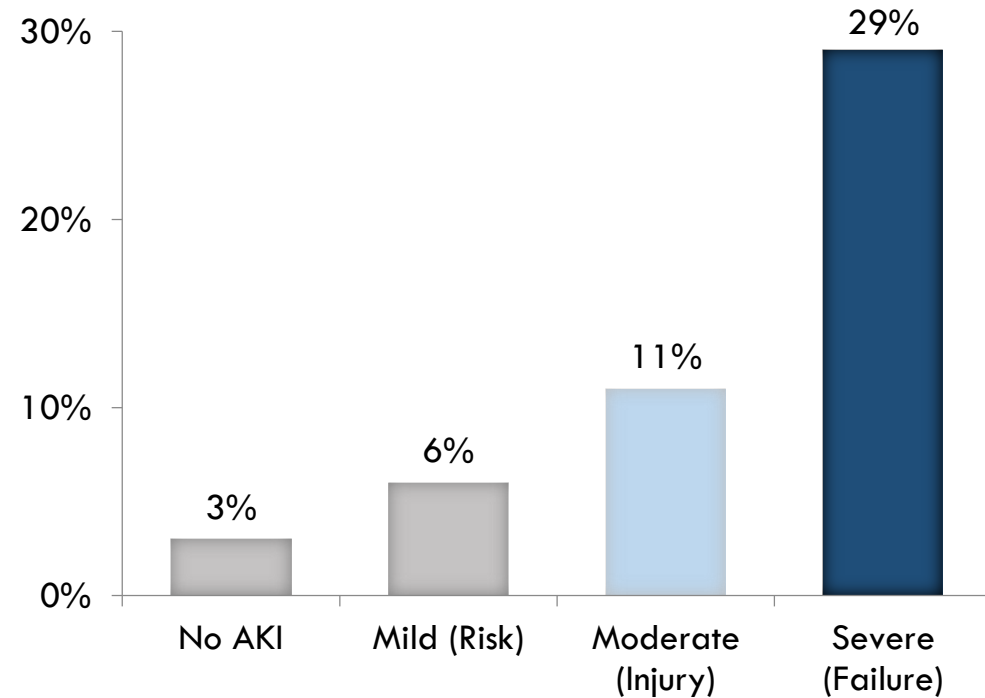
- Sepsis
- Pneumonia
- Cardiogenic Shock
- Major Surgery
- Cardiac Surgery
- Nephrotoxic Drugs
- Radiocontrast Agents
- Hypovolemia

AKI Is Common and Deadly: Major Surgery

Hospital Mortality

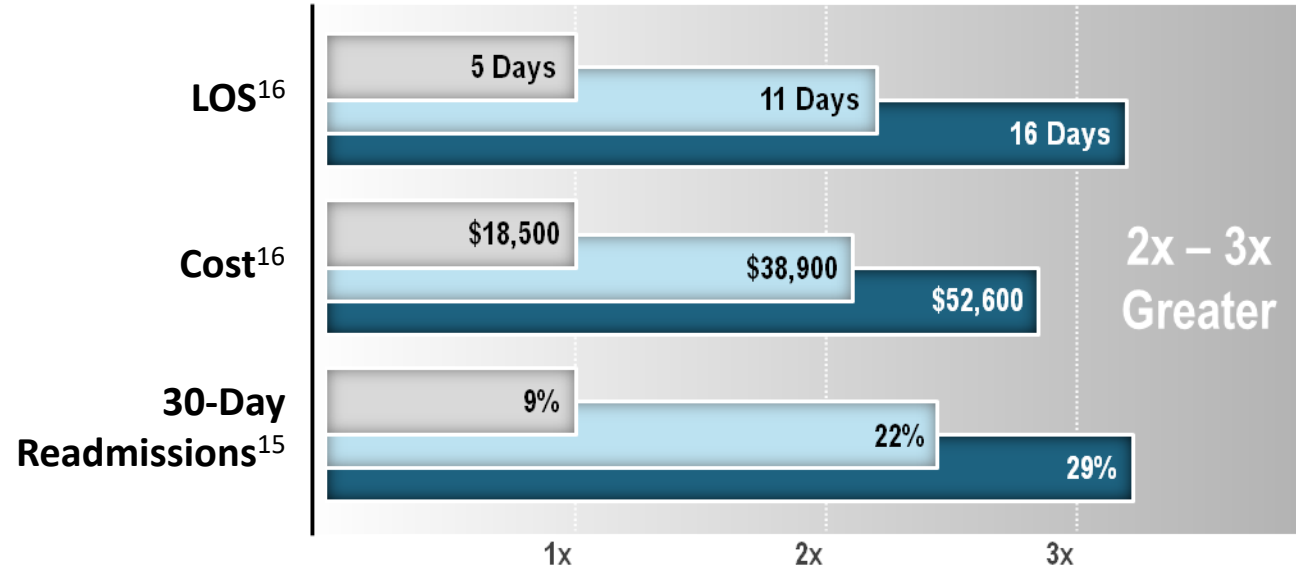


90-Day Mortality



In a single-center cohort of 27,841 adult surgical patients undergoing major surgery, it was identified that hospital and 90-day mortality were significantly higher among patients with AKI compared to patients with no AKI.¹⁴

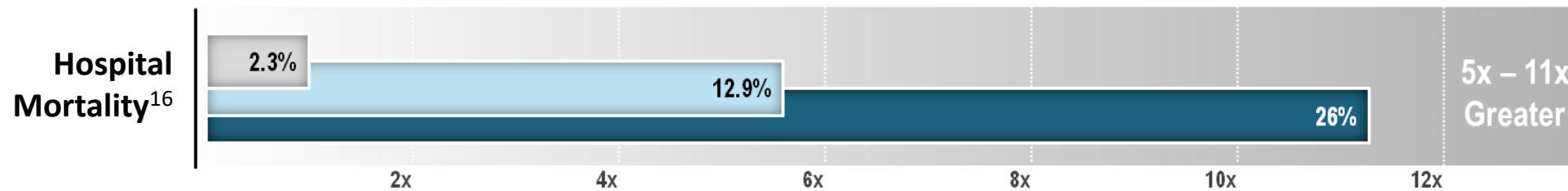
Everything Is At Least 2-3 Times Worse With Moderate-Severe AKI



Short-term & long-term consequences associated with increasing AKI severity



LOS: Total postoperative length of stay (days/patient); Cost: Total postoperative cost (US\$/patient); 30-Day Readmissions: % of postoperative patients; Hospital Mortality: % of postoperative patients.



Back to our patient

- CKD, DM, Major surgery risk factors for AKI
- Its all about the BP
- Minimizing nephrotoxins, particularly NSAIDS
- Stopping ACEI before surgery?

Preoperative administration of ACEI/ARB?

- Vision Trial (Vascular events In noncardiac Surgery Patients Cohort evaluation) London, MJ, Anesthesiology 2017 126:1-3
- Controversy still exists
 - If used for BP, discontinue the night before surgery, enalaprilat can be used intravenously if necessary during surgery
 - If used for Heart Failure and BP normal, use your best judgement?

Approach to minimizing renal risk in the perioperative period

- Conclusions:
 - Assess degree of preexisting renal disease
 - CKD stage and microalbuminuria
 - Assessing comorbid conditions that might impact on AKI
 - Minimizing potential for AKI
 - Avoiding nephrotoxins
 - Controlling perioperative BP, avoiding both highs and lows