Approach to minimizing renal risk in the perioperative period

Todd Gehr, M.D
Professor and Chief of Nephrology, VCU Health System

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
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 Factors\(^8\)
- 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

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

<table>
<thead>
<tr>
<th>Short-term &amp; long-term consequences associated with increasing AKI severity</th>
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<td>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.</td>
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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 cQhort 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