

# Harvard Medical School Department of Continuing Education and the Renal Division of Brigham and Women's Hospital



## *Nephrology Rounds*

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### **Biomarkers for Early Detection of Acute Kidney Injury**

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#### **Objectives:**

This issue of *Nephrology Rounds* will allow the reader to successfully identify potential biomarkers for acute kidney injury (AKI), understand the need for such noninvasive indicators, and recognize the problems and the promise of these biomarkers.

#### **Questions:**

1. Which stage of the RIFLE criteria for AKI is excluded in the Acute Kidney Injury Network (AKIN) staging criteria?
  - a) Risk
  - b) Injury
  - c) Failure
  - d) Loss
  - e) None of the above
2. Which one of the following statements regarding AKI is *incorrect*?
  - a) AKI is often seen in the setting of multiple organ failure and sepsis.
  - b) Mortality rates of patients with severe AKI requiring renal replacement therapy have decreased significantly in the last decade.
  - c) Many potential AKI therapeutic agents have been tried but with little success.
  - d) None of the above
  - e) All of the above
3. Which treatment modality is shown to be successful in reversing or ameliorating established AKI in a Phase II or III National Institutes of Health (NIH) clinical study?
  - a) Atrial natriuretic peptide
  - b) Insulin-like growth factor-1
  - c) Endothelin receptor antagonist
  - d) None of the above
  - e) All of the above
4. Which one of the following statements regarding serum creatinine (SCr) is *incorrect*?
  - a) A change in SCr does not discriminate the time and type of renal insult.
  - b) A change in SCr does not discriminate the extent of glomerular or tubular injury.
  - c) AKIN staging criteria are based on an increase in SCr or decrease in urine output.
  - d) A change in SCr is insensitive for the early diagnosis of AKI.
  - e) None of the above
5. Which one of following biomarkers is *not* associated with proximal tubular injury?
  - a) N-acetyl- $\beta$ -D-glucosaminidase
  - b)  $\alpha$ 1-microglobulin
  - c) Retinol binding protein
  - d) Carbonic anhydrase
  - e) None of the above
6. Which one of the following statements regarding neutrophil gelatinase-associated lipocalin (NGAL) is *incorrect*?
  - a) NGAL is a member of the lipocalin superfamily and is highly expressed in the early postischemic mouse and rat kidney.
  - b) NGAL has been implicated as an early predictive urinary biomarker of ischemic AKI in both children and adults after cardiac surgery.
  - c) NGAL has been implicated as a predictor for development of delayed graft dysfunction after renal transplantation.
  - d) NGAL measurement is not affected by infection and inflammatory conditions.
  - e) None of the above

7. Which one of the following statements regarding kidney injury molecule-1 (KIM-1) is **incorrect**?
- KIM is a type 1 transmembrane glycoprotein.
  - KIM-1 is also known as hepatitis A virus cellular receptor 1 and T-cell immunoglobulin and mucin domain-containing molecule 1.
  - There is no association between urinary KIM-1 expression and adverse clinical outcomes in patients with established AKI.
  - KIM-1 can be detected in the urine of patients with established AKI.
  - None of the above
8. Which one of the following statements regarding interleukin-18 (IL-18) is **incorrect**?
- IL-18 is a proinflammatory cytokine.
  - IL-18 is increased in the urine of patients of AKI.
  - IL-18 is increased in the urine of patients with delayed renal allograft function.
  - None of the above
  - All of the above
9. Which one of the following statements regarding cystatin C (Cys-C) is **incorrect**?
- Serum Cys-C is released into the plasma by all nucleated cells.
  - Serum Cys-C is freely filtered by the glomerulus and is catabolized in the proximal tubules.
  - Serum Cys-C level is not affected by corticosteroid use, rheumatic disease, or malignant disease.
  - Urinary excretion of Cys-C has diagnostic value in predicting the requirement of renal replacement therapy among nonoliguric patients with AKI.
  - None of the above
10. Which biomarker is associated with markers for glomerular filtration rate (GFR) and AKI?
- NGAL
  - KIM-1
  - Cystatin-C
  - IL-18
  - None of the above
11. This issue of *Nephrology Rounds* adequately addressed the topic, and the data and discussion were fair and balanced.
- AGREE  DISAGREE
12. Potential conflicts of interest disclosed by the author on the back page were properly expressed.
- AGREE  DISAGREE
13. The information presented in this issue of *Nephrology Rounds* will increase my clinical knowledge and improve the care of my patients.
- AGREE  DISAGREE
14. *Nephrology Rounds* from Brigham and Women's Hospital and Harvard Medical School is an effective CME program.
- AGREE  DISAGREE

Comments/Topic Suggestions: \_\_\_\_\_

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