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ACS Renal Section Review Course Questions

1. Which of the following best describes a classification system for assessing acute kidney injury and acute renal failure?
    a. MELD
    b. RIFLE
    c. POSSUM
    d. SOFA
2. Which of the following is true about hyperchloremic metabolic acidosis?
    a. Increases ICU mortality
    b. Improves renal blood flow
    c. Enhances coagulation
    d. Reduces catecholamine tone
3. Starch-based colloid plasma volume expansion is:
    a. Three times as effective as crystalloid resuscitation
    b. Unassociated with coagulation abnormalities
    c. Linked to AKI and ARF in septic shock patients
    d. Appropriate to use without maintenance fluid
4. Intermittent hemodialysis
    a. Establishes an effective creatinine clearance of 50 ml/min
    b. Evidences more complications that continuous techniques
    c. Is appropriate for patients with pressor-requiring shock patients
    d. Has outcomes similar to continuous dialysis in non-shock patients

5. Which of the following statements best describes the outcome from acute renal failure occurring in the ICU?
    a. Outcome is primarily driven by the rapidity of renal recovery
    b. Population-based in-hospital mortality rates are approximately 50%
    c. If patients survive to ICU discharge, life expectancy is normal
    d. Improved outcomes occur in patients managed with diuretics

Answer Key:

1. B
2. A
3. C
4. D
5. B

Rationales

1. The RIFLE criteria are a means of assessing acute kidney injury and acute renal failure using criteria that identify renal Risk, Injury, Failure, Loss and End-stage renal disease (RIFLE). MELD is used to grade hepatic compromise. SOFA score is a severity and mortality prediction tool for ICU patients utilizing sequential organ failure assessment that uses 6 variables, including creatinine and urine output. The POSSUM score uses 12 physiologic parameters and 6 operative features to derive a score that indicates the risk of morbidity and mortality for general surgery patients; renal elements include urea, sodium and potassium.

2. Hyperchloremic metabolic acidosis has been demonstrated in a large sample of ICU patients to impart an additional mortality risk above that of ICU patients admitted without any acidosis. HCMA has also been related to decrements in renal blood flow and glomerular filtration rate in animals and humans. Acidosis impairs the kinetics of pH dependent enzyme systems including the serine proteases of the coagulation cascade and therefore, impedes coagulation. Compared to lactic acidosis, HCMA has been demonstrated to be pro-inflammatory and therefore does not reduce catecholamine tone.

3. In multiple studies of ICU patients receiving starch compared to crystalloid resuscitation, the actual ratio of starch to crystalloid with regard to bioequivalent resuscitation efficacy is 1:1.4 and not the expected 1:3. Starch based resuscitation does impede the coagulation system, and is frequently related to diminished calcium and magnesium in the diluent. Increasing data does link starch resuscitation to AKI and ARF in patients with severe sepsis and septic shock, although such a link has not been well-established in other conditions. Maintenance fluid is required as starch preparation do not provide free water in significant quantity and as such will create a hyperoncotic state which is strongly associated with AKI and ARF.

4. In patients who are able to tolerate either intermittent (IHD) or continuous renal replacement therapy (CRRT) outcomes are indeed equivalent. CRRT still is the dialysis modality of choice for those with hemodynamic instability. IHD and CRRT establish an effective creatinine clearance of ~ 25 ml/min and allows for pharmacologic dosing at that level of renal function. IHD does not have more complications and generally costs less than CRRT. CRRT generally is more complicated due to issues with filter clotting, temporary access, catheter-related infection and sepsis, and other resource consuming complications.

5. Now-onset ARF in the ICU has a durable mortality of ~ 50% across multiple studies and spanning the last decade of inquiry. The rapidity of recovery does not relate to outcome, and may be reduced when diuretics are used to manage volume status as opposed to dialytic techniques. Life expectancy is reduced and may approach 70% mortality by 7 years post-ICU ARF onset.