EVIDENCE-BASED CARE SHEET

Renal Failure, Acute: Prognosis and Recovery

What We Know

› Acute renal failure (ARF) is the sudden decrease in or loss of kidney function. ARF is a common complication in the hospitalized patient and contributes significantly to morbidity and mortality[1,2,3,4,5,6] (For more information on ARF, see the series of related *Quick Lessons* and *Evidence-Based Care Sheets*)

› Prognosis and recovery in ARF are highly varied and dependent on a number of factors, including the cause of ARF, timing of diagnosis, presence of comorbid conditions, and the age of the patient[1,2,3,4,5,6]

• Renal compromise can be categorized based on the anatomic location of the cause as prerenal (i.e. related to decreased renal perfusion and/or reduced glomerular blood flow), intrinsic (i.e., caused by a specific disease or injury to the kidneys, such as injury from nephrotoxic drugs or other substances), and postrenal (i.e. related to obstruction of the urinary tract). Patients with ARF that has a prerenal or a postrenal cause generally have a better prognosis than patients with ARF that involves intrinsic renal disease such as acute tubular necrosis (ATN) or interstitial nephritis[2]

• ARF secondary to dehydration typically carries a good prognosis if detected and promptly treated; most cases resolve in 7–14 days[3]

• Contrast-induced nephropathy (CIN) is associated with higher mortality[1]
   − At 16-month follow-up, mortality in patients with CIN was 31.8% compared with 22.6% in patients who received contrast media but did not develop CIN
   − Contrast that is administered I.V. is associated with higher mortality from CIN than contrast that is administered intra-arterially

• Early detection and intervention may help to improve prognosis and chance of recovery[1,3,6]
   − Patients with ARF who are treated at an early stage according to RIFLE criteria have reduced mortality; RIFLE criteria are used to define and classify the stages of renal dysfunction. RIFLE is an acronym for **r**isk of renal failure, **i**njury to kidney, **f**ailure of kidney function, **l**oss of kidney function, and **e**nd-stage renal failure.[1]
   − Having the maximum RIFLE score during the first 3 days of admission to ICU has been shown to accurately predict increased mortality[1]
   − ARF can be completely reversed if treated early; as it progresses, irreversible damage typically occurs[3]
   − Early identification and treatment of patients with pyelonephritis and glomerulonephritis can improve prognosis[6]

• The presence of comorbid conditions can complicate recovery and result in poorer patient outcomes[1,3,5,6]
   − Hypoalbuminemia in hospitalized patients has been associated with more than double the chance of developing ARF; of patients with ARF, low albumin can increase mortality by a factor of almost 2.5[1]
   − Overall inpatient mortality from ARF is 45%, but this increases to 70% in patients with severe illness, multisystem organ failure, or recent surgery[3,5,6]

- Advanced age has been shown to be an independent risk factor for the development of ARF, and older patients have a poorer prognosis[1,3,4,5,6]
  - Older patients have a lower chance of recovering renal function following the development of ARF[1,4]
    - Only 68.7% of older patients recover renal function following inpatient discharge compared with 74% of younger patients[4]
- Approximately 12.5% of patients who survive ARF remain dependent on hemodialysis 10 years later[6]

› Use of novel biomarkers may predict the need for continued hemodialysis in patients with ARF[1]
- Serum cystatin C has demonstrated 82% sensitivity and 93% specificity in predicting the need for hemodialysis
- Urinary neutrophils gelatinases-associated lipocalin (NGAL) has demonstrated 90% sensitivity and 54% specificity in childrenwith hemolytic-uremicsyndrome (HUS) in identifying the severity of AKI and predicting poor patient outcomes
- Further research is needed in the field of novel biomarkers before they can be used as definitive predictors of recovery

What We Can Do

› Become knowledgeable about the prognosis and recovery of patients with ARF so you can accurately assess your patients' personal characteristics and health education needs; share this information with your colleagues
› Monitor patients who are at risk for ARF (e.g., older adults, patients who are critically ill, postsurgical patients) for signs of ARF, and inform the treating clinician promptly if signs of ARF develop because early intervention is key to good patient outcomes

Coding Matrix

References are rated using the following codes, listed in order of strength:

M Published meta-analysis
SR Published systematic or integrative literature review
RCT Published research (randomized controlled trial)
R Published research (not randomized controlled trial)
C Case histories, case studies
G Published guidelines

RV Published review of the literature
RU Published research utilization report
QI Published quality improvement report
L Legislation
PGR Published government report
PFR Published funded report

PP Policies, procedures, protocols
X Practice exemplars, stories, opinions
GI General or background information/texts/reports
U Unpublished research, reviews, poster presentations or other such materials
CP Conference proceedings, abstracts, presentation

References

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6. Workeneh, B. T. (2013). Acute Kidney Injury. *Medscape Reference*. Retrieved October 10, 2013, from http://emedicine.medscape.com/article/243492-overview **(GI)**