Dialysis Initiation During the Hospital Stay

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KEYWORDS

• Dialysis • Renal replacement therapy (RRT) • Ultrafiltration • Uremia
• Acute kidney injury (AKI)

HOSPITAL MEDICINE CLINICS CHECKLIST

1. Consideration of renal replacement therapy (RRT) initiation is commonly needed in hospitalized patients with acute kidney injury (AKI) or those presenting with advanced or progressive chronic kidney disease (CKD).
2. The decision to commence dialysis requires a thorough consideration of the patient profile, including symptomatology, laboratory data, vascular access, patient safety, urgency, and goals of care.
3. Absolute indications to initiate dialysis include uremic pericarditis, uremic encephalopathy, volume overload, severe acid-base disturbances, and medically intractable hyperkalemia.
4. Often the decision to initiate RRT largely hinges on relative indications and a subjective assessment of symptoms, including lethargy, nausea and vomiting, pruritus, and decreased cognitive function.
5. There is no compelling evidence that initiation of dialysis based on measurement of estimated glomerular filtration rate (eGFR) alone without accompanying clinical indications leads to improvement in clinical outcomes.
6. A majority of clinical trials have failed to consistently show a benefit of earlier initiation of RRT in AKI. Additionally, earlier initiation in AKI is not without risk of exposure to potential harms of vascular access and complications of RRT, particularly if clinical criteria predict spontaneous recovery.
7. Dialysis access planning should anticipate initiation and represents an important determinant of RRT quality.

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INTRODUCTION

The decision to commence dialytic support and the precise timing to initiate therapy are common clinical questions encountered in hospital medicine. Although RRT has been used extensively in clinical practice for more than 30 years, the decision to commence RRT involves the assimilation of several considerations, including symptomatology, laboratory data, vascular access, patient safety, and clinical urgency as well as social factors and patient goals of care. Additionally, there is a paucity of evidence to help guide clinicians on the optimal utilization of RRT and no consensus currently exists to help guide decision-making strategy.

RRT encompasses a range of modalities and, in general, can be categorized into either intermittent or continuous techniques. Intermittent RRT options include hemodialysis and peritoneal dialysis, whereas continuous RRTs (CRRTs) include a range of techniques, such as continuous venovenous hemofiltration that is used commonly in critically ill patients. Although beyond the scope of this review, kidney transplantation is another form of RRT that is considered the treatment of choice for many patients with end-stage renal disease (ESRD).

RRT initiation commonly needs to be considered in hospitalized patients with AKI or those presenting with advanced or progressive CKD. Mounting epidemiologic evidence has shown that AKI is an independent risk factor for mortality.[1] AKI, regardless of stage, is associated with a variety of outcomes, including length of hospital stay and readmission rates, and is an important risk factor for new-onset CKD. More than 30% of critically ill patients develop AKI.[2] In both severe AKI and advanced-stage CKD, RRT represents a cornerstone of treatment. This review provides an overview of pivotal factors that should be considered surrounding initiation of dialysis in hospitalized patients. A discussion of various RRT modalities and vascular access issues that need to be considered prior to dialysis initiation is also provided.

FACTORS INFLUENCING DECISIONS TO INITIATE RENAL REPLACEMENT THERAPY

Historically, dialysis has been a scarce resource and in general was only initiated when patients demonstrated clear signs of life-threatening uremic complications.[3] Since the mid-1990s, the mean eGFR in patients starting maintenance dialysis in the United States has increased.[4] Virtually all the new patients starting maintenance dialysis in the United States in recent years can be accounted for by those with an eGFR of greater than 10 mL/min/1.73 m^2.[5] In Canada and Europe, similar trends have been noted; however, the mean eGFR at the initiation of dialysis in these countries is generally lower than in the United States.[6] Unfortunately, the reasons for this trend are currently unclear and it is apparent that there is a large variation in clinical practice as to when to start RRT.[7] A myriad of factors influence the decision-making process of when to start RRT (**Box 1**).

What factors should be considered in a decision to initiate renal replacement therapy?

The need to initiate acute RRT in non-ICU patients is sometimes overlooked; however, more than 10% of non-ICU patients admitted to the hospital with AKI may require acute RRT.[8] In this setting, hospitalists should be vigilant to identify absolute indications to initiate dialysis. These include uremic pericarditis, uremic encephalopathy, volume overload, severe acid-base disturbances, and medically intractable hyperkalemia.[4] In AKI patients, hyperkalemic complications in conditions where an