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NEPHROLOGY BOARD REVIEW MANUAL

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Acute Renal Failure: Pathophysiology and Treatment

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Table of Contents

Introduction	2
Etiology and Epidemiology	2
Diagnosis and Clinical Evaluation	4
Pathophysiology	5
Management of Ischemic Acute Renal Failure	7
Renal Replacement Therapy	9
References	11

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INTRODUCTION

Acute renal failure (ARF) is a clinical syndrome characterized by an acute fall in glomerular filtration rate (GFR), resulting in decreased clearance of metabolic waste products from the blood. ARF can be caused by a number of diseases and pathophysiologic mechanisms. Most cases of ARF, however, occur in the most seriously ill, who often have complex comorbid illnesses, such as sepsis and multisystem organ failure. Despite many advances in critical care medicine, mortality in patients with ARF remains high; in some studies it is greater than 80%. This review discusses pathophysiologic mechanisms involved in the development of ARF, pharmacologic agents with potential therapeutic benefit, and issues surrounding the selection of a modality for renal replacement therapy in ARF patients.

ETIOLOGY AND EPIDEMIOLOGY

ETIOLOGY

The causes of ARF are typically divided into 3 categories: prerenal, renal, and postrenal (**Table 1**). Prerenal ARF results from an abnormality in glomerular perfusion that reduces the GFR in the absence of any pathology of the renal parenchyma. It is important to note that this form of renal failure is rapidly reversed when the hypoperfusion is corrected. Postrenal ARF results from obstruction of urinary collection and, again, occurs in the absence of any direct insult to the renal parenchyma. This form of ARF is also completely reversible when the obstruction is relieved. Finally, renal (or intrinsic) ARF occurs when there is direct damage to the renal parenchyma itself; it can