Epidemiology of HCV in Renal Disease
Hepatitis C testing is routinely recommended for patients with chronic kidney disease on hemodialysis, who have a higher prevalence of hepatitis C infection compared with the general population. Serologic studies in the United States have estimated the prevalence of HCV infection among patients on hemodialysis ranges between 10% to 36%. While many of these patients have independent risk factors for HCV infection, de novo infections during hemodialysis may occur. Common source outbreaks from a breakdown of universal precautions, such as use of multidose vials have been reported. In a study that examined procedures at 53 dialysis centers in the U.S., the prevalence of anti-HCV was 9.9% among over 2900 patients tested. After adjusting for non-dialysis related HCV risk factors, several patient care practices during dialysis were associated with a higher risk of HCV infection (reusing priming receptacles without disinfection, handling blood specimens adjacent to medications and clean supplies, and using mobile carts to deliver injectable medications). A higher patient to staff ratio and longer duration of hemodialysis were also associated with a higher prevalence of HCV infection. Neither hemodialysis machines nor dialysis membranes have been considered sources of HCV infection and anti-HCV positive patients are not required to be dialyzed in isolation, unlike for chronic hepatitis B infection.

Increased morbidity and mortality
The presence of hepatitis C infection in patients with chronic kidney disease does have an impact on morbidity and mortality. As may be expected, hepatocellular carcinoma and cirrhosis as causes of death were more frequent among anti-HCV positive than anti-HCV negative hemodialysis patients. Interestingly, it has generally been noted that HCV liver disease appears to be less aggressive, as evidenced by lower levels of aminotransferases and diminished necroinflammatory activity, in those on hemodialysis than in non-hemodialyzed HCV controls. However, several observational studies have demonstrated that all-cause mortality is also significantly higher among hemodialysis patients with hepatitis C, a finding which could be linked to increased HCV-associated cardiovascular mortality reported in this population. Patient and graft survival after kidney transplantation is also lower for anti-HCV positive recipients compared to non-infected individuals, although patient survival curves diverge only after 10 years post-kidney transplantation with some of the excess mortality attributed to complications of chronic liver disease.

Treatment of HCV in hemodialysis and kidney transplant patients
Treatment for hepatitis C in patients with chronic kidney disease may be extremely challenging and is associated with higher rates of adverse events, although sustained virological response can be achieved in some patients. Treatment must be modified for patients on hemodialysis. Peginterferon at reduced doses (Peginterferon alfa-2a = 135 µg /week or peginterferon alfa-2b = 1.0 µg/kg/week) and ribavirin at 200 mg/day can be administered to patients on hemodialysis. Extreme caution and close monitoring is required with the use of ribavirin in the setting of hemodialysis since this medication is not dialyzed and hemolytic anemia will worsen. Several small studies have utilized low dose, weekly dosing, or dosing...
titrated to blood ribavirin levels in an attempt to improve sustained virological response and minimize adverse events. Regardless of the regimen, HCV therapy in the hemodialysis population has consistently demonstrated a high rate of adverse events and frequent premature discontinuation due to side effects 12.

The absence of well-designed controlled clinical trials using peginterferon and ribavirin with sufficient statistical power to identify the regimen that optimizes safety and efficacy has hampered the treatment of hemodialysis patients. Similarly, the roles of HCV protease inhibitors, boceprevir and telaprevir, remain under investigation. The pharmacokinetics of these drugs is not substantially altered by severe renal impairment and dosage modification would appear not to be necessary. However, a search of clinicaltrials.gov yielded only a pilot study of boceprevir combined with peginterferon and ribavirin in the hemodialysis population.

Treatment of chronic hepatitis C in patients following kidney transplantation has generally not been routinely recommended due to concerns of renal allograft dysfunction and rejection which have been reported in numerous case series of interferon-based treatment 13 14. Serial liver biopsies after kidney transplantation to identify patients with progressive liver disease may help in assessing the benefits/risk of antiviral therapy. Fibrosing cholestatic hepatitis (FCH), is a unique rapidly progressive, frequently fatal liver injury reported in several types of solid organ transplantation, for whom interferon-based therapy may be effective 13,15.

References