Role of Pneumococcal Vaccination in Renal Diseases

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Disease Burden

Chronic kidney diseases (CKD) is defined as abnormalities of kidney structure or function, present for >3 months, with implications for health and is categorized based on cause, GFR category, and albuminuria.[1] A population screening of 4712 subjects in New Delhi[2] suggested that there are approximately 7.85 million chronic renal failure (CRF) patients in India and etiologically diabetes accounted for 41% of all causes. The Screening and Early Evaluation of Kidney Disease (SEEK) study analyzed 5588 individuals in 12 Indian cities and estimated the prevalence of CKD in India at 17.2%.[3] The Tanker Foundation (www.tankerfoundation.org), a non-governmental organization (NGO) in South India, in an early detection and prevention program in rural and urban areas detected dipstick proteinuria in 24.2% and an eGFR <60 mL/min/1.73 m2 was found in 7.7%.[4] Diabetic nephropathy was found to be the commonest cause of CKD in cross-sectional study using Indian CKD registry and about 48% of cases were in stage V at presentation.[5]

Infectious Complications in Chronic Renal Diseases

Regardless of the primary cause for the development of CKD, patient outcomes after the development of infections were 3 to 4 times worse than in the non-CKD population. Compared with the non-CKD population, the rates of pneumonia are 3 times greater in the CKD population and 5 times greater in the dialysis population.[6] The annual percentage of mortality secondary to sepsis is approximately 100 to 300 fold higher in dialysis patients[7] According to the Medicare claims in patients initiating dialysis in the United States between 1996-2001, one in five patients was diagnosed with pneumonia in the 1-year period following inception of dialysis therapy and the cumulative survival probabilities were 0.51 at 1 year after the first occurrence of pneumonia[8]. In a population-based retrospective cohort study from Taiwan the incidence rate ratio of end-stage renal disease (ESRD) was 23% higher in those with pneumococcal pneumonia than in those without pneumococcal pneumonia (5.26 vs. 3.10 per 1000 person–years).[9] The incidence rate of IPD in organ transplant population is 12.7 times more than the general population.[10]

Clinical and immunogenicity data of pneumococcal vaccines in renal diseases

There is insufficient data to be certain about the efficacy of PPV or PCV in CRF patients. The immunogenicity data from PPV suggested that the majority of patients will have a serologic response to at least some of the serotypes contained in the vaccine. However there was rapid decline in pneumococcal antibody titers (especially those on hemodialysis) and can even occur in the first year after PPV. Use of corticosteroids has no consistent effect on this response.[11] A randomized trial suggested that the initial immune response is an important predictor of the durability of response after 3 years follow-up period in transplant patients.[12]

National and global recommendations for pneumococcal vaccination in chronic renal disease

Kidney Disease Improving Global Outcomes (KDIGO 2013)[1] recommends that all adults with eGFR <30 ml/min/1.73 m2 & those at high risk of pneumococcal infection (e.g., nephrotic syndrome, diabetes, or those receiving immunosuppression) receive vaccination with polyvalent pneumococcal vaccine. The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP 2014)[13] recommends the sequential use of PCV13 and PPV23 in adults with chronic renal failure and nephrotic syndrome. Other societies like Indian Society of Nephrology, Spanish Society of Nephrology and Canadian Society of Nephrology also recommends pneumococcal vaccination in chronic renal diseases.[14-16] The immunization strategies should be formulated early in the course of progressive renal disease to maximize likelihood of vaccine-induced immunity since the secondary antibody responses are less affected by immune compromise than primary antibody responses.[17]

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