Similar clinical results of influenza vaccination in peritoneal dialysis and haemodialysis patients

Raymond T. Krediet

Academic Medical Centre, University of Amsterdam, Amsterdam, The Netherlands

Correspondence and offprint requests to: Raymond T. Krediet; E-mail: r.t.krediet@amc.uva.nl

The need for vaccination against common infectious diseases is especially present in those with impaired host defence and extensive comorbidity, like the elderly population, in those with end-stage renal disease (ESRD) and in patients treated with immunosuppression, for instance, after a kidney transplant. ESRD patients have alterations of both innate and adaptive immunity, consisting of immunodepression and immunoactivation [1]. An impaired antibody response after vaccinations is well known in dialysis patients. This may be due to impaired function of antigen-presenting cells, T cells or B cells. Also, functional memory cells are required for the effectiveness of a vaccine [2]. In vitro T and B cells from uraemic patients have essentially a normal function after adequate stimulation. However, heavily impaired proliferation of lymphocytes of haemodialysis (HD) patients is present, as reviewed in Grindt et al. [3]. Overproduction of IL-6 by monocytes is associated with low levels of T-cell activation. High plasma concentrations of this cytokine are also present [3, 4]. This has either been attributed to increased production due to a pro-inflammatory state, leading to increased production [3], or simply to impaired renal excretion. The observation that peritoneal dialysis patients have lower concentrations than HD patients [3], is in accordance with an effect of glomerular filtration rate. Also the higher serum IL-6 levels that are found in long-term peritoneal dialysis (PD) patients compared with recently started ones [4], fits within the concept that renal failure itself is the main course of impaired lymphocyte function. The better preservation of residual renal function can be the most important explanation for the lower rates of non-dialysis-related infections, like pneumonia in PD patients compared with those treated with HD [5]. These results have recently been confirmed for all non-dialysis-related infections [6].

Based on the considerations described above, a lower vaccination efficacy can be expected when dialysis patients are compared with individuals with normal renal function. Also, the results could be better in PD than in HD patients. For a proper interpretation, the characteristics of the control group are important. Compared with healthy subjects, HD patients had a lower antibody response after vaccination [7, 8]. In contrast, elderly individuals often have some impairment of renal function and a number of co-morbid conditions, making them a more suitable control group. No comparison of antibody response has been done between geriatric individuals and dialysis patients, but a meta-analysis of 96 databases of individuals aged ≥65 years, mainly from the Cochrane Library, reported a remarkable difference in influenza vaccine effectiveness between those living in elderly homes, where the reduction of influenza-like illness averaged 23% and death from influenza or pneumonia 42%, and individuals living in the community, where no significant effect could be demonstrated [9].

A recently published systematic review and meta-analysis on the effects of influenza vaccination in ESRD patients included 5 epidemiologic studies out of the 1541 screened [10]. No randomized controlled trial was present, so all were observational cohort studies. Four of these were in HD and only one in PD.
In all studies, the vaccination grade was <50%, despite governmental coverage of the costs. This means the interpretation of the results must be done cautiously, because of the high risk of bias due to unmeasured differences between vaccinated and non-vaccinated patients. HD patients had a pooled estimate of adjusted odds ratio of 0.65 for all-cause mortality and 0.85 for hospitalization due to influenza or pneumonia. These results point to low vaccine effectiveness. The USRDS results for PD patients were of a similar magnitude [11].

In the present issue of Nephrology Dialysis Transplantation, a study from Taiwan, Wang et al. [12] present a study in 4608 incident PD patients, 2325 of whom (50%) received a free influenza vaccination and 2283 chose not to be vaccinated. Both groups were followed up for 1 year. Although the vaccinated patients had more coronary artery disease and chronic obstructive pulmonary disease, both leading to a priori increased risk of death, the incidence rate of mortality was 10 per 100 patient-years, compared with 16 in the non-vaccinated patients. The corresponding adjusted hazard ratio for death was 0.64. Although no comparison was made, these results were not essentially different from those in HD patients from Taiwan [13] or from PD patients in the USRDS [11]. An interesting finding was a favourable effect on peritonitis incidence rates. These might suggest a general immune-stimulating effect of vaccination, but results will have to be confirmed in other studies.

It can be concluded that influenza vaccination has some effect in dialysis patients, especially on mortality, without a difference between HD and PD patients.

CONFLICT OF INTEREST STATEMENT

None declared.

(See related article by Wang et al. Seasonal influenza vaccination is associated with reduced morbidity and mortality in peritoneal dialysis patients. Nephrol Dial Transplant 2016; 31: 269–274.)

REFERENCES


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