The Impact of Statin on Influenza Vaccine Efficacy in the Elderly and Patients With Acute Respiratory Illness

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Statins are a class of drugs used to lower cholesterol levels by inhibiting the enzyme HMG-CoA reductase. Considering the association between elevated cholesterol levels and the risk of cardiovascular diseases and because of studies show that statins can lower this risk, it is given to a large number of adults (1). In fact, it is estimated that more than one billion people worldwide take statins (2). Although the primary goal of statin therapy was to lower cholesterol levels, it was recognized that this drug class had other effects, including suppression of T-cell activation and immunomodulatory and anti-inflammatory effects (3, 4). Many patients who routinely take statins are the elderly who are at higher risk for the complications of influenza (5).

Statins are beneficial for cardiovascular diseases due to their lipid-lowering effect (6). They also exhibit anti-inflammatory and immunomodulatory properties, which not only contribute to their impact on cardiovascular disease, but can also affect the clinical course of a variety of infectious processes, including sepsis, bacteremia, community-acquired pneumonia and laboratory-confirmed influenza. Furthermore, statins affect vaccine responsiveness in individuals, and their widespread use could influence overall vaccine effectiveness (VE) in a population (7-11).

Based on a study, the immunosuppressive effect of statins on the vaccine immune response was most dramatic in individuals receiving synthetic statins. These effects were observed in both the adjuvanted and non-adjuvanted vaccine groups in the clinical trial. These results, if confirmed, could have implications both for future clinical trial designs, as well as vaccine use recommendations for the elderly (12). Also in another study, statin therapy was associated with reduced influenza VE against laboratory-confirmed influenza are needed (13).

Researchers observed that statin users had a significantly reduced to immune response to vaccination compared to those not taking statins, as measured by the level of antibodies to the flu vaccine strains in the patients’ blood three weeks after vaccination. The effect was most dramatic in patients on synthetic statins, rather than naturally derived statins (14).

Apparent, statins interfere with the response to influenza vaccine and lower the immune response, and it seems to also result in a lower effectiveness of influenza vaccines. If confirmed, the findings could support the preferential use of high-dose flu vaccine or vaccines containing adjuvants to boost immune response in the elderly, in an attempt to counteract the apparent effect (15, 16).

Researchers in a study observed that vaccine effectiveness, to prevent serious respiratory illness, was lower among the patients taking statins compared to the ones not on statins, particularly when flu was widespread in the region. The findings have potential implications for guidelines regarding statin use in older adults around the vaccination time, but additional studies, including researches examining laboratory-confirmed cases of flu, are needed to provide more guidance (12, 13).

In conclusion the results of these studies should be viewed as hypothesis-generating and should prompt further investigations on whether statins reduce inactivated influenza vaccine immunogenicity and, if so, the mechanisms by which immune responses and associated vaccine effectiveness are adversely affected.

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References


