Original Article

Effect of Statins on the Mortality of Bacteremic Patients: A Systematic Review and Meta-analysis of Clinical Trials

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Abstract

Background: Statins modify inflammatory cell signaling during the immune response to infection. This has been considered as a pleotropic effect. Effects of statins in inflammatory conditions such as bacteremia have been found to be controversial. **Aims:** We examined the effect of statins on the mortality of bacteremia patients. **Materials and Methods:** Major databases were searched for the pertinent clinical trials. **Results:** Six cohort studies comprising 7553 patients were included. Hospital mortality was lower (15.36% vs 22.28%) in patients on statin. **Conclusions:** There may be a potential role of statins in similar inflammatory and infective conditions.

Keywords: Bacteremia, infection, inflammation, mortality

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Background

The pleiotropic effects of statins have been shown to modify inflammatory cell signaling during the immune response to infection. It has been postulated that statins can halt endothelial apoptosis, decrease isoprenylated proteins necessary for leukocyte cellular signaling, modulate endothelial cell adhesion molecules and proinflammatory cytokines, and regulate chemotactic proteins.[1,2] Studies in the past have shown inconsistent results, with some studies suggesting beneficial effects of statins in inflammatory conditions such as bacteremia,[1,3-7] pneumonia,[8] and sepsis,[9] whereas others showing potential harm. We, therefore, sought to conduct a systematic review and a meta-analysis regarding the effect of statins on the mortality of bacteremic patients.

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Materials and Methods

Relevant studies were identified through MEDLINE, EMBASE, Cochrane Library, Scopus, and clinicaltrials.gov electronic databases and hand-searched from inception through December 2014. Prospective and retrospective observational cohort studies examining the association between statin use (on hospital admission or previous users) and the outcomes of bacteremic patients were included. The outcome of interest was

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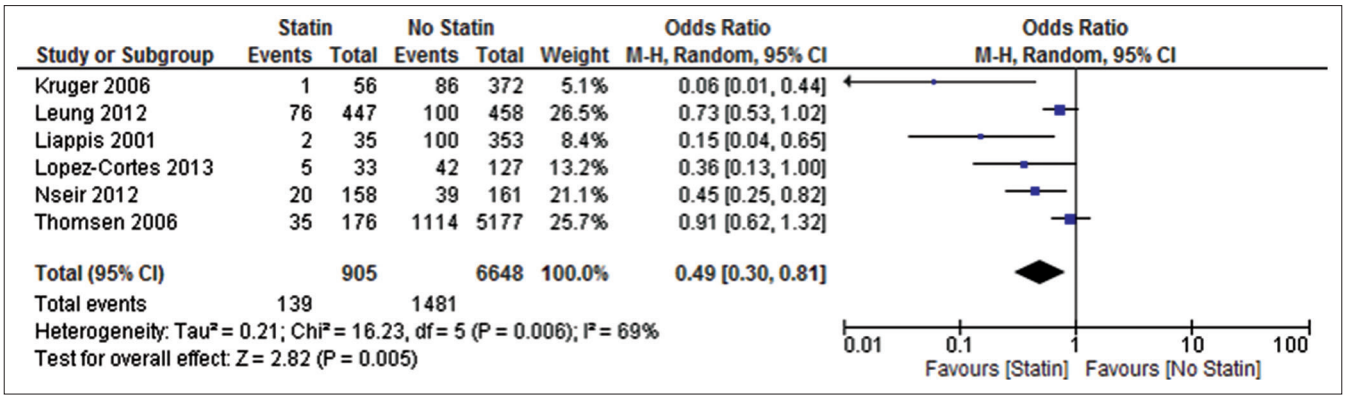

Figure 1: Meta-analysis of overall hospital mortality in statin vs. no statin group

overall hospital mortality at the longest follow-up at each single study. The statistical analysis was performed using Review Manager (RevMan) [Windows]. Version 5.2. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014. A *P* value of <0.05 was considered statistically significant. Study-specific risk ratios were calculated and combined using random-effects model meta-analysis. Between studies heterogeneity was assessed using the I^2 statistics. Quality assessment of cohort studies was performed using the Newcastle-Ottawa Scale.

Results

Six cohort studies[1,3-7] comprising 7553 patients were eligible. The overall hospital mortality was 15.36% (139/905) in patients on statin versus 22.28% (1481/6648) in patients not on a statin (Odds ratio = 0.49; 95% confidence interval = 0.30–0.81; $I^2 = 69\%$, $P = 0.005$) [Figure 1]. Quality analysis showed that all the included studies were of high or moderate quality (16.67% high and 83.33% moderate scores).

Discussion

In previous studies, statins have inconsistently been shown to improve mortality among septic patients. Our study showed that statin treatment in bacteremic patients was associated with significantly lower mortality rates. This might be due to the long known pleotropic effects of statins.

Conclusions

There may be a potential role for statins in similar inflammatory conditions. The optimum dose and type of statin (hydrophilic vs. lipophilic) and the mechanism by which statins potentially halt the inflammatory cascade remains an area of further study. Large, well designed, randomized controlled trials are warranted to provide more conclusive knowledge and potentially change clinical practice.

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Conflicts of interest

There are no conflicts of interest.

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