

Review: Trials of injectable pneumococcal vaccines do not show effectiveness in chronic obstructive pulmonary disease

Granger R, Walters J, Poole PJ, et al. *Injectable vaccines for preventing pneumococcal infection in patients with chronic obstructive pulmonary disease*. *Cochrane Database Syst Rev*. 2006;(4):CD001390.

Clinical impact ratings: GIM/FP/GP ★★★★★☆ Infectious Disease ★★★★★☆☆ Pulmonology ★★★★★☆☆

QUESTION

In patients with chronic obstructive pulmonary disease (COPD), are injectable pneumococcal vaccines effective?

METHODS

Data sources: MEDLINE, EMBASE/Excerpta Medica, CINAHL, Cochrane Airways Group Specialized Register, and lists of conference abstracts (to April 2006).

Study selection and assessment: Randomized controlled trials (RCTs) that evaluated the efficacy of injectable pneumococcal vaccines (14- or 23-valent) in patients with COPD. Exclusion criteria included previous pneumococcal vaccination. 4 RCTs ($n = 937$, age range 40 to 89 y) met the selection criteria: Pneumococcal vaccination was compared with no vaccination in 2 RCTs and with saline in 2 RCTs. Quality assessment of individual studies was based on allocation concealment and scores on the 5-point Jadad scale. The included studies had Jadad scores ranging from 2 to 4.

Outcomes: Acute exacerbations. Secondary outcomes included all-cause mortality, pneumonia, change in lung function, hospitalization, disability, and adverse events.

MAIN RESULTS

Individual studies showed that groups did not differ for acute exacerbations or hospitalizations (Table). Meta-analysis showed that groups did not differ for all-cause mortality or pneumonia (Table). No studies reported changes in lung function, disability, or adverse events.

CONCLUSION

In patients with chronic obstructive pulmonary disease, trials of injectable pneumococcal vaccines do not show effectiveness.

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14- or 23-valent pneumococcal vaccination (PV) vs no vaccination or saline in chronic obstructive pulmonary disease at 6 to 48 months*

Outcomes	Number of trials (n)	Comparisons	Weighted event rates	RRI (95% CI)	NNH
Acute exacerbation	1 (49)	23-valent PV vs no vaccine	81% vs 75%	8.1% (-36 to 27)	Not significant
				RRR (CI)	NNT
All-cause mortality	1 (596) 2 (292)	23-valent PV vs no vaccine 14-valent PV vs saline	19% vs 19% 14% vs 16%	1.6% (-35 to 30) 12% (-50 to 52)	Not significant Not significant
Pneumonia	2 (645) 1 (103)	23-valent PV vs no vaccine 14-valent PV vs saline	14% vs 14% 6.0% vs 13%	2.6% (-43 to 36) 55% (-57 to 89)	Not significant Not significant
Hospitalization	1 (49)	23-valent PV vs no vaccine	49% vs 50%	2.6% (-55 to 59)	Not significant

*Abbreviations defined in Glossary; weighted event rates, RRR, RRI, NNT, NNH, and CI calculated from control event rates and odds ratios in article using a fixed-effects model.

COMMENTARY

In adults, pneumococcal pneumonia occurs at a rate of about 1 per 1000 per year and pneumococcal bacteremia at a rate of about 1.5 per 10 000 per year. Older age, COPD, and smoking can increase these risks. The pneumococcus bacterium is also a common cause of infectious exacerbations in patients with COPD. Although preventing these infections is clearly desirable, the review by Granger and colleagues did not show any benefit from pneumococcal polysaccharide vaccines.

As with many negative studies, the results are of frustratingly little use in decision making. Although no statistically significant effect of vaccination existed for any outcome assessed, only 4 trials were included and the primary analysis had a total sample size of 49 patients. This finding does not mean that the vaccine is not beneficial; it means only that we cannot tell.

The dilemma with polysaccharide pneumococcal vaccines in adults is that RCTs suggest that the vaccine is not effective in preventing pneumonia or less severe infections (1). However, the trials were not large enough to measure efficacy against bacteremic infections. In contrast, observational studies suggest that this type of vaccine is effective in

preventing bacteremic pneumococcal disease (2, 3) and that vaccination programs are cost-effective even if the vaccine prevents only bacteremic disease (4). Physicians who wish to provide best care for patients should be comfortable erring on the side of commission. Vaccination of patients with COPD will do little if any harm and may save lives.

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