Critical Appraisal topic (CAT)

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Clinical Scenario:
A 57 year old male, develops onset of community acquired pneumonia. Diagnosis was 1 week ago, and he is taking Levofoxacin 750mg PO every 24hours. His treatment is outpatient, with a CURB score of 0. The patient has a past history of influenza which is co morbidity. The patient is inquiring about a pneumococcal vaccination for prevention against community acquired pneumonia in the future.

Clinical Question:
In the healthy adult population, how effective is the pneumococcal vaccination on prevention of community acquired pneumonia?

Articles:


Critical Review of Study:

I. Summary of Key Evidence
Study Design: Jackson, et al. (2003) is a Meta-analysis study providing level 1 evidence and Huss et al. (2006) is a cohort study providing level 4 evidence.

Sample: Jackson et al. included a review of literature in 22 trails involving 101,507 participants. Huss et al. included 47,365 participants aged 65 years or older who were members of Group health cooperative in WA State.

Procedure: Jackson, et al. was a literature review ranging from the years 1966-2007 covering a variety of peer reviewed resources. Clinical trials selected were trials that compared pneumococcal polysaccharide vaccine with a placebo, other vaccines or no intervention. Reports were compared to selected clinical outcomes or death. Huss et al. was a review of patient data from a clinical database of the Group Health Cooperative. Review of the diagnosis codes was conducted along with documentation of receiving a pneumococcal vaccination and the outcome.
Outcome Measured: Outcomes in the Jackson et al. study consist of definitive pneumococcal pneumonia, defined as typical clinical or radiologic findings and S. pneumonia isolated from normally sterile body fluid such as blood; presumptive pneumococcal pneumonia, defined as typical clinical or radiologic findings; pneumonia from all causes; bronchitis from all causes; death from all causes; death from pneumonia; death from pneumococcal infection and bacteremia or invasive pneumococcal disease. Outcomes measured in the Huss et al. include review of hospitalization for community-acquired pneumonia, pneumonia in patients who were not hospitalized and pneumococcal bacteremia.

Results: Both studies concluded that the pneumococcal vaccine is not effective in prevention of community acquired pneumonia. There was evidence the vaccine was effective in prevention of bacteremia, but alternative interventions are suggested in prevention of community acquired pneumonia, even in the populations the vaccine is recommended for.

1. **Clinical Bottom Line**

Pneumococcal vaccination is proven effective in prevention of bacteremia, but not proven effective in the prevention of community acquired pneumonia in adults.

Participants who received the pneumococcal vaccine in Jackson et al. study had a relative risk of 0.64 with a 95% confidence interval (CI) for presumptive pneumococcal pneumonia and 0.73 relative risks with a 95% CI, for all-causes of pneumonia with a probability of 0.053. In Huss et al. study participants had a relative risk 0.56 with a 95% CI of pneumococcal bacteremia, increased risk with hospitalization for pneumonia with relative risk at 1.14 and 95% CI. Outpatient pneumonia with a relative risk of 1.04 and a 95% CI, showing the pneumococcal vaccination did not alter the risk of community acquired pneumonia.

The strengths of the studies included that both had a large sample size of participants. The Jackson et al. study conducted thorough literature reviews with a novel comprehension analysis. The number of years involved in the studies provides validity to the results. The Huss et al. study provided a thorough analysis of a large sample size. There were a number of years in follow up research and observation. The biggest weakness was there was no actual participation in the results of the study. The Jackson et al. study was a literature review and the Huss et al. was an observational study only. While researching this topic, there was a lack of prior research completed about pneumococcal vaccines for my review. The Huss et al. 2003, is an article that is slightly outdated, but supplied a great level of evidence. Opportunities for this research include the education to the health care provider. It is a current recommendation in our healthcare that patients older than 65 years of age get the pneumococcal vaccine, and this study provides us with different and controversial information. This may also provide a threat to the study as well. Many people may not believe this information, or use it in their practice. This may also provide motivation for some to provide more research on this topic. It has the opportunity for furthering the
research and the recommendations in healthcare. This may provide many more opportunities to change the current recommendations in our healthcare system.

The relevance to our clinical practice is quite evident. As healthcare providers we are striving for disease prevention, and we are led to believe that vaccinations will aide in this task. Out patients also expect us to have the most up to date information and apply it to our practice. In review of these studies, it is shown there is no further protection from community acquired pneumonia for our healthy adult patient population when receiving the pneumococcal vaccine and this would be something to consider in your practice. It is efficacious to consider these results in your daily practices and critical thinking.

References:
