

Practice Corner: Setting EBM in motion

In addition to time pressures that we encounter when searching for evidence to support care decisions for individual patients, it may be difficult for us to apply the evidence that we find. The rate-limiting step may not be doing the search, but the steps needed in “setting evidence-based medicine (EBM) in motion.”

We present an example of a search for evidence by a physician assistant (PA) student that highlights this challenge. PAs receive accelerated training in the medical model and work in teams under physician supervision. Approximately 40 000 PAs currently work in the United States in a wide range of settings and specialties. Practicing EBM has become an important component of training for PAs.

During an internal medicine rotation, a PA student encountered a common clinical practice unsupported by current evidence—administration of nebulized albuterol in patients with community-acquired pneumonia (CAP). While this practice may be justified in patients with underlying chronic obstructive pulmonary disease (COPD) who also present with CAP, this student questioned the grounds for its use in patients with CAP who do not have COPD.

CLINICAL SCENARIO

A 68-year-old man presented to the emergency department with fever, chills, and a nonproductive cough of 1-week duration. He had fatigue, headache, rhinorrhea, and mild nausea but no dyspnea. He had no history of smoking or of COPD. He had atrial fibrillation and was taking warfarin for stroke prevention.

On admission, the patient's temperature was 38.4 °C, heart rate was 108 beats/min, respiratory rate was 24 breaths/min, blood pressure was 156/88 mm Hg, and oxygen saturation was 86% by pulse oximetry on room air. Rales were heard in both lung bases and in the right middle lobe. Chest radiography showed a diffuse infiltrate in the right middle and lower lobes. Complete blood count showed white blood cell count of 22 000 cells/mL with a left shift, and arterial blood gases showed mild respiratory acidosis.

One dose of ceftriaxone was administered parenterally, and a course of azithromycin was started. Albuterol, 5% solution delivered by nebulizer 3 times daily, was also ordered, in addition to a combination of inhaled ipratropium and albuterol, delivered by metered-dose inhaler every 4 hours as needed. During the hospital stay, the pneumonia resolved, but the patient's heart rate increased to 150 beats/min and blood pressure rose from 156/88 to 200/110 mm Hg.

CLINICAL QUESTION

Although there was no institutional protocol for use of nebulized albuterol for treatment of CAP, the housestaff often ordered it. The PA student queried: In a 68-year-old man with CAP and no underlying COPD, does use of nebulized β_2 -agonists improve symptoms? What is the risk for harm in this patient?

SEARCH STRATEGY

First, a treatment guideline was sought to clarify recommendations regarding use of nebulized albuterol for treatment of CAP. The American Thoracic Society guidelines for management of CAP (1) were rapidly retrieved through PubMed, UpToDate, and MD Consult. The British Thoracic Society (BTS) guidelines for the management of CAP in adults (2) were also found in PubMed. Both sets of guidelines were relevant to our patient, but neither guideline discussed the use of nebulized albuterol in the treatment of CAP. The BTS guidelines had a section on general management, which discussed the use of adjunctive therapies for CAP, but nebulized albuterol was not mentioned. Evidence from controlled clinical trials was mentioned in the guideline for “bottle blowing” (3) but not for physiotherapy.

Having not fully answered our question with a review of relevant guidelines (and having not attracted the attention of anyone who could change the patient's treatment plan), PubMed was searched again, this time specifically for studies on the use of albuterol in patients with CAP. No relevant trials were found on the use of nebulizers for CAP.

To identify evidence about harm with the use of albuterol, PubMed was searched using the terms nebulized albuterol, cardiac arrhythmias, and randomized or controlled clinical trials. No trials were found. When just the content terms were searched, 9 articles, not directly relevant to our patient, were found. One prospective, open-label study on the effect of nebulized albuterol (for treatment of asthma) on cardiac rhythm was found (4). 10 patients were studied, and although no adverse effect on cardiac rhythm or blood pressure was found, the study did not convince the team that no potential for harm existed in this or other patients, especially in the absence of a clear indication for albuterol.

Recognizing that searching and appraising the literature are not the only important aspects of practicing EBM, an experienced pulmonologist who practices and teaches using the EBM model was consulted. In addition to reviewing treatment plans for multiple cases of CAP requiring hospitalization with the nurse practitioner/physician assistant service, he recommended review of the Centre for Evidence-Based Medicine Web site at Mount Sinai Hospital in Toronto, Ontario, Canada (www.cebm.utoronto.ca), which suggested bubble-blowing as a method for clearing secretions (2, 3). This served as an excellent, rapid approach to finding good information on treatment of CAP and confirmed the evidence previously found in the literature search.

APPLICATION OF THE EVIDENCE TO THIS, AND FUTURE PATIENTS

The treatment plan for this patient was not altered by the student's rapid search for evidence. Changes in usual care for a common illness require a comprehensive search and discussion among all clinicians in

our institution caring for patients with CAP. The results of the search were reviewed by the clinical team and because no evidence was found to support use of albuterol in patients like ours, changes were made to future practice. As a result of this process, which took a few hours and evolved over several weeks, orders for bronchodilators for patients with CAP are now made on an individual basis, depending on the presence of comorbid illnesses, such as COPD.

CONCLUSION

The need for a rapid search for evidence is sometimes, but not always, important to the care of an individual patient. In this case, the speed of the search did not affect the ability of the PA student to apply the evidence to the patient. Setting the evidence in motion may require communication of search results to other members of the clinical team and may affect the care of future patients. Although the catalyst for setting EBM in motion was a student, the evidence, including the results of further research along with the judgment of an experienced pulmonologist, convinced the clinical team to make changes to usual care and to base future treatment of this common condition on the best available evidence.

*Mark Rao, MS, PA-C
Holy Family Hospital
Methuen, Massachusetts, USA*

*Noel J. Genova, MA, PA-C
Mercy Primary Care
Portland, Maine, USA*

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CORRECTION

PLEASE CHECK YOUR BAYES' NOMOGRAM!

Some time ago, we published a version of the Bayes' nomogram with some ill-spaced likelihood ratios (LRs) at the extremes of the scales. Ill-formed versions will have the LR of 1000 and 0.001 at a greater spacing than the rest of the LRs. These appeared in the glossaries of *ACP Journal Club* between Sep/Oct 1998 and Nov/Dec 1999. If you have been using a nomogram that differs (at the extremes of the center scale) from the one at www.acpj.org/shared/glossary.htm, please replace it. Our thanks to Jan Hajek for alerting us to the problem.

