Cochrane for Clinicians

Putting Evidence into Practice

Procalcitonin to Guide Antibiotic Therapy in Acute Respiratory Infections

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Clinical Question

Can using procalcitonin levels help guide antibiotic stewardship for patients with acute respiratory infections?

Evidence-Based Answer

Procalcitonin-guided antibiotic therapy, when compared with routine treatments, results in decreased mortality in patients with acute respiratory infections (absolute risk reduction [ARR] = 1.4%; number needed to treat [NNT] = 71). (Strength of Recommendation: A, based on consistent, good-quality patient-oriented evidence.) Compared with routine treatments, procalcitonin-guided antibiotic therapy also results in 2.4 fewer overall days of exposure to antibiotics and fewer overall antibiotic-related adverse effects (16% vs. 22% in the control group).[1] (Strength of Recommendation: B, based on inconsistent or limited-quality patient-oriented evidence.)

Practice Pointers

Acute respiratory infections are the most common reason for antibiotic therapy in primary care and hospital settings.[2-4] Appropriate treatment, including judicious use of antibiotics, is associated with improved clinical outcomes.[3-5] Procalcitonin is a calcitonin precursor whose serum levels rise in the setting of bacterial infection; procalcitonin-guided antibiotic therapy is already used in many clinical settings. This Cochrane analysis was designed to evaluate whether procalcitonin-guided antibiotic therapy for acute respiratory infections leads to improved outcomes vs. routine management. It is an update of a 2012 review.

The authors included 26 randomized controlled trials with a total of 6,708 patients who had acute respiratory infections.[1] Outcomes included all-cause mortality, treatment failure, and duration of antibiotic exposure. Per GRADE (grading of recommendations, assessment, development, and evaluation) criteria, the data in this review were deemed to be of high quality for mortality and antibiotic exposure outcomes. Data were deemed to be of moderate quality for treatment failure and adverse effects because the definitions for these end points among trials were not identical.

Compared with patients receiving routine care, those receiving procalcitonin-guided antibiotic therapy for acute respiratory infections were found to have lower 30-day all-cause mortality across all clinical settings (ARR = 1.4%; 95% confidence interval [CI], 0.5% to 2.4%; NNT = 71). Mortality is very low in primary care settings; therefore, assessment of this group was incomplete.

Treatment failure—defined as death, hospitalization, acute respiratory infection–specific complications (e.g., empyema for lower acute respiratory infections, meningitis for upper acute respiratory infections), recurrent or worsening infection, and participants reporting any symptoms of an ongoing respiratory infection (e.g., fever, cough, dyspnea) at follow-up—was not significantly lower in the procalcitonin group. Procalcitonin guidance was associated with a reduction in total antibiotic exposure (from a mean of 8.1 days to 5.7 days; regression coefficient = –2.4 days; 95% CI, –2.7 to –2.2; $P < .001$).

Data from six of the primary care and emergency department trials were analyzed and revealed a significant reduction in antibiotic-related adverse effects in patients whose care was

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guided by procalcitonin algorithms (16.3% in the procalcitonin-guided group vs. 22.1% in the control group; odds ratio = 0.68; 95% CI, 0.57 to 0.82; $P < .001$). Procalcitonin can be used quickly, with most in-house laboratories returning results within two hours. However, it may be cost prohibitive depending on insurance.

Appropriately timed and utilized procalcitonin-guided therapy has the potential to improve the management of patients with acute respiratory infections but has yet to be adequately studied in those with other clinical diagnoses. National guidelines do not yet mention the use of procalcitonin as part of the management of acute respiratory infections.

The practice recommendations in this activity are available at http://www.cochrane.org/CD007498.

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Individual Behavioral Counseling for Smoking Cessation

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Clinical Question

Does individual behavioral counseling provided by a trained therapist impact the rate of smoking cessation?

Evidence-Based Answer

Individual behavioral counseling conducted by a trained therapist provides some benefit when compared with brief counseling and support; however, this benefit is less pronounced in the context of pharmacotherapy. If seven out of 100 smokers are able to quit smoking for at least six months with brief counseling (i.e., brief advice, educational self-help materials, or usual care), adding individual behavioral counseling delivered by a trained therapist would increase this number to 10 to 12 out of 100 smokers. (Strength of Recommendation: A, based on consistent, good-quality patient-oriented evidence.) If 11 out of 100 smokers are able to quit smoking with pharmacotherapy, adding individual behavioral counseling by a trained therapist might increase this number to as many as 16 out of 100 smokers.[1] (Strength of Recommendation: B, based on inconsistent or limited-quality patient-oriented evidence.)

Practice Pointers

Cigarette smoking is the single greatest modifiable health risk factor in the United States, with current smokers dying on average at least 10 years earlier than those who have never smoked.[2] Family physicians are encouraged to screen for tobacco use, offer smoking cessation counseling, and provide pharmacotherapy when appropriate.[3] This analysis measured whether individual behavioral counseling provided by a therapist trained in smoking cessation adds additional benefit compared with brief counseling intervention or no counseling intervention. The analysis specifically excluded studies in which counseling was delivered by physicians or nurses as part of routine clinical care.

This Cochrane review included 49 randomized or quasirandomized controlled trials in which at least one treatment arm consisted of an unconfounded intervention from a therapist, with 19,000 total adult participants.[1] The trials took place in a variety of settings and included inpatient medical and surgical patients, outpatient primary care patients, and veterans with drug or alcohol dependency in residential rehabilitation facilities. All trials involved one or more face-to-face counseling sessions with a smoking cessation therapist that lasted at least 10 minutes, although most sessions were much longer, and many included follow-up telephone contact. All trials also included a follow-up period of at least six months.

Thirty-three trials compared individual behavioral counseling with a control group of patients who received only minimal support with brief advice about cessation, usual care, or written materials.[1] Individual behavioral counseling improved the likelihood that patients would remain abstinent at the longest reported follow-up period, which varied by study (number needed to treat = 25; 95% confidence interval, 20 to 33). Six of the trials provided some form of pharmacotherapy for smoking cessation to all participants. In this subset of patients, a trend suggested that therapist counseling was more effective than control, but the results were not significant. Eleven studies compared different levels of counseling and found only a small benefit from more intensive counseling vs. brief counseling.

Five studies compared counseling approaches with similar contact times; however, these studies could not be pooled because they were clinically heterogeneous. Only one study found any significant difference between types of counseling approaches.[4] The study, which included 755 African American "light" smokers (i.e., no more than 10 cigarettes per day), demonstrated that persons who received a health education intervention were more likely to stop smoking than light smokers who received a motivational interviewing intervention (16.7% vs. 8.5% quit rates, respectively; $P < .001$). Health education is a counseling approach that uses semi-structured scripts to provide information on the addictive properties of nicotine, the health consequences of smoking, and the benefits of cessation while providing concrete strategies for developing a quit plan and addressing smoking triggers.

The Agency for Healthcare Research and Quality (AHRQ) Treating Tobacco Use and Dependence guideline recommends that clinicians offer every patient who uses tobacco at least a brief intervention, and that they encourage patients who are attempting smoking cessation to use pharmacotherapy, except when medically contraindicated or in specific populations (e.g., pregnant women, light smokers). First-line medications include sustained-release bupropion (Zyban), nicotine gum, nicotine inhaler, nicotine lozenge, nicotine nasal spray, nicotine patch, and varenicline (Chantix). The guideline also recommends individual, group, and telephone counseling, including telephone quit lines. The AHRQ guideline emphasizes that counseling and pharmacotherapy are each effective when used individually for smoking cessation, but the combination is more effective than either strategy alone.[5]

The practice recommendations in this activity are available at http://www.cochrane.org/CD001292.

Editor's note: The number needed to treat reported in this Cochrane for Clinicians was calculated by the author based on raw data provided in the original Cochrane review.

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