ICU
MANAGEMENT & PRACTICE

Procalcitonin does not curb antibiotic use for lower respiratory tract infection

In the Procalcitonin Antibiotic Consensus Trial (ProACT), the use of a procalcitonin-guided antibiotic prescription guideline did not result in less exposure to antibiotics than did usual care among patients presenting to the emergency department (ED) with suspected lower respiratory tract infection.

Overuse of antibiotics is common in infections of the lower respiratory tract, where bacterial and viral infections manifest similarly. Procalcitonin is a peptide with levels that are more typically elevated in bacterial than in viral infections; the magnitude of the elevation correlates with the severity of infection, and decreasing levels over time correlate with the resolution of infection.

National authorities and medical societies reached varying conclusions about procalcitonin-guided antibiotic prescription in suspected lower respiratory tract infection, ranging from findings of moderate-strength evidence of benefit and low-strength evidence of not causing harm to recommendations against routine use.

ProACT was a patient-level, 1:1 randomised trial, in 14 hospitals in the United States. Researchers provided guidance for clinicians in the 14 sites about national clinical practice recommendations for the treatment of lower respiratory tract infections and the interpretation of procalcitonin assays. They then randomly assigned patients who presented to the ED with a suspected lower respiratory tract infection and for whom the treating physician was uncertain whether antibiotic therapy was indicated to one of two groups: the procalcitonin group, in which the treating clinicians were provided with real-time initial (and serial, if the patient was hospitalised) procalcitonin assay results and an antibiotic use guideline with graded recommendations based on four tiers of procalcitonin levels, or the usual-care group.

The ProACT team hypothesised that within 30 days after enrolment the total antibiotic-days would be lower — and the percentage of patients with adverse outcomes would not be more than 4.5 percentage points higher — in the procalcitonin group than in the usual-care group.

A total of 1,656 patients were included in the final analysis cohort (826 randomly assigned to the procalcitonin group and 830 to the usual-care group), of whom 782 (47.2%) were hospitalised and 984 (59.4%) received antibiotics within 30 days. The treating clinician received procalcitonin assay results for 792 of 826 patients (95.9%) in the procalcitonin group (median time from sample collection to assay result, 77 minutes) and for 18 of 830 patients (2.2%) in the usual-care group.

In both groups, the procalcitonin-level tier was associated with the decision to prescribe antibiotics in the ED. There was no significant difference between the procalcitonin group and the usual-care group in antibiotic-days

(mean, 4.2 and 4.3 days, respectively; difference, −0.05 day; 95% confidence interval [CI], −0.6 to 0.5; P=0.87) or the proportion of patients with adverse outcomes (11.7% [96 patients] and 13.1% [109 patients]; difference, −1.5 percentage points; 95% CI, −4.6 to 1.7; P<0.001 for noninferiority) within 30 days.

"Our findings contrast with those of previous trials of procalcitonin-guided antibiotic prescription in suspected lower respiratory tract infection. Possible reasons include differences in case mix, design, and setting," the authors write. "Previously, the largest effects on minimising antibiotic exposure were observed among patients without pneumonia. We enrolled a high proportion of such patients, most of whom had low procalcitonin levels, which provided ample opportunity to detect an effect of the intervention on antibiotic exposure."

The authors also say their findings can be attributed to the fact that the procalcitonin-based prescribing guideline provided fewer opportunities to change antibiotic decisions than in previous trials, both because clinicians in the usual-care group already commonly withheld antibiotics during emergency department and hospital encounters and because decisions to initially withhold antibiotics on the basis of procalcitonin level were subsequently overruled in the outpatient setting.

Source: The New England Journal of Medicine
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