

Nosocomial Infection and Re-admission

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Background:

Antimicrobial resistance remains a growing threat to public health and a vexing challenge to clinicians. Rates of in vitro susceptibility for most commonly utilized antibiotics continue to decline for both gram-positive and gram-negative organisms. This is particularly problematic among such gram-negative pathogens as *Pseudomonas aeruginosa*, *Acinetobacter baumannii* and various Enterobacteriaceae . Since prompt appropriate treatment is critical for treatment success, this rise in the risk of inappropriate empiric therapy (IET) associated with resistant organisms is a harbinger of potentially worse outcomes Exposure to IET is associated with longer durations of hospitalizations and greater healthcare costs, independent of its impact on mortality .Despite the link between inappropriate therapy and worsened outcomes, multiple obstacles preclude clinicians from effectively targeting these resistant organisms. These challenges include difficulty with risk stratification, concern about promoting further resistance through prescribing unnecessarily broad empiric coverage, and the acquisition costs of potentially active, newer antimicrobials. However, the trade-offs between these pathways have not been fully explored. For example, in a representative cohort of patients, on balance, does each day of exposure to inadequate antimicrobial treatment cost more than the potential savings from using less active but cheaper medications, which are more likely to be inadequate? Or what proportion of the overall hospital bill is attributable to antimicrobials and how, if at all, does it differ between patients given appropriate and inappropriate empiric treatment? Answering these questions may lend a broader perspective to the debate of risks and benefits of broad-spectrum treatment when warranted than simply focusing on acquisition costs. Enterobacteriaceae represent frequent pathogens in multiple common infections such as urinary tract infection (UTI), sepsis and pneumonia. Not surprisingly, the rising prevalence of carbapenem resistant Enterobacteriaceae (CRE) heightens the risk for the clinician to prescribe IET, which, in turn, increases mortality . The full economic impact of IET in this setting, however, is less well understood. Although in a prior study IET was associated with an approximately 5-day increase in length of stay (LOS) and a \$10,000 increase in costs, other important economic outcomes have not been examined in this population .

Conclusions:

In this study of Enterobacteriaceae infections, the cost of antibiotics was a small component of total costs, irrespective of whether empiric treatment was appropriate or whether a CRE was isolated. In contrast, each extra day of inadequate treatment added to hospital costs. Both CRE and IET were associated with an increased risk of readmission within 30 days.Hospitalizations with Enterobacteriaceae are costly, and specific antibiotic agent choice exerts less impact on overall costs than antibiotic appropriateness. Given many lines of evidence that document that IET is detrimental to survival, it becomes a clinical imperative to adopt strategies and protocols that maximize rates of appropriate therapy.

Demonstrate that concerns about the costs of broader-spectrum antibiotics, at least those available at the time of the analysis, appear unwarranted, since the total antimicrobial costs comprise only a modest proportion of total costs of hospitalization and must also be weighed against the potential for a no-pay event, such as a hospital readmission. Finally, the fact that each additional day of inadequate treatment is roughly equivalent in cost to the total per-patient cost of all antimicrobials administered is a reason to pause to reconsider these now clearer trade-offs in clinical decision-making. If other investigations confirm our findings, there may be a need for a paradigm shift to account for failure to cover serious infections appropriately.

Key word: _Hospital Readmission, Nosocomial Infection, Cost Of Antibiotics