Impact of prospective verification of intravenous antibiotics in an emergency department

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**Purpose/Background:** Delay in appropriate antibiotic therapy is associated with an increase in mortality and prolonged length of stay. Automatic dispensing machines decrease the delivery time of intravenous (IV) antibiotics to patients in the emergency department. However, when IV antibiotics are not reviewed by pharmacists before being administered in the emergency department, patients are at risk of receiving inappropriate antibiotic therapy.

**Research Objective:** The objective of this study is to determine if there is a difference in the time to administration of appropriate antibiotic therapy prior to and after implementation of prospective verification of antibiotics in the emergency department.

**Methodology:** This retrospective, IRB-approved pre- versus post- analysis assessed if a difference in time to administration of appropriate antibiotics exists when a pharmacist verifies orders before administration. The electronic medical record system identified patients who were at least 18 years of age started on intravenous antibiotics in the emergency department. Exclusion criteria included pregnant women, prisoners, and patients transferred from outside facilities. Appropriate antibiotic therapy was based on infectious diseases specific evidence-based guidelines, appropriate pharmacokinetic and pharmacodynamic properties, and microbiologic data. The primary endpoint was the time from emergency department arrival to administration of appropriate antibiotic therapy. Secondary endpoints included length of stay, mortality and disposition at discharge. Data was evaluated using SPSS v21.0.

**Results:** Patients were age 65 ± 17.3 years with majority of infections being pneumonia (44%) and urinary tract infections (18%) and most patients being admitted to the floor. Time to appropriate antibiotic therapy was reduced in the post-group vs. the pre-group, 8.1 ± 8.6 vs. 15.2 ± 22.8 hours respectively, p=0.03. In addition, appropriate empiric antibiotics were initiated more frequently after the implementation (92% Post vs. 66% Pre, p=0.0001). There was no difference in mortality or length of stay between the two groups.

**Conclusions:** Prompt administration of the appropriate antibiotics is imperative in patients with infections presenting to the emergency department. The impact of prospective verification of antibiotics by pharmacists led to significant improvement on both empiric selection of and time to appropriate antibiotic therapy.