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Relationship between antibiotic treatment failure and 30-Day mortality in adult outpatients with community-acquired pneumonia

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Background: Community-Acquired Pneumonia (CAP) is a significant cause of morbidity and mortality across the U.S. Antibiotic treatment failure (ATF) is recorded in as many as 1 in 4 adult outpatients with CAP. Despite the high reported rates of ATF, the association between treatment failure and mortality has not been well described. This study sought to compare 30-day mortality rates between adult outpatients who experienced ATF to those who did not.

Material/methods: U.S. retrospective claims analysis of MarketScan® Commercial & Medicare Supplemental Databases was employed. Patients were included on the following criteria: (1) ≥18 years old, (2) ICD-9-CM codes for CAP in the outpatient setting from 2011 to 2015, and (3) received one of the following antibiotic classes as monotherapy: fluoroquinolone, macrolides, beta-lactam, or tetracycline. Patients were excluded if an antibiotic prescription claim was identified in the 30 days prior to the CAP episode. Treatment failure was defined as any of the following events within 30 days of initial antibiotic claim: (1) antibiotic refill, (2) antibiotic switch, (3) ER visit (4) hospitalization. Patient demographics, insurance data, comorbid conditions, healthcare resource utilization, pharmacy claims, and vital status were collected. The Charlson Comorbidity Index (CCI) was calculated for each patient.

Results: 251,947 unique patients met inclusion criteria. Mean age was 52.2 years old, 47.7% were male, 21.5% had Medicare coverage and 20.5% had a CCI score of ≥2. The majority of patients

received fluoroquinolones (44.4%) or macrolides (43.6%), with beta-lactams (6.5%) and tetracyclines (5.5%) being prescribed less frequently. Of the included patients, 22.1% were classified as ATF. The most common ATF event was antibiotic switch (70.7%) followed by antibiotic refill (20.6%), hospitalization (5.4%), and ER visit (3.3%). ATF rates for tetracyclines (22.5%) and macrolides (22.9%) were similar, while failure rates were lower for fluoroquinolones (20.8%) and higher for beta-lactams (25.7%) [p<0.0001]. Among patients classified as ATF, mortality rate was 18.1% compared to 4.6% in the non-ATF cohort (OR=4.60 [4.46-4.74], p<0.0001). In the working age (i.e. 18-64 years old) cohort, 16.1% of ATF patients died compared to 3.9% of non-ATF patients (OR=4.09 [3.94-4.24], p<0.0001). In the elderly (i.e. ≥65 years old) cohort, 24.3% of ATF patients died compared to 7.3% of non-ATF patients (OR=3.35 [3.17-3.53], p<0.0001).

Conclusions: There is a strong relationship between antibiotic treatment failure and 30-day mortality in adult outpatients with CAP. The high incidence of ATF-associated 30-day mortality rates observed in this study highlights the vulnerable nature of this population and the critical importance of reducing antibiotic treatment failure.