Follow-up of emergency department microbiological cultures in the event of organism-antibiotic mismatch

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BACKGROUND

Approximately 15.7% of patients discharged from the emergency department (ED) receive prescriptions for antimicrobial agents[1]. In the vast majority of cases, antimicrobials are prescribed before culture and sensitivity results are known, potentially resulting in a mismatch of the agent's spectrum of activity and the causative organism. Such mismatches increase the chances of clinical failure, leading to additional visits to the ED or hospital admission. In addition, the growing threat of antimicrobial resistance has been shown to be caused in part by the inappropriate use of antimicrobials[2]. Appropriate selection of agent, dose and duration in therapy modification after ED discharge is an area uniquely suited to pharmacy intervention.

Several studies have examined the impact of pharmacist involvement in the ED culture follow-up process. Dumkow et al. found that a multi-disciplinary culture follow-up program reduced the rate of combined ED revisits at 72 hours and admissions in 30 days by 7% compared to a retrospective cohort, although this difference was not statistically significant. Modification of therapy was required in 25% of patients[3]. Baker et al. found that pharmacist involvement in culture follow-up decreased the time to culture review and patient/PCP notification. No difference was seen between the retrospective and prospective cohorts with respect to appropriateness of empiric and definitive antimicrobial therapy[4]. A larger study by Randolph et al. showed that a culture follow-up process consisting of pharmacists contacting and counseling patients over the phone in event of therapy modification significantly reduced the rate of unplanned readmissions to the ED. Readmissions specifically related to noncompliance and cost were also significantly reduced[5].

PURPOSE

This project will first seek to retrospectively characterize the extent of therapeutic mismatches resulting in changes to therapy, as well as the efficacy of follow-up.

The prospective component of the study will involve pharmacists in the culture follow-up process and evaluate outcomes compared to the retrospective study. Through increasing pharmacist involvement in the process, we hope to improve treatment outcomes and patient safety.

METHODS

STUDY DESIGN

- Comparative cohort study

INCLUSION CRITERIA

- 18 years of age or older
- Visit to the ARMC ED recorded between either 9/1/2014 – 11/30/2014 (retrospective cohort) or 9/1/2015 – 11/30/2015 (prospective cohort), with a bacterial culture resulting after discharge from the ED
- The following cultures will be included: blood, urine, sputum, wound/body fluid, cerebrospinal fluid, hemolytic Strep swabs

EXCLUSION CRITERIA

- Less than18 years of age
- Viral or sexually transmitted disease culture.

METHODS

A list of patients who visited the ARMC ED between September 1, 2014 and November 30, 2014 and who had cultures which resulted after their discharge from the ED will be developed by pharmacy in collaboration with IT. A chart review of these patients will be conducted to gather baseline demographic data (age, sex, race, weight/BMI and allergies) as well as parameters relating to their ED visit including infection diagnosis and antibiotic issued at discharge. Culture and sensitivity data will be recorded, and in the event of a therapeutic mismatch necessitating follow-up, the time to follow-up documentation and change in therapy will be recorded. Any trends noted in the resistance patterns of isolated bacteria will be noted. Admissions to either the ARMC emergency department within 96 hours or to an inpatient ward at ARMC within 30 days will also be recorded.

DATA ANALYSIS

Time to follow-up, ED re-visit and 30-day admission rates assessed for equivalence; microbiologic resistance with descriptive statistics.

DISCLOSURE

The authors of this presentation have no conflicts of interest to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

Results

Prospective: 119 cultures selected for review; 22 required follow-up (18.4%)

Retrospective: 149 cultures selected; 26 required follow-up (17.4%)

Demographics of Patients Requiring Follow-Up

	Retrospective (n = 26)	Prospective (n= 22)
Percent female	81.5%	72.7%
Age (median)	47	46
BMI (median)	26.5	30
Culture Type	Urine 84.6%	Urine 77.3%
Discharge antibiotic	Fluoroquinolone (35%) No antibiotic (27%) TMP/SMX (19%)	Fluoroquinolone (41%) No antibiotic (36%) TMP/SMX (14%)

Time to Follow-Up

Retrospective 3.77 days vs. 3.45 days ($P = 0.23$)

ED Re-Visits

Retrospective 2 / 26 (7.7%) vs. 2 / 22 (9%) ($P = 0.87$)

30-Day Readmissions

Retrospective 1 / 26 (3.8%) vs. 1 / 22 (4.5%)

Microbiologic Trends

9 instances of fluoroquinolone resistance; 8/9 susceptible to cephalexin

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