41693 Tailored Empiric Antibiotic Prescribing Tool Addresses Gaps in Infectious Diseases Knowledge and Improves Trainee Prescribing Choices

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REVISED ABSTRACT

Background: Antimicrobial Stewardship Programs (ASP) assist prescribers select optimal antibiotic regimens based on presenting syndromes, host factors, and local microbiology. Our objectives were to assess: 1) baseline infectious disease (ID) knowledge among inpatient prescribers 2) the role of tailored educational tools on empiric prescribing. Methods: An anonymous pretest was administered to medicine residents and other providers at Montefiore Medical Center (MMC) accessing prescribing decisions on common ID clinical scenarios. The medicine teaching service consists of over 150 residents in 3 distinct firms. A before and after intervention comparative pilot study was performed (intervention group: Firm 1 residents, controls: Firm 3 residents) from December 2012-April 2013.   The intervention comprised of an educational session and distribution of a pocket antibiotic algorithm (tailored to local microbiology) and MMC antibiograms. Pre- and post- antibiotic selection "appropriateness" judged by ID physicians for a sampling of inpatients was compared using bivariate analyses.   Firm1 was surveyed for acceptability. Results: The mean score on the ID pretest was 36% for all clinician participants; performance did not statistically differ among the provider types (p> 0.05). Performance by syndrome was highly variable. Appropriateness of prescribing for actual patients did not vary between the two firms pre-intervention. However, Firm 1 and 3 residents showed improved prescribing after the intervention compared to their prior performance. The majority of Firm 1 residents found the pretest fair (100%), the educational session and tool helpful and use it frequently (> 90%) . Conclusion: Identifying prescribing deficits can focus ASP efforts. Educational programs using algorithms tailored to specific syndromes and local microbiology appear to have early success in improving antibiotic appropriateness and are acceptable to providers. Our study serves as a pilot for developing antibiotic algorithms for wider prescribing populations.

BACKGROUND

➢ Montefiore Medical Center (MMC) is a 1400-bed, academic institution in New York City
➢ There are 164 trainees in the Medicine Residency Program who rotate in 3 distinct Firms
➢ The Antimicrobial Stewardship Program (ASP) at MMC screens roughly 5000 calls per year from the ER and all inpatient services
➢ The goal of ASP at MMC is to improve appropriateness of empiric antimicrobial prescribing and to assist clinicians streamline regimens when indicated

OBJECTIVE

➢ To develop an evidence based, tailored antibiotic algorithm for inpatient syndromes adjusted to our local epidemiology, and to determine if education coupled with the algorithm can improve appropriateness of empiric antimicrobial prescribing in house staff at MMC

METHODS

➢ **Study design**: Before and after intervention comparative pilot study
➢ **Population**: Medicine house staff in 2 distinct firms at MMC
➢ **Intervention**: An educational session involving distribution of a 3-question, multiple choice "pop-quiz", a case-based lecture on empiric regimens, and distribution of the pocket antibiotic algorithm plus the facility's antibiogram
➢ **Evaluation**: 1) Chart review of electronic medical records was conducted for the Medicine Teaching Service from December 2012 through June 2013, 2) Administered antibiotics were reviewed for appropriateness by indication based on patient presenting signs and symptoms, 3) Comparisons between Firms and over time performed in MS Excel 2010 and Epi Info
➢ **Appropriateness definition:** a score of "Y" or "N" was assigned based on the following criteria, 1) Were antibiotics indicated for this patient, 2) Does initial regimen cover the syndrome in question, 3) Is regimen suited to documented allergy

RESULTS

➢ There was an average of 765 patients per month on the teaching service from December 2012 through June 2013, and 7531 admissions to all medical services from January 2013 through April 2013
➢ 5704/7531 patients were on antibiotics = 76%
➢ 135 prescribers in 5 different prescriber groups took the ID pop-quiz, with an average of 36.3% correct responses; no significant difference in pretest performance was observed (P > 0.05)
➢ 182 charts were analyzed pre-intervention, 266 charts were analyzed post intervention
➢ Antibiotics were often indicated both pre- and post-intervention in Firm 1 and Firm 3 reflecting similarity in patient groups (P = 0.45 and P = 0.82, respectively)
➢ Most frequently prescribed antimicrobials are listed in table 1
➢ An improvement in appropriateness of empiric prescribing was observed in both Firm 1 and Firm 3 in the month after the intervention, although not statistically significant (10% improvement in Firm 1 and 11% improvement in Firm 3; P = 0.9 and 0.2, respectively)
➢ A non-significant improvement in prescribing was also demonstrated for 4 of the most frequently encountered syndromes, as shown below (P > 0.05)

Table 1: Most Frequently Prescribed Antimicrobials on Teaching Service

ANTIBIOTIC	NUMBER OF PATIENTS
Ceftriaxone	851
Vancomycin IV	672
Fluoroquinolones	545
Azithromycin	504
Piperacillin/tazobactam	377
Cefepime	128
Oseltamivir	84

Table 2: Appropriateness by Indication

	Pre Intervention	Post Intervention	P value
Firm 1	50/85 = 58.6%	72/105 = 68.6% (n = 32)	P = 0.9 (OR 0.92, 95% CI 0.5-1.73)
Firm 3	62/102 = 61%	42/58 = 72% (n = 36)	P = 0.2 (OR 1.53, 95% CI 0.81-2.9)
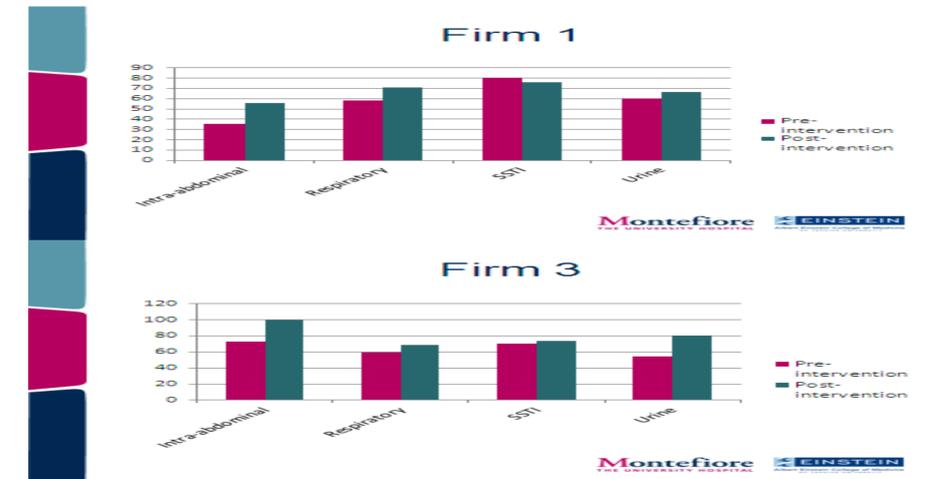
Figure 1: Appropriateness by Presenting Syndrome

CONCLUSIONS

➢ Feasibility study with improvements demonstrated over short time frame
➢ Small improvement in performance may translate into ≥ 100 patients/month on more appropriate antibiotic regimens
➢ Streamlined, appropriate antibiotic regimens may improve cost savings to hospital
➢ Acceptability survey in a sampling of participants showed >90% find the algorithm helpful and use it frequently
➢ High demand for our educational session/prescribing tool from residents, physician assistants, ER staff, hospitalists, and surgeons since our pilot study
➢ 2013-2014: adaptation of our prescribing tool into an application for mobile devices is in progress

LIMITATIONS

1. Limited sample size after exclusions
2. Lack of power to show statistical significance
3. Despite several educational conferences, only 68/164 residents received intervention
4. Tool was on paper, not electronic, easy to lose
5. Study started 6 months into academic year, perhaps larger effect if started in July 2012
6. Prescribing behavior only reviewed immediately following intervention, long term improvements to be determined

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