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Impact of standardised review of intravenous antibiotic therapy 72 hours after prescription in two internal medicine wards[☆]

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Summary   Post-prescription review of hospital antibiotic therapy may contribute to more appropriate use. We estimated the impact of a standardised review of intravenous antibiotic therapy three days after prescription in two internal medicine wards of a university hospital. In one ward, we assessed the charts of patients under intravenous antibiotic therapy using a standardised review process and provided feedback to the prescriber. There was no intervention in the other ward. After six months we crossed the allocation between the two wards. In all, 204 courses of antibiotic therapy were included in the intervention periods and 226 in the control periods. Post-prescription review led to proposals for modification in 46% of antibiotic courses. Time to treatment modification was 22% shorter in the intervention periods compared with the control periods (3.9 ± 5.2 days vs 5.0 ± 6.0 days, $P = 0.007$). Patients included in the intervention group had lower antibiotic consumption than patients in the control group, but the intervention had no significant impact on the overall antibiotic consumption of the two wards.
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Introduction

The use of antibiotics is a well-documented determinant of antibiotic resistance.[1] This is particularly true in acute hospitals, where up to 50% of the patients receive antibiotic therapy at some point during their stay, often inappropriately.[2–4] This has prompted numerous calls for better use of antibiotics, and the importance of antimicrobial stewardship in hospitals is now recognised.[1,5,6] Studies have shown that multidisciplinary antibiotic management programmes led to reduction in antibiotic consumption, shorter length of stay and decreases in antibiotic resistance.[7–11] Prudent use of antibiotics has been associated with a reduction in mortality in some instances.[12,13]

Interventions targeting the point of prescription may have a limited impact because of the usual empirical nature of this prescription. Therefore formal reassessment of antibiotic therapy after two to four days, when the clinical evolution and microbiological results are available, may lead to modifications of the prescription and might contribute to more appropriate use of antibiotics.[14]

We set up an intervention aimed at guiding reassessment of intravenous antibiotic therapy three days after prescription by means of a standardised case review process. A secondary goal was to estimate the impact of this intervention on the quantity of antibiotic use.

Methods

We conducted a prospective, cross-over, interventional study over two six-month periods in two similar, 50-patient, general internal medicine wards (Ward A and Ward B) of an 850-bed university hospital. The study was approved by the institutional Quality Improvement Committee.

Study population

Patients admitted to one of the study wards were included if they had received an intravenous antibiotic for more than three days. Patients could be included several times for each course of intravenous antibiotic therapy initiated during all the study period. However, new prescriptions were excluded if they resulted from adjustment of an ongoing course of antibiotic therapy.

An electronic prescription system facilitated screening for eligibility. Patients who became eligible during weekends were included on the next Monday provided they were still receiving the same intravenous antibiotic.

Intervention

In one of the two study wards an intervention was conducted to foster and guide reassessment of the ongoing intravenous antibiotic therapy in the included patients. The other ward served as control. After six months the wards switched allocation for a further six months (cross-over phase).

The intervention consisted of the assessment of the clinical record of each included patient by an infectious disease specialist, who completed a standardised, itemised evaluation form to be provided to the physician in charge of the patient and discussed with the treating physician. The report included proposals for modification if applicable.

The assessment was based on a standardised post-prescription review process that was developed in agreement with the 12-step Program to Prevent Antimicrobial Resistance Among Hospitalised Adults proposed by the US Centers for Diseases Control and Prevention (http://www.cdc.gov/drugresistance/healthcare/). This process derived from the evaluation method described by Kunin as modified by Gyssens.[15,16] Briefly, it proposed criteria to verify the four following steps:

- continuation of the antibiotic therapy was justified by at least one of the following conditions: clinical definition and/or microbiological definition of an infection, severe sepsis or septic shock, or febrile neutropenia;[17]
- choice of antibiotic was justified by the documentation of a causative pathogen or by an epidemiologically sound list of possible pathogens in the case of empirical therapy;
- maintenance of the intravenous route was justified by the absence of sufficient clinical improvement to permit oral switching, need for an antibiotic only available intravenously, need for a high dosage, or insufficient oral intake and/or digestive absorption; and
- the dosage was appropriate.

Data collection

The following characteristics were prospectively collected: age, sex, date of hospitalisation, date of admission to the ward, nursing workload score according to the 'Projet de Recherche en Nursing' (PRN) on the day of inclusion.[18] Additional data were collected from the intervention group.

We used the hospital's electronic prescription system to collect data on antibiotic consumption at patient level as well as aggregate data for the