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Original article

Proper use of carbapenems: Role of the infectious disease specialist

Bon usage des carbapénèmes : impact d'un référent en infectiologie

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Abstract

Objective. – One of the objectives of the French national plan on antibiotics is to preserve antibiotic effectiveness. A group of infectious disease specialists of the University hospital of Bordeaux aimed to monitor the prescriptions of broad-spectrum antibiotics. Particular attention was paid to carbapenem (CBP) prescriptions given the increase in betalactamase- and carbapenemase-producing bacteria.

Patients and methods. – We carried out a three-step Professional Practice Evaluation (PPE): evaluation of CBP prescriptions made at the hospital between January and June 2013; CBP prescription training for prescribers; and another evaluation of CBP prescriptions between January and June 2014.

Results. – Although the number of admissions remained stable between the two evaluation periods, CBP prescriptions decreased by 16%. The mean treatment duration was stable (9.6 days). Physicians asked for the infectious disease specialist's advice for 82% of CBP prescriptions in 2013 and for 83% in 2014. The number of case patients discussed at the multidisciplinary staff meetings for approval of CBP prescriptions increased from 16% in 2013 to 39% in 2014. Antibiotic de-escalation increased by 61% between the two periods.

Conclusion. – Professional Practice Evaluation, supervised by an infectious disease specialist, is a useful addition to weekly multidisciplinary staff meetings to improve CBP prescription.

Keywords: Infectious disease specialist; Antibiotic stewardship; Carbapenems

Résumé

Objectif. – Préserver l'efficacité des antibiotiques existants est un des objectifs du plan national d'alerte sur les antibiotiques. Dans cette optique, un groupe de référents en infectiologie du CHU de Bordeaux s'est fixé pour objectif de surveiller la prescription des anti-infectieux de niveau 3. Une attention particulière a été portée à la prescription des carbapénèmes (CBP) en raison de la recrudescence des bactéries productrices de bêtalactamases à spectre élargi et de carbapénèmases.

Patients et méthodes. – Évaluation des pratiques professionnelles (EPP) en trois phases successives : audit des prescriptions de CBP au sein de l'établissement entre janvier et juin 2013, puis sensibilisation des médecins à la prescription des CBP et nouvel audit des prescriptions entre janvier et juin 2014.

Résultats. – Alors que le nombre d'admissions était stable entre les deux périodes de l'étude, le nombre de prescriptions de CBP a diminué de 16 %. En revanche, la durée moyenne de traitement est restée stable (9,6 jours). Si le recours à un avis référent était de 82 % en 2013 et de 83 % en 2014, le nombre de dossiers présentés en réunion de concertation pluridisciplinaire (RCP) d'infectiologie pour validation des prescriptions de CBP est passé de 16 % en 2013 à 39 % en 2014. Entre les deux périodes, le recours à la désescalade a augmenté de 61 %.

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Conclusion. – L'EPP, pilotée par un référent en infectiologie, est un dispositif complémentaire aux RCP hebdomadaires pour optimiser la prescription des CBP.

Mots clés : Référent en infectiologie ; Bon usage des antibiotiques ; Carbapénèmes

1. Introduction

The emergence and spread of extended-spectrum beta-lactamase (ESBL)-producing bacteria and carbapenemase-producing bacteria is a major public health problem [1–3]. The 2011–2016 French national plan on antibiotics aims to streamline broad-spectrum antibiotic prescription such as carbapenems (CBPs) through the implementation, among other measures, of Professional Practice Evaluation programs (PPE) [4]. Our hospital's infectious disease specialists carried out a PPE to assess the use of CBPs.

2. Material and methods

The Saint-André hospital is part of the university hospital of Bordeaux. The hospital's number of beds decreased from 388 to 375 between 2013 and 2014. In 2014, short stay medical departments had 305 beds (internal medicine and infectious diseases, geriatrics, gastroenterology, dermatology, and oncology) compared with 316 in 2013. Digestive surgery departments had 50 beds in 2012 and 2013, and Intensive care units (ICU) had 20 beds in 2013 (14 in medical ICU and 6 in digestive surgery ICU) compared with 22 in 2013. The group of specialist physicians in charge of weekly multidisciplinary staff meetings (MSM) was responsible for designing the PPE protocol and ensuring compliance with PPE. The evaluation took place over 18 months and aimed to compare CBP prescriptions during two distinct periods of 6 months each (from January to June 2013 and 2014) so as to avoid seasonal variations in CBP prescription. We conducted a three-step evaluation:

- a first evaluation of CBP prescriptions from January 1st to June 30th, 2013 (1st period);
- training sessions for prescribers: infectious disease specialists provided healthcare professionals (residents, assistants, and hospital practitioners) with three training sessions during weekly MSMs. They discussed ESBL epidemiology and appropriate indications for CBP prescription on the basis of guidelines issued by the Hospital's anti-infective drug committee (French acronym COMAI). Some local guidelines for CBP prescription were updated in-between the two periods to ensure a proper use of CBPs in line with the specialists' recommendations [5]. First-line CBPs were no longer recommended in the ICU for the following indications: "aplasia with fever", "nosocomial or healthcare-associated septic shock", "nosocomial peritonitis", and "mechanical ventilation-associated late pneumonia". First-line CBPs were also no longer recommended for patients presenting with necrotizing osteitis, with the exception of patients hospitalized in the ICU. It was also decided that every CBP prescription should be initially approved by an infectious disease specialist and then reviewed at the weekly MSM. A list of all infectious disease specialists working at the hospital was made available to all physicians;
- second evaluation of CBP prescriptions made between January 1st and June 30th, 2014 (2nd period).

Assessment criteria for each CBP prescription included microbiological documentation, indication, treatment duration, whether or not the infectious disease specialist's opinion had been asked for and/or case patients presented and discussed at the weekly MSMs. We then compared the results of the two evaluation periods.

3. Results

In 2013 and 2014, the number of hospital admissions during the first 6 months of the year was 12,063 and 11,828, respectively. These figures correspond to an absolute decrease of 1.9% but to a relative increase when compared with the number of beds (+1.5%) which kept on decreasing between the two periods (Table 1). The number of CBPs prescribed during the first period was 137 (125 patients) while 115 (103 patients) CBP prescriptions were made during the 2nd period (Table 1). CBP prescription distribution between the two periods was as follows:

- imipenem: 64% versus 63%;
- doripenem: 18% versus 23%;
- ertapenem: 12% versus 12%;
- meropenem: 6% versus 2%.

Doripenem was exclusively prescribed to patients hospitalized in the hematology ICU or on dialysis. Ertapenem was mainly prescribed in geriatrics because of its suitable administration route for elderly patients.

Most CBP prescriptions made during the 1st and 2nd periods were for nosocomial or healthcare-associated infections: 66% and 77%, respectively. Physicians working in the ICUs wrote a total of 54 CBP prescriptions in 2013 and 38 in 2014. Most of these prescriptions were made to patients presenting with respiratory infection (33% versus 30%), abdominal infection (28% versus 25%), and urinary tract infection (18% versus 24%). We observed that 53% of CBPs prescribed during the 1st period were empirical prescriptions; that same figure was 59% during the 2nd period. In-hospital case fatality among patients who