Evaluation of Pharmaceutical Interventions on Antibiotic Prescriptions at the University Hospital Fattouma Bourguiba of Monastir

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Abstract

Prerequisite: The absence of a clear and validated strategy in terms of pharmaceutical validation of antibiotics prescription is a major reason for the emergence of antibiotics resistance and the increase of hospital costs. The implementation of such a strategy requires close cooperation between the prescriber and the hospital pharmacist.

Objective: Evaluate the acceptance of prescribers for the validation role of the hospital pharmacist, and thus describe pharmaceutical interventions performed for the clinical departments at the University Hospital Fattouma Bourguiba of Monastir.

Methods: The study was conducted over a period of six months during which an assessment of pharmaceutical interventions was established, a result of the validation of antibiotics hospital prescriptions.

Results: 110 pharmacotherapeutic problem were identified, corresponding to 110 performed pharmaceutical interventions. The two most frequent interventions concerned proposals for dosage adjustments that were the primary cause of interventions (39.1%), followed by proposals for substitutions of antibiotic treatments (35.45%). 64.5 % of all the interventions (71 pharmaceutical interventions) were accepted by the prescribers.

Conclusion: This strategy of pharmaceutical validation has contributed to the prevention of some inappropriate treatments. Therefore, it allows avoiding as much as possible the therapeutic inefficacy or the possible toxicity of administered medications, the reduction of resistance and the treatment failure, in addition to a significant financial gain. The good acceptance rate reflects the satisfactory collaboration between the prescribers and the pharmacists in our Hospital. However, it can be improved by the continued presence of the pharmacist in the clinical departments and his permanent exchange with the prescribers.

Keywords: Pharmacotherapeutic Problem, Pharmaceutical Intervention, Anti-Infectives, Hospital Pharmacist

Introduction

Since their introduction in therapeutic, antibiotics have brought significant benefits for the health of the populations by the disappearance of many forms of serious bacterial diseases and the decrease of complications and mortality of common infectious diseases. However, their massive and repeated use has led to the emergence of resistant bacteria to these drugs [1]. Punctual at the start, these resistances have become the cause of various situations of therapeutic impasses. In this regard, the World Health Organization (WHO) said in its latest report published on March 20, 2014 that antibiotic resistance worldwide is no longer a forecast but a reality in all regions of the world; and poses a serious

threat to public health. WHO also notes in its report that the broad-spectrum antibiotics are consumed unduly and are subject to abusive prescriptions [2]. Taking massive regulation measures at national and international level on the supply, the prescription, the consumption and the distribution of antibiotics appears therefore essential [3].

In Tunisia, anti-infectives are considered among the most prescribed therapeutic drugs classes; and are a topic of great concern for health managers [4]. Indeed, they constitute 25% of the consumed drugs in 2010 and have a preponderant part of drugs spending with significant increase in costs (up 25 million dinars

between 2008 and 2009) [5].

Therefore, all health care providers should contribute to the rationalization of this drug class's use, including the pharmacist. Indeed, as medication expert, the hospital pharmacist can play a significant role in ensuring the effectiveness and the safety of drug use clinically and economically [6], with particular attention to anti-infective considering the risk of development resistance and its consequences. This can be effectively achieved by pharmaceutical analysis and validation of medical prescriptions from clinical departments. This analysis takes into account firstly the individual patient profile (medication history, pathophysiology field, clinical and biological data ...), and secondly, the drug strategy adopted from recent therapeutic repositories. Indeed, the good practice guidelines should form the basis of the Pharmaceutical opinions regarding the therapeutic strategy [7].

Each pharmacotherapeutic problem (PTP) identified during the pharmaceutical analysis should require a pharmaceutical intervention (PI), defined as: "Any proposed of amendment to the drug therapy initiated by the pharmacist" [8].

In the pharmacy department of the Tunisian University Hospital Fattouma Bourguiba (FB), the pharmaceutical validation of antibiotics hospital prescriptions, and the monitoring of antimicrobial consumption are a routine task that constitute pharmacist prerogatives. Thus, this last is led in some cases to make PI for the prescribers to palliate the potential PTP.

In this context, our work is carried out in the aims to evaluate the pharmaceutical activity in the managing and the consumption of anti-infectives at the University Hospital FB, and thus describe the PI made according to the different anti-infective classes and clinical departments concerned by the PTP, and finally estimate their acceptance by the medical setting and their impact within the Hospital.

Materials and methods

This is a prospective study taking place over a period of six months from January to June 2014 at the pharmacy department by a resident in pharmacology in collaboration with a group of internal pharmacy affected in different clinical departments. This study included all the hospitalized patients during this period. To perform a pharmacological analysis of prescriptions according to the clinical context, we asked an explanatory letter written by the physician

and sent to the pharmacy for each request for introduction or modification of an anti-infective therapy. This letter must include the prescribed treatment and the all necessary clinical informations.

The analysis tools were essentially the dictionary of pharmaceutical specialties Vidal [9], the practical guide of medicines Dorosz [10], and therapeutic recommendations and consensus of the French National Security Agency of Medicines and Health Products (ANSM) [11], the Infectious Diseases Society of French Language (SPILF) [12], and the French Society of Anesthesia and Intensive Care (SFAR) [13], as well as the thesaurus, which is the French national repository interactions drug-2014, developed by the Working Group of drug Interactions (GTIAM) ANSM [14].

Therefore, the analysis of antibiotic prescription focuses on the verification of prescribed dosages and duration of treatment according to the antibiotic and/or treated infectious diseases, the detection of possible contraindication or a potentially serious drug interaction based on pathophysiological field of the patient, as well as checking the choice of drugs in relation to the indication and the patient profile, and comparison of current therapy with the good practice guidelines (required associations, reservation of some antibiotics for codified indications ...). Moreover, the daily obtaining of hospital antibiograms from the microbiology laboratory allowed us to verify the agreement between the bacteriological results and the prescribed antibiotics.

Each prescription of antibiotics is recorded in a register reserved for the traceability and the monitoring of antibiotics by mentioning the patient's name, the prescribed medications and their dosages, the indication and the duration of treatment, and some clinical information of the patient. If there is a problem relating to the therapeutic treatment of the patient, a pharmaceutical opinion is formulated and notified to the prescriber either by direct contact in the clinical department or by telephone. The entire PI performed during the study period were recorded and studied and a report was then established.

Results

The analysis of antibiotics prescriptions yielded a total of 110 PTP corresponding to 110 PI conducted in clinical departments during the study period. The majority of these PTP concerned a parenteral therapy at a rate of 78%. Their distribution according to classes of antibiotics is illustrated in the Figure 1.

Figure 1: Distribution of pharmaceutical interventions according to the antibiotics classes and therapeutic problems

The most concerned classes were primarily fluoroquinolones (24.5%), followed by aminoglycosides (16.4%) and penicillins (14, 5%). The fusidic acid alone occupied 11% of all the interventions. The others antibiotics classes were carbapenems

(8.2%), cephalosporins (6.4%) and glycopeptides (5.5%).

The distribution of the PI is illustrated in the Table I. The departments that have benefited the most from our interventions are listed in the Table II.

Clinical departments	Percentage of pharmaceutical interventions
surgery departments	27,3%
Orthopedics department	16,4%
Cardiology departments	10%
Nephrology department	8,2%
Rheumatology department	8,2%
Gastrology department	5,4%
Pediatric department	4,5%
Neurology department	4,5%
Others	15,5%

Table 1: Distribution of different types of pharmaceutical interventions

Problems related to dosages requiring PI can be divided into three classes: under-dosing, overdosing or error of taken distribution as shown in the Figure 2. In addition, 11.6% of this type of PTP correspond to an inadequacy of dosage for patients with renal insufficiency.

The PI concerning the treatment duration were devised in two types: A lengthening of the duration of treatment at the rate of 14.3% when the prescribed period was proved insufficient, or often a discontinuation if the intended or recommended period has been exceeded.

Interventions aimed to change the antibiotic therapy were of three types: either a therapeutic alternative proposal if there is an inappropriate antibiotic therapy compared with suspected or documented infection (56.4%); or a proposal to make an association of antibiotics (23.1%); or a removal of an antibiotic if

it turned out not indicated or not justified (20.5%).

Seventy-one PI presented to clinical departments were accepted, representing approximately 64.5% of all the interventions. The acceptance by the medical setting differed according to the clinical departments and the type of PI. Its estimate is illustrated in the Figures 3 and 4.

The impact or the potential therapeutic and financial benefits of the PI translating the pharmaceutical performance within the Hospital are described in the Table III.

Figure 3: Estimate of the acceptance of pharmaceutical interventions based on interventions types

Figure 4: Estimate of the acceptance of pharmaceutical interventions based on clinical departments

Interventions to prevent the therapeutic inefficacy	52,7%	Correction of the under-dosing	58,4%
		Correction of the treatment short duration	5,5%
		Modification of inadequate or insufficient treatment	30,6%
		Management of the drug interactions	5,5%
Interventions for financial gain for the Hospital	24,9%	Discontinuation of a treatment exceeding the expected duration	47%
		Stopping abusive deliveries of medicines	53%
Interventions to prevent a possible toxicity	13,7 %	Correction of the overdosing	55,4%
		Stopping an aminoglycoside after 5 days of treatment (outside of infective endocarditis)	22,3%
		Association of 2 antibiotics from the same class	22,3%
Others	8,7%		

Table 2: Distribution of pharmaceutical interventions based on clinical department

Résultats : 110 problèmes pharmaco-thérapeutiques ont été recensés, correspondant à 110 interventions pharmaceutiques réalisées. Les deux interventions les plus fréquentes portaient sur des propositions d'adaptations posologiques qui ont constitué la principale cause d'interventions (39,1%), suivies par les propositions de substitution de l'antibiothérapie (35,45%). 64.5% de l'ensemble des interventions (71 interventions pharmaceutiques) ont été acceptées de la part des prescripteurs.

Conclusion : Cette stratégie de validation pharmaceutique a contribué à la prévention de certains traitements mal conduits. Elle permet donc d'éviter autant que possible l'inefficacité thérapeutique ou l'éventuelle toxicité des médicaments administrés, la minimisation des résistances et des échecs thérapeutiques, en plus d'un gain financier important. Le taux d'acceptation assez satisfaisant témoigne de la collaboration entre les prescripteurs et les pharmaciens de l'hôpital. Cependant, il pourrait être amélioré par

la présence continue du pharmacien dans les services cliniques et son échange permanent avec les prescripteurs.

Mots clés : Problèmes pharmaco-thérapeutiques, Intervention pharmaceutique, Anti-infectieux, Pharmacien hospitalier.

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