Pre-hospital Consumption of Antibiotics in Children Admitted to the Pediatric Ward of CHU Tambohobe Fianarantsoa

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ABSTRACT

Introduction: Antibiotic consumption is on the rise; this increases the risk of bacterial resistance which represents a public health threat with an increasing number of therapeutic impasses. The objective of our study is to evaluate the pre-hospital consumption of antibiotics in children admitted to the pediatric service of CHU-Tambohobe Fianarantsoa.

Method: This is a prospective cross-sectional study during a period of 6 months in the pediatric department of the CHU-Tambohobe Fianarantsoa; including all children admitted with antibiotics before their hospitalization.

Results: We included 105 cases, i.e. 27.5% of hospitalized patients. The age of our patients ranged from 0 to 180 months with a median age of 24 months. The infectious sites for which antibiotics were prescribed were predominantly respiratory [27.6%] and ENT [24.5%]. Self-medication was used in 11.4% of cases, and 88.6% had consulted a health centre, 76% of whose prescribers were doctors. The antibiotic used was not adapted to the infection site in 54.3% of cases, and the dose was insufficient in 48.27%. The most prescribed antibiotic was Amoxicillin in 37.9% of cases, followed by Cotrimoxazole in 15.9%. The evolution was marked by the absence of improvement which motivated the hospitalisation of the child.

Conclusion: Our study showed an inappropriate pre-hospital consumption of antibiotics. Continuous training on the correct prescription of antibiotics as well as the implementation of antibiotic therapy protocols are necessary.

Keywords: Antibiotic, consumption, Fianarantsoa, pediatrics, pre-hospital.

I. INTRODUCTION

Antibiotics are among the most prescribed drugs in the world. Global antibiotic consumption increased by 65% between 2000 and 2015 [1]. France is the leading European country for antibiotic prescriptions, with more than 60 million prescriptions made each year in outpatient medicine, a significant proportion of which are for children [2]. This excessive use of antibiotics is mainly seen in respiratory diseases, 90% of which are viral in origin and require only symptomatic treatment [3]. The overuse of antibiotics is therefore an alarming medical phenomenon. The overuse of antibiotics not only exposes the risk of the emergence of multi resistant bacteria but also represents an important economic issue, with the risk of increasing medical costs [4]. The increase in bacterial resistance increases therapeutic failures, and the loss of efficacy of antibiotics prescribed on an outpatient basis sometimes makes hospitalization unavoidable in order to introduce adequate treatment. All of this results in higher health care costs [5]. In view of this problem, the main objective of the present study is to analyze the out-of-hospital consumption of antibiotics in children admitted to the paediatric service at the CHUT Fianarantsoa and as specific objectives to determine the most prescribed antibiotic, to evaluate the correlation between the site of infection, the outcome of the child and the choice of antibiotics of the prescribers.

II. METHODS

The study was conducted in the pediatric department of the Tambohobe University Hospital in Fianarantsoa. This is a prospective study from 1er July 2018 to 31 December 2018.

Children who had been prescribed an antibiotic in the history of their current illness were included. The latter was selected after consulting the health record or the prescription received at the time of the consultation, or after collecting the list of medicines received by the child from the parents. Oral consent was required for inclusion in the study.

For each child, the socio-demographic parameters, information on the antibiotic used such as names, dosage form, dosage, diagnosed pathology, prescriber.

The prescriber could be doctors or paramedical staff
(midwives or nurses) or the parents by self-medicating.

The data collected was computerized and analyzed using Microsoft Excel. Statistical calculations and results were made using Epi info 7 for Windows. The statistical test used was the Chi-square. A “p” value of less than 0.05 was considered statistically significant.

III. RESULTS

In total, of the 382 admissions during the study period, 105 (27.5%) children received pre hospital antibiotics.

The majority of children who received pre-hospital antibiotic therapy were infants aged between 1 and 24 months (61.9%). When questioned, self-medication was among the 11.4% of prescriptions, 76% were medical prescriptions and 12.6% were paramedical prescriptions. According to the site of infection, the sites for antibiotic prescriptions were dominated by the respiratory site in 27.6%, the ENT site in 24.8%, followed by the digestive site in 21.9% of cases (Fig. 1).

According to the signs presented by the patients and or the diagnostic hypotheses marked in the health booklet, pneumopathies followed by gastroenteritis were the most evoked diagnoses motivating the prescription of antibiotics; rhinopharyngitis as well as meningitis constituted the third indications of antibiotic therapy among the known diagnoses in our study (Table I).

Among the different types of antibiotics, the most prescribed antibiotic was Amoxicillin in 37.9% of cases, followed by Cotrimoxazole with a rate of 15.9% and 48.3% of children received more than one antibiotic during their outpatient consultation (Fig. 2).

When studying the prescriptions and comparing them with the pediatric antibiotic prescribing guidelines, only 45% of the prescriptions were indicated. Furthermore, 52% of the antibiotics used were not adapted to the infection site. The dose administered was insufficient in 48.3% of cases (Table II).

IV. DISCUSSION

The aim of this study was to evaluate the prescription of antibiotics in out-of-hospital settings in the Fianarantsoa region. The choice of subject was triggered by the observation of an overconsumption of antibiotics by children admitted to hospital and the emergence of resistance to classic antimicrobials.

The present study shows that 27.5% of patients admitted to pediatric emergency departments have ever been prescribed antibiotics in the community. In Italy in 2017, the prevalence of antibiotic prescriptions was 46% in 0–13-year-olds among 636,911 children, during a one-year follow-up period [5]. This prescription can be beneficial for patients if the indication is well defined, otherwise, especially in viral infections, it favors bacterial resistance and constitutes a costly burden for patients [6].

Infants under 24 months of age were the most affected population with a frequency of 61.9%. Infections, especially of viral origin, are frequent in this age group, which could be explained by the weakness and immaturity of the immune system, and the ease of contamination by those around them [5, 7]. Failure to recognize the preponderance of viral infections in this age group leads to inappropriate prescription of antibiotics.

Self-medications was found in 11.4% of patients. This could be explained by the easy access to antibiotics in pharmacies and even in inappropriate places. It is therefore necessary to require a medical prescription for any purchase of medicines and to fight against their illicit sale. In this study, respiratory

**TABLE I: DISTRIBUTION OF ANTIBIOTIC PRESCRIBING ACCORDING TO HYPOTHESES**

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Workforce (n=105)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory disease</td>
<td>47</td>
<td>44.8</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>22</td>
<td>20.9</td>
</tr>
<tr>
<td>Rhinopharyngitis</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Meningitis</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Skin infection</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>Measles</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Bone and joint infection</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Unknown</td>
<td>7</td>
<td>6.7</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>47</td>
<td>44.8</td>
</tr>
</tbody>
</table>

**TABLE II: DISTRIBUTION ACCORDING TO ANTIBIOTIC DOSE**

<table>
<thead>
<tr>
<th>Deduction of the dose</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>43</td>
<td>29.7</td>
</tr>
<tr>
<td>Insufficient</td>
<td>70</td>
<td>48.3</td>
</tr>
<tr>
<td>Overdosed</td>
<td>32</td>
<td>22.1</td>
</tr>
<tr>
<td>Total</td>
<td>145</td>
<td>100.0</td>
</tr>
</tbody>
</table>

According to the signs presented by the patients and or the diagnostic hypotheses marked in the health booklet, pneumopathies followed by gastroenteritis were the most evoked diagnoses motivating the prescription of antibiotics; rhinopharyngitis as well as meningitis constituted the third indications of antibiotic therapy among the known diagnoses in our study (Table I).
diseases were among the most common antibiotic prescriptions in 27.6%. This is consistent with the data from other [8]-[10].

Indeed, respiratory infections are a frequent reason for consultation in pediatrics. In the majority of cases, they are of viral origin, evolving spontaneously and not requiring antibiotics. In France, these infections are the first indication for antibiotic prescription and in other studies, the prescription rate varies from 40 to 80% [9]-[10].

It is important to establish management protocols and to disseminate them while promoting training for all health professionals in order to limit the irrational use of these antibiotics.

Concerning the most commonly used antibiotics, amoxicillin was the most prescribed in 37.9% followed by cotrimoxazole in 15.9%. The frequent prescription of amoxicillin is in line with other African studies, it is an easily accessible molecule and considered by many mothers as a treatment for "cough" [7]. According to the recommendations, it remains the first-line treatment for pneumococcal respiratory infections, one of the most common bacterial infections [12], [13]. In addition, cotrimoxazole is no longer of interest in the initial management of certain diseases and is still prescribed in 15.9% of cases [12].

This could be explained by the lack of ongoing training to update prescribers' knowledge. The use of antibiotics in the city can be advantageous if the indication is well justified, but if it is unnecessary, it promotes bacterial resistance According to [14], 97% of New Zealand children had received one or more courses of antibiotics and each child had received a median of eight antibiotic courses. Parental pressure often influences the prescribing of some doctors, requiring several drugs for a quick cure [5]. However, for effective antibiotic prescription, it is recommended to choose a narrow-spectrum antibiotic whenever possible. Furthermore, children are a fragile group and the combination of several drugs can be harmful to them.

The outcome of the patients was not correlated with the prescription of antibiotics in the pre-hospital period, however in 5 out of 11 cases of death, antibiotic therapy was not indicated.

V. Conclusion

At the end of this study, it was highlighted that the out-of-hospital consumption of antibiotics among children in the Fianarantsoa region is significant. The rare of prescription for respiratory pathologies remains significant. Most of the prescriptions are erroneous. Self-Medication was also noted in this series. With these data, mandatory continuing medical education for health care providers and regulation of drug sales can be implemented for rational antibiotic prescribing and patient management to reduce the threatening emergence of bacterial resistance.

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REFERENCES