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RESEARCH ARTICLE

Community and nosocomial carriages of ESBL-enterobacteria in surgery departement in Mahajanga

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ABSTRACT

Enterobacteria producing Extended Spectrum Beta-Lactamase (ESBL-E) are major problems in public health. The aims of this study were to find the prevalence rate of intestinal ESBLE carriage and to identify community or nosocomial origin of ESBL-E carriage. This is a cohort study performed between April to June 2015 in Surgery departement of the University Hospital Center Zafisaona Gabriel in Mahajanga which is a north west city of Madagascar.

In the first 48 hours after admission, and thanks to patients' consent, a rectal swab is performed to identify the community carriage. Then, a second one is done before the exit of each patient. Seventy rectal swabs are performed in 35 patients. Five people (14.3%) have EBLS-E of community origin. Four patients (11.4%) acquired an EBLSE during their hospitalization of which 1 was positive on day 9th of admission, 1 to 12th days, 1 to 17th days and 1 to 25th days. Overall, nine patients (25.7%) had EBLS-E including 6 cases in Traumatology, 2 in Urology and 1 in Visceral Surgery. There is no association found between EBLS-E carriage and age, gender or service ($p > 0.05$). However, a significant association between EBLS-E carriage and length of hospital stay was observed ($p < 0.05$). The identified bacteria are all E. coli.

This study is part of the activities of the hospital to improve the hygiene of the establishment while knowing that an important part of EBLS-E are of community origin and can contaminate hospital wards.practitioners do not correspond to the suspected pathology. It is registered in a rich context of actuality on the need of the implementation of a national program so as to improve the good use of antibiotics, especially in town, to limit the emergence of resisting bacteria, with the main goal to elaborate documents of references about the prescription of antibiotics. The antibiomicrobial resistance is a real problem of public health but which still seems to be too abstract for the general practitioner in Toamasina.

KEYWORDS:

EBLS-E, intestinal carriage, surgery, screening, hospital.

HISTORY
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INTRODUCTION

A recent study has reported a prevalence of 57% of intestinal carriage acquisition of Extended Spectrum Beta-Lactamase-producing enterobacteria (ESBL-E) after some trips in Madagascar [1]. These bacteria are multidrug resistant. These are the causes of a comparatively high death rate and over expenditure due to the increased length of the stay in hospital [2]. In Madagascar, we don't have the figures of the carriage prevalence in surgery department but in pediatrics unit at Antananarivo, it was 21.2% on admission [3]. The aims of this study were to find the prevalence of intestinal carriage of ESBL-E, and to identify community or nosocomial origin.

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MATERIALS AND METHODS

We have performed a cohort study between from April to June 2015 in the Surgery Department, especially visceral surgery unit, urology and traumatology of the University Hospital Center Zafisaona Gabriel in Mahajanga which is a north west city of Madagascar. Patient rectal swabs were sampled within 48 hours after admission in hospital in order to find out a community carriage and at the last day of his hospitalization. In all patients, two swabs have been carried out on each person. Samples were immediately plated into Hektoen agar which is a specific agar of negative Gram bacillus and then incubated at 37°C. The identification of enterobacteria was done on the second day. Then, enterobacteria isolates were screened for ESBL production using both the resistance phenotype and the double-disk synergy test using conventional combination: cefepime, ceftazidime, ceftriaxone and amoxicillin-clavulanic acid. The organisms were considered to be producing ESBL when the zone of inhibition around any of the expanded-spectrum cephalosporin discs showed a clear-cut increase towards the clavulanic acid disc.

RESULTS

Seventy rectal swabs were carried out on 35 patients. The average age of the patients was 28.17 years old, between extremes of 1 to 64 years old. Five people (14.3%) are ESBL-E carrier from community origin, in which where Traumatology unit had 3 cases, 1 in visceral surgery and 1 in urology. They are admitted for an osteitis, a cranial trauma, an inguinal hernia, a diabetic wound, a benign tumor of the prostate, respectively.

Four patients (11.4%) acquired ESBL-E during their hospitalization. They were admitted for a hydrocele, a cranial trauma and an open fracture of the femur for two patients. Three of these patients were in Traumatology unit and one in Urology. These second rectal swabs was respectively positive at the 9th, at the 12th, at the 17th, and at the 25th day of admission. On the whole, 9 cases of ESBL-E were found in this study including 6 in Traumatology Unit, 2 in Urology and 1 in Visceral Surgery. The identified bacteria were all E.coli. There was no association found between the ESBL-E carriage and age, or gender, or Unit where the patients were admitted ($p>0.05$). Nevertheless, there was a significant link between the fact that a person carries ESBLE and the length of hospital stay as it has been observed ($p<0.05$).

DISCUSSIONS

This study is essentially focused on the prevalence of multiresistant bacteria in Surgery departement. It is helpful as it aims at improving patient care, and at taking the appropriate prevention measures [4].

ESBLE community carriage

The prevalence of community ESBL-E carriage was 14.3% in this study. This result slightly increased compared to that found in Antananarivo in 2009 which was 10% [5]. Besides, others authors reported a prevalence of 25% to 34% in Morocco [6].

Nosocomial ESBLE patients

Four patients (11.4%) caught ESBL-E, one of whom was found positive at the 9th day after his admission to hospital, one at the 12th day, one at the 17h day, and one at the 25thday. Another study which has been carried out in a pediatric unit in Antananarivo reported 3.1% of nosocomial ESBL-E in 2011 [3]. In Norway, it attained 15.8% in 2011, with patients suffering from gastroenteritis [7], though in Israel, the rate was at a level of 21% [8]. These rates vary according to countries and hospitals. The current incapacity to contain this new epidemic is due to several reasons: the huge ESBLE reservoir (community and nosocomial), the non-respect of strict basic hygiene rules and the non-rational prescription of antibiotics.

Risk factor

ESBL-E carriers in this study were all male. Nevertheless, gender has no link with ESBL-E carriage ($p>0.05$). Another study conducted in Israel reported that for women more than 65 years old, the advanced age was among the risk factors of intestinal ESBL-E hospital carriage [8]. A female predominance of 60% has been as well reported in Algeria [1]. In this study, ESBL-E carriage was predominant in individuals of 40 years old and more ($p>0.05$). Other authors found alike, as ESBL-E carriage didn't appear related with neither age, nor gender, nor hygiene habits [5] [9].

During this study, 9 patients were carriers, 6 of whom were in Traumatology Unit, 1 in Visceral Surgery unit and 2 in urology - that is respectively 17%, 3% and 6%. ESBLE carriage is also frequently seen in various units of hospital in rich countries like in Israel [8] or in Europe [10].

The length of hospital stay

We saw the length of hospital stay that varied from 3 to 36 days, and the average length was 15 days. Other study assume that a longer stay in hospital is a risk factor of catching ESBLE ($p=.002$) [8].

CONCLUSION

This study reported that a big part of ESBL-E carriers are community origin. Indeed, on the one hand, the hospital is a vulnerable center in catching those multidrug resistant bacterias and it results their spreading at the hospital. Therefore, it is essential to isolate the patients as soon as the case has been discovered. On the other hand, the infected patient may transmit the multiresistant bacteria to non-carrier patients. After hospitalization, the length of intestinal carriage of ESBLE could be taken over 6 to 12 months or even beyond. So it requires from medical staff to improve hygiene measures so as to fight infections at hospital.

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