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Epidemioclinical and Bacteriological Profile of Nosocomial Infections in the Urology Department of Sikasso Hospital

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Introduction

Nosocomial Infection NI is an infection contracted by the patient in a hospital 48 hours after admission. The history of NI back to the creation of the first hospitals. According WHO report, NI increasingly occupy a fairly important place in infectious diseases and have a serious impact on the health care cost, hospital's morbidity and mortality rate (Vela Navarrete et al., 2007; World Health Organization [WHO],2002).

Different types of nosocomial infection exist; but its prevalence, clinical and biological features vary from one service to another. With the exception of paediatric neonatal emergencies, urinary nosocomial infection ranks 1st place among NI in our clinical practice.

Nosocomial urinary tract infection NUTI is defined by a bacteriuria: 10^4 -10^5UFC / ml and / or Leukocyturia 10^4 WBC / ml; Fever ±; urine characteristic change.

Nosocomial infection of surgical site NISS is manifested by tenderness, fever T ≥38°C, purulent discharge of the surgical wound +/ - associated with isolation of pathogenic germ. Sepsis following central or peripheral vascular catheterization could be defined by phlebitis, fever T≥ 38°C associated to positive blood culture.

Faced to the emergence and multi-resistant strains spreading, nosocomial infection management, which is based on germs identification and its sensitivity to antibiotics action, is currently a challenge for hospital practitioners, biologists and health authorities.

The objective of this study was: Analyse the epidemioclinical, bacteriological and therapeutic aspects of NI in our department.

Materials and Methods

This was a prospective cohort study conducted in the urology department of Sikasso Hospital between May 1 and October 15, 2021.

Study population: All patients hospitalized or admitted to outpatients consecutively in our department during the said period.

Inclusion: Patients admitted to our department for at least 48 hours; who has carried out a pre-therapeutic assessment including a Cytobacteriological examination of urine CBEU and has benefited from therapeutic care. The survey sheet, the hospitalization register were used to collect information relating to age, sex, provenance, general condition, urinary signs, biological examinations, diagnosis, the therapeutic management and intraoperative complications.

All cases of skin or systemic infection detected at admission; community infections with no recent history of surgery or endo urological manoeuvre are excluded from the study.

Patients operated with sterile CBEU received ceftriaxone 2.0 as antibiotic prophylaxis treatment and antibiotherapy was initiated in accordance with the antibiogram for those who a germ have been isolated.

Data analysis performed by SPSS 20. Pearson chi square test and fisher's exact test were used for comparative analyses of data with P = 0.05 significant.

Result

We collected totally 109 patients, 93 males and 16 females; coming from Sikasso city; Sikasso rural area and border countries (Republic of Côte d'Ivoire and Burkina Faso) respectively 56.96%, 32.16% and 12%.

General health condition

The majority of patients have at least sixty years old (figure1).

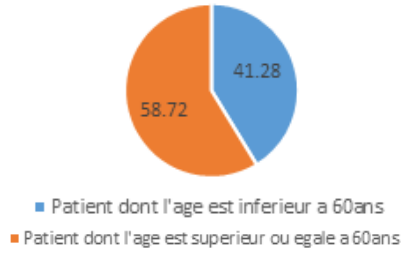

Figure 1: Patients distribution according age

Mean age: 56.10 ±18.3 (15-97 years old)
Mean average of blood haemoglobin: 12.56 ±2.04 (3.30-17);
Mean average of White blood cells: 7.78± 5.22 (2.5-47)

Prostatic hypertrophy occupies the 1st place in our activities with acute urinary retention (20.18%) as the first reason followed by dysuria / pollakiuria 19.26% (figure 2).

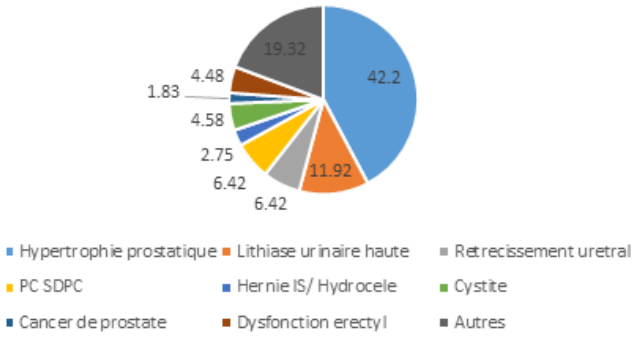

Figure 2: Patients distribution according pathology

The predominant urinary sign in this cohort was urination burn (28.44%) found alone or in combination with others. Eleven patients accounting for 10.09% had fever and out of them two patients did hemoculture witch were revealed negative.

A total of 44 patients underwent surgical operation. Out of which 88.63% were classified ASA 1-2 and the rest of 11.40% of patients were classified ASA 3-4.

Nosocomial infection was found in 40 patients (36 NUTI and 4 NISS).Overall nosocomial infection rate of 36.69%.

Out of those 40 cases of nosocomial infection, only sixteen have been contracted 48 hours after their admission, an intra-hospital incidence of 14.67%.

Two types of intra-hospital nosocomial infection were recorded:

Nosocomial urinary tract infection which is the predominant form (11.01%) and surgical site infection (3.66%).No germs were isolated during Cytobacteriological examination of surgical wound swab.

Resistance profile of nosocomial GNB (figure3):
E Coli Strong resistance to amoxy / clavulanic acid 66.66%.
Moderated resistance to Ceftriaxone34.78% and ciprofloxacin 50.0%.
Low resistance to imipenem 4.34% and amikacin 16.66%.

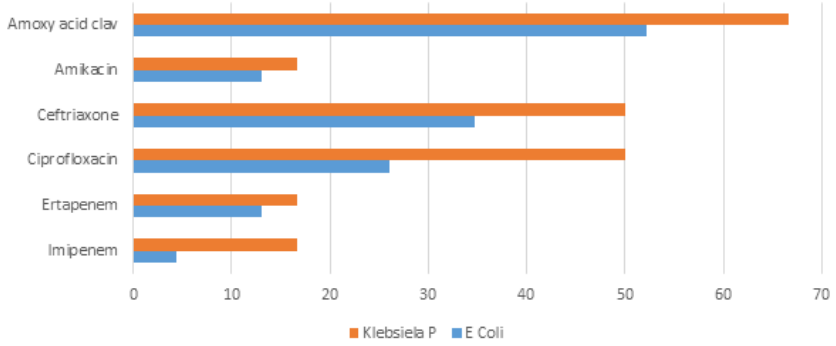

Figure 3: Profile of nosocomial germ resistance to antibiotics action

Risk Factors

In this study nosocomial infection is associated to different risks factors

First risk factor: Indwelling uretrovesical catheter (75.0%)
2eme risk factor: Cystostomy /cystoponction-aspiration (15.0%)

A clear correlation was found between sex, age and occurrence of nosocomial urinary tract infections respectively P: 0.014 (95% CI: 0.0225-0.555) P: 0.001 (95% CI: 0.00438-0.139)

Comment and Discussion

The prevalence of nosocomial infections in our series is quite high compared to that reported by other authors (Echcheikh Elalaoui, I. & Ameur A, 2007). Something that could be explained in part by the fact that the majority of our cases of nosocomial infection were admitted with this infection contracted during urinary diversion attempts by indwelling uretrovesical catheterisation, suprapubic punction or cystostomy carried out in our basic community health care center few times before their admission. As suggested by several studies, nosocomial infections incidence rate varies according to the department; as 2nd reference hospital's urology department, our incidence is much lower than kallel H et al (Kallel et al., 2005).

Surgical site infections ranked 2nd place after nosocomial urinary tract infections in our series. Despite the evocative clinical manifestations namely: Pain/tenderness, purulent discharge and fever, the results of cyto-bacteriological analyses carried out on this wounds secretion were negative. This might be the result of inappropriate antibiotic treatment, inadequacies in the way of sample collection and packaging; the use of an inappropriate culture medium and inefficient diagnostic means. The predominance of UNI followed by surgical site infections, found both in our series and other African studies (Nejad et al., 2011), proves sufficiently the failure of our health care system to enforce the respect of intra-hospital good hygiene principles and aseptic rules by health care givers in our health care facilities. But also the needs of perfect haemostasis, closed and aspirative drainage system promotion in our patient's surgical practice.

In contrast with the literature (Bereket et al., 2012; Sherifa & Moatez, (2012) where immunosuppression, alteration of general condition and female sex are recognized as risk factors for nosocomial infections, only one diabetic, one HIV positive cases were identified and the majority of patients had an acceptable general condition. In addition, to the fact that indwelling uretrovesical catheterization and cystostomy were found respectively as the 1st and second risk factor in our study. A clear correlation was seen between male sex, age and the occurrence of NUI. This could be explained by the specificity of our service which is a urology department where the majority of patients are elderly men whose frequency of sexual activities, the presence of the genital glands on a fairly long urethral pathway expose to obstructive and infectious cervico-urethral pathologies. On the bacteriological level, there is a certain conformity between our result and others (Azeez-Akande, (2012), the most frequent germs are gram-negative bacillus such as E Coli 63.88% and Klebsiela Pneumonia 16.66% (Table1).

Germe ECBU	Frequence	Percentage
GNB Gram negative Bacillus		
Citrobacter freundi	1	2.77%
Escherichia Coli	*23*	63.88%
Klebsiela Pneumonia	*6*	16.66%
Enterobacter cloacae	2	5.55%
GPC Gram positive cocci		
Enterococcus Spp	2	5.55%
Staphylococcus Aureus	1	2.77%
Levures		
Candida Albicans	1	2.77%
Total	36	100

Table1: Distribution of germs responsible of urinary infection

The resistance profile of isolated germs to antibiotics action corroborates the literature (Patil et al., 2013); a strong resistance was found to the action of amoxy / clavulanic acid, while the resistance to the action of habitually used antibiotics (ceftriaxone, ciprofloxacin) in our practice was moderate. Nevertheless, this study reveals a high sensitivity to the action of new antibiotics such as imipenem, ertapenem and amikacin. This high prevalence of multi-resistant strains to the antibiotics action, could be the result of selection following an increasing self-medication but also to the inappropriate and inadequate use of antibiotics in our health care facilities. Like others (Samuel et al., 2010; Tohme et al., 2001), this study has shown that the presence of nosocomial infection with its corollary of long duration treatment, multiplication of investigation means and the use of antibiotics often too expensive, generates an increase health care cost and negatively impacts our family both on economical and psychological point of view.

Conclusion

The increasing prevalence of nosocomial infections associated with the emergence and multiplication of multi-resistant germs poses a real public health threat to our low-income countries. The need for efficient management and strict control, faced to the risk of multi-resistant germ spreading, require the availability of modern diagnostic tools and antibiotic arsenal adapted to the context.

The struggle against nosocomial infections requires the establishment of a surveillance programme for early detection and quick management; training of health care providers in hospital hygiene and the respect of aseptic rules in the execution of medical and nursing acts in all health care facilities. Adoption and implementation of policy in the aims to combat irrational prescription, self-medication and the illicit sale of medicines.

Conflict of interest

authors declare having any conflict of interest

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