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ORIGINAL ARTICLE

Prevalence of bacterial pathogens and their emerging resistance patterns in patients with renal diseases

Luisa Bono[a], Gioacchino Li Cavoli[a,*], Maria Stella Verde[b], Concetta Sodano[b], Calogera Tortorici[a], Angelo Ferrantelli[a], Tancredi Vincenzo Li Cavoli[a], Ugo Rotolo[a]

[a] *Nephrology and Dialysis Department, Civico – Di Cristina Hospital, Palermo, Italy*
[b] *Microbiology and Virology Department, Civico – Di Cristina, Palermo, Italy*

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KEYWORDS
Antibiotic susceptibility;
Bacterial resistance;
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Abstract
Background: Antibiotic resistance is a global problem today. The knowledge of bacterial resistances trend is crucial for antibiotic empiric therapy. Nephrology practice meets several sites of microbiological interest. We aimed to study the prevalence of bacterial pathogens and their emerging resistance patterns to antibiotics commonly used.
Methods: We reviewed 1249 microbiologic reports obtained between January 2009 and December 2013 from patients admitted to Nephrology Department. We analyzed the antibiotic susceptibility patterns for the firsts 4 identified bacterial pathogens.
Results: The bacterial pathogens most frequently isolated were: *Escherichia coli*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Candida*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae*. The percentage of extended spectrum beta-lactamase-producer *Escherichia coli* was 37% and methicillin-resistent *Staphilococcus aureus* was 15%.
Conclusion: Antibiotic resistance of bacterial pathogens to commonly used antibiotics is increasing. Our report on bacterial spectra of major antibiotic susceptibility patterns enables a more rational use.

PALABRAS CLAVE
Sensibilidad a los antibióticos;
Resistencia bacteriana;
Nefropatía

Incidencia de patógenos bacterianos y sus patrones emergentes de resistencia en pacientes con nefropatías

Resumen
Antecedentes: La resistencia a los antibióticos es un problema mundial hoy en día. El conocimiento de las tendencias de resistencias bacterianas es fundamental para el tratamiento empírico con antibióticos. La nefrología confluye con varios puntos de interés microbiológico.

* Corresponding author.
E-mail address: gioacchinolicavoli@libero.it (G. Li Cavoli).

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Perseguimos estudiar la incidencia de patógenos bacterianos y sus patrones emergentes de resistencia a los antibióticos más comunes.
Métodos: Se revisaron 1249 informes microbiológicos de entre enero de 2009 y diciembre de 2013 de pacientes ingresados a cargo de la unidad de nefrología. Se analizaron los patrones de sensibilidad a antibióticos para los primeros 4 patógenos bacterianos que se identificaron.
Resultados: Los patógenos bacterianos más comunes fueron: Escherichia coli, Staphylococcus cureus, Enterococcus faecalis, Pseudomonas aeruginosa, Candida, Staphylococcus epidermidis, Klebsiella pneumoniae. El porcentaje de cepas Escherichia coli productoras de betalactamasas de espectro extendido fue del 37% y de Staphylococcus aureus resistente a la meticilina fue de 15%.
Conclusión: La resistencia de los patógenos bacterianos a los antibióticos comunes está en aumento. Nuestro informe sobre el espectro bacteriano de patrones de sensibilidad los principales antibióticos permite un uso más racional.

Introduction

The antibiotic bacterial resistance is an important public health problem. The inappropriate use of antibiotics is critical to development of bacterial resistance. The Nephrology Departments in routine clinical practice meet several sites of microbiological interest: Urinary Tract, Central Venous Catheter (CVC) for hemodialysis treatment, Peritoneal Catheter (PC) for peritoneal dialysis (PD) treatment, the peritoneal dialysis fluid, the bloodstream, the CVC- or PD-skin exit-sites. Antibiotic resistance is a global problem today. The widespread use of antibiotics and the changing of bacterial pathogens susceptibility profiles requires regular review of treatment guidelines. The knowledge of the epidemiology of pathogens and the antibiotic resistance is necessary for timely and effective treatment of infections[1–2] and it is crucial to use the most appropriate antibiotic empiric therapy (ET) for first-choice treatment. We studied the prevalence of bacterial pathogens and their emerging resistance patterns to antibiotics commonly used. We performed a retrospective analysis of microbiological reports from patients admitted to Nephrology Department between January 2009 and December 2013.

Materials and methods

The infection sites were: urine (49.1%), soft tissues (12.1%), peritoneal dialysis fluid (10.1%), bloodstream (9.7%), CVC- or PD-skin exit-site (6.9%), CVC- or PC-tips (12.1%). We used commercial blood culture bottles to assess bacteraemia and sterile cotton for superficial infections; the urine samples and CVC- or PC-tips were collected in sterile single-use pots for microbiological culture. All samples were collected and processed from patients in accordance with standard protocols. Antibiotic susceptibility of the isolates was done by disc diffusion method according to international guidelines recommendations.

Results

We analyzed 1249 microbiological reports. The majority of the isolates were: *Escherichia coli* (19.3%), *Staphylococcus aureus* (13.4), *Enterococcus faecalis* (12.5); *Pseudomonas aeruginosa* (8.6), *Candida* (8.2), *Staphylococcus epidermidis* (7.6), *Klebsiella pneumoniae* (6.0), *Staphilococcus haemoliticus* (2.4), *Enterococcus cloacae* (2.0). We reviewed the antibiotic susceptibility patterns for the firsts 4 bacterial pathogens identified. We found: (a) *E. coli*: the susceptibility to imipenem, meropenem, colistin, ertapenem and tigecycline was 100%; to amikacin was 97.7%; the susceptibility to piperacillin-tazobactam, gentamicin, cefotaxime, ceftazidime, tobramycin, cotrimoxazole, piperacillin, ciprofloxacin, levofloxacin, ampicillin was under 90%. The proportion of extended spectrum betalactamase (ESBL)-producers was 37% (Fig. 1). (b) *S. aureus*: the susceptibility to linezolid, mupirocin and tigecycline was 100%; to teicoplanin and vancomycin, fusidic acid, daptomycin, trimethoprim/sulfamethoxazol, tobramycin and tetracycline was over 90%. The proportion of methicillin resistant *Staphilococcus aureus* (MRSA) was 15% (Fig. 2). (c) *E. faecalis*: the susceptibility to teicoplanin, daptomycin was 100%; to amoxicillin and clavulanic acid, vancomycin, ampicillin-sulbactam, imipenem and linezolid was over 90%. (Fig. 3) (d) *P. aeruginosa*: the susceptibility to colistin was 100; to imipenem was 78%; to meropenem and piperacillin was 77%; to amikacin was 75% (Fig. 4).

Discussion

Patients with chronic kidney disease are at risk for infections caused by nosocomial multidrug resistant (MDR) pathogens exhibiting decreased susceptibility to many antimicrobials. Suboptimal antibiotic stewardship practices, such as using antibiotics when unnecessary and using broad-spectrum antibiotics or multiple antibiotics, have been linked to the epidemic of MDR organisms. The