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Meirelles, RF Jr, Ceneviva R, Caboclo JLF, Eisenberg MM. A inativação de radicais livres melhora o fluxo capilar pancreático em pancreatite aguda induzida por ceruleína em ratos. *Acta Cir Bras [serial online]* 2003 vol 18 suppl 5. Disponível em: www.scielo.br/acb.

RESUMO – Objetivo: A inativação de radicais livres (RL) foi estudada para determinar as alterações do fluxo capilar pancreático (FCP) na pancreatite aguda induzida por ceruleína em ratos. **Métodos:** Um laser-Doppler fluxímetro determinou o FCP e o composto N-t-Butyl-PhenylNitron (PBN), para inativar os RL, foi utilizado. Quarenta ratos foram divididos em 4 grupos: 1) controle; 2)ceruleína; 3) PBN; 4)ceruleína+PBN. Dosagens bioquímicas e análise histopatológica foram realizadas. **Resultados:** O FCP foi em média $109.08 \pm 14.54\%$, $68.24 \pm 10.47\%$, $102.18 \pm 10.23\%$ e $87.73 \pm 18.72\%$ nos grupos 1, 2, 3 e 4, respectivamente. O FCP nos grupos 2 e 4 diminuíram em média $31.75 \pm 16.79\%$ e $12.26 \pm 15.24\%$, respectivamente. A média da amilase sérica foi de $1323,70 \pm 239,10$ U/l, $2184,60 \pm 700,46$ U/l, $1379,80 \pm 265,72$ U/l e $1622,10 \pm 314,60$ U/l nos grupos 1, 2, 3 e 4, respectivamente. Observou-se diferença significativa no FCP e na amilase sérica quando comparados os grupos 2 e 4. Vacuolização citoplasmática estava presente nos grupos 3 e 4. Não foram observadas outras alterações qualitativas. **Conclusão** A inativação de RL melhorou o FCP e minimizou a elevação da amilase sérica na pancreatite aguda induzida por ceruleína. A presença de RL parece ser um evento precoce neste modelo de pancreatite aguda experimental.

DESCRITORES: Fluxo sanguíneo. Ceruleína. Laser-Doppler. Radicais de oxigênio.

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12 – ARTIGO ORIGINAL

Community acquired urinary tract infection: etiology and bacterial susceptibility¹

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ABSTRACT – Purpose: Urinary tract infections (UTI) are one of the most common infectious diseases diagnosed. UTI account for a large proportion of antibacterial drug consumption and have large socio-economic impacts. Since the majority of the treatments begins or is done completely empirically, the knowledge of the organisms, their epidemiological characteristics and their antibacterial susceptibility that may vary with time is mandatory. **Objective:** The aim of this study was to report the prevalence of uropathogens and their antibiotic susceptibility of the community acquired UTI diagnosed in our institution and to provide a national data. **Methods:** We analyzed retrospectively the results of urine cultures of 402 patients that had community acquired urinary tract infection in the year of 2003. **Results:** The mean age of the patients in this study was 45.34 ± 23.56 (SD) years. There were 242 (60.2%) females and 160 (39.8%) males. The most commonly isolated organism was *Escherichia coli* (58%). *Klebsiella sp.* (8.4%) and *Enterococcus sp.* (7.9%) were reported as the next most common organisms. Of all bacteria isolated from community acquired UTI, only 37% were sensitive to ampicillin, 51% to cefalothin and 52% to trimethoprim/sulfamethoxazole. The highest levels of susceptibility were to imipenem (96%), ceftriaxone (90%), amikacin (90%), gentamicin (88%), levofloxacin (86%), ciprofloxacin (73%), nitrofurantoin (77%) and norfloxacin (75%).

Conclusions: Gram-negative agents are the most common cause of UTI. Fluoroquinolones remains the choice among the orally administered antibiotics, followed by nitrofurantoin, second and third generation cephalosporins. For severe disease that require parenteral antibiotics the choice should be aminoglycosides, third generation cephalosporins, fluoroquinolones or imipenem, which were the most effective.

KEY WORDS: Urinary tract. Infection. Community. Bacteria. Antibiotic. Susceptibility.

INTRODUCTION

Urinary tract infections (UTI) are one of the most common infectious diseases diagnosed in outpatients as well as in hospitalized patients, and can lead to significant mortality¹. UTI account for a large proportion of antibacterial drug consumption and have large socio-economic impacts².

Since the majority of the treatments begins or is done completely empirically, the knowledge of the organisms, their epidemiological characteristics and their antibacterial susceptibility is mandatory. These data are essential to optimize the treatment and avoid the emergence of bacterial resistance³, which is responsible for the increasing number of therapeutic failure^{4,5}. Temporal and local variables can modify these data so they need to be constantly re-evaluated. There are few publications about urinary tract pathogens in Brazil⁶⁻¹⁰.

The aim of this study was to report the information about the uropathogens and their antibiotic susceptibility of the community acquired UTI diagnosed in our institution and to provide a recent national data.

METHODS

We analyzed the results of urine cultures of 402 patients that had community acquired urinary tract infection [3×10^5 colony-forming units (CFU/mL)¹¹] and had urine sampled in the Hospital das Clínicas – FMRP-USP from January to June of 2003.

RESULTS

Demographic data

The mean age of the patients in this study was 45.34 ± 23.56 (SD) years; (range 3 months to 95 years). There were 242 (60.2%) females and

160 (39.8%) males. The prevalence of UTI in the females was more homogenous between age groups, considering intervals of 10 years, with small difference after the third decade, and few children was diagnosed. Fifty percent of the male patients were older than 60 years and the distribution was almost constant in the younger decades (Table 1).

Pathogens

The most commonly isolated organism was *Escherichia coli* (58%). *Klebsiella sp.* (8.4%) and *Enterococcus sp.* (7.9%) were reported as the next most common organisms. The others bacteria are summarized in Table 2.

Bacterial susceptibility

The comparison of the susceptibility pattern of organisms to various antimicrobial agents from all the specimens was shown in Table 3. *Escherichia coli* showed high susceptibility to aminoglycosides: amikacin (97%) and gentamicin (94%); to nitrofurantoin (89%); fluoroquinolones: norfloxacin (81%), ciprofloxacin (78%) and levofloxacin (91%); second and third generation cephalosporins and imipenem. There was a low susceptibility pattern of *E. coli* to ampicillin (41%), trimethoprim-sulfamethoxazole (TMP-SMX) (50%) and cephalothin (58%).

Klebsiella sp. was highly susceptible to aminoglycosides: gentamicin (91%) and amikacin (84%); to cephalosporins: cefoxitin (96%), cefotaxime (90%) and ceftriaxone (88%). Nevertheless, there was a decreased susceptibility to nitrofurantoin (50%), norfloxacin (68%), ciprofloxacin (71%), cephalothin (58%), TMP-SMX (58%) and ampicillin (6%).

Enterococcus sp. showed high sensibility to nitrofurantoin (100%), penicillin G (100%), vancomycin (100%) e ampicillin (96%) The resistance to TMP-SMX was high, approximately 70% (Table 3).

Percentage of susceptible micro-organisms

Of all bacteria isolated from community acquired urinary tract infection, only 37% were sensitive

TABLE 1 - Incidence of UTI in the sex groups, divided in decades.

Age (years)	Male (n = 160)	Female (n = 242)
0 -10	12 (7.8%)	19 (7.9%)
10-20	7 (4.5%)	20 (8.3)
20-30	8 (5.2%)	47 (19.0%)
30-40	9 (5.8%)	34 (14.0%)
40-50	21 (14.0%)	48 (20.0%)
50-60	20 (13.0%)	26 (11.0%)
>60	77 (50%)	48 (20.0%)

TABLE 2 Micro-organisms isolated in urine

Agent	Number	%
<i>E.coli</i>	235	58.4
<i>Klebsiella sp.</i>	34	8.5
<i>Enterococcus sp.</i>	32	7.9
<i>Enterobacter sp.</i>	18	4.5
<i>S. aureus</i>	16	4.0
<i>Citrobacter sp.</i>	14	3.5
<i>Proteus sp.</i>	13	3.2
<i>P. aeruginosa</i>	12	3.0
<i>Acinetobacter sp.</i>	8	2.0
<i>Streptococcus sp.</i>	7	1.7
<i>Serratia sp.</i>	6	1.5
<i>Morganella sp.</i>	5	1.2
<i>Providencia sp.</i>	3	0.7

TABLE 3. Antibiotic susceptibility of uropathogens.

Drug	<i>E.Coli</i> (%)	<i>Klebsiella</i> (%)	<i>Enterococcus</i> (%)	General (%)
ampicillin	41	6	96	37
amikacin	97	84	83	90
cefalothin	58	58	–	51
cefotaxime	98	90	–	87
cefoxitin	92	96	–	80
ceftriaxone	98	88	–	90
ceftazidime	98	85	–	89
ciprofloxacin	78	71	71	73
imipenem	100	100	–	96
gentamicin	94	91	71	88
levofloxacin	91	–	100	86
nitrofurantoin	89	50	100	77
norfloxacin	81	68	61	75
TMP-SMX	50	58	33	52
tetracycline	60	56	54	56
Tobramycin	92	86	–	86

to ampicillin, 51% to cefalothin and 52% to TMP-SMX. The highest levels of susceptibility were to imipenem (96%), ceftriaxone (90%), amikacin (90%), gentamicin (88%), levofloxacin (86%), cefoxitin (80%) nitrofurantoin (77%), norfloxacin (75%) and ciprofloxacin (73%)- (Table 3).

DISCUSSION

Urinary tract infection occurs in every age and in both genders. According to the demographic data, it is more frequent in woman¹².

The present study is retrospective, using the results of our routine diagnostic and susceptibility analysis. These data are from a tertiary hospital, the patients are screened in the primary and secondary level of healthy system and prone to associated conditions and diseases. These factors may influence the patterns of the data herein presented. We are concerned about the necessity of periodical re-evaluation of bacterial etiology and antibiotic resistance in each health unit and of a national surveillance to avoid the rise of the antimicrobial resistance.

In the community, it is important to guide the general practitioners that generally treat empirically the UTI, for what they need to be aware of the locally prevalent strains and their sensitivity pattern. Geographic variations in pathogen occurrence and susceptibility profiles require frequent monitoring to provide information to guide the therapeutic options. Unfortunately, there is few studies published on the prevalence of strains and their antimicrobial susceptibilities in Brazil.

We found that *E. coli* is the predominant bacterium in urine samples, corresponding to 58% of the cases. This is in accordance with previous studies¹³⁻¹⁵, however in a study from Norway¹⁶ *E. coli* caused 81.5% of UTI in outpatients compared to 58% in the present study. A lower proportion of UTI was caused by *Klebsiella sp* (8.4%) and *Enterococcus sp* (7.9%), which is in accordance to others^{12,13,15}.

E. coli exhibited resistance to the commonly used antibiotics, and the most effective in-vitro

agents were found to be aminoglycosides: amikacin (97%) and gentamicin (94%) among the injectables; and fluoroquinolonas: norfloxacin (81%), ciprofloxacin (78%) and levofloxacin (91%) among the orally administered ones. Other useful oral antibiotic is nitrofurantoin (89%). The organisms showed resistance to common used urinary antibiotics like ampicillin (59%), TMP-SMX (50%) and cephalothin (42%), in disagreement with data published by others^{13,17,18}.

In summary, fluoroquinolones remains the choice among the orally administered antibiotics, followed by nitrofurantoin, second and third generation cephalosporins. To treat severe illness one may use the injectable antibiotics, and among then, we should choice aminoglycosides, third generation cephalosporin, fluoroquinolones or imipenem, which were the most effective ones. The high resistance patterns to ampicillin, cephalotin and TMP-SMX should be remembered.

CONCLUSION

The most common community acquired UTI is caused by negative-Gram agents. Fluoroquinolones remains the choice among the orally administered antibiotics, followed by nitrofurantoin, second and third generation cephalosporins. For severe disease that require parenteral antibiotics the choice should be aminoglycosides, third generation cephalosporin, fluoroquinolones or imipenem, which were the most effective.

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RESUMO – Introdução: Devido a frequência a infecção do trato urinário (ITU) responde por consumo elevado de antibióticos e tem impacto sócio-econômico elevado. Como a escolha do antimicrobiano no início do tratamento ou para o tratamento completo é geralmente empírica, o conhecimento da prevalência bacteriana e sua sensibilidade, que podem variar no tempo, é mandatória. **Objetivo:** O objetivo do trabalho é relatar a frequência das cepas bacterianas diagnosticadas em nossa instituição, bem como a sensibilidade aos antimicrobianos, e prover dados nacionais. **Métodos:** Foram analisados retrospectivamente os resultados de cultura de urina de 402 pacientes com ITU adquirida na comunidade e tratados em nossa instituição. **Resultados:** A idade média dos pacientes foi de 45,3±23,5 anos, 242 (60,2%) dos quais eram mulheres e 160 (39,8%) eram homens. A bactéria mais frequente foi a *E. coli* (58%) seguida de *Klebsiella sp.* (8,4%) e *Enterococcus sp.* (7,9%). Das bactérias isoladas somente 37% apresentavam sensibilidade à ampicilina, 51% à cefalotina e 52% ao trimaxazol. As maiores taxas de sensibilidade ocorreram para o imipenem (96%), ceftriaxone (90%), amicacina (90%), gentamicina (88%), levofloxacina (86%), ciprofloxacina (73%), nitrofurantoina (77%) e norfloxacina (75%). **Conclusão:** As bactérias Gram-negativas são a causa mais comum de ITU comunitária. Os antimicrobianos de escolha para tratamento oral são as fluoroquinolonas, nitrofurantoina, cefalosporinas de segunda e terceira geração. Para quadros graves que requerem antibiótico parenteral a escolha recai sobre os aminoglicosídeos, cefalosporinas de terceira geração e imipenem.

DESCRIPTORES: Trato urinário. Comunidade, infecção. Bactéria. Antibiótico, sensibilidade.

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13 – ARTIGO ORIGINAL

Prevalence and bacterial susceptibility of hospital acquired urinary tract infection¹

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Dias Neto JA, Silva LDM, Martins ACP, Tiraboschi RB, Domingos ALA, Suaid HJ, Tucci Jr S, Cologna AJ. Prevalence and bacterial susceptibility of hospital acquired urinary tract infection. Acta Cir Bras [serial online] 2003 vol 18 suppl 4. Available in www.scielo.org.br/acb

ABSTRACT – Purpose: Urinary tract infection is the most common nosocomially acquired infection. It is important to know the etiology and antibiotic susceptibility infectious agents to guide the initial empirical treatment. **Objective:** To determine the prevalence of bacterial strains and their antibiotic susceptibility in nosocomially acquired urinary tract infection in a university hospital between January and June 2003. **Methods:** We analyzed the data of 188 patients with positive urine culture (= 10⁵ colony-forming units/mL) following a period of 48 hours after admission. **Results:** Half of patients were male. Mean age was 50.26 ± 22.7 (SD), range 3 months to 88 years. Gram-negative bacteria were the agent in approximately 80% of cases. The most common pathogens were *E. coli* (26%), *Klebsiella sp.* (15%), *P. aeruginosa* (15%) and *Enterococcus sp.* (11%). The overall bacteria susceptibility showed that the pathogens were more sensible to imipenem (83%), second or third generation cephalosporin and aminoglycosides; and were highly resistant to ampicillin (27%) and cefalothin (30%). It is important to note the low susceptibility to ciprofloxacin (42%) and norfloxacin (43%). **Conclusion:** This study suggests that if one can not wait the results of urine culture, the best choices to begin empiric treatment are imipenem, second or third generation cephalosporin and aminoglycosides. Cefalothin and ampicillin are quite ineffective to treat these infections.

KEY WORDS: Urinary tract infection. Etiology, susceptibility. Nosocomial infection. Microbiology.

INTRODUCTION

Hospitalized patients are predisposed to a variety of nosocomial infections, especially with multidrug-resistant organisms¹. Urinary tract infection (UTI) is the most frequent nosocomial infection and has been suffering a shift in the etiology and antimicrobial susceptibility, as common as other infections detected in the last

decade²⁻⁵. Since most of treatments began empirically, prior knowledge of the bacterial prevalence as well as the resistance patterns in a particular setting is essential.

Information on the etiology and bacterial susceptibility of nosocomially acquired UTI in Brazil are scarce which makes the decisions on antibiotic choice almost entirely dependent of international data⁶. As both geographic and

temporal factors can influence these data, they need to be constantly and locally re-evaluated.

The aim of this study was to determine the local prevalence of bacterial strains and the antibiotic susceptibility of the nosocomially acquired UTI in our institution to guide antibiotic choice and to achieve a maximal clinical response in empiric treatment while the antibiotic susceptibility of the pathogen is still unknown.

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