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Infections

Prevalence of Hospital-Acquired Urinary Tract Infections in Urology Departments

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Abstract

Objectives: The aim of our study was to register the prevalence of nosocomial urinary tract infections (NAUTIs) in urology sections in Europe and Asia.

Methods: A total of 6033 hospitalised patients in 194 different urology departments were screened in two Internet-based studies. Detailed reports on 727 patients with NAUTI were provided.

Results: The prevalence of NAUTI was 10% in the Pan European Prevalence (PEP) study, 14% in the Pan EuroAsian Prevalence (PEAP) study, and 11% in the combined analysis. The largest group was asymptomatic bacteriuria (29%) followed by cystitis (26%), pyelonephritis (21%), and urosepsis (12%). There were significant differences between regions and types of hospitals.

Conclusions: NAUTI is a large problem for urologic patients and causes huge extra costs for hospitals.

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[1] Leonid Stratchounski died in June 2005.
[2] See Appendix A.
[3] See Acknowledgements.

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1. Introduction

A nosocomially acquired infection is an infection obtained during hospitalisation. The incidence has been reported as high as 45% in intensive care units, and depends on the size of the hospital and the size of the clinical department [1]. Urinary tract infections (UTIs) account for about 40% of nosocomial infections [2].

A recent pan-European study on the incidence of microbiologically proven nosocomially aquired urinary tract infections (NAUTIs) in hospitals calculated the prevalence to 10.65 per 1000 patient days [3]. If clinically diagnosed UTIs had been included, it is likely that the incidence of UTIs would be much higher than those reported [3], but such figures are not yet known.

Recommendations on how to monitor NAUTI were worked out by an international group of experts sponsored by the World Health Organization and the United States Centers for Disease Control and Prevention (CDC) [4]. In developed countries, a continuous IT-based system was considered to be possible.

On this background we established an IT-based monitoring system and carried out two consecutive international prevalence studies on NAUTI in urology departments by means of the Internet in the year 2003 and 2004. The aim of this paper is to report the prevalence of clinically and microbiologically proven NAUTI.

2. Materials and methods

2.1. *Organisation and protocol*

The study was initiated and organised by the board of the European Society for Infections in Urology (ESIU)[1]. Both studies were fully sponsored by the European Association of Urology (EAU). The studies were carried out in collaboration with several other medical societies (Table 1).

Table 1 – Collaborating medical associations in the PEP and PEAP studies

- European Study Group on Nosocomial Infections (ESGNI), a working group of the European Society of Clinical Microbiolgy and Infectious Diseases (ESCMID)
- The International Society of Chemotherapy for Infection and Cancer (ISC)
- The Federation of European Societies for Chemotherapy and Infection (FESCI)
- The Asian Association of UTI/STD (Sexually transmitted diseases) (PEAP study only)
- The European Society of Infections in Urology, a full section under The European Association of Urology

Obtaining ethical approval was the responsibility of each study centre. Since all patient data were reported anonymously to the study database, no investigators decided to ask for formal approval of the protocol by the regional ethical committees.

The first study, the Pan European Prevalence study (PEP study), was carried out as a one-day prevalence study in November 2003. The second study, the Pan EuroAsian Prevalence study (PEAP study), was carried out as a one-day study in November 2004. Both studies used the definitions of NAUTI established by the CDC [5] and the definition of sepsis worked out by the American College of Chest Physicians/Society of Critical Care Medicine [6] (Table 2). Urine cultures were taken according to the routine practice in the participating urology departments.

2.2. *Internet application*

The study was carried out by means of Uroweb, the Internet portal of the EAU, which provides all protocol details. An original Internet application was developed (version 0.9) programmed in PHP (a recursive acronym for PHP Hypertext Preprocessor). Investigators filled in reply forms on a special Web site (the so-called front end, Fig. 1). These data were stored securely in a specially designed MySQL database [7].

After the data had been processed, the investigators could consult automatically generated graphical presentations of the study results (Fig. 2).

Investigators were also given the opportunity to submit handwritten report forms that were later entered into the

Table 2 – Definitions of NAUTI used in the PEP and PEAP studies

Summary of CDC criteria for NAUTI [5]*	
1.	Symptomatic urinary tract infections (UTI) Symptoms and bacteriuria Two of seven criteria (other than bacteriuria) indicating UTI
2.	Asymptomatic bacteriuria Indwelling urinary catheter present (within the last seven days) No indwelling urinary catheter present (within the last seven days)
3.	Other infections of the urinary tract Positive cultures of fluid (other than urine) or tissue Abscess or other evidence of infection Two of five criteria indicating other infection
Summary of ACCP/SCCM criteria for urosepsis [6]*	
1.	Systemic Inflammatory Response Syndrome (SIRS) due to bacteraemia confirmed by culture.

ACCP/SCCM: American College of Chest Physicians/Society of Critical Care Medicine; CDC: Centers for Disease Control and Prevention; NAUTI: nosocomial urinary tract infection; PEAP: Pan EuroAsian Prevalence; PEP: Pan European Prevalence.
* For details see refs. [5] and [6].

[1] Kurt Naber, Chairman, Straubing, Germany; Truls E. Bjerklund Johansen, Chairman elect, Porsgrunn, Norway; Michael C. Bishop, Nottingham, UK; Henry Butto, Paris, France; Mete Cek, Istanbul, Turkey; Magnus Grabe, Malmø, Sweden; Bernard Lobel, Rennes, France; Joan Palou Redorta, Barcelona, Spain; and Peter Tenke, Budapest, Hungary.

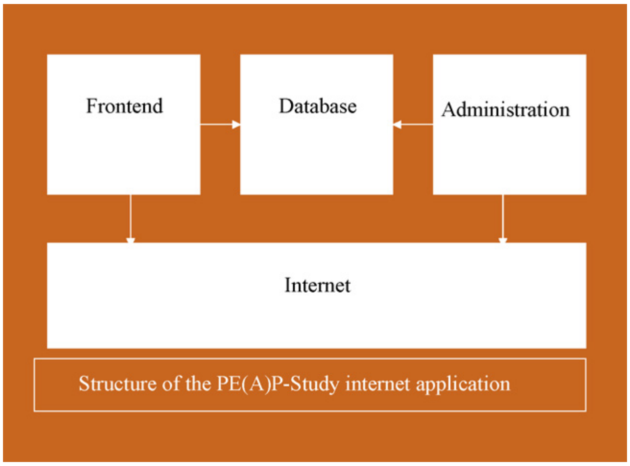

Fig. 1 – Structure of Interet application for the Pan EuroAsian Prevalence (PEAP) and Pan European Prevalence (PEP) studies.

study database by the study organisers (52 patients from four urology departments).

2.3. *Data processing and statistics*

All patients with NAUTI were identified by the local investigator. Study data were imported from the Web-based survey into Microsoft Access (Microsoft Corp, Seattle, Wash). They were then reorganised into the Statistical Package for Social Sciences version 13.0 (SPSS Inc, Chicago, IL) and analysed. This article mainly presents observed frequencies. When dichotomous data are compared, the odds ratios have been computed alongside *p* values from chi-square tests and the Fischer exact test. When comparing other categoric data, the chi-square test is used. To compare continuous variables for different regions and hospital types, we used analysis of variance with Bonferroni correction as the post hoc test.

For hospitals that took part in both the PEP and the PEAP study, only hospital data from the PEP study have been processed for this paper in the comparative calculations. The overall prevalence was calculated for each study:

$$\text{Prevalence}(\%) = (\text{Patients with Nosocomial UTI}/\text{Total Number of Patients Present at Study Day}) \times 100$$

Information about risk factors, pathogens, and susceptibility that is based on the patient report forms were published separately [8].

To obtain groups of hospitals suitable for regional comparisons, we considered the best recruiting countries such as Turkey, Hungary, Germany, and Russia as separate units, whereas the other Asian countries were assembled in one group called "Asia," and the other European countries were assembled in another group called "Europe."

3. Results

3.1. *Participation*

The 2003 PEP study recruited investigators from 216 hospitals; 93 investigators from 23 countries

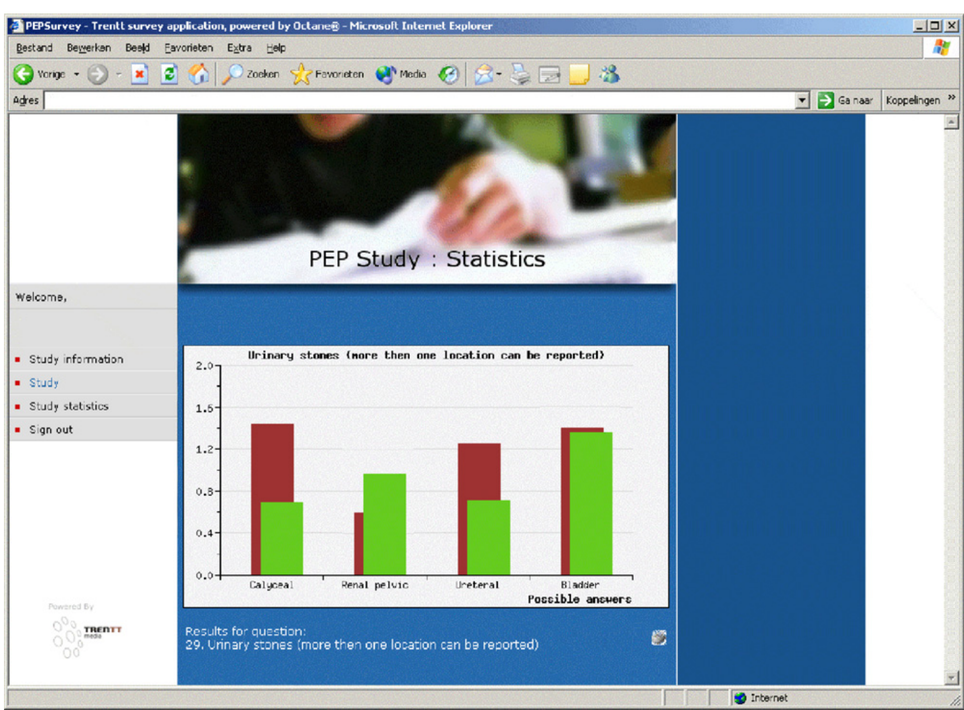

Fig. 2 – Example of the Pan EuroAsian Prevalence (PEAP) study statistics. The investigator can see his or her results, shown in green bars, compared with the average of the total, shown in brown bars.

Table 3 – Characteristics for each type of hospital taking part in the Pan EuroAsian Prevalence (PEAP) and Pan European Prevalence (PEP) studies

Characteristics	University hospital (N = 67) Median (range)	Teaching hospital (N = 46) Median (range)	District hospital (N = 33) Median (range)	Other types of hospital (N = 5) Median (range)
No. of beds in the hospital	856 (40–2206)	600 (31–1800)	418 (20–1100)	320 (120–1600)
No. of beds in the urology department	38 (8–200)	30.5 (10–96)	21 (3–60)	25 (7–130)
No. of admissions per year	1481 (330–8700)	1600 (70–8960)	993 (0–2896)	1255 (98–2509)
Average period of hospitalisation	6.0 (2–19)	5.4 (3.8–38)*	4.7 (1–11)†	15 (5–21.7)
No. of urine cultures per year	621 (0–9763)	700 (0–6000)	370 (0–2145)	347 (65–2210)
N of urine cultures/n of admissions per year	0.44 (0–5.9)	0.59 (0–2.9)	0.46 (0.01–3.4)	0.82 (0.07–1.2)

* Excluded one outlier (611).
† Excluded one outlier (7286).

completed the hospital registration form and registered the prevalence of NAUTI. Investigators from 210 hospitals registered for the 2004 PEAP study; 101 investigators from 24 countries completed the hospital forms and were included in the study. Forty-two urology departments took part in both studies. In the analysis we included each department only once. When a department participated in both studies, the information from the PEP study was used. Data from 152 hospitals were eligible for the final analysis. One of these was excluded from most of the analysis because of incomplete data (e.g., missing data on number of hospitalised patients). The information about patients with NAUTI was, however, complete. The principal investigators on each site are listed in Acknowledgements.

3.2. *Department characteristics*

Forty-four percent of urology departments were university hospitals, 31% were teaching hospitals, 22% were district hospitals, and 3% belonged to the group of other types of hospitals. The average number of beds in the urology departments varied from 3–150 (median: 30). The total number of beds in the urology departments screened on study day was 5768.

The median number of admissions per year for all urology departments was 1473 (maximum: 8960). The mean number of urine cultures taken from the bed department in the previous year for all urology departments was 1105 (median: 616; maximum: 9763). The number of cultures taken varied widely, between 5.8 per patient admission and 7 per 1000 patient admissions, or even none in a few cases. The characteristics are shown in Table 3.

3.3. *Characteristics of hospitalised patients on study days*

The total number of patients hospitalised in urology departments on the study days was 6033. Since data from each department have been included only once, only 4706 patients were included in the following analyses. There were 3466 (74%) males and 1240 (26%) females. The data show that 82% of beds were occupied, 3% of patients were ≤16 yr, 40% were ages 16–60 yr, and 56% were >60 yr.

Surgical procedures reported up to and including study day in the 4706 patients were 3551 (0.75 procedures per patient). The types of procedures were 42% open surgery, 50% endoscopic surgery, 3% laparoscopic surgery, and 5% prostatic biopsies. Laparoscopic interventions were most frequently performed in university departments with 6%, followed by 2% in teaching and 1% in district hospitals. The percentage of endoscopic surgery varied from 46% in university hospitals to 60% in district hospitals. The different types of procedures in each type of hospital are presented in Fig. 3.

A total of 2849 catheters were registered (0.61 catheter per patient). Each patient could have more than one urinary catheter or stent. Of the 2849 catheters registered, 51% were transurethral with continuous drainage; 10%, transurethral with open

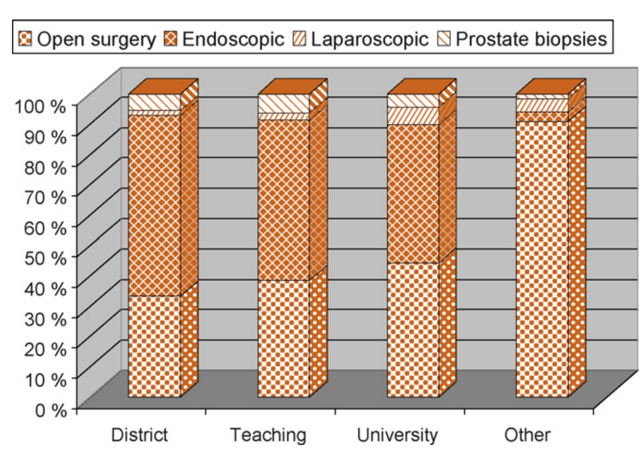

Fig. 3 – Types of surgery in urology departments per hospital type.

Table 4 – Types of NAUTIs by counts and percentage per region

	Russia (n = 124) N (%)	Hungary (n = 200) N (%)	Turkey (n = 78) N (%)	Germany (n = 71) N (%)	Europe (n = 118) N (%)	Asia (n = 95) N (%)	Total (n = 686) N (%)
Urosepsis	3 (2)	7 (4)	21 (27)	4 (6)	27 (23)	23 (24)	85 (12)
Pyelonephritis	54 (44)	42 (21)	6 (8)	9 (13)	20 (17)	10 (11)	141 (21)
Cystitis	13 (11)	73 (37)	21 (27)	25 (35)	17 (14)	32 (34)	181 (26)
Asymptomatic bacteriuria	37 (30)	51 (26)	26 (33)	24 (34)	35 (30)	24 (25)	197 (29)
Other	17 (14)	27 (14)	4 (5)	9 (13)	19 (16)	6 (6)	82 (12)

NAUTI: nosocomial urinary tract infection.

drainage; 2%, clean intermittent catheterisation; 11%, suprapubic catheters; 12%, nephrostomy tubes; and 14%, ureteral stents.

Of all patients, 56% (2617 of 4706) were receiving antibiotics on study day, with 46% of these receiving antibiotics as part of a prophylactic regimen, 26% having a microbiologically proven urinary tract infection, 21% receiving antibiotics for a suspected but not microbiologically proven UTI, and 7% receiving antibiotics for other infections.

3.4. *Prevalence of NAUTI*

The prevalence of NAUTI in the PEP study was 10% (322 cases amongst 3124 hospitalised patients), and the prevalence of NAUTI in the PEAP study was 14% (401 cases amongst 2909 hospitalised patients). In addition four patients were reported from the one hospital that did not report the number of hospitalised patients. The total number of patients with NAUTI was 727.

For the 42 hospitals taking part in both studies, the prevalence data from the PEP study 2003 were used in the overall analysis. Three hospitals (44 patients) were excluded because of obvious errors in their registration. Of the remaining 4662 hospitalised patients on study day, 528 were reported as having a NAUTI, thus giving a prevalence of 11% when the two studies are combined.

The prevalence of NAUTI in the main geographic regions was 21% in Hungary, 19% in Asia, 16% in Turkey, 15% in Russia, 7% in Germany, and 7% in the rest of Europe. The prevalence of infections in each region was compared with the use of the chi-square with p values adjusted with the Bonferroni correction. This analysis showed significant differences ($p < 0.001$) between Germany and "other European countries" on one hand and Hungary, Asia, Turkey, and Russia on the other. The prevalence of NAUTI per hospital category was 16% in district and 11% in both teaching and university hospitals. Chi-square test with p values adjusted with the Bonferroni correction for multiple comparisons showed significant difference ($p < 0.01$) between district and both teaching and university hospitals.

3.5. *Types of NAUTIs*

The largest group of NAUTIs was asymptomatic bacteriuria with 29% followed by cystitis (26%), pyelonephritis (21%), urosepsis (12%), and other infections (12%) of all cases of NAUTIs. While the relative occurrence of asymptomatic bacteriuria was fairly constant about 30% in all regions, there were highly significant differences ($p < 0.001$) between regions and types of NAUTIs. The least variation was seen for "other infections." Pyelonephritis varied from 8% in Turkey to 44% in Russia. The relative occurrence of urosepsis was 6% or lower in Russia, Hungary, and Germany, but higher than 20% in Europe, Asia, and Turkey. The relative occurrence in each region is presented in Table 4, and an overview is given in Fig. 4.

The number of positive blood cultures reported from each region varied from 2–11. When the number of positive cultures was divided with the number of urosepsis cases, culture-positive cases of

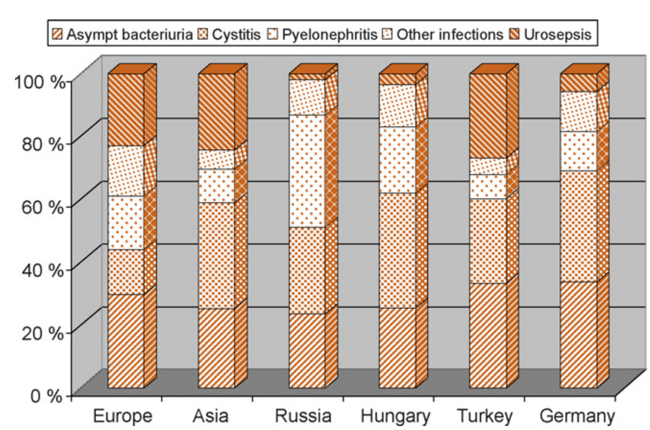

Fig. 4 – Clinical presentation of nosocomial urinary tract infections in countries and regions.

urosepsis in Asia were 9%; in Europe, 33%; in Turkey, 48%; and in Germany, 50%. There were more positive blood cultures than cases of urosepsis in Russia and Hungary, which means that, in Russia and Hungary, practically all cases of urosepsis were based on a positive blood culture and that not all patients with a positive blood culture were classified as having urosepsis. In clinical practice more than one blood culture is often taken for each patient. However, in the study questionnaire the investigators were asked only whether or not patients with urosepsis had a positive blood culture, urine culture, or any other positive culture. In contrast, in Asia urosepsis was a clinical diagnosis in most cases, rarely supported by a positive blood culture.

3.6. *Statistical evaluation*

There are no or minor differences between the characteristics of the population reported as hospitalised patients on study day in the urology department and those with NAUTI when it comes to age category and gender. However, a higher rate of procedures (0.85 vs. 0.75 per patient) and a higher rate of catheters (0.87 vs. 0.61 per patient) was observed among the patients with NAUTI than in the group of all hospitalised patients in urology departments on study day. These differences were statistically significant ($p < 0.001$).

A regression model using stepwise regression was created with prevalence of NAUTI as a dependent variable. The following variables were included as possible independent variables: percentage of males; percentage of patients <16 yr; percentage of patients >60 yr; number of patients who had undergone the different surgical procedures; number of patients with the different types of catheters; number of patients receiving antibiotic prophylaxis; and size and characteristics of the hospital. According to this theoretical model the prevalence would be reduced by 0.002 per percent of hospitalised patients receiving antibiotic prophylaxis. As a result, a unit in which 100% of patients get antibiotic prophylaxis would have 0.2 or 20% points lower prevalence than a corresponding unit with 0% of patients receiving antibiotic prophylaxis. The prevalence would be reduced by 0.002 per extra patient hospitalised in a given department. Thus, a department with 10 more patients than an otherwise similar, corresponding department would have 0.02 or 2% points lower prevalence. The prevalence would be reduced by 0.08 or 8% point if the department was in "other European countries" as compared with the rest. The model accounted for 13% of the variance in the prevalence.

4. Discussion

A continuous registration of all cases of NAUTI gives complete information about incidence and is the ideal way of monitoring a given unit, but it is too time consuming for most urologists. The lack of information in a short-term prevalence study may be compensated to some extent if many hospitals take part in the study [9]. We believe that our one-day studies comprising 194 urology units give an important overview of nosocomial infections in urology departments in Europe and Asia. These are the first intercontinental studies on the prevalence of nosocomial infections in the field of urology.

In our Internet based studies there were no study monitors visiting each centre to check uniform reporting of data. The definition of NAUTI requires a 48-h delay after admission before symptoms appear [5]. The period of hospitalisation in urologic university departments is shorter than 6 d for 50% of patients, and it is sometimes difficult to decide whether an infection was already present on admission. Thus there is a chance that hospitals are not reporting data from fully comparable groups of patients. The data presented are not a representative evaluation of individual countries. For example, in Hungary, Turkey, and Germany, significantly more centres took part in the study than in other countries. The two regions, Europe and Asia, which were used for comparison, are obviously very heterogeneous.

However, a similar study design with local investigators has been used in other multicentre prevalence studies [1–3]. Our Internet application was designed with a built-in quality control. If a report form was not correctly filled in, the application would not accept the report and would tell the investigator which question was not correctly answered [7]. We believe that this strict control system is the most important reason why so many of those who registered did not complete the report forms. The hospital characteristics were almost the same in hospitals of the same category in all regions.

The average prevalence of NAUTI in urology departments in a representative part of Europe and Asia is 11%. It must be noted that UTI in this context also includes infections of solid tissue such as orchitis and epididymitis as well as abscesses in any location of the urinary and male genital tract [5]. However, a surprisingly large proportion of the infections were urosepsis, which is a serious condition with a significant mortality [6,10].

The prevalence of NAUTI in urology departments is almost the same as that of NAUTI in intensive care units [1,2]. It is, however, difficult to compare our data with the prevalence figures in the European Study Group on Nosocomial Infections (ESGNI)-04 study [3], which gave no information about which departments the patients with NAUTI belonged to. The prevalence reported was calculated, not registered, and only patients with a microbiologically proven NAUTI were included. There are more risk factors for developing UTI in urologic patients, so the prevalence of NAUTI in urology sections is probably higher than that in the hospital as a whole [3]. Furthermore, a large proportion of patients in urologic wards are receiving extended prophylaxis or are being treated for suspected NAUTIs that are not microbiologically proven. It could be argued that many of the infections are asymptomatic bacteriuria with minor clinical importance. Nevertheless, 94% of all NAUTIs were treated with antibiotics [8]. According to the IDSA guidelines [11] asymptomatic bacteriuria should only be treated in very selected cases. Specific guidelines on the management of asymptomatic NAUTI do not exist.

While the percentage of asymptomatic bacteriuria and other infections had a similar distribution in most regions, the prevalence of sepsis was about 25% in Europe, Asia, and Turkey, and only about 5% in the other countries. Low prevalence of sepsis was compensated by a higher relative prevalence of pyelonephritis in Russia, and cystitis in Germany and Hungary. All cases were microbiologically proven. We do not believe that there is a true 5-fold difference in the prevalence of sepsis between the regions studied. Shivering and fever are common after urologic surgery, and so is bacteraemia. The difference in the prevalence of sepsis is most probably due to difference in the practice of taking blood cultures after urologic surgery and in the interpretation of the definitions. Of patients in the ESGNI study, 31.9% had "plain sepsis" [3].

One episode of NAUTI adds 1–3 d, and pneumonia adds 9 d of hospitalisation [12]. If the incremental cost of stay averages 500 Euro/day [13], and the extra period of hospitalisation is set to 3 d per NAUTI [14], the extra costs of NAUTI in an average university urology department with 1931 (mean) admissions per year varies between 318,615 Euro per urology unit (prevalence: 11%) and 608,265 Euro (prevalence: 21%). If the recruiting population is set to 400,000 people per hospital, the total annual cost of NAUTI in all European countries with 800 million people may reach 1216.53 million (1.22 billion) Euros (prevalence: 21%). It has been shown that awareness itself will lower the occurrence of nosocomial infections [13,14]. Supporting studies like PEP and PEAP may be a very good investment for health authorities. The Internet application developed for the PEAP studies has proven effective in providing new evidence in the field of NAUTI, and also in giving investigators the opportunity to view their own results compared with the average of other urology departments, which is an essential part of quality improvement processes.

A prevalence of 11% means that NAUTI is not a complication for only the unlucky ones; it is a significant risk for all patients. Information about the risk of nosocomial infection should be included in all patient contracts that are signed before surgery.

5. Conclusions

The prevalence of NAUTI was 11%. The largest group was asymptomatic bacteriuria with 29% followed by cystitis (26%), pyelonephritis (21%), urosepsis (12%), and other infections (12%). There were significant differences between regions and types of hospitals. There were also significant differences in microbiologic evidence for diagnosing urosepsis. The numbers of bacteriologic cultures taken varied widely among hospitals.

The Internet portal of the EAU proved to be a valuable instrument for studying NAUTI on an intercontinental level.

Acknowledgements

Our coauthor Leonid Stratchounski died in June 2005. His contribution to this study was invaluable.

We also acknowledge the investigators listed in Appendix A; they also are co-authors and contributed the local data to the PEP and PEAP studies.

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We thank Alexey Shevelev for reviewing this paper.

Appendix A. Participants and coauthors in the PEP and PEAP studies, sorted according to region

PEP-study	PEAP-study	Region	Country	City	Hospital name	Department	First name	Middle name	Last name	E-mail address
	x	ASIA	Iran	Teheran	Jam Hospital	Urology	Bahman		Piranviseh	b.piran@yahoo.com
	x		Pakistan	Multan	Nishtar Hospital	Urology	Muhammad		Rafique	rafiqanju@hotmail.com
x	x		Georgia	Tbilisi	Tbilisi State Medical University Central Clinical Hospital	Urology	David		Ebralidze	david@tsmu.edu
	x		Georgia	Tbilisi	National Center of Urology	Urology I.	David		Nikoleishvili	dnikoleishvili@yahoo.com
	x		Georgia	Tbilisi	National Center of Urology	Urology II.	Dachi		Berulava	Berulava@msn.com
	x		Japan	Kagoshima	National hospital organization Kyushu Cardiovascular Center	Urology	Hiroshi		Hayami	bass@h3.dion.ne.jp
	x		Japan	Kobe	Kobe University Hospital	Urology	Kazushi		Tanaka	kazushi@med.kobe-u.ac.jp
	x		Japan	Ongagun	Fukuoka shin mizumaki hospital	Urology	Koichi		Takahashi	k-takaha@shinmizumaki-hp.jp
	x		Japan	Tokyo	The Jikei University Hospital	Urology	Hiroshi		Kiyota	kiyota@jikei.ac.jp
	x		Korea, South	Busan	Usan National University Hospital	Urology	Sang Don		Lee	lsd@pusan.ac.kr
	x		Korea, South	Seoul	St Mary Hospital	Urology	Yong-Hyun		Cho	hofguy@catholic.ac.kr
	x		Korea, South	Seoul	Ewha University	Urology	Bongsuk		Shim	bonstone@ewha.ac.kr
	x		Oman	Sohar	Sohar	Urology	Emad	Eldin	Moussa	emadmousa67@hotmail.com
	x		Pakistan	Peshawar, NWFP	Postgraduate Medical Institute, Hayatabad Medical Complex(Lady Reading Hospital), Peshawar	Urology	Taskeen	Ahmad	Khan	profdrta@psh.paknet.com.pk
	x		Pakistan	Karachi	Aga Khan University	Surgery (division of Urology)	M Hammad Ather		Seemal Mumtaz	hammad.ather@aku.edu
	x		Singapore	Singapore	Singapore General Hospital	Urology	Lay-Guat		Ng	gurnlg@sgh.com.sg
	x		Singapore	Singapore	National University Hospital	Urology	Edmund		Chiong	surce@nus.edu.sg
	x	EUROPE	Austria	Baden	Thermenklinikum Baden	Urology	Martin	Christoph	Vorauer	martin.vorauer@thermenklinikum-baden.at
	x		Austria	Korneuburg	Humanis Clinic Lower Austria	Urology	Oliver	Michael	Schlarp	o.schlarp@aon.at
x	x		Austria	Vienna	Hanusch Krankenhaus	Urology	wondratsch		wolfgang	wolfgang.wondratsch@wgkk.sozvers.at
x	x		Austria	Vienna	Krankenhaus der Barmherzigen Brader Wien	Abteilung für Urologie und Andrologie	Michael		Lamche	michael.lamche@bbwien.at
x			Austria	Vienna	University Hospital Vienna	Clinical Division of Hospital Hygiene	Alexander		Blacky	alexander.blacky@akh-wien.ac.at
x			Belgium	Gent	Ghent University Hospital	Urology	Ronny	G	Pieters	ronny.pieters@ugent.be
	x		Bulgaria	Pleven	Mhat – Pleven	Urology	Nikolay	Hristov	Kolev	kolevmd@yahoo.com
x			Croatia	Zagreb	Clinical Hospital Center Zagreb	Clinical and Molecular Microbiology	Vesna		Tripkovic	v.b.tripkovic@email.hinet.hr
	x		Czech Republic	Liberec	Hospital Liberec	Urology	Jan		Mecl	jan.mecl@nemlib.cz
x			Estonia	Tartu	Tartu University Clinics	Urology and Renal Transplantation	Piret		Mitt	piret.mitt@kliinikum.ee

Appenxix A *(Continued)*

PEP-study	PEAP-study	Region	Country	City	Hospital name	Department	First name	Middle name	Last name	E-mail address
x	x	E U	Estonia	Tallinn	North-Estonian Regional Hospital	Urology	Kristel		Paro	kristel.paro@regionaalhaigla.ee
x		R	France	Suresnes	Foch	Urology	Henry		Botto	h.botto@hopital-foch.org
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PEAP: Pan EuroAsian Prevalence; PEP: Pan European Prevalence.

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Editorial Comment

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Nosocomial-acquired urinary tract infections (NAUTIs) are the most frequent hospital-acquired infections and thus have a great impact on clinical medicine. They are almost exclusively complicated UTIs and can merge into severe infections such as urosepsis and septic shock; about 80% are associated with the use of catheters. Each medical specialty encounters its own problems in the management of NAUTIs. Urologic patients are inherently more susceptible to NAUTIs [1]; however, data in urology are generally scarce. In this issue of *European Urology*, Bjerklund Johansen et al. provide a large multicentre prevalence study on NAUTIs in urologic departments in Europe and Asia. They used an Internet-based system for reporting detailed hospital and patient data using internationally approved criteria for stratifying UTIs. The authors found an 11% prevalence of NAUTIs, consisting of 29% asymptomatic bacteriuria, 26% cystitis, 21% pyelonephritis, and 12% sepsis, with significant regional differences. These data show the extent of the problems caused by NAUTIs in urologic patients. Up to one third of patients will develop severe infections such as pyelonephritis or sepsis, which cause significant extra morbidity and costs. But also "mild" infections, such as asymptomatic bacteriuria and cystitis, should be treated with caution in urologic patients. The virulence factors of bacterial strains needed to cause infections in urologic patients may be different from those in other patient cohorts. Bacterial properties such as biofilm infections may play a much greater role [2]. In addition the bacterial strains are fully exposed to the different compartments of the nosocomial environment [3], such as pressure by antibiotics or unrelated compounds, selecting for strains perfectly adapted to this habitat. This continuous specific evolution is an ongoing challenge in urologic medicine.

Assessing the prevalence of NAUTIs in urologic patients, as done in this study by the Board of the European Society for Infections in Urology, is certainly the first step in determining the extent of this problem. Follow-up studies need to deliver target points for the specific management of NAUTIs in urologic patients, such as risk factor analyses, to detect starting points for intervention strategies. Additionally, the effect of the specific intervention taken must be monitored. By using a comprehensive strategy, a substantial number of NAUTIs can potentially be prevented [4].

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Editorial Comment

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The criteria adopted for prophylaxis of urologic procedures are based on those previously validated for general surgery [1]. In contrast urologic procedures are characterised by peculiar aspects that make difficult their classification according to general surgery criteria. In particular the classification of endoscopic procedures remains uncertain. Therefore we still need a strong effort by the clinicians to better define criteria and to establish modality of antibiotic prophylaxis in urology. The first step is a better understanding of the epidemiology of hospital-acquired urinary tract infections in urology departments to define their prevalence in relation to different procedures and to identify the possible specific risk factors. This large Internet-based study represents an important milestone of this process. It shows strikingly differences between data from different departments and nations that might be due to differing policies of antibiotic prophylaxis, and differing clinical and microbiologic criteria adopted to define the presence and to classify postoperative infections.

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