Letter to the Editor

Urinary tract infection in the oldest old: a work overload for the microbiology laboratory

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Sir,

Urinary tract infections (UTI) are 20 times more frequent in the oldest old, those aged 80 and over, than in younger individuals, but there is little information as to which pathogens are implicated and to which workload is generated by urine sampling in Microbiology laboratories[1]. For that purpose, we conducted a study during 2012 and 2013 in three Spanish hospitals with different services: Hospital Universitario Puerta del Mar (university), Hospital General La Mancha-Centro (regional) and Hospital General de Tomelloso (local), with 740, 370 and 70 beds, respectively. We performed urine cultures from all the samples received for microbiological investigation and estimated the global workload of the nosocomial UTI by the number of urines processed for culture with respect to the global hospital admissions and the admissions of patients over 80 years old in the period. For the culture we used blood agar, CLED/EMB agar and Sabouraud/chromID *Candida* agar (bioMérieux, France). Interpretation of cultures was done according to the criteria issued in the European Urinalysis Guidelines[2]. In general, both low and high counts ($\geq 10^3$ colony forming units (CFU)/mL urine) were considered significant for yeasts, primary and secondary pathogens, and higher counts ($\geq 10^5$ CFU/mL) for presumptive skin commensals or colonizers (doubtful pathogenic bacteria). When two morphotypes were present, only the most pathogen was informed. The isolation of three morphotypes was interpreted as contamination. For the identification of microorganisms the automated systems Wider (Soria Melguizo, Spain), Vitek2 (bioMérieux, France), MALDI-TOF (Bruker Daltonics, Germany) and API tests kits (bioMérieux, France) were used.

A total of 81,939 urine cultures were performed, out of which 9,999 (12.2%) corresponded to people aged 80 and over. Outpatients amounted 80.7% and inpatients, 19.3%. A positive urine culture was found in 4,164 (41.6%) patients, 93.4% due to bacteria and 6.6% to yeasts. Fifty-six different microorganisms were informed. The most common pathogens are listed in table 1. Out of 54,596 patients admitted in the period and to the hospitals included in the study, 8,567 (15.7%) aged 80 and over. The global workload of urine cultures from the hospitalized elderly with respect to the global hospitalization was 35 cultures per each 1,000 admissions/year, and with respect to the elderly population, 225 cultures per each 1,000 admissions/year.

Despite urine culture is one of the commonest tests in the Microbiology Laboratory, not far did not exist international consensus on the criteria to use for its interpretation[1]. A document to guarantee the quality from a microbiological point of view was recently published under the auspices of the European Confederation of Laboratory Medicine (ECLM) and the workgroup for urinalysis of the European Society of Clinical Microbiology and Infectious Diseases (ESCMID). In this protocol diagnosis criteria are proposed both for symptomatic and asymptomatic patients in accordance with an original system of classification for microorganisms depending on their pathogenicity[2]. Unlike bacteria, there is no reference standard for the diagnosis of candiduria and the lack of consensus has driven to the use of varying definitions, which may skew the analysis of the incidence and outcome of candiduria[3]. The cut-off to diagnose candiduria ranges from 10^3 to 10^5 CFU/mL urine. The European Urinalysis Guidelines consider yeasts a doubtful pathogen which should be given significance with high counts ($\geq 10^5$ CFU/mL urine), but we have followed the current trend which is to assign higher pathogenicity to yeasts and thus lower the cut-off to 10^3 UFC/mL[1,2,4,5].

Escherichia coli has been described as the most commonly identified uropathogen causing 70-80% of UTI in patients of all ages[6,7]. In the oldest old it also constitutes the most usual pathogen, both in women and men, but as our

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Table 1 **Most common microorganisms isolated from the urine cultures of 4,164 elderly patients.**

MICROORGANISMS (N=56)	TOTAL (N=4164)		COMMUNITY (N=3349)		HOSPITAL (N=815)	
Escherichia coli	1944	46.7%	1693	50.5%	251	30.8%
Klebsiella pneumoniae	434	10.4%	366	10.9%	68	8.3%
Enterococcus faecalis	317	7.6%	247	7.4%	70	8.6%
Pseudomonas aeruginosa	235	5.6%	184	5.5%	51	6.2%
Proteus mirabilis	193	6.3%	166	4.9%	27	3.3%
Candida albicans	153	4.6%	45	1.3%	108	13.2%
Non-albicans Candida	121	2.9%	31	0.9%	90	11.0%
Klebsiella oxytoca	89	2.1%	81	2.4%	8	1.0%
Morganella morganii	78	1.9%	69	2.1%	9	1.1%
Enterobacter cloacae	75	1.8%	62	1.8%	13	1.6%
Providencia stuartii	74	1.8%	63	1.9%	11	1.3%
Streptococcus agalactiae	70	1.7%	65	1.9%	5	0.6%

data point up, its frequency is much lower (50.5% in the community and 30.8% in the hospital). Other uropathogens identified in this population are related to prior antimicrobial courses, health care exposures, underlying diseases, frail immunity and use of indwellling catheters, among other factors[8]. In our study there were marked differences in the distribution of pathogens according to the clinical setting. In the community *E. coli* was trailed far behind by *Klebsiella pneumoniae, Enterococcus faecalis, Pseudomonas aeruginosa* and *Proteus mirabilis*. In hospitalized patients the distance between *E. coli* and other pathogens was shorter, being the predominance of yeasts remarkable (24.2%), as also reported somewhere else[2,9].

The oldest old represent a growing group in the developed countries. In Spain it supposes 5.2% of the current population. However, the baby-boom generation, born between 1958 and 1977, is expected to retire in 2024 and consequently, the aged over 80 will constitute 6 million inhabitants around 2050[10,11]. Hospitalization is more common in this population in whom admissions have increased 200% in the last ten years[12]. The global admission rate in our study was 15.7%, although in the regional and local hospitals was over one-fourth of the total admissions. The workload of urine cultures in relation to the admittance of elderly was high and especially in the local hospital (391 cultures per each 1 000 admissions/year), meaning that urine culture is performed in one out of three patients admitted.

In conclusion, the etiology of the UTI in elderly from the community is similar to that of other groups of age and thus predictable, but in the hospital setting it is widely varying and our results call for greater focus on the isolation of yeasts. Attempts to limit and rationalize the performance of urine cultures in the elderly appear to be necessary.

FUNDING

Authors declare no financial support for this study.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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