90 Antimicrobial resistance in urological outpatient and inpatient settings: Results of a monocentric observation

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Introduction & Objectives:

Urinary tract infections are among the most frequent bacterial diseases of the human body[1]. They are among the leading causes of physician-patient contacts and entail a large economical burden for healthcare systems. While mortality (of urosepsis) is in decline, it still lies between 18% and 60%[2,3]. Rapid initiation of targeted antibiosis can decrease mortality, especially in severe infections[4]. This necessitates up-to-date knowledge of local bacterial spectra, as even small geographical changes yield considerable heterogeneity[5].

We evaluated bacterial spectra and antimicrobial resistance in urine cultures of patients in both outpatient and inpatient settings at the Kepler University Clinic – MedCampus III between 2015 and 2017.

Materials & Methods:

Bacterial analysis was carried out via Dip-in-mediums (Roche®Uricult™) after 24-hour incubation in 37°C. Relevant colonies were identified using mass spectrometry (Bruker Maldi®-TOF system). If uropathogen colonies were present in isolates, resistance analysis was undertaken using agar diffusion mediums. Bacterial resistance was evaluated according to European Committee on Antimicrobial Susceptibility Testing (EUCAST) criteria.

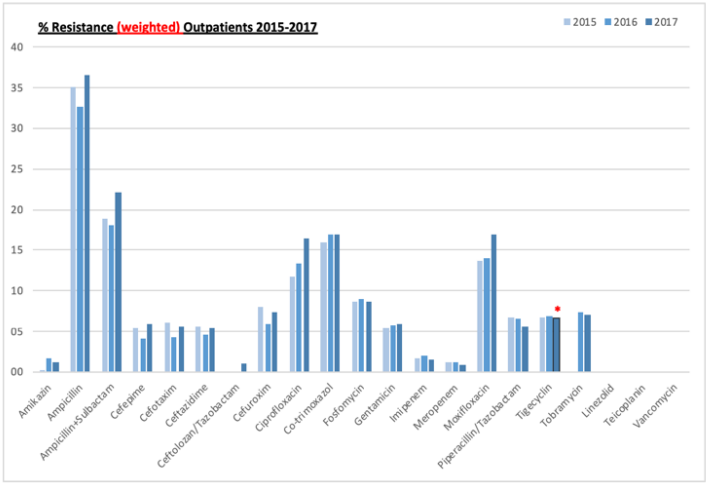
Results:

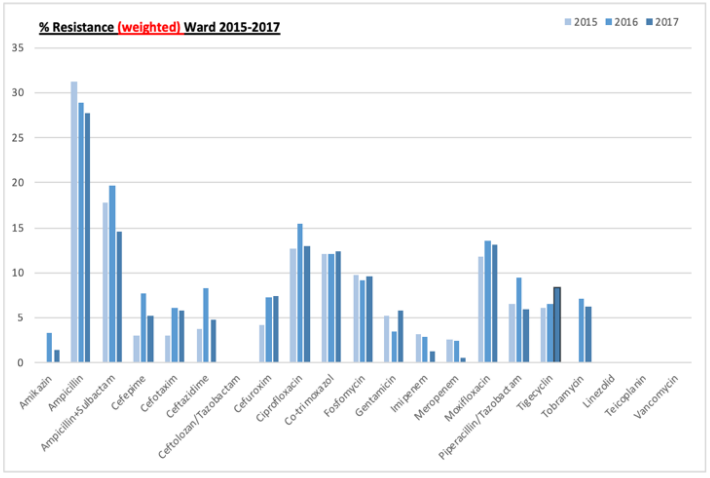
4342 isolates were collected between 2015 and 2017, of which **2910** were collected from outpatient settings and **1432** from the urological ward. In total, 34 distinct bacterial strains could be identified. The most frequent strains were (outpatient and ward, in descending order): **E.coli** (56,4% resp. 44,1%), **E. faecalis** (22,4% resp. 30,4%), **P. aeruginosa** (7,5% resp. 10,5%), **K. pneumoniae** (7,1% resp. 8,3%) and **P. mirabilis** (6,6% resp. 6,7%). These five strains amount to 82,12% of the total bacterial spectrum in our material.

Resistance rates were comparable to reference data from AURES and EARS-Net AT, albeit for small, but relevant peculiarities

Out '15-'17	E. coli	E. faecalis	P. aeruginosa	P. mirabilis	K. pneumoniae		% Resistance	% stratified res.	
Number	1641	652	219	191	207	2910			
% of germs	56,4	22,4	7,5	6,6	7,1				
Amikazin	1,8		2,6	4,0	0		2,1	1,5	Amikazin
Ampicillin	44,6	0,2		36,3	100		45,3	34,7	Ampicillin
Ampicillin+Sulbactam	29,9			11,9	27,8		23,2	19,6	Ampicillin+Sulbactam
Cefepime	7,9		4,3	1,7	4,0		4,5	5,2	Cefepime
Cefotaxim	8,4			1,7	6,4		5,5	5,3	Cefotaxim
Ceftazidime	7,0		7,0	1,1	8,9		6,0	5,2	Ceftazidime
Ceftolozan/Tazobactam			14,7				14,7	1,1	Ceftolozan/Tazobactam
Cefuroxim	10,6		6,8	2,2	12,1		7,9	7,0	Cefuroxim
Ciprofloxacin	18,4		12,3	27,3	14,3		18,1	14,1	Ciprofloxacin
Co-trimoxazol	23,6			32,2	15,6		23,9	16,7	Co-trimoxazol
Fosfomycin	4,8			19,7	68,6		31,0	8,9	Fosfomycin
Gentamicin	6,2		5,3	22,7	4,0		9,6	5,7	Gentamicin
Imipenem	0	0,2	19,9	2,9	0		4,6	1,7	Imipenem
Meropenem	0		14,3	0	0		3,6	1,1	Meropenem
Moxifloxacin	19,2			42,5	17,1		26,3	14,8	Moxifloxacin
Piperacillin/Tazobactam	8,3			1,1	21,4		10,3	6,3	Piperacillin/Tazobactam
Tigecyclin	0			99,0	3,8		34,3	6,8	Tigecyclin
Tobramycin	10,7			13,8	5,2		9,9	7,3	Tobramycin
Linezolid									Linezolid
Teicoplanin		0					0	0	Teicoplanin
Vancomycin		0					0	0	Vancomycin
	12,6	0,1	8,6	20,2	20,3		13,4		

Ward '15-'17	E. coli	E. faecalis	P. aeruginosa	P. mirabilis	K. pneumoniae		% Resistance	stratified res.	
Number	631	435	151	96	119	1432			
% of germs	44,1	30,4	10,5	6,7	8,3				
Amikazin	4,2		0,7	6,6	0		2,9	2,4	Amikazin
Ampicillin	42,6	0,2		32,7	100		43,9	29,3	Ampicillin
Ampicillin+Sulbactam	32,3			7,7	31,0		23,7	17,3	Ampicillin+Sulbactam
Cefepime	8,9		6,2	0	8,3		5,9	5,3	Cefepime
Cefotaxim	9,9			0	8,3		6,0	5,0	Cefotaxim
Ceftazidime	8,3		13,5	0	6,7		7,1	5,6	Ceftazidime
Ceftolozan/Tazobactam									Ceftolozan/Tazobactam
Cefuroxim	11,2			2,0	14,9		7,0	6,3	Cefuroxim
Ciprofloxacin	23,1		10,8	21,4	11,1		16,6	13,7	Ciprofloxacin
Co-trimoxazol	20,9			23,3	17,1		20,4	12,2	Co-trimoxazol
Fosfomycin	5,3			22,6	68,7		32,2	9,6	Fosfomycin
Gentamicin	7,4		1,3	18,2	2,7		7,4	4,8	Gentamicin
Imipenem	0	0,4	21,2	0	0		4,3	2,4	Imipenem
Meropenem	0		17,2	0	0		4,3	1,8	Meropenem
Moxifloxacin	23,0			25,5	12,7		20,4	12,9	Moxifloxacin
Piperacillin/Tazobactam	12,0				24,5		12,2	7,3	Piperacillin/Tazobactam
Tigecyclin	0			98,8	4,9		34,6	7,0	Tigecyclin
Tobramycin	13,2			9,1	6,4		9,5	6,9	Tobramycin
Linezolid									Linezolid
Teicoplanin		0					0	0	Teicoplanin
Vancomycin		0					0	0	Vancomycin
	13,7	0,1	8,6	16,8	20,7		12,3		





Conclusions: In uncomplicated UTIs, resistance-guided antibiotic therapy can avoid unnecessary complications and consequential costs for the healthcare system.

Our collective also exhibited high carbapenem resistance in P.aeruginosa, as shown in previous upper Austrian data. Good practice in antibiotic stewardship might reverse this development.

While resistance rates are declining in the ward, results from the outpatient clinic do cause concern. Future development ought to be monitored closely as to not lose pace in an already high-resistance environment.