



Trends in antimicrobial resistance of *Acinetobacter baumannii* clinical isolates in a Greek university hospital



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Antibiotic susceptibility (by hospital unit origin) of 914 *A. baumannii* clinical isolates

INTRODUCTION

Acinetobacter baumannii is a multidrug-resistant (MDR) nosocomial pathogen mainly affecting immunocompromised patients with severe underlying diseases. Outbreaks caused by *A. baumannii* have been increasingly reported particularly among patients hospitalized in intensive care units (ICUs), and in many instances such isolates are resistant to all available antimicrobial agents except colistin.

The aim of the present study was to evaluate the rates of antimicrobial resistance and changes over time of *A. baumannii* isolated from hospitalized patients over a 5 consecutive years (2010-2014), in relation to patient setting and clinical specimen origin, in the only tertiary hospital of Crete, Greece.

MATERIAL AND METHODS

We retrospectively analyzed the rates of antimicrobial resistance and changes over time of all *A. baumannii* isolated from hospitalized patients over a 5 year period (January 2010 - December 2014). Bacterial species were identified by the use of standard biochemical methods and the Vitek 2 automated system (bioMérieux SA, Marcy L' Etoile, France). Vitek 2 was also used for antimicrobial susceptibility testing. The antimicrobials tested were: Ampicillin/sulbactam, ticarcillin, ticarcillin/clavulanic acid, piperacillin, piperacillin/tazobactam, cefotaxime, ceftazidime, cefepime, imipenem, meropenem, gentamicin, amikacin, tobramycin, ciprofloxacin, tetracycline, tigecycline, trimethoprim/ sulfamethoxazole, and colistin. The minimum inhibitory concentration (MIC) of tigecycline and colistin was also determined by the E-test method (bioMérieux SA), following manufacturer's recommendations. All tests were performed in duplicate. The Clinical and Laboratory Standards Institute (CLSI) MIC breakpoints were used for the interpretation of results of all antimicrobial agents except for tigecycline for which the Food and Drug Administration (FDA) breakpoints were applied.

RESULTS

Overall 914 clinical isolates of *A. baumannii* were recovered over the study period. These were recovered from the ICU (n=493), medical (n=252) or surgical (n=169) wards. Only 4.9% of all tested isolates were fully susceptible to the tested antimicrobials, while 92.89% of them were MDR. With the exception of ampicillin/ sulbactam, ticarcillin, piperacillin, piperacillin/tazobactam, cefotaxime, ceftazidime, cefepime, and ciprofloxacin, highly statistically significant changes in resistance by year were noted for the remaining 10 tested antibiotics. Tigecycline susceptibility progressively decreased over the entire study period, with intermediate susceptibility isolates pre-dominating in the early years (2010-2011) and resistant isolates in 2012-2014. Although colistin resistance was low, 20 of 27 (74%) resistant isolates were recovered in the two most recent study years. For 13 of 14 tested antimicrobials except colistin, statistically significant changes were noted by hospital unit origin. ICU strains were the most resistant, followed by surgical and medical wards. Colistin strains from surgical wards (n=9) were more resistant than ICU strains (n=17).

	ICU (n=493)				SURGICAL WARDS (n=169)				MEDICAL WARDS (n=252)			
	S	S (%)	I+R	I+R (%)	S	S (%)	I+R	I+R (%)	S	S (%)	I+R	I+R (%)
AM/S	22	4.5	471	95.5	11	6.5	158	93.5	36	14.3	216	85.7
TIC	12	2.4	481	97.6	9	5.3	160	94.7	30	11.9	222	88.1
PIP	10	2	483	98	7	4.1	162	95.9	19	7.5	233	92.5
P/T	11	2.2	482	97.8	11	6.5	158	93.5	34	13.5	218	86.5
CTX	7	1.4	486	98.6	5	3	164	97	13	5.2	239	94.8
CAZ	11	2.2	482	97.8	10	5.9	159	94.1	28	11.1	224	88.9
IMI	26	5.3	467	94.7	22	13	147	87	53	21	199	79
MER	30	6.1	463	93.9	24	14.2	145	85.8	65	25.8	187	74.2
GEN	56	11.4	437	88.6	31	18.3	138	81.7	63	25	189	75
AMI	185	37.5	308	62.5	70	41.4	99	58.6	108	42.9	144	57.1
CIP	16	3.2	477	96.8	11	6.5	158	93.5	34	13.5	218	86.5
TIG	160	32.4	333	67.6	57	33.7	112	66.3	102	40.5	150	59.5
COL	476	96.6	17	3.4	160	94.7	9	5.3	251	99.6	1	0.4

AM/S: ampicillin/sulbactam, TIC: ticarcillin, PIP: piperacillin, P/T: piperacillin/ tazobactam, CTX: cefotaxime, CAZ: ceftazidime,, IMI: imipenem, MER: meropenem, GEN: gentamicin, AMI: amikacin, CIP: ciprofloxacin, TIG: tigecycline, COL: colistin

CONCLUSION

The vast majority of *A. baumannii* clinical isolates in our hospital are MDR, severely limiting the available treatment options.