COMPARATIVE STUDY BETWEEN THREE SEQUENTIAL SEMESTERS TO EVALUATE THE IMPLEMENTATION OF ANTIBIOTICS' STEWARDSHIP PROGRAMME IN INTENSIVE CARE UNIT OF A 500-BED GENERAL HOSPITAL

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Background and Objectives

Dissemination of drug-resistant strains is very common in Intensive Care Unit (ICU) resulting in combining several antibiotics for prolonged periods. Greece is considered endemic for multi-drug resistant Gram-negative pathogens. An Antibiotics' Stewardship Program (ASP), with chief hospital pharmacist to coordinate the stewardship multidisciplinary team, according to national legislation, was activated in March 2017 in our hospital for all clinical departments to initially rationalize the use of crucial protected antibiotics (PA): carbapenems, collistin, tigecycline, linezolid and daptomycin.

The study was conducted to assess safety and efficacy of interventions of a restrictive ASP regarding the use of protected antibiotics in ICU of our hospital in three sequential semesters.

Material and Methods

The ASP program implemented consisted on **consultation by the defined intensivist or the ID physician before** administartion of the protected antibiotic to the patient. Consumption data (volume and value) from ICU for the following antibiotics: **carbapenems (meropenem, imipenem/cilastatin, ertapenem), collistin, tigecycline, linezolid and daptomycin** were analyzed in monthly basis, regarding the first semester of 2017 (59 patients) and compared to the first (58 patients) and second semester of 2016 (76 patients), before ASP activation. DDDs per 100 bed days (%) were calculated by ABC Calc version 3.1. Mortality rates during hospitalization, mean in-hospital stay and surveillance results from monitoring resistance in defined bacterial isolates were also available for the relevant semesters.

Results

DDD/100 bed days (%) decreased significantly for targeted antibiotics after ASP implementation (e.g. **for carbapenems from 50% to 21%, colistin from 71% to 36%, linezolid from 9% to 3%**) except for tigecycline that remained in low levels but slightly increased from 1% to 3%. *Number of resistant isolates decreased for both Gram(+) and Gram(-) bacteria for the examined periods, proving that establishment of more strict infection control measures at the same time added value to the ASP*. Mortality rates decreased by 23% and cost of antimicrobial therapy/bed day in ICU decreased from 58€ to 33€ between January-June 2016 and 2017.

Consumption of protected antibiotics in ICU

DDDs/100 patient-days (%)
Legend: COLISTIN, CARBAPENEMS, LINEZOLID, TIGECYCLIN, DAPTOMYCIN
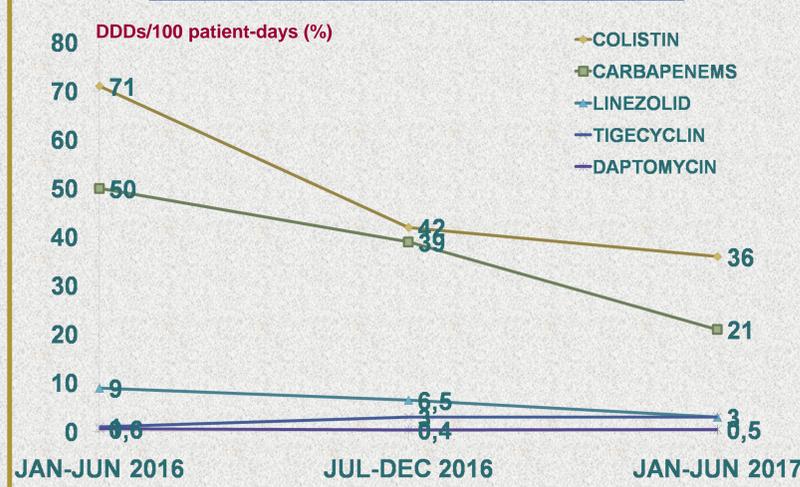
Comparison of resistant isolates in ICU between 2 semesters

	2016						2017					
	ACINET	KLEBS	PSEU	MRSA	VRE		ACINET	KLEBS	PSEU	MRSA	VRE	
JANUARY	4	3	3	0	1		4	7	2	0	0	
FEBRUARY	9	6	2	0	0		3	1	1	0	0	
MARCH	11	14	8	0	0		10	8	5	1	0	
APRIL	6	4	8	0	0		7	2	3	0	0	
MAY	6	1	4	1	1		5	2	2	1	1	
JUNE	8	7	6	1	0	TOTAL	5	5	6	1	0	TOTAL
	44	35	31	2	2	114	34	25	19	4	1	83

Conclusions

Analysis of data evidences that the ASP implemented consists of **safe and efficient interventions for critically ill patients in ICU** and is **cost-effective for the hospital**. The positive results from ICU can increase conformity from other clinics to the ASP. The stewardship program should quickly expand by monitoring more procedures in our hospital, such as surgical prophylaxis or use of antifungal pharmacotherapy.

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