Antimicrobial Resistance of Enterobacteriaceae at a Colombian Orinoquía Hospital

Pérez N, Pavas N, Molina N y Rodríguez EI.
Intensive Care Unit & Microbiology Laboratory, Villavicencio State Hospital
Grupo de Investigación de Villavicencio (Villavicencio Research Group) - GRIVI

Introduction

Bacterial resistance to antimicrobials has been reported to be raising in several hospitals in our country and overseas for Gram negative enteric bacteria. The level of resistance has no been described yet neither the frequency of ESBL (extended spectrum betalactamases) at our institution or the orinoquian region. It favors the adoption of foreign guideline treatments believing they will work likewise in here. We designed a retrospective, non randomized cohort study with the records of the microbiology laboratory from September 2005 to may 2006 for Escherichia coli and Klebsiella, analyzing the difference of resistance patterns and the presence of ESBL between ICU, ambulatory and non ICU wards. 30% of the microbiology samples were positive finding 438 for the studied bacteria. We found good sensitivity for Amikacina and carbapenem but high resistance to frequently used antimicrobials such Ampicillin, Ampicillin/Sulbactam, Cephalotin, Ciprofloxacin, Gentamycin and Trimetoprim/Sulfa. Although 3rd generation cephalosporin resistance was less than reported in other cities of the country, there was a difference on ESBL between the wards. This is the first report of the resistance bacterial patterns at Colombian orinoquía and it will be useful for the development of prophylaxis and infection treatment guidelines. The objective of the study was to identify and compare the antimicrobial resistance patterns of E. coli and Klebsiella at our hospital.

Methods and Materials

Design: consecutive, retrospective, non symmetric, non randomized cohort.
Setting: High level Colombian orinoquía hospital.
Subjects: 438 bacterial isolation of lactose fermenting enterobacteriaceae (Escherichia coli & Klebsiella) but non Proteus, from hospitalized (ICU and general wards) and ambulatory patients from September 2005 to may 2006.
Measurements: Two identification techniques were used during this period, automatization (Vitek®, Biomerieux) and Kirby-Bauer
Measurement: The main outcome was the presence of ESBL or a phenotypic pattern by 3rd generation cephalosporins resistance (Cefotaxime or Ceftazidime).

	RESISTENTE								
E. coli	UCI			NO UCI			C EXT		
	N	n	%	N	n	%	N	n	%
AMK	24	0	0.0	288	4	1.4	113	4	3.5
AMP	18	10	55.6	245	172	70.2	93	59	63.4
SAM	18	3	16.7	245	62	25.3	93	26	28.0
CEF	24	12	50.0	286	99	34.6	112	42	37.5
CAZ	24	0	0.0	283	3	1.1	111	3	2.7
CTX	24	0	0.0	284	12	4.2	112	4	3.6
CIP	24	10	41.7	295	101	34.2	113	50	44.2
GEN	24	8	33.3	295	49	16.6	113	17	15.0
SXT	24	10	41.7	293	181	61.8	113	65	57.5
TZP	23	1	4.3	272	10	3.7	100	7	7.0
IMI	24	0	0.0	289	1	0.3	113	0	0.0
MEM	23	0	0.0	266	2	0.8	113	0	0.0
BLEE	15	1	6.7	198	13	6.6	92	13	14.1

Table 1. # of resistant isolations of E. coli by type of ward.

	RESISTENTE								
Klebsiella	UCI			NO UCI			C EXT		
	N	n	%	N	n	%	N	n	%
AMK	16	0	0.0	24	7	29.2	23	4	17.4
AMP	14	14	100.0	71	68	95.8	18	18	100.0
SAM	14	2	14.3	71	23	32.4	18	7	38.9
CEF	17	3	17.6	71	23	32.4	23	3	13.0
CAZ	16	1	6.3	90	19	21.1	23	3	13.0
CTX	16	1	6.3	90	8	8.9	23	0	0.0
CIP	17	0	0.0	92	23	25.0	23	3	13.0
GEN	17	0	0.0	92	18	19.6	23	6	26.1
SXT	16	5	31.3	91	36	39.6	23	7	30.4
TZP	17	2	11.8	83	13	15.7	21	2	9.5
IMI	17	0	0.0	92	1	1.1	23	0	0.0
MEM	15	0	0.0	83	1	1.2	20	0	0.0
BLEE	9	1	11.1	60	13	21.7	17	4	23.5

Table 2. # of resistant isolations of Klebsiella by type of ward.

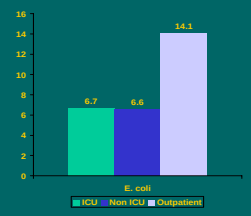

Figure 1.a E. coli

Results

4058 samples were processed and 30% of them were positive. 438 E. coli and 132 Klebsiella were isolated. 6, 20 and 74% of the isolations were from ICU, ambulatory and general ward respectively. There was low Amikacine and carbapenem resistance at every ward and it was high for Ampicillin, Sulbactam/Ampicillin, Cephalotine, Fluoroquinolone, Gentamycin and Trimethoprim-Sulfamethoxazole. Surprisingly, there seems to be more isolations of resistant bacteria and ESBL from the outpatient for both E. coli and Klebsiella. There was significance ($p<0.05$), although the IC_{95} is too wide and crosses number 1, but it demonstrate the need of a higher sample within the groups.

Conclusions

We observed different resistance patterns between wards with less ESBL at ICU, which differs from most reports, probably because there is a policy of antimicrobial which is not applied in other wards or for the outpatient. Although the frequency of ESBL is still low considering other reports at the country and overseas, there is high resistance to fluoroquinolones even for the ambulatory patient.

We found our null hypothesis was false and the alternative hypothesis was true, proving there are differences for the patterns of bacterial antimicrobial resistance between these type of wards. This was an exploratory trial and there are some limitations for the final conclusions and further trials would have to differentiate health or community acquired, type of infection, type of sample and risk factors. Our recommendation is to make more efforts by administrative, clinical and laboratory staff, for microbiological surveillance at every hospital in order to understand differences of their behavior in our institutions compared to what has already been published.

	BLEE				p	OR	IC 95%	
		N	n	%			min	max
E coli	UCI	15	1	6.7				
	No UCI	198	13	6.6	<0.01	0.98	0.12	8.08
	C EXT	92	13	14.1	<0.01	2.3	0.28	19.04
Klebsiella	UCI	9	1	11.1				
	No UCI	60	13	21.7	< 0.05	2.21	0.25	19.34
	C EXT	17	4	23.5	< 0.05	2.46	0.23	26.11

Table 3. Type of ward and ESBL.

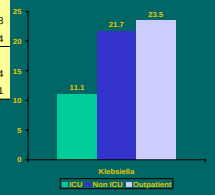

Figure 1.b Klebsiella

References

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