

TRENDS OF THE SPECIES AND ANTIMICROBIAL SUSCEPTIBILITIES OF MICROORGANISMS ISOLATED FROM BLOOD CULTURE OF PATIENTS

Hyun Young Chi, Dae Seop Woen, Se Youn Kim, Young Sook Cho

Department of Microbiology, Samkwang Medical Laboratories, Seoul, Korea

Backgrounds

The isolated microorganisms from blood culture and resistance pattern of microorganisms to antimicrobial agents are influenced with time, area and circumstances of each hospital. For this reasons, we analyzed how frequently microorganisms are isolated and researched into the antimicrobial susceptibility trend at a commercial laboratory in 2005-2007.

Methods

We cultured 46,157 blood specimens (44,757 of patients) by ordinary manual procedure with tryptic soy broth and thioglycollate broth from Jan/2005 to Dec/2007 by request. Identification of the isolated microorganisms were performed with Vitek system (bioMerieux Vitek Inc., SA, Marcy-1'Etoile, France) and when necessary API 20NE, API 20E were used. Test of antimicrobial susceptibility which is based on Clinical and Laboratory Standards Institute (CLSI) guideline was analyzed using either disc diffusion method or Minimal Inhibitory Concentration (MIC) from Vitek system.

Results

The positive rate of specimens and patients were 8.4%/5.7% in 2005, 10.3%/7.6% in 2006, 11.2%/8.3% in 2007 respectively and they were seemed to be increasing. The overall positive rate of 10.3% of specimens 7.4% of patients was found for 3 years (**Table1**), and among them all, 99.7% were aerobics and facultative anaerobics, 0.3%(12cases) were anaerobics, 1case of fungus was isolated as well as *CNS*. *E. coli*, *S. aureus* *K. pneumoniae*, *A. baumannii*, *P. aeruginosa*, *E. fecalis* were isolated in the order named (**Table2&3**).

The positive rate for each administrative district were 17.3% in Gangwon-Do, 15.4% in Jeolla-Do, 10.6% in Chungcheong-Do, 9.5% in capital area and 9.4% in Gyeongsang-Do(**Table4**).

The Prevalence of Methicillin-resistant *S. aureus*(MR-SA) was 70.7% in 2005, 66.5% in 2006 and 60.3% in 2007. There was no great difference in frequency of isolated microorganisms with patients' age and *CNS* isolation rate was higher in hospitals but no striking differences in isolated microorganisms were found between hospitals and clinics.

Ceftazidime-resistant *E. coli* and Cefotaxime-resistant *K. pneumoniae* seemed to be on the increase, meanwhile Imipenem-resistant *P. aeruginosa* and *A. baumannii* seemed to be on the decrease.

Vancomycin-resistant *E. fecalis* was not detected in 2005, but 16.1% in 2006 and 13.3% in 2007 were isolated(**Figure2**).

Conclusion

We had expected that it would be meaningful to analyze blood culture results and trends of antimicrobial susceptibility since it was possible to be conducted on a nationwide level and also taking into account the various scales of hospitals.

The positive rate of blood culture and isolated microorganisms have no great difference from other reports but some correlations between high positive rate and high proportion of elderly group, in Gangwon-Do and Jeolla-Do, who has increasing infection rate are quite considerable (**Figure1**).

Henceforth, we are convinced that we can help clinicians make a right decision for antimicrobials by extending study period and providing various formats for the analyzed data.

Table 1. The positive rate of blood culture during 2005~2007

	Total		2005		2006		2007	
	I	P	I	P	I	P	I	P
Total(N)	46157	44757	11038	10717	15287	14829	19832	19211
No Growth(N)	41428	41428	10106	10106	13709	13709	17613	17613
Growth(N)	4729	3329	932	611	1578	1120	2219	1595
Growth(%)	10.25	7.43	8.44	5.70	10.32	7.55	11.19	8.30

Table 3. Annual isolation of relatively common species of bacteria during 2005~2007

Organism	Total(N)	2005	2006	2007
<i>Coagulase Negative Staphylococcus</i> .	890	152	295	443
<i>Escherichia coli</i> .	575	127	194	254
<i>Staphylococcus aureus</i> .	449	83	138	228
<i>Klebsiella pneumoniae</i> .	185	34	63	88
Gram positive bacilli(Unidentification).	150	0	44	106
<i>Acinetobacter baumannii</i> .	119	21	47	51
<i>Pseudomonas aeruginosa</i> .	111	28	38	45
<i>Enterococcus faecalis</i> .	76	16	22	38
<i>Enterobacter cloacae</i> .	58	5	27	26
<i>Enterococcus faecium</i> .	55	16	18	21

Table 4. Relatively common species of bacteria isolated by administrative district of hospital

Organism	Total (N)	Capital area	Gangwon	Chungcheung	Jeolla	Gyeong sang
<i>Coagulase Negative Staphylococcus</i> .	1077	216	49	125	298	389
<i>Escherichia coli</i> .	837	152	9	122	149	405
<i>Staphylococcus aureus</i> .	691	199	41	68	147	236
<i>Klebsiella pneumoniae</i> .	295	62	7	27	45	154
<i>Acinetobacter baumannii</i> .	203	67	8	10	31	87
<i>Pseudomonas aeruginosa</i> .	191	77	6	4	18	86
Gram positive bacilli(Unidentification).	178	41	8	44	49	36
<i>Enterococcus faecalis</i> .	128	49	0	17	21	41
<i>Enterococcus faecium</i> .	91	20	1	8	22	40
<i>Enterobacter cloacae</i> .	82	13	2	7	7	53

Table 2. Microorganisms isolated from blood during 2005~2007

Organism	Total Isolates (N)	Total Patients (N)	2005		2006		2007	
			I	P	I	P	I	P
CNS	1089	903	187	154	362	298	540	448
Gram positive cocci								
<i>Staphylococcus aureus</i>	691	449	140	83	206	138	345	228
Other	408	263	96	55	120	86	192	122
Gram positive bacilli	300	244	22	20	129	102	149	122
Enterobacteriaceae	1507	993	337	209	518	340	652	444
Gram negative bacilli								
GNF	660	422	136	79	216	138	308	205
Other	61	45	8	5	23	16	30	24
Fungi	1	1	0	0	0	0	1	1
Anaerobe	12	9	6	6	4	2	2	1
Total	4729	3329	932	611	1578	1120	2219	1595

Figure 1. The age distribution pattern in each administrative district

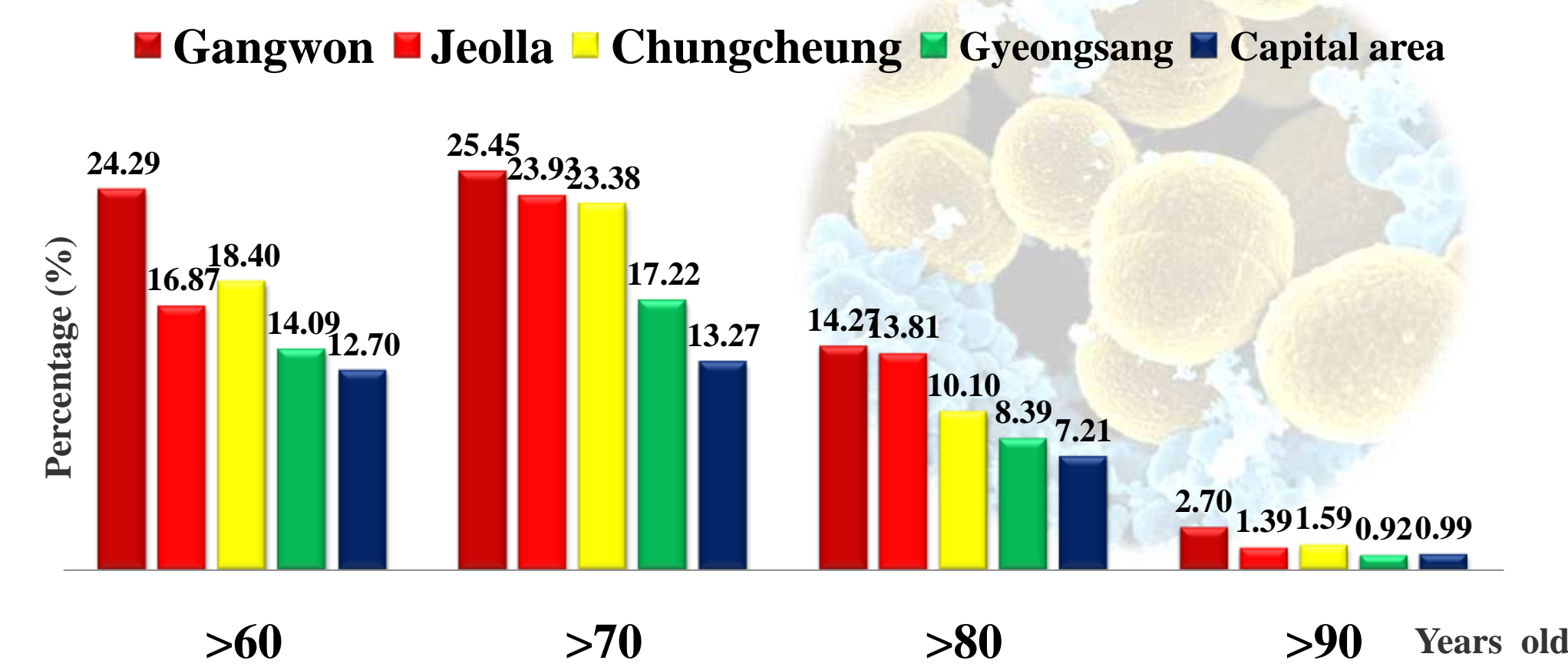


Figure 2. Trend of resistance of *S. aureus*, *E. facium*, *S. pneumoniae*, *E. coli*, *K. pneuminae*, *P. aeruginosa* and *A. baumannii* to antimicrobial agents by year

