

= Abstract =

Use of Antimicrobial Agents for the Treatment of Inpatients in  
Chonbuk National University Hospital

Jae Ho Song, M.D. and Jung Soo Kim, M.D.

*Department of Pediatrics, Chonbuk National University Hospital, Chonju, Korea*

**Purpose :** The use antimicrobial agents is one of the important strategies for the treatment and prophylaxis of microbial infections. But injudicious abuse and misuse of antimicrobial agents is problem to add an extra weight on medical fee, increase of resistant bacteria and side effects according to the antibiotic use. This study was performed to establish the pertinent use of antimicrobial agent in Chonbuk National University Hospital(CNUH). Characteristics of antibiotics use was analysis by reviewing the medical records of patients admitted to CNUH during the period of May 1998.

**Methods :** One thousand eight hundred and thirty three patients were enrolled in this study (medical division 1,014 cases, surgical division 819 cases). Medical records were retrospectively reviewed to classify the rate of antibiotics use, name of antibiotics used, appropriateness of antibiotics use.

**Results :** The overall rate of antibiotic usage in CNUH was 67.2%(1,231/1,833), showing higher rate in surgical division(89.6%) compare to that of medical division(49.0%). Among 1,231 patients to whom antimicrobial agents were given, only 125(10.2%) were treated with single antimicrobial agents. 311(25.3%) were treated with two antimicrobial agents, and 795(64.5%) patients received 3 or more antibiotics.  $\beta$ -lactams(56.4%) were most frequently used followed by aminoglycosides(35.3%), the others(4.9%) and quinolons(3.4%). Amoxicillin-clavulanate was the mostly commonly used antibiotics followed by amoxicillin and unasin. Prophylactic use of antibiotics was carried in seven hundred six patients(57.4%), mostly in surgical division, which can be considered somewhat inappropriate in the initiation time and duration of antibiotic use.

**Conclusion :** Importance of monotherapy and appropriate prophylactic antibiotic use should be emphasized. Strategies of antibiotics use, such as restriction of drug use, continuous monitoring system, flow sheet system should be considered to reduce antibiotics use and establish the appropriate use of antibiotics as well as inhibiting the occurrence of resistant strains.

**Key Words :** Antimicrobial agents



734 (89.6%)

41.9%

59.9%, 19.1%, 40.0%,

50.0%, 5.3%

81.6%

93.1%, 98.4%, 77.3%,

93.0%, 88.5%,

89.1%, 90.5%,

clean, clean-con- 100.0% (Table 1).

taminated wound 가 1,231 706

(57.4%) , 525 (42.6%)

78 (15.7%)

, 419 (84.3%)

1,833 628 (85.6%)

1,231 67.2% , 106 (14.4%)

602 32.8%

1,014 497

(49.0%) , 819 72.5% , 25%,

Table 2. Distribution of Patients According to the Purpose of Antibiotics Use

	No. of Subjects	Purpose	
		Prevention(%)	Treatment(%)
Medical Department	497	78( 15.7)	419(84.3)
Internal Medicine	182	50( 27.5)	132(72.5)
Pediatrics	296	21( 7.0)	275(93.0)
Neurology	9	3( 33.3)	6(66.7)
Rehabilitation Medicine	4	2( 50.0)	2(50.0)
Psychiatry	1	1(100.0)	0( 0.0)
Dermatology	5	1( 20.0)	4(80.0)
Surgical Department	734	628( 85.6)	106(14.4)
Urology	40	34( 85.0)	6(15.0)
Obstetrics & Gynecology	201	192( 95.5)	9( 4.5)
Plastic & Reconstructive Surgery	62	51( 82.3)	11(17.7)
Neurosurgery	51	45( 88.2)	6(11.8)
Ophthalmology	40	39( 97.5)	1( 2.5)
Otorhinolaryngology	77	69( 89.6)	8(10.4)
General Surgery	115	75( 65.2)	40(34.8)
Orthopedic Surgery	98	89( 90.8)	9( 9.2)
Oral Surgery	31	21( 67.7)	10(32.3)
Thoracic & Cardiovascular Surgery	19	13( 68.4)	6(31.6)
Total	1,231	706( 57.4)	525(42.6)

66.7%, 50.0%, 100.0%, 13가 .  
 80.0% . -lactams,  
 32.3% , aminoglycosides, quinolones  
 15.0%, 4.5% .  
 11.8%, 2.5%, 10.4%, -lactams  
 34.8%, 9.2%, 57.0%, aminoglycosides 34.5%, quinolones 3.6%  
 31.6% (Table 2). 4.9% , -lactams aminogly-  
 cosides가 가 . -lactams pen-  
 icillin cephalosporin . Penicillin  
 augmentin<sup>®</sup> 56.1% 가 , amoxicillin  
 (18.1%) . penicillin pipe-  
 racillin, urbacillin, kedacillin . Ce-  
 phalosporin 2 cephalosporin 50.4%  
 가 1 가 36.7%, 3 가  
 12.9% . 2 cephalosporin cefuroxim  
 41.8% 가 , 1 cephalosporin cef-  
 tezole 51.7% 가 , 3 cephalosporin  
 ceftriaxone 36.7% 가 .  
 Aminoglycosides tobramycin 33.7% 가

Table 3. Status of Antibiotics Use According to the Departments

	No. of Antibiotics(%)					Total
	One	Two	Three	Four	>Five	
Medical Department	54(10.9)	178(35.8)	177(35.7)	44( 8.8)	44(8.8)	497
Internal Medicine	21	55	55	26	25	182
Pediatrics	24	120	116	18	18	296
Neurology	1	3	5	0	0	9
Rehabilitation Medicine	3	0	1	0	0	4
Psychiatry	1	0	0	0	0	1
Dermatology	4	0	0	0	1	5
Surgical Department	71( 9.7)	133(18.1)	385(52.5)	88(12.0)	57(7.7)	734
Urology	4	9	21	5	1	40
Obstetrics & Gynecology	51	33	102	11	4	201
Plastic & Reconstructive Surgery	3	10	35	7	7	62
Neurosurgery	5	15	17	12	2	51
Ophthalmology	1	8	30	1	0	40
Otorhinolaryngology	4	10	43	15	5	77
General Surgery	2	26	45	19	23	115
Orthopedic Surgery	1	11	61	14	11	98
Oral Surgery	0	5	25	0	1	31
Thoracic & Cardiovascular Surgery	0	6	6	4	3	19
Total	125(10.2)	311(25.3)	562(45.7)	132(10.6)	101(8.2)	1,231

Table 4. Preference of Antibiotics According to the Departments

		Department		Total n=1,231
		Medical Dep. n=497	Surgical Dep. n=734	
Penicillin	AMXCCV	255(51.3)	89(12.1)	344(27.9)
	AMCSB	10( 2.0)	62( 8.4)	72( 5.8)
	AMXC	69(13.9)	42( 5.7)	111( 9.0)
	Others	18( 3.6)	68( 9.3)	86( 7.0)
1 <sup>st</sup> generation cephalosporin	CTZL	39( 7.8)	199(27.1)	238(19.3)
	CRDN	0( 0.0)	169(23.0)	169(13.7)
	Others	34( 6.8)	19( 2.6)	53( 4.3)
2 <sup>nd</sup> generation cephalosporin	CTAM	11( 2.2)	159(21.7)	170(13.8)
	CRXM	68(13.7)	196(26.7)	264(21.4)
	CRND	20( 4.0)	65( 8.9)	85( 6.9)
	CFOX	5( 1.0)	107(14.6)	112( 9.1)
3 <sup>rd</sup> generation cephalosporin	CTRX	47( 9.5)	14( 1.9)	61( 5.0)
	CPRD	8( 1.6)	34( 4.6)	42( 3.4)
	Others	34( 6.8)	24( 3.3)	58( 4.7)
Aminoglycoside	TOB	137(27.6)	244(33.2)	381(31.0)
	MCR	9( 1.8)	170(14.5)	179(23.2)
	GM	213(42.9)	11( 1.5)	224(18.2)
	AMK	106(21.3)	47( 6.4)	153(12.4)
	NET	6( 1.2)	228(31.1)	234(19.0)

AMXCCV; amoxicillin/clavulanic acid, AMCSB; ampicillin/sulbactam, AMXC; amoxicillin, CTZL; ceftazolidime, CRDN; cephadrine, CTAM; cefotiam, CRXM; cefuroxime, CRND; ceforanide, CFOX; cefoxitin, CTRX; ceftriaxone, CPRD; cefpimizole, TOB; tobramycin, MCR; micromicin, GM; gentamicin, AMK; amikacin, NET; netilmicin

netilmicin, gentamicin  
20% , micromicin, amikacin  
. Quinolones enoxacin, ciprofloxacin  
aminoglyco-  
sides tobramycin 가  
cephalosporin, penicillin , 가 가  
quinolones, macrolides, metronidazole,  
cephalosporin, 2 cephalos-  
porin 가 aminoglycosides, pen-  
icillin quinolones,  
metronidazole, fosfomycin . 가 가

1, 6, 16)

가

가

가

(latex agglu-

tination, )  
 (PCR, DNA probe)  
 가  
 1940 penicillin<sup>1)</sup>  
 가  
 4  
 4, 6, 19)  
 -lactam , amino-  
 glycoside , quinolone  
 -lactams -lactam  
 peptidoglycan cross-linking  
 penicil-  
 lin , cephalosporin , monobactam , carbapenem  
 , carbacephem 가  
 Penicillin  
 Ampicillin broad-spectrum  
*E. Coli* 가  
 penicillin , *En-*  
*terococcus*, *L. monocytogenes*  
 7, 16)  
 Cephalosporin penicillin  
 가  
 1 4  
 1  
 cephalosporin surgical prophylaxis  
 2 3  
 cephalosporin ,  
 surgical prophylaxis 60%  
 3 cephalosporin community-acquired  
 CNS infection, multi-drug resistant salmonella  
 , community-acquired aerobic GNB infection  
 home IV therapy 4 cephalo-

sporin 3 가<sup>1, 9, 10)</sup>  
 Aminoglycosides  
 . 1944 streptomycin  
 15 , streptomycin kanamy-  
 cin  
 gentamicin, tobramycin,  
 amikacin, micromomicin  
 . Aminoglycosides 가  
 lactam glycopeptide  
 aminoglycoside  
 1, 11, 12)  
 Quinolones  
 fluoro-  
 quinolone 가 , *S. aureus* *P.*  
*aeruginosa*  
 가 가  
 8, 13, 14)  
 Glycopeptide MRSA -lactam  
 vancomycin, teico-  
 planin<sup>15)</sup>  
 67.2%  
 49.0%  
 60%  
 가  
 가 (89.6%)  
 가 , 가



%) , 525 (42.6%)

1,231 1가 125  
 (10.2%) , 2가 311  
 (25.3%), 3가 562 (45.6%), 4가  
 233 (18.9%) , 70%

3가 가

-lactam, aminoglyco-  
 side, quinolone, macrolide, , metronidazole,  
 clindamycin, trimethoprim-sulfamethoxazole, glycopep-  
 tide, fosfomycin

-lactam 57.0%,  
 aminoglycoside 34.5%, quinolone 3.6%  
 4.9% , -lactam aminoglycoside가  
 가

: 2가

- 1) 1995;38:596-602.
- 2) Schwarz. Principle of surgery 7th edition, vol. 1 1999;123:153.
- 3) Anonymous. Antimicrobial prophylaxis in surgery. Med Lett 1995;37:39.
- 4) Anonymous. The choice of antibacterial drugs. Med Lett 1996;38:25.
- 5) Platt R, Kaiser AB(eds). International symposium on perioperative antibiotic prophylaxis. Rev

Infect Dis 1991;13:S779.

- 6) Stanford JP, Gilbert DN, et al. Guide to anti-microbial therapy, 1994.
- 7) Donowitz GR, Mandell GL. Beta-lactam anti-biotics. N Engl J Med 1988;319:419.
- 8) Neu HC. An update on fluoroquinolones. Current Opin in Inf Dis 1992;5:755.
- 9) . New cephalosporins. 1994;12:5.
- 10) Margaret C. Fisher : Infection control and prophylaxis. In : Behrman, et al. Nelson Textbook of Pediatrics 16th ed. p1089:1092, Philadelphia, Pennsylvania, 2000.
- 11) , . 1989;32:595.
- 12) Lortholary O, Tod M, Cohen Y, petijean O. Aminoglycosides. Med Clin North Am 1995;79:761.
- 13) AA Alghasham and MC Nahata. Trovafloxacin : A New Fluoroquinolone Ann Pharmacother 1999;33:48-60.
- 14) EJ Goldstein. Possible role for the new fluoro-quinolones(levofloxacin, grepafloxacin, trovafloxacin, clinafloxacin, sparfloxacin, and DU-6859a) in the treatment of anaerobic infections : Review of current information on efficacy and safety. Clin Infect Dis 1996;23(Suppl 1):S25-30.
- 15) Fekety R. Vancomycin and Teicoplanin, In : Mandell GS, Bennett JE, Dolin R. Principles and practice of infectious disease. 4th ed, New York, Churchill Livingstone, 1995, p346-54.
- 16) Greenwood D. Antimicrobial chemotherapy; General principles of the treatment of infection. Oxford univ. press, 1995:179-87.
- 17) Goldmann DA, Weinstein RA, Wenzel TP, et al. Strategies to prevent and control the emergence and spread of antimicrobial-resistant microorganisms in hospital. JAMA 1996;275:234-40.
- 18) Schillossberg D. Current therapy of infectious disease. Mosby-Year Book, Inc. 1996:605-8.
- 19) . 1997;40:678-89.