References

Alexander, M.R. , Berglund, B.C., Kasik, J.E., Fox, A. and Chinn, W.M. 1979. The concentration of tobramycin in bronchial secretions. Chest . 75 : 675 - 678.

Barclay, M.L., Duffull, S.B., Begg, E.J., and Buttimore, R.C. 1995. Experience of once-daily aminoglycoside dosing using a target area under the concentration-time curve. Aust. NZ. J. Med. 25 : 230 - 235 .

Begg, E.J.,et al.1989. Individualised aminoglycoside dosing based on pharmacokinetic analysis is superior to dosage based on physician intuition at achieving target plasma drug concentrations. Br. J. Clin. Pharmac. 28 : 137 - 141.

Begg, E.J., et al. 1992. Comparison of gentamicin dosing regimens using an in vitro model. J. Antimicrob.Chemother. 29 : 427 - 433.

Begg, E.J.,et al.1995. A suggested approach to once-daily aminoglycoside dosing.. Br. J. Clin.Pharmac. 39 : 605 - 609.

Blaser, J. , et al . 1987. Comparative study with enoxacin and netilmicin in a pharmacodynamic model to determine importance of ratio of antibiotic peak concentration to MIC for bactericidal activity and emergence of resistance. Antimicrob. Agents Chemother. 31 : 1054 - 60.

Blaser, J. , Konig, C. , Simmen, H. , and Thurnheer, U. 1994 . Monitoring serum concentrations for once-daily netilmicin dosing regimens . J. Antimicrob. Chemother. 33 : 341 - 348 .

Burton, M.E., Vasko, M.R. and Brater, D.C.1985. Comparison of drug dosing methods. Clin.Pharmacokinet. 10 : 1 - 37.

Craig, W.A., et. al.1991. Pharmacodynamics of amikacin in vitro and in mouse thigh and lung infections. J. Antimicrob. Chemother. 27 suppl. c : 29 - 40.

Daikos,G.L., Jackson,G.G., Lolans,V.T., and Livermore,D.M. 1990. Adaptive resistance

to aminoglycoside antibiotics from fisrt-exposure down regulation. J. Infect. Dis.162 : 414 - 420.

Daikos, G.L.1991. Continuous versus discontinuous antibiotic therapy : the role of post antibiotic effect and other factors. J. Antimicrob. Chemother. 27 : 157-167.

De Broe, M.E., Guilliano, R.A., and Verpooten, G.A. 1986. Choice of drug and dosage regimen : two important risk factors for aminoglycoside nephrotoxicity. Am. J. Med. 80 (suppl. 6B) : 115 - 118.

Dudley, M.N., and Zinner, S.H. 1991. Single daily dosing of amikacin in an in vitro model. J. Antimicrob.Chemother. 27 (suppl. C) : 15 - 19.

Dull, W.L., Alexander, M.R. and Kasik, J.E. 1979 . Bronchial secretion levels of amikacin. Antimicrob Agents Chemother. 16 : 767 - 771.

Erdman, S.M. , Rodvold, K.A., and Pryka, R.D.1991. An updated comparison of drug dosing methods part III : aminoglycoside antibiotics. Clin. Pharmacokinet. 20 : 374 - 388.

Evan,W.E.,et al.1986.Applied Pharmacokinetics principle of therapeutic drug monitoring 2nd ed. Washington : Applied Therapeutic Inc.

Fan , S.T., et al.1988. Once-daily administration of netilmicin compared with thrice daily , both in combination with metronidazole in gangrenous and perforated appendicitis. J. Antimicrob.Chemother. 22 : 69 - 74.

Flick, M.R. and Cluff, L.E. 1976. Pseudomonas bacteremia : review of 108 cases. Am. J. Med. 60 : 501 - 508.

Francoli, P., Ruch, W., Stamboulian, D. and The international Infective Endocarditis Study group. 1995. Treatment of streptococcal endocarditis with a single daily dose of ceftriaxone and netilmicin for 14 days : a prospective multicenter study. Clinical Infect. Dis. 21 : 1406 - 1410.

Giamaellou,H.,et al.1991.Comparative kinetics and efficacy of amikacin administered once or twice daily in the treatment of systemic gram-negative infections. J. Antimicrob.Chemother. 27(suppl. C) : 73 - 79.

Gilbert , D.N. 1991. Once-daily aminoglycoside therapy. Antimicrob Agents Chemother. 35 : 399 - 405.

Gilbert, D.N. 1995. Aminoglycosides. In G.L. Mandell ; J.E. Bennette ; and R. Dolin (eds.) Principles and practice of infectious diseases, pp. 279 - 306. New York : Churchill livingston.

Giuliano, R.A., Verpooten, G.A., Verbist, L., Wedeen, R.P., and De Broe, M.E. 1986. In vivo uptake kinetics of aminoglycosides in the kidney cortex of rats. J. Pharmacol. Exp. Ther. 236 : 470 - 475.

Gyselynck, A.M., Forrey, A.,and Cutler, R. 1971. Pharmacokinetics of gentamicin : distribution and renal clearance. J. Infect. Dis. 24(Suppl.): S70-S76.

Hollender, L.F., et al. 1989. A multicentric study of netilmicin once daily versus thrice daily in patients with appendicitis and other intra-abdominal infections. J. Antimicrob.Chemother. 23 : 773 - 783.

Hull, J.H., and Sarubbi, F.A. 1976. Gentamicin serum concentrations : pharmacokinetic predictions. Ann. Intern. Med. 85 : 183 - 189.

John, J.F.1988. What price success? the continued sega of the toxic therapeutic ratio in the use of aminoglycoside antibiotics. J Infect. Dis. 158 : 1 - 6.

Konrad, F., Wagner, R., Neumeister, B., Rommel, H., and Georgieff, M. 1993. Studies on drug monitoring in thrice and once daily treatment with aminoglycosides. Int. Care. Med. 19 : 215 - 220.

Koo, J., et al.1996. Comparison of once-daily versus pharmacokinetic dosing of aminoglycosides in elderly patients. Am. J. Med. 101 : 177 - 183.

Korvick, J.A. , and Yu, V.L.1991. Antimicrobial agents therapy for psuedomonas aeruginosa. Antimicrob Agents Chemother. 35 :2167 - 2172.

Lietman, P.S. 1990. Aminoglycosides and spectinomycin : aminocyclitols. In G.L. Mandell; J.E. Bennette ; and R. Dolin.(eds.). Principles and practice of infection diseases, pp. 269 - 84. Edinburgh : Churchill livingston.

MacGowan, A.P., et al. 1994. The pharmacokinetics of once-daily gentamicin in neutropenic adults with haematological malignancy. J. Antimicrob.Chemother. 34 : 809 - 812.

Maller, R. ,et al. 1988. A study of amikacin given once versus twice daily in serious infections. J. Antimicrob.Chemother. 22 : 75 - 79.

Marra, F., Parton, N., and Jewesson, P. 1996. Aminoglycoside administration as a single daily dose. Drugs. 52 : 344 - 370.

Moore, R.D., Smith, C.R., and Lietman, P.S.1984 . Association of aminoglycoside plasma levels with therapeutic outcome in Gram-negative pneumonia. Am. J. Med. 77 : 657 - 662.

Moore, R.D., Smith, C.R., and Lietman, P.S.1984. The association of aminoglycoside plasma levels with mortality in patients with Gram-negative bacteremia. J. Infect. Dis. 149 : 443 - 448.

Moore, R.D., Smith, C.R., and Lietman, P.S.1987. Clinical response to aminoglycoside therapy:importance of the ratio of peak concentration. J.Infect. Dis.155:93 - 99.

Nicolau, D.P., et al. 1995. Experience with a once-daily aminoglycoside program administered to 2184 adult patients. J. Antimicrob. Chemother. 39 : 1165-1168.

Nordstrom, L., et al. 1990. Does administration of an aminoglycoside in a single daily dose affect it efficacy and toxicity ? J. Antimicrob. Chemother. 25 : 159 - 173.

Parker, S.E. , and Davy, P.G. 1993. Once-daily aminoglycoside dosing . Lancet . 341 : 346 - 347.

Parry, M.F. and New, H.C. 1978. A comparative study of ticarcillin plus tobramycin versus carbenicillin plus gentamicin for the treatment of seriuos infections due to gram-negative bacilli. Am. J. Med. 64 : 961 - 966.

Prins, J.M., et al. 1993. Once versus thrice daily gentamicin in patients with serious infections. Lancet . 341 : 335 - 339.

Prins, J.M., et al. 1994. Once-daily gentamicin versus once-daily netilmicin in patients with serious infections - a randomized clinical trial. J. Antimicrob.Chemother. 33 : 823 - 835.

Prins, J.M., et al. 1996 . Validation and nephrotoxicity of simplified once-daily aminoglycoside dosing schedule and guidelines for monitoring therapy. Antimicrob Agents Chemother. 40 : 2494 - 2499.

Reeves, D.S. and MacGowan, A.P. 1993. Once- daily aminoglycoside dosing. Lancet. 341 : 895 - 896.

Rescott, D.L., et al. 1988. Comparison of two methods for determining in vitro. postantibiotic effects of three antibiotics on Escherichia coli. Antimicrob. Agents Chemother 32 : 450 - 453.

Rozdzinski, E., et al. 1993. Once-daily versus thrice-daily dosing of netilmicin in combination with β - lactam antibiotics as empirical therapy with febrile neutropenia patients. J. Antimicrob. Chemother. 31 ; 585 - 598.

Sawchuk, R.J., et al . 1977. Kinetic model for gentamicin dosing with the use of individual patient parameters. Clin. Pharmac. Ther. 21 : 362 - 365.

Schumock, G.T., et al. 1995. National survey of once-daily dosing of aminoglycoside antibiotics. Pharmacotherapy. 15 : 201 - 209.

Sturm, A.W. 1989. Netilmicin in the treatment of gram-negative bacteremia : single daily dose versus multiple daily dosage. J. Infect. Dis. 159 : 931 - 937.

Ter Braak, E.W., et al. 1990. Once daily dosing regimen for aminoglycoside plus β - lactam combination therapy of serious bacterial infections:comparative trial with netilmicin plus ceftriaxone. Am. J. Med. 89 : 58 - 66.

Valcke, Y.J., Vogelaers, D.P., Colardyn, F.A., and Pauwels, R.A. 1992. Penetration of netilmicin in the lower respiratory tract after once-daily dosing. Chest. 101 : 1028 - 1032.

Vigano, A., et al. 1992. Comparison of 5 milligrams of netilmicin per kilogram of body weight versus 2 milligrams per kilogram thrice daily for treatment of gram-negative pyelonephritis in children. Antimicrob. Agents Chemother. 36 : 1499 - 1503.

Viscoli,C. , et al. 1991. Serum concentrations and safety of single daily dosing of amikacin in children undergoing bonemarrow transplantation. J. Antimicrob. Antimicrob.Chemother. 27(Suppl.C) : 113 - 120.

Vogelman, B.S., et al. 1988 . In vivo. postantibiotic effect in a thigh infection in neutropenia mice. J. Infect. Dis. 157 : 287 - 298.

Vogelman, B.S., and Craig, W.A. 1985. Postantibiotic effect. J. Antimicrob. Chemother. 15 : 37 - 46.

Wang, G.A., Peirce, T.H. , Goldstein, E. and Haeprich, P.P. 1975. Penetration of antimicrobial agents into bronchial secretions. Am. J. Med. 59 : 219 - 223.

Wenk,M., Vozeh,S., and Follath,F. 1984. Serum level monitoring of antibacterial drugs Clin. Pharmacokinet. 9 : 475 - 492.

Winter, M.E. 1994. Basic Clinical Pharmacokinetics 3rd ed. Washington : Applied Therapeutic Inc.

Zaske, D.E., et al. 1982. Gentamicin pharmacokinetics in 1640 patients : method for control of serum concentration. Antimicrob. Agents Chemother .21: 407 - 411.

Zhanel, C.G., and Criag, W.A. 1994. Pharmacokinetic contributions to postantibiotic effects: focus on aminoglycosides. Clin. Pharmacokinet. 27(5) : 377 - 392.

Appendix

Equations for calculated pharmacokinetic parameter.

1. $Kd = \frac{\ln Cp1/Cp2}{\Delta t}$

2. $T1/2 = \frac{0.693}{Kd}$

3. If $t_{in} \times 6 \leq$ T1/2 rearranged bolus model to revise for Vd and then Cl.

$$Vd = \frac{(Dose/Cpsst)\, e^{-kt}}{1 - e^{-k\tau}}$$

$$Cl = Kd \times Vd$$

If $t_{in} \times 6 >$ T1/2 rearranged short infusion model to revise Cl and then Vd

$$Cl = \frac{\frac{Dose}{Cpsst}(1 - e^{-ktin})\, e^{-kt}}{1 - e^{-k\tau}}$$

$$Vd = Cl / Kd$$

Note : Cp1 = serum concentration of the first post-infusion sample (mg/L)

Cp2 = serum concentration of the second post-infusion sample (mg/L)

Cpsst = serum concentration in steady state at t

Cl. = clearance (L/hr.)

Kd = elimination rate constant (per hour)

t = time from the start of the infusion to the time of Cpsst (hr.)

Δt = t2 - t1 (hr.)

t_{in} = infusion duration (hr.)

T1/2 = half-life (hr.)

τ = dosing interval (hr.)

Vd = volume of distribution (L.)

Vita

Miss Nantaka Suntivisut was born on April 14th , 1968 , in Bangkok , Thailand. She earned her Bacherlor Degree in Pharmaceutical Sciences in 1991 from the Faculty of Pharmaceutical Sciences ,Chulalongkorn University. Her current position is a pharmacist in the Department of Pharmacy , Rajavithi Hospital , Bangkok , Thailand.