REFERENCES

1. ศรีสง่า สาริภูติ. การใช้ยาอย่างถูกต้องในเด็ก. กรุงเทพมหานคร: ดี.แอล.เอส. 2532. หน้า 1,44.
2. Gcloff, S. P. Infection of the neonatal infant. In R. E. Behrman; R. M. Kliegman; and A. M. Arvin (eds.) , Nelson textbook of pediatric.15 th ed. , p. 514 Philadelphia : W.B.Saunders,1996.
3. Fisk, K. L. A review of gentamicin use in neonates. Neonatal Netw. 12(7) (Oct, 1993) : 19-23 ; quis 24-8.
4. Evans, W. E. Gentamicin dosage in children. J Pediatr. 94: (Jan, 1997) : 139-143.
5. McEvoy, G. K. (ed.) Drug information. Wisconsin: American Society of Health - System Pharmacists, 1997. pp. 56-64.
6. สยมพร ศิรินาวิน. การใช้ยาต้านจุลชีพ. กรุงเทพมหานคร: เมดิคัลมีเดีย, 2538. หน้า 5-6.
7. Isemann, B. T. , et al. Optimal gentamicin therapy in preterm neonates includes loading dose and early monitoring. Ther-Drug-Monit. 18 (1996) : 549.
8. Barza, M. ; and Lauermann, M. Why monitor serum levels of gentamicin. Clin Pharmacokinet. 3 (1978) : 202-215.
9. Massey, K. L. ; Hendeles, L. ; and Neims, A. Identification of children for whom routine monitoring of aminoglycoside serum concentrations is not cost effective. J Pediatr. 109 (Nov, 1986) : 897-901.
10. Dahlgren, J. G. ; Anderson, E. T. ; and Hewitt, W. L. Gentamicin blood level: a guide to nephrotoxicity. Antimicrob Agents Chemother. 8 (July, 1975) : 58-62.
11. Radomski, K. M. ; Davis, G. A. ; and Chandler, M. H. H. General versus subpopulation values in Bayesian prediction of aminoglycoside pharmacokinetic in hematology-oncology patients. Am J Health-Syst Pharm. 54 (Mar, 1997) : 541-544.
12. Shevchuk, Y. M. ; and Taylor, D. M. Aminoglycoside volume of distribution in pediatric patients. DICP, Ann Pharmacother. 24 (Mar, 1990) : 273-276.
13. Cos, M. A. , et al. Time course of trough serum gentamicin concentration in Preterm and term neonates. Clin Pharmacokinet. 23(5) (1992) : 391-401.

14. Shahidullah, M. , et al. Serum Levels of gentamicin at peak and trough in neonates and infants. Indian J Pediatr. 58 (1991) : 217-221.

15. Winter, M. E. Aminoglycoside antibiotic . In M. A. Koda-Kimble (ed.) , Basic clinical pharmacokinetic. 3 th. ed., pp.128-176. Washington: Applied Therapeutics, 1994.

16. Noone, P. , et al. Experience in monitoring gentamicin therapy during treatment of serious gram-negative sepsis. B M J. 1 (1974) : 477-481.

17. Prins, G. , et al. Gentamicin monitoring in neonates. Ther-Drug-Monit. 10 (1988) : 421-427.

18. Wersall, J. ; Lundguist, P. G. ; and Bjorkroth, B. Ototoxicity of gentamicin. J Infect Dis. 119 (1969) : 410.

19. Matthews, S. J. Aminoglycoside. ใน เอกสารประกอบการประชุมเชิงปฏิบัติการ ทางเภสัชกรรมคลินิก ครั้งที่ 24 เรื่องเภสัชบำบัดชั้นสูง. 11-15 มีนาคม 2539 ณ.โรงแรมภูริมาศบิศ จ.ระยอง

20. Kumana, C. R. ; and Yuen, K. Y. Parenteral aminoglycoside therapy. Drug. 47(6) (1994) : 902- 913.

21. Klotz, U. ; and Godel, A. Once-daily dosing of gentamicin: Experience with thera - peutic drug monitoring and Bayesian pharmacokinetics. Ther- Drug-Monit. 16 (1994) : 534-535.

22. Powell, S. H. , et al. Once-daily vs continuous aminoglycoside dosing:Efficacy and toxicity in animal and clinical studies of Gentamicin, Netilmicin, and Tobramycin. J Infect Dis. 147(5) (May, 1983) : 918-932.

23. Marra, F. ; Partovi, N. ; and Jewesson, P. Aminoglycoside administration as a single daily dose. Drugs. 52(3) (Sep, 1996) : 344-370.

24. Barclay, M. L. ; Begg, E. J. ; and Hickling, K. G. What is the evidence for once - daily aminoglycoside therapy? Clin Pharmacokinet. 27(1) (1994) : 32-48.

25. Prins, J. M. , et al. Once versus thrice daily gentamicin in patients with serious infections. Lancet. 341 (Feb6, 1993) : 335-339.

26. Nicolau, D. P. , et al. Experience with a once - daily aminoglycoside program administered to 2,184 adult patient. Antimicrob Agents Chemother. 39(3) (Mar, 1995) : 650-655.

27. Schumock, G. T. , et al. National Survey of once - daily dosing of aminoglycoside

antibiotics. Pharmacotherapy. 15(2) (1995) : 201-209.

28. Bates, R .D. ; and Nahata, M. C. Once - daily administration of aminoglycosides. Ann Pharmacother. 28 (June, 1994) : 757-766

29. Gilbert, D. N. Once-daily aminoglycoside therapy. Antimicrob Agents chemother. 35(3) (Mar, 1991) : 399-405.

30. Mattie, H. ; Craig, W. A. ; and Pechere, J. C. Determinants of efficacy and toxicity of aminoglycosides. Antimicrob Chemother. 24 (1989) : 281-293.

31. Gresores, A. , et al. A once - daily gentamicin dosing regimen for neonates ≥ 34 weeks postconceptional. (Abstract 1768). Pediatr Res. 35 (1994) : 297A.

32. Skopnik, H. ; and Heimann, G. Once daily aminoglycoside dosing in full term neonates. Pediatr Infect Dis J. 14(1) (Jan, 1995) : 71-72

33. Hayani, K. C. , et al. Pharmacokinetics of once - daily dosing of gentamicin in neonates. J Pediatr. 131(1) (July, 1997) : 76-80.

34. Chambers, H. F. ; Hadley, K. W. ; and Jawetz, E. Aminoglycosides and Spectinomycin. In B. C. Katzung (ed.), Basic and Clinical Pharmacology. 17 th ed., pp.752 – 757. Connecticut: A simon and schuster, 1998.

35. Rosenkrantz, B. E.; Groeco, J. R.; and Hoogerheide, J. G. Gentamicin In K. Florey (ed.) , Analytical Profiles of Drug Subsutances, pp. 295 – 340. New York : Academic Press, 1980.

36. Gennaro, A. R. Remington:The science and practice of pharmacy.19 th ed. Pennsylvania: Mack Printing, 1995. pp. 1299- 1301

37. Trissel, L. A. Handbook on injectable drugs. 8 th ed., pp. 484 – 494. Wisconsin: American Society of Hospital Pharmacist, 1994

38. Reynolds, J. E. F. Martindale The extra pharmacopoeia. 13 th ed. pp. 169 – 172. Singapore: Royal Pharmaceutical Society of Great Britain, 1994.

39. Olin, B. R. Drug Facts and comparisons. 50 th ed. Missouri: Facts and comparisons, 1996. pp. 2137 – 2148.

40. Chambers, H. F. ; and Sande, M. A. Antimicrobial agents. In J. G. Hardman, A. G. Gilman; and L. E. Limbird (eds.) , Goodman and Gilman' s The Pharmacological basic of therapeutic . 9 th ed., pp. 1103 – 1115. USA: The Mc Graw – Hill, 1996.

41. Dew III, R. B. ; and Susla, G. M. Once–Daily Aminoglycoside treatment. Infection Diseases in clinical practice. 5 , 1 (1998) : 12 – 24.

42. Taketomo, C. K. ; Hodding, J. H. ; and Kraus, D. M. Pediatric dosage handbook 4 th ed. Ohio: Lexi - compinc, 1997. pp. 342 – 344, 881.

43. Zaroevitz, B. J. ; Pilla , A. M. ; and Popovich , J. Expanded gentamicin volume of distribution in patients with indicators of malnutrition. Clin Pharm. 9 (1990) : 40-44.

44. Tointon, M. M. ; Job , M. L. ; Pettier, T. T. ; Murphy, J. E. ; and Ward, E. S. Alteration in aminoglycosdie volume of distribution in patients below ideal body weight. Clin Pharm. 6 (1987) : 160 – 164.

45. Sketris, I. ; Lesar , T. ; Zaske, D. E. ; and Cipolle, R. J. Effect of obesity on genta - micin pharmacokinetic. J Clin Pharmacol. 21 (1981) : 288 – 294.

46. Watterberg, K. L. , et al. The need for a loading dose of gentamicin in neonates. Ther – Drug – Monit. 11(1) (1989) : 16 – 20 .

47. Neu, H. C. Aminoglycosdies. In S. N. Pradhan (ed.) , Pharmacology in medicine : principles and practice, pp. 803 – 810. Maryland: SP Press , 1986.

48. Reimche, L. D. , et al. An evaluation of gentamicin dosing according to renal func- tion in neonates with suspected sepsis. Am J Perinat. 4 (3) (1987) : 262 – 265.

49. Rischel, W. A. Handbook of basic pharmacokinetics 4 th ed. singapore: Drug I Intelligence Publication, 1994. pp. 187–188.

50. Moore, R. D. ; Lietman, P. S. ; and smith , C. R. Clinical response to aminogly - cosides therapy: importance of the ratio of peak concentration to minimal inhibitory concentration. J Infect Dis. 155 (1987) : 93 – 99.

51. Vogelman, B. , et al. In vivo postantibiotic effect in a thigh infection in neutropenic mice. J Infect Dis. 157 (1988) : 289 – 288 .

52. Vogelman , B.S. ; Craig, W. A. Postantibiotic effects. J Antimicrob Chemother. suppl: (1985) : 37 – 46.

53. Barclay, M. L. ; Begg , E. J. ; and Chambers, S.T. Adaptive resistance following single doses of gentamicin in a dynamic in vitro model. Antimicrob Agents Chemother. 36 (1992) : 1951 – 1957 .

54. Abraham, P. A. ; and Matzke, G. R. Drug–induced renal disease . In J. T. Di Piro, et al. (eds.) , Pharmacotherapy: A pathophysiology approach , pp. 550 – 551. New York: Elsevier, 1989.

55. Collier, V. U. ; Lietman, P. S. ; and Mitch, W. E. Evidence for luminal uptake of

gentamicin in the perfused rat kidney. J Pharmacol Exp Ther. 210 (1979) : 247 – 251.

56. De Broe, M. E. ; et al. Early effects of gentamicin, tobramycin, and amikacin on the human kidney. Kidney International. 25 (1984) : 643 – 652 .

57. Reiner, N. E. ; Bloxham, D. D. ; and Thompson, W. L. Nephrotoxicity of gentamicin and tobramycin given once daily or continuously in dogs. J Antomocrb Chemother. 4 (Suppl. A) (1978) : 85 – 101.

58. Bertino, J. S. , et al. Incidence and significant risk factors for aminoglycoside associated nephrotoxicity in patients dose by using individua ized pharmacokinetic monitoring . J infect Dis. 167 (1993) : 173 – 179.

59. Sawyers, C. L. , et al. A model for predicting nephrotoxicity with aminoglycosides. J Infect Dis. 167 (1993) : 173 – 179.

60. Frame, P. T. , et al. Pharmacologic factors associated with gentamicin nephro - toxicity in rabbits. J Infect Dis. 135 (1977) : 952 – 956.

61. Verpooten, G. A. , et al. Once daily dosing decreases accumulation of gentamicin and netilmicin . Clin Pharmacol Ther. 45 (1989) : 22 – 27.

62. Moore, R. D. ; Smith, C. R. ; and Lietman, P. S. The association of aminogly - coside plasma levels with mortality in patient with gram – negative bacteremia. J Infect Dis . 149 (1984) : 443 – 448.

63. Moore, R. D. , et al. Risk factors for nephrotoxicity in patients treated with amino - glycoside . Ann Intern Med . 100 (1984) : 352 – 359 .

64. Brumett, R.. E. ; and Fox, K. E. Aminoglycoside - induced hearing loss in humans. Antimicrob Agents Chemother. 33 (1989) : 797 – 800 .

65. Mawer, G. E. Prescribing aids for gentamicin. Br J Clin Pharmacol 1 (1974) : 45.

66. Tatro, D.S. Drug interaction facts. 5 th ed. Missouri: Facts and comparison. 1996. pp. 28 – 33.

67. กฤษณา เพ็งสา. ภาวะการขาดออกซิเจนและการช่วยฟื้นชีวิตทารกแรกเกิด ใน กฤษณา เพ็งสา และ สุกัญญา ทักขพันธุ์ คู่มือทารกแรกเกิด, หน้า 39 – 40. ขอนแก่น: คลังนาวิทยา , 2540

68. เกรียงศักดิ์ จีระแพทย์. การดูแลระบบการหายใจในทารกแรกเกิด กรุงเทพ: เรือนแก้ว, 2536. หน้า 1–2,25–26.

69. Apgar, V . etal . Evaluation of the newborn infant - second report . J A M A. 18 (Dec , 1958) : 1985 – 1988 .

70. Apgar, V. ; and James, L. S. Further Observations on the newborn scoring system. Am J Dis Child. 104 (Oct , 1962) : 419 – 428 .

71. Houston, I. B. ; Oetiker, O. The growth and development of the kidneys. In J. A. David; J. Doubbings (eds.) , Scientific foundations of pediatrics . pp. 300. Philadelphia: W.B. Saunders, 1974.

72. Laing, I. A. Obstertric aspect of perinatal care. In A. J. M. campbell (ed). Text book of pediatric, pp. 167 – 169 . Livington: ELBS with Churghill, 1992.

73. Hreij , B. J. ; and Mc Cragken, G. H. Acute infection. In G. D. Every (ed.) , Neonatology pathophysiology and management of the newborn, pp. 1789. Philadelphia: J. B. Littincott, 1994.

74. Dawson, S. P. ; and Reeves, D. S. Therapeutic monitoring, the concentration – effect relationship and impact on the clinical efficacy of antibiotic agents. J Chemother. 9 : supplement n. 1 : (1997) : 84 – 92.

75. Noone, P. , et al. Experience in monitoring gentamicin therapy during treatment of serious gram – negative sepsis , Br Med J. 1 : (1974) : 477 – 481.

76. Noone, P. ; Pattison, J. R. The effective use of gentamicin in life-threatening sepsis. Postgrad Med J. 50 suppl. 7 (1974) : 9 –16.

77. Moore, R. D. ; Smith, C. R. ; Lietman, P. S. The assiciation of aminoglycosides plasma levels with mortality in patients with gram – negative bateremia. J Infect Dis. 149 (1984) : 443 – 448.

78. Noone P. ; and Rogers, B. T. Pneumonia caused by coliforms and Pseudomonas aeruginosa. J Clin Pathol. 29 (1976) : 652 – 656.

79. Moore, R. D. ; Smith, C. R. ; Lietman, P. S. Association of amincglycoside plasma levels with therapeutic outcome in gram negative pneumonia. Am J Med. 77 (1984) : 657 – 662.

80. ธวัชชัย งามสันติวงศ์. หลักการและวิธีใช้คอมพิวเตอร์ในงานสถิติเพื่อการวิจัย กรุงเทพ: บริษัท 21 เซ็นจูรี่จำกัด, 2540. หน้า 278.

81. จันทรนิวัทธ์ เกษมสันต์. Developmental renal physiology. ใน สุขชาติ เกิดผล โรคไต ในเด็ก, หน้า 46 – 48. ขอนแก่น: ศิริภัณฑ์ออฟเซ็ท, 2538.

82. Grupe, W. E. The Kidney. In M. H. Klaus ; and A. A. Fanaroff (eds.) , Care of the high – risk neonate 4 th, pp. 374 – 377. Maxico: W.B. Saunders, 1993

83.ประพุทธ ศิริปุณย์. ทารกแรกเกิด ใน วันดี วราวิทย์; ประพุทธ ศิริปุณย์; และ สุรางค์ เจียมจรรยา(บรรณาธิการ) , ตำรากุมารเวชศาสตร์ 2, หน้า 1. กรุงเทพ: โฮลิสติก

พับลิชชิ่ง, 2540.

84. Watson, M. A. ; and Abraham, P. A. Drug – Induced renal disease. In J. T. Dipiro, et al. (eds.) , Pharmacotherapy: A pathophysiologic apprcach. 2 th ed. , pp. 701 – 719. Connecticut : Appleton & Lange, 1993.

85. Kraus, D. M. ; and Hatzopoulos, F. K. Neonatal Therapy In L. Y.Young; and M.A. Koda – Kimble (eds), Applied Therapeutics. 6 ed. , pp.96 – 13 Vancouver: Applied Therapeutics, Inc, 1995.

86. Naranjo, C. A. , et al. A method for estimating the probability of adverse drug reactions. Clin Pharmacol Ther. 30 (1981) : 239 – 245 .

87. Bister, J. Efficacy of once – and thrice – daily dosing of aminoglycoside in in-vitro models of infection. J Antimicrob Chemother. 27,suppl. C (1991) : 21-28.

88. Rotschafer, J. C. ; and Rybak, M. J. Single daily dosing of aminoglycoside: A commentary. Ann Pharmacother. 28 (1994) : 799 - 801.

89. Dawson, S. J. Therapeutic monitoring, the concentration – effect relationship and impact on clinical efficacy. J Chemother. 9 suppl. n 1 (1997) : 84-92.

90. Knoben, J. E. ; and Anderson, P.O. Handbook of clinical drug data. 7 th ed. Singapore: Drug intelligence publication. 1994 p.14.

91. Ravel, R. Clinical laboratory medicine. 5 ed. St.Louis: Mosby year book, 1989. p.684.

92. Klaus, M.H. ; and Fanaroff, A.A. Care of the high-risk neonates. 4 th ed. Mexico: W.B. Saunders. 1993

APPENDIX

I - Admission summary note

II - Naranjo 's algorithm used to evaluate gentamicin adverse reaction.

III - The data and method for calculation Clcr in ml/min/1.73 m^2 to Clcr in l/hr.

IV - Temperature and white blood cell of the patients in the TDD group.
- Temperature and white blood cell of the patients in the ODD group.

V - Diagnosis, evidence, and assessment of the patients in the TDD group.
- Diagnosis, evidence, and assessment of the patients in the ODD group.

APPENDIX I

ADMISSION SUMMARY NOTE **HN.....**

Demographic and administration data admission date.....Discharge date..... ....=.....days

Name..... .....Gender.....Bed.....AN.....

GA.....weeks PA.....days Ht.....cm Wt..... .....gm.

Apgar score at 1 min..... 5 min..... Drug allergy.....

CC.....

.....

.....

Diagnosis..... Other Diseases.....

.....

VITAL SIGNS

Date / VS														
T(36.0-37.8°C)														
RR														
BP														
IP														
OP														

Date / VS														
T(36.0-37.8°C)														
RR														
BP														
IP														
OP														

LAB

Date / Lab. Data													
BUN(4-15mg/dl)													
Scr (mg/dl)													
WBC x 10^3(cell/cm^3) 0-3d=9.0-35.0 3-14d=5.0-21.0													
C/S													

DRUG PROFILE **HN**.....

Date / Drug Administration													

Date / Drug Administration													

PHARMACOKINETIC DATA

Date	Peak/Trough	Time of infusion	Time	Level

SCr mg/dl Wt. g Ht. cm

CLcr (ml/min/1.73 m^2) = $\frac{K \times L}{Scr}$

K = ln $\frac{C_{psspk}/C_{psstr}}{\Delta t}$ =.....hr^{-1}

$t_{1/2}$ = 0.693/K = ...hr

If 6 (t in)<= t1/2 Use Bolus Model: Vd = $\frac{SFD \times e^{-kt}}{C_{pss}(1-e^{-kt})}$ =..... l

Vd =.....l/kg

If 6 (t in)>= t1/2 Use Infusion Model: Vd = $\frac{SFD(1-e^{-ktin})\ e^{-kt}}{Cpss(1-e^{-kt})\ (t_{in})\ k}$ =

Cl = K (Vd)

Note.. .....
.....
.....
.....
.....
.....
.....
.....

APPENDIX II

Naranjo 's algorithm used to evaluate gentamicin adverse reaction

(Using patient number 8 in TDD group as example.)

	Yes	No	Do not know	Score
1. Are there previous conclusive report on the reaction?	+1	0	0	+1
2. Did the adverse event appear after the suspected drug was administration?	+2	-1	0	+2
3. Did the adverse reaction improve when the drug was discontinued or a specific antagonist was administered?	+1	0	0	+1
4. Did the adverse reaction reappear when the drug was readministered?	+2	-1	0	0
5. Are there alternative cause (other than the drug) that could on their own have caused the reaction?	-1	+1	0	-1
6. Did the reaction appear when the placebo was given?	-1	+1	0	0
7.Was the drug detected in the blood(or other fluids) in concentrations know to be toxic?	+1	0	0	0
8. Was the reaction more severe when the dose was increased, or less severe when the dose was decrease?	+1	0	0	0
9. Did the patient have a similar reaction to the same or similar drugs in any previous exposure?	+1	0	0	0
10. Was the adverse event confirmed by any objective evidence?	+1	0	0	+1 (Scr=1.47mg/dl)
TOTAL				4

Total score	$\geq$ 9	Definite ADR
Total score	5 – 8	Possible ADR
Total score	1 – 4	Probable ADR
Total score	0	Unlikely

APPENDIX III

The data and method for calculation Clcr in ml/min/1.73m^2 to Clcr in l/hr.

Pt.no	TDD group					ODD group				
	Wt. (gm)	Ht. (cm)	SA (m^2)	Clcr (ml/min/ 1.73 m^2)	Clcr (l/hr)	Wt.(gm)	Ht (cm)	SA (m^2)	Clcr (ml/min/ 1.73 m^2)	Clcr (l/hr)
1.	3.8	52	0.238238	111.43	0.920702	2.8	50	0.199037	173.08	1.194774
2.	4	53	0.246758	27.41	0.234577	3.2	45	0.205108	31.64	0.225074
3.	4	53	0.246758	95.4	0.816441	2.6	48	0.18819	108	0.704897
4.	2.9	57	0.213642	85.5	0.633517	2.05	45	0.161427	24.75	0.138566
5.	2	45	0.159297	35.36	0.195355	2.15	45	0.165615	20.63	0.118496
6.	2.15	45	0.165615	46.41	0.266573	3.4	52	0.224405	47.76	0.371709
7.	2.9	49	0.201211	78.75	0.54955	2.75	50	0.197117	32.14	0.219723
8.	2.05	44	0.159995	20.74	0.115085	2.45	47	0.180756	62.04	0.388929
9.	3.2	50	0.213856	56.25	0.417205	2.4	47	0.178763	34.02	0.19232
10.	2.25	45	0.169714	64.57	0.380061	3.95	52	0.243251	43.33	0.365551
11.	2.65	48	0.190128	30	0.197821	2.25	47	0.172665	35.07	0.216001
12.	2.75	48	0.193953	50.23	0.337883	2.75	49	0.195545	53.03	0.393554
13.	2.5	49	0.185775	30.63	0.197351	3.8	51	0.236412	57.38	0.470473
14.	2.85	48	0.197715	72	0.493716	3	50	0.206561	43.91	0.350389
15.	3.05	47	0.203356	105.75	0.745833	3.5	52	0.227931	43.33	0.342529
16.	2.55	48	0.186235	26.34	0.170131	4.3	57	0.264051	136.59	1.067714
17.	3	48	0.203245	90	0.634407	2.4	47	0.178763	43.08	0.26709
18.	4.75	57	0.27857	80.16	0.774458	3.7	51	0.233045	35	0.687012
19.	2.55	48	0.186235	108	0.697574	2.6	50	0.19126	44.12	0.292661
20.	2.5	47	0.182731	49.19	0.311741	2.5	49	0.185775	33.92	0.218548
21.	3.4	50	0.220944	37.5	0.287354	3.5	53	0.229659	61.15	0.487062
22.	3.35	50	0.21919	187.5	1.42537	2.5	48	0.184262	33.75	0.215683
23.	3.3	50	0.217425	62.5	0.471296	3.25	50	0.215647	37.5	0.280465
24.	2.9	48	0.199573	93.91	0.650008	2.4	49	0.18174	16.17	0.101922
25.	3.8	52	0.238238	43.33	0.358019	2.55	48	0.186235	30.86	0.199325
26.	2.8	49	0.197449	61.25	0.419437	3.4	50	0.220944	102.27	0.783673
27.	2.7	48	0.192049	54	0.359675	2.8	48	0.195842	32.73	0.222309

Equation 1(form Haycock, G.B. et al.)[90]

$$SA = Wt^{0.5378} \times Ht^{0.3964} \times 0.024265$$

SA = Surface area (m^2)

Wt = Weight (kg)

Ht = Height (cm)

Equation 2

$$Clcr\ (l/hr) = \frac{Clcr\ (ml/min/1.73m^2) \times 60\ (mins) \times SA\ (m^2)}{1{,}000\ (ml) \times 1.73\ (m^2)}$$

APPENDIX IV

Table 1 Temperature and white blood cell of the patients in the TDD group.

Pt.No.	Temperature (^{o}c)			White blood cell(x10^{3}cell/cm^{3})**	
	day1	day3	day-off	day1	day-off
1.	36.7	36.4	36.8	14.7	14.5
2.	36.6	37.2	36.6	22.1*	5.0
3.	38.0*	36.3	37.2	23.9*	10.0
4.	36.5	36.9	37.2	9.1	12.2
5.	36.4	36.0	36.6	10.8	10.1
6.	37.7	36.8	37.2	15.8	9.4
7.	36.2	36.6	36.6	15.7	13.8
8.	36.6	37.2	36.6	18.1	9.6
9.	36.3	37.2	37.2	22.6*	16.7
10.	36.9	36.7	37.0	15.9	13.5
11.	36.6	37.2	37.4	23.2*	9.2
12.	36.2	37.2	37.3	17.6	15.2
13.	36.5	36.6	36.6	13.7	13.5
14.	38.1*	36.6	37.0	9.3	13.9
15.	36.6	37.5	36.6	15.0	12.0
16.	36.6	37.0	37.2	16.8	14.9
17.	37.4	37.1	36.6	35.7*	14.2
18.	37.2	36.8	36.6	30.7*	14.7
19.	36.1	37.0	36.6	3.30*	9.9
20.	37.2	36.0	36.8	10.1	16.1
21.	36.8	36.7	37.0	27.6*	13.1
22.	37.0	37.2	37.2	15.9	12.5
23.	36.6	37.5	36.4	14.1	11.1
24.	37.2	36.1	36.6	41.2	11.5
25.	37.4	36.9	36.6	26.6	16.7
26.	37.1	37.2	36.5	12.0	11.0
27.	37.3	36.5	37.2	13.9	7.7
Mean (range)				18.4± 8.5 (3.3-41.2)	12.3±2.8(5.0-16.7)

** The mean of WBC were significant different ($P<0.05$)

Table 2 Temperature and white blood cell of the patients in the ODD group

Pt.No.	Temperature (^{o}c)			White blood cell (x10^{3}cell/cm^{3})**	
	day1	day3	day-off	day1	day-off
1.	36.0	37.7	36.9	26.1*	12.5
2.	36.2	36.8	36.9	20.0	15.7
3.	36.6	37.2	37.2	16.4	11.7
4.	36.5	37.2	36.8	15.5	12.0
5.	36.8	36.5	36.4	14.1	15.0
6.	36.5	36.1	37.0	21.3*	14.4
7.	37.0	37.0	37.1	18.4	9.5
8.	38.2*	36.1	36.6	13.5	17.7
9.	36.5	36.6	36.1	13.0	9.5
10.	36.8	37.2	36.8	23.7*	15.0
11.	34.6*	37.0	36.2	11.0	8.7
12.	37.0	37.2	37.0	7.9	11.0
13.	36.5	37.1	36.7	5.4	8.3
14.	37.0	36.6	36.7	5.0*	11.5
15.	36.6	37.7	37.6	12.3	15.1
16.	36.9	37.1	36.0	17.3	11.5
17.	37.2	36.6	37.3	16.9	8.1
18.	37.7	36.6	36.8	27.0*	7.9
19.	37.4	36.7	37.0	14.7	9.7
20.	37.0	36.1	36.8	19.7	11.2
21.	36.6	36.6	37.1	18.3	12.5
22.	37.5	37.2	37.2	6.5	10.1
23.	37.0	36.8	37.0	17.7	14.6
24.	38.3*	37.3	37.0	17.6	9.2
25.	36.7	36.7	37.2	20.5*	9.4
26.	37.0	36.6	36.6	24.6*	12.7
27.	36.0	36.4	37.1	15.3	17.7
Mean (range)				16.3±5.9(5.0-27.0)	11.9±2.9(7.9-17.7)

** The mean of WBC were significant different ($P<0.05$)

APPENDIX V

Table1 Diagnosis, evidence, and assessment of the patients in the TDD group.

Pt. No.	Diagnosis	Evidence	Assessment
1.	PROM,Sepsis	PROM > 24 hr., Respiratory distress, Chest x-ray infiltration, Poor feeding, RR ↑110, Deminished activity	Clinical improvement, Normal Respiratory rate, feeding, and activity
2.	Sepsis	Tachypnea,Hypotonia	Clinical improvement, no Tachypnia,hypotonia
3.	Pneumonia	T= 38°C , WBC ↑23900, Chest x-ray infiltration, Tachypnea	Clinical improvement, T=37.2°C, WBC=10000, no tachypnea
4.	PROM,Sepsis	PROM > 24 hr., Poor feeding	Clinica improvement
5.	NEC	Abdominal distention, Poor feeding	Clinica improvement after 1 day of NPO
6.	Sepsis	Cyanosis at birth, on respirator 1 day, apnea	Clinica improvement
7.	NEC	Abdominal distention, Poor feeding, maternal fever x-ray – bowel ilus	Clinica improvement after 3 day of NPO
8.	Pneumonia, Sepsis	Chest x-ray bilateral pulmonary infiltration On ET tube 3 day, dypnea, tachypnea	Clinical improvement, no dypnea, Tachypnea
9.	PROM,Sepsis	PROM 19 hrs. , WBC ↑22600, tachypnea	Clinical improvement, no tachypnea ,WBC 16700
10.	PROM	PROM > 24 hr, foul smell aminotic fluid, irregular breath	Clinical improvement after 5 day of NPC
11.	Pneumonia	Chest x-ray infiltration of both lung WBC ↑23200, Moderate birth asphyxia, tachypnea	Clinical improvement, no tachypnea WBC 9200
12	PROM	PROM > 24 hr, cyanosis	Clinical improvement, no cyanosis
13	Clinical sepsis	Poor feeding, drowsiness	Clinical improvement, Normal feeding and activity after 2 days of therapy
14.	Pneumonia	T= 38.1-38.5°C, Chest x-ray infiltration, CBC band 3%, plt ↓143000 (<150000)	Clinical improvement after 2 days of therapy , T= 36.6 ,plt > 150000
15.	MAS	Chest x-ray infiltration, tachypnea	Clinical improvement, no tachypnea
16.	MAS Pneumonia	Chest x-ray infiltration plt ↓ 80000(<150000)	Clinical improvement ,plt ↑ 296000
17.	RD	tachypnea WBC ↑35700	No tachypnea, WBC 14200

Continue

Table 2 Diagnosis, evidence, and assessment of the patients in the TDD group.

Pt. No.	Diagnosis	Evidence	Assessment
18.	MAS	Chest x-ray infiltration ,WBC ↑30700 NE 80%, tachypnea	Clinical improvement, no Tachypnea, WBC 14700
19.	NEC	PROM 13 hrs., bloody stools, plt ↓5000, ↓WBC 3300	Normal feeding after NPO 3 days WBC ↑9900, plt ↑149000
20.	NEC	Coffee ground	Normal feeding after NPO 3 days
21.	PROM	PROM >24 hrs , WBC ↑27600 Chest x-ray infiltration, Pneumothorax, tachypnea, neonatal asphyxia	Clinical improvement, no tachypnea
22	Pneumonia, Sepsis	Chest x-ray infiltration, tachypnea, maternal T= 38°C	Clinical improvement, no tachypnea
23	Pneumonia	PROM, asphyxia, on respirator 4 days, CBC band=8 %, H/C gr+ve cocci	Clinical improvement, no Tachypnea, H/C no growth
24	RD	WBC ↑41700, tachypnea	Clinical improvement, no tachypnea
25.	Pneumonia	WBC ↑26600, Chest x-ray infiltration	Clinical improvement, WBC 16700
26.	Pneumonia	Chest x-ray infiltration, black content in NG tube	Clinical improvement
27.	Sepsis	x-ray mild cardiomegaly, ileus of abdomen, Abdominal distention	Clinical improvement after 4 days

Table2 Diagnosis, evidence, and assessment of the patients in the ODD group.

Pt. No.	Diagnosis	Evidence	Assessment
1.	Pneumonia, Sepsis	Chest x-ray infiltration, WBC ↑26100, anemia H/C MRSA (after 5 days of therapy)	On ampi + gentamicin 3 days, ampi + cefuroxime 2 days then changing to Vancomicin
2.	MAS	tachypnea	Clinical improvement, no Tachypnea
3.	NEC	x-ray bowel ileus, Abdominal distention, poor feeding	Clinical improvement, normal feeding
4.	Pneumonia, Sepsis	Hypotonia, Respiratory destress, birth asphyxia	Clinical improvement, no tachypnea
5.	Sepsis	foul smell aminotic fluid, tachypnea, C/S gastric content (P.aeruginosa), amniotic fluid find E.coli, K. pneumoniae	Clinical improvement, no tachypnea, normal activity
6.	PROM	PROM > 24 hrs., WBC ↑21300, drawsiness, Hypotonia	Clinical improvement, no tachypnea, normal activity WBC 14400
7.	PROM	PROM > 24 hrs., drawsiness, tachypnea	Clinical improvement, no Tachypnea, normal activity
8.	RD, TTNB	Maternal fever, infant fever T= 38.2°C ,tachypnea	Clinical improvement, no tachypnea
9.	PROM	PROM > 24 hrs., On respirator 5-6 days, shock (hypotension)	Clinical improvement
10.	RD	Tachypnea, RR 100, WBC 23700	Clinical improvement, no tachypnea
11.	RD	Tachypnea, PROM 6 hrs.,On respirator Chest x-ray R/O RDS	Clinical improvement, no tachypnea
12.	MAS	Tachypnea, dyspnea	Clinical improvement, no tachypnea, dyspnea
13.	NEC	Abdominal distension,WBC 5400	Clinical improvement within 2-3 days WBC 8300
14.	Omphalitis	WBC ↓ 5000 ,C/S Umbilical/ E.coli.,Dipteroids, Inflammation at skin around umbilicus	Clinical improvement no omphalitis after 3 days of therapy
15.	MAS	Asphyxia, tachypnea	Clinical improvement, decrease tachypnea, need O_2↓

Continue

Table2 Diagnosis, evidence, and assessment of the patients in the ODD group.

Pt. No.	Diagnosis	Evidence	Assessment
16.	MAS	Chest x-ray , minimal infiltration IMP: MAS is possible, tachypnea	Clinical improvement, decrease tachypnea,
17.	PROM	PROM >24 hrs., NE ↑84, poor feeding	Clinical improvement, could Feeding after 2 days of NPO
18.	RD,TTNB	Tachypnea, WBC ↑27000, irregular breathing	Clinical improvement, on O2 1 day normal breathing WBC 7900
19.	MAS	Tachypnea, pale,mild birth asphyxia form fetal distress	Clinical improvement, decrease tachypnea,
20.	MAS	Tachypnea, Hypoglycemia	Clinical improvement, no tachypnea after 2 days of therapy
21.	Pneumonia	Chest x-ray infiltration, Tachypnea	Clinical improvement, decrease tachypnea,
22.	Sepsis	CBC, WBC 6500 band/NE 0.18(>0.16), Hypoglycemia, mild ileus abdomen	Clinical improvement after 2 days of therapy WBC 10100
23.	NEC	PROM, Film bowel ileus	Clinical improvement, could Feeding after 5 days of NPO
24.	Sepsis	Fever T=38.3 Chest x-ray infiltration, Tachypnea	Clinical improvement, no tachypnea
25.	MAS	Chest x-ray infiltration of both lungs, medial pneumothorax, dyspnea, Tachypnea, plt 64000 (<15000)	Clinical improvement, no tachypnea,dyspnea
26.	RD,TTNB	Tachypnea,WBC 24600	Clinical improvement, no tachypnea
27.	Pneumonia	Chest x-ray infiltration, NE 79%, on ET and respirator 8 days	Clinical improvement, could off respirator, decrease tachypnea

VITAE

Miss Amporn Narongsanti was born on December 11, 1968, in Bangkok, Thailand. She graduated with Bachelor Degree of Science in Pharm in 1992 form the Faculty of Pharmacy, Chulalongkorn University, Bangkok, Thailand. Her current position is a staff in Department of Pharmacy, Pichit Hospital, Pichit, Thailand.