

Respiratory Syncytial Virus

Occurrence and Clinical Characteristics of Patients Infected with Subgroups of Respiratory Syncytial Virus

Wonkeun Song, M.D., Kyu Man Lee, M.D. and Hyun Tae Kim, M.D.

*Department of Clinical Pathology, Hallym University College of Medicine,
Seoul, Korea*

Background : Respiratory syncytial virus (RSV) is the single most common cause of lower respiratory tract infections in infants and young children. RSV can be classified into two major groups, A and B with subgroups based on their reactivity with monoclonal antibodies. There were no reports on the subgroups of RSV isolates in Korea. The purpose of this study is to identify RSV isolates from patients with lower respiratory tract infections to subgroup level and to examine clinical characteristics of subgroup infections.

Methods : RSV infection was diagnosed by viral culture of nasopharyngeal aspirates in patients with lower respiratory infection. Forty two RSV isolates over four successive outbreaks (94/95, November 1994-January 1995; 95/96, Nov. 95-Jan. 96; 96/97, Nov. 96-Jan. 97; 97/98, Nov. 97-Jan. 98) were subgrouped by indirect immunofluorescence with subgroup-specific monoclonal antibodies. Clinical characteristics of subgroup infections were evaluated by review of medical records.

Results : Twenty eight (67%) isolates were identified as group A and 14 (37%) strains as group B. Group A isolates of the 94/95, 95/96, and 96/97 seasons were subgroup A/4, and those of 97/98 season were subgroup A/2. Group B isolates were all identified as subgroup B/2. There was no statistically significant difference in clinical characteristics according to the subgroup infections.

Conclusions : This study show that RSV subgroup A/4, A/2 and B/2 isolated over recent four successive epidemic seasons in Seoul. There was no significant difference in clinical characteristics or severity according to the subgroup infections.

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Key words : Respiratory syncytial virus (RSV), Lower respiratory tract infections, Groups, Subgroups

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10-20% [1].

, respiratory syncytial virus (RSV), adenovirus, influenza virus, parainfluenza virus, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, *Streptococcus pneumoniae*, *Mycobacterium tuberculosis* [2].

RSV 가 Paramyxoviridae Pneumovirus 가 [3], 가 100-350 nm RNA [4], , (syncytial) 가 RSV [5]. RSV 2 가 2 가 [6,7]. RSV RSV [8]. , , , 가 [9]. RSV G F A B [10]. A B 6 , B 3 [11]. RSV 가 [12]. RSV [13]. RSV RSV RSV A B [11,14-17]. 가 . RSV RSV A B 가 , RSV A B . RSV 가 [14,15]. RSV A B 가 [18-20]. RSV [21-23], A B [24], A B 4 RSV A B , .

1.

RSV 가 , 1994 11 1995 1 (94/95), 1995 11 1996 1 (95/96), 1996 11 1997 1 (96/97) RSV , -70 RSV 1997 11 1998 1 (97/98) . 2. 1) 50 µg/mL gentamicin, 2.5 µg/mL amphotericin B, 340 U/mL penicillin G가 veal infusion , 가 -4 . 2) HEp-2 RSV 24 0.1-0.2 mL HEp-2 (ATCC, CCL23)가 24 well , 10% Eagle's minimum essential medium (EMEM) , 2% EMEM 10 . 3) RSV RSV 가 well , 10 , RSV mouse (Chemicon International Inc., Temecula, CA, USA) 가 30 , 3 , FITC-conjugated anti-mouse IgG(Cappel, West Chester, PA, USA) 30 , 3 . 4) RSV RSV (94/95 , 16 ; 95/96 , 12 ; 96/97 , 3) 97/98 (11) 42 . RSV Anderson [10] RSV (Chemicon International Inc., Temecula, CA, USA) , A B F 92-11c 102-10b , G 130-5f, 130-6d, 130-9g, 143-5a . RSV Anderson

Table 3. Clinical characteristics of patients infected with respiratory syncytial virus according to the subgroups

Characteristics	No. (%) of patients		
	A/4 (n = 20)	A/2 (n = 8)	B/2 (n = 14)
Gender			
Male	14 (70)	7 (88)	8 (57)
Female	6 (30)	1 (12)	6 (43)
Age (month)			
0 - 5	7 (35)	3 (38)	7 (50)
6 - 11	7 (35)	4 (50)	4 (29)
12 - 23	4 (20)	1 (12)	3 (21)
24 - 35	2 (10)	0 (0)	0 (0)
Type of respiratory disease			
Bronchiolitis	16 (80)	7 (88)	11 (79)
Pneumonia	2 (10)	1 (12)	3 (21)
Croup	2 (10)	0 (0)	0 (0)
Patient with underlying disease*	4 (20)	0 (0)	2 (14)

* Underlying diseases are all asthma.

가, 8 (7)
3-5
가, 50% 가)
RSV A
B 가 , G
F
[25]. 1% . A B G
5% 53%
RSV , F 53%가
[26]. 가 89%가 [14,16]. G F RSV
가
[27]. [29]. RSV
RSV 가 2
(95%) , A B A
81%, 14% 가 , 94/95
RSV B [24]
5-7 90/91 A 50%, B 48%, 91/92
11% , 8% A , 92/93 A 93% B 7%,
[9]. , 93/94 B , A
B 가 . Hall [14]
15 (1975-1990)
A 71%, B 29% . 1-2
A B
1 B 40%
가 [18,20], 1980 1987 A
[19]. 53.5%, B 45.1% , 가
5 3 B , 2 A
가 [17].
A B A
가 ,
A B
6 가 [12]. Hendry

[30] , A 67% G : 28 (67%)가 A 14 (37%)가 B
 , B 58% . A 94/95, 95/96, 96/97 A/4 ,
 . 97/98 A/2 . B
 B , A B/2
 B 가 , B 가
 [30]. : 4 A
 A 9 A/4 A/2 , B B/2
 B 5.5 가
 , B
 가 [28]. Hall [14] ,
 가
 A B
 14 RSV A B
 가
 A B
 ,
 ,
 A B 가 ,
 가
 [11]. influenza virus
 가
 가 [31]. 4
 A B , A/4, A/2
 B/2 ,
 ,
 ,
 가
 RSV 가
 .
 : Respiratory syncytial virus (RSV)
 가 . RSV
 A B
 .
 RSV
 :
 RSV . 4
 (94/95, 94. 11.-95. 1.; 95/96, 95. 11.-96. 1.; 96/97,
 96. 11.-97. 1.; 97/98, 97. 11.-98. 1.) 42
 RSV
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1. , , , , , . (1966-1985).
 1987;30:385-91.
2. Baron EJ and Finegold SM. ed. *Bailey & Scott's Diagnostic Microbiology*. 8th ed. St. Louis: Mosby, 1990:230-2.
3. Joncas J, Berthiaume L, Pavilanis V. *The structure of the respiratory syncytial virus*. *Virology* 1969;38:493-6.
4. Bertaiume L, Joncas J, Pavilanis V. *Comparative structure, morphogenesis and biological characteristics of the respiratory syncytial (RS) virus and the pneumoniae virus of mice (PVM)*. *Arch Gesamte Virusforsch* 1974; 45:39-51.
5. Chanock RM, Kim HW, Vargosko AJ, Deleva A, Johnson KM, Cumming C, et al. *Respiratory syncytial virus. I. Virus recovery and other observations during 1960 outbreak of bronchiolitis, pneumonia, and minor respiratory diseases in children*. *JAMA* 1961;176:647-653.
6. Glezen WP and Denny FW. *Epidemiology of acute lower respiratory disease in children*. *N Engl J Med* 1973;288:498-505.
7. Parrott RH, Kim HW, Arrobio JO, Hodes DS, Murphy BR, Brandt CD, et al. *Epidemiology of respiratory syncytial virus infection in Washington, D.C. II. Infection and disease with respect to age, immunologic status, race and sex*. *Am J Epidemiol* 1973;98:289-300.
8. Beem M. *Repeated infections with respiratory syncytial virus*. *J Immunol* 1967;98:1115-22.
9. Green M, Brayer AF, Schenkman KA, Wald ER. *Duration of hospitalization in previously well infants with respiratory syncytial virus infection*. *Pediatr Infect Dis J* 1989;8:601-5.
10. Anderson LJ, Hierholzer JC, Tsou C, Hendry RM, Fernie BF, Stone Y, et al. *Antigenic characterization of respiratory syncytial virus strains with monoclonal antibodies*. *J Infect Dis* 1985;151:626-33.
11. Anderson LJ, Hendry RM, Pierik LT, Tsou C, McIntosh K. *Multicenter study of strains of respiratory syncytial virus*. *J Infect Dis* 1991;163:687-92.
12. Henderson FW, Collier AM, Clyde WA Jr., Denny FW. *Respiratory-syncytial-virus infections, reinfections and immunity: a prospective, longitudinal study in young children*. *N Engl J Med* 1979;300:530-4.
13. Tyeryar FJ. *Report of a workshop on respiratory syncytial*

- virus and parainfluenza viruses. *J Infect Dis* 1983;148:588-98.
14. Hall CB, Walsh EE, Schnabel KC, Long CE, McConnochie KM, Hildreth SW, et al. Occurrence of groups A and B of respiratory syncytial virus over 15 years: associated epidemiologic and clinical characteristics in hospitalized and ambulatory children. *J Infect Dis* 1990;162:1283-90.
 15. Hendry RM, Pierik LT, McIntosh K. Prevalence of respiratory syncytial virus subgroups over six consecutive outbreaks: 1981-1987. *J Infect Dis* 1989;160: 185-90.
 16. McIntosh EDG, de Silva LM, Oates RK. Clinical severity of respiratory syncytial virus group A and B infection in Sydney, Australia. *Pediatr Infect Dis J* 1993;12:815-9.
 17. Tsutsumi H, Onuma M, Suga K, Honjo T, Chiba Y, Chiba S, et al. Occurrence of respiratory syncytial virus subgroup A and B strains in Japan, 1980-7. *J Clin Microbiol* 1988;26:1171-1174.
 18. Hendry RM, Talis AL, Godfrey E, Anderson LJ, Fernie BF, McIntosh K. Concurrent circulation of antigenically distinct strains of respiratory syncytial virus during community outbreaks. *J Infect Dis* 1986; 153:291-7.
 19. McConnochie KM, Hall CB, Walsh EE, Roghmann KJ. Variation in severity of respiratory syncytial virus infections with subtype. *J Pediatr* 1990;117:52-62.
 20. Stark JM, Fatemi SH, Amini SB, Huang YT. Occurrence of respiratory syncytial virus subtypes in hospitalised children in Cleveland, Ohio from 1985 to 1988. *Pediatr Pulmonol* 1991;11:98-102.
 21. .
respiratory syncytial , , .
 , .
1992;12:473-8.
 22. . Respiratory syncytial virus
 . 1992;35:1389-401.
 23. , , . Respiratory syncytial virus
 nested reverse transcription-
polymerase chain reaction . 1995;38:
1486-97.
 24. , , . Respiratory syncytial
virus A, B . 1996;
28:481-91.
 25. Mulholland EK, Olinsky A, Shann FA. Clinical findings and severity of acute bronchiolitis. *Lancet* 1990;335: 1259-61.
 26. Eriksson M, Forsgren M, Sjöberg S, von Sydow M, Wolontis S. Respiratory syncytial virus identification in young hospitalized children: Identification of risk patients and prevention of nosocomial spread by rapid diagnosis. *Acta Pediatr Scand* 1983;72:47-51.
 27. McConnochie KM and Roghmann KJ. Wheezing at 8 and 13 years: Changing importance of bronchiolitis and passive smoking. *Pediatr Pulmonol* 1989;6:138-46.
 28. Tayler LE, Morrow S, Scott M, Young B, Toms GL. Comparative virulence of respiratory syncytial virus subgroups A and B. *Lancet* 1989;1:777-8.
 29. Tayler LE, Stott EJ, Bew M, Fernie BF, Cote PJ, Collins AP, et al. Monoclonal antibodies protect against respiratory syncytial virus infection in mice. *Immunology* 1984;52:137-42.
 30. Hendry RM, Burns JC, Walsh EE, Graham BS, Wright PF, Hemming VG, et al. Strain-specific serum antibody responses in infants undergoing primary infection with respiratory syncytial virus. *J Infect Dis* 1988;157:640-7.
 31. Murphy BR, Webster RG. Orthomyxoviruses. In: Fields BN, Knipe DM, Howley DM, ed. *Fields Virology*. 3rd ed. Philadelphia: Lippincott-Raven, 1995:1397-445.