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Differences Between the Clinical Characteristics of Respiratory Syncytial Virus Subgroup A and B Infections in Hospitalized Adults: A 10-year Retrospective Study

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Introduction

- Respiratory syncytial virus (RSV) is a leading cause of acute respiratory infections in both children and adults, particularly among elderly and immunocompromised individuals. RSV is classified into two major subgroups — subgroup A (RSV-A) and subgroup B (RSV-B) — which co-circulate annually but exhibit distinct genetic and antigenic profiles.
- While pediatric studies have described subgroup-specific clinical differences, comparative data in adult populations remain limited, especially regarding co-infection patterns and clinical outcomes.
- This study aimed to identify differences in clinical characteristics, laboratory findings, and outcomes between RSV-A and RSV-B in hospitalized adults over a 10-year period.

Methods

- We conducted a single-center, retrospective cohort study at a 750-bed university-affiliated tertiary hospital from January 2015 to December 2024.
- Adult patients (≥18 years) hospitalized with laboratory-confirmed RSV-A or RSV-B infection were included.
- Clinical data including demographics, comorbidities, symptoms, laboratory findings, and outcomes were collected via medical record review.
- Univariate analysis was performed using chi-square test or Fisher's exact test for categorical variables, and Student's t-test or Kruskal-Wallis test for numerical variables.
- Variables with p<0.10 in univariate analysis were entered into a multivariate logistic regression model.

Results

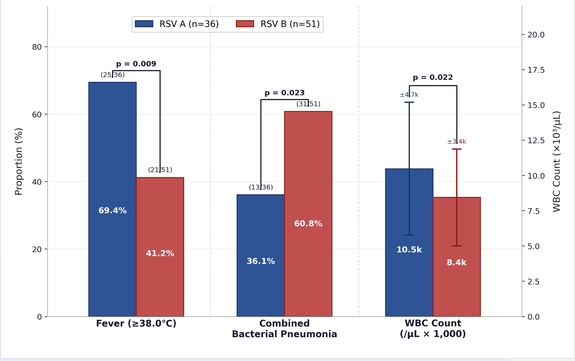
- A total of 87 patients were included: 36 (41.4%) with RSV-A and 51 (58.6%) with RSV-B.
- In univariate analysis, RSV-A patients presented significantly more frequently with fever (≥38.0°C) compared to RSV-B patients (69.4% vs 41.2%, p=0.009) and higher count of WBC (10,468 vs 8,438, p=0.022).
- In contrast, bacterial pneumonia co-infection was significantly more frequent in RSV-B patients (60.8% vs 36.1%, p=0.023).
- No significant differences were observed in 30-day mortality and 90-day mortality (both 2.8% vs 11.8%, p=0.231), intubation rate (16.7% vs 11.8%, p=0.542) and ICU admission (36.1% vs 29.4%, p=0.510) between two subgroups.
- In multivariate logistic regression analysis, bacterial pneumonia co-infection was independently associated with RSV-B infection (OR 3.110, 95% CI 1.162–8.326, p=0.024), and fever (≥38.0°C) was independently associated with RSV-A infection (OR 0.297, 95% CI 0.108–0.820, p=0.019).

- **Table 1. Comparison of clinical characteristics between RSV subgroup A and B**

Variable	RSV A (n=36)	RSV B (n=51)	Odds Ratio (95% CI) / p-value†	p-value‡
Demographics				
Sex, male	18 (50.0)	24 (47.1)	–	0.787
Age, years	71.0 ± 12.0	75.1 ± 10.9	–	0.106
Acquired place				
Community	22 (61.1)	39 (76.5)	–	0.123
Healthcare facilities	14 (38.9)	12 (23.5)	–	
Comorbidities				
Diabetes mellitus	14 (38.9)	15 (29.4)	–	0.356
Cardiovascular diseases	8 (22.2)	4 (7.8)	0.301 (0.072–1.254) p = 0.099	0.066
COPD	11 (30.6)	16 (31.4)	–	0.935
End-stage renal disease	5 (13.9)	3 (5.9)	–	0.267
Metastatic solid cancer	4 (11.1)	11 (21.6)	–	0.203
Modified CCI	5.3 ± 2.4	5.9 ± 2.4	–	0.258
Symptoms at presentation				
Fever (≥38.0°C)	25 (69.4)	21 (41.2)	**0.297 (0.108–0.820) p = 0.019**	**0.009**
Wheezing	11 (30.6)	19 (37.3)	–	0.517
Tachypnea (≥24/min)	18 (50.0)	20 (39.2)	–	0.318
Dyspnea	28 (77.8)	32 (62.7)	–	0.136
Clinical findings at presentation				
Supplemental oxygen	24 (66.7)	32 (62.7)	–	0.707
Mechanical ventilation	6 (16.7)	6 (11.8)	–	0.542
Intensive care unit	13 (36.1)	15 (29.4)	–	0.510
PSI score	103.8 ± 30.1	103.5 ± 31.0	–	0.962
Laboratory findings at presentation				
WBC count (/μL)	10,468 ± 4,708	8,438 ± 3,427	0.901 (0.795–1.021)* p = 0.102	**0.022**
Albumin (g/dL)	3.4 ± 0.7	3.3 ± 0.6	–	0.538
C-reactive protein (mg/dL)	100.5 ± 85.3	110.4 ± 105.5	–	0.642
Co-infections				
Combined bacteremia	2 (5.6)	6 (11.8)	–	0.461
Combined bacterial pneumonia	13 (36.1)	31 (60.8)	**3.110 (1.162–8.326) p = 0.024**	**0.023**
Outcomes				
30-day mortality	1 (2.8)	6 (11.8)	–	0.231
90-day mortality	1 (2.8)	6 (11.8)	–	0.231
Re-admission within 90 days (any cause)	5 (13.9)	8 (15.7)	–	0.817
Need for intubation	6 (16.7)	6 (11.8)	–	0.542
Secondary pneumonia (within 30 days)	4 (11.1)	3 (5.9)	–	0.441
Hospital LOS, days	25.1 ± 60.3	15.8 ± 23.6	–	0.317

Data are presented as n (%) for categorical variables and mean ± standard deviation for continuous variables.
Categorical variables were compared using chi-square test or Fisher's exact test. Continuous variables were compared using Student's t-test when equal variance was confirmed, or Kruskal-Wallis test when equal variance was not met.
* WBC count was entered into the multivariate model as a continuous variable in units of 1,000/μL; odds ratio reflects change per 1,000/μL increment.
† Odds ratio (95% CI) and multivariate p-value from multivariate logistic regression analysis. Shown only for variables with $p < 0.05$ in univariate analysis that were included in the model. Model fit: AIC = 106.917; Hosmer-Lemeshow test p = 0.868; Nagelkerke's $R^2 = 0.265$.

- **Figure 1. Comparison of key clinical variables between RSV subgroup A and B**



- **Figure 2. Forest plot from multivariate logistic regression analysis comparing the characteristics of population between RSV subgroup A and B**

Conclusions

- RSV-A and RSV-B subgroups demonstrated distinct clinical profiles despite comparable baseline characteristics and short-term outcomes.
- Bacterial pneumonia co-infection was independently associated with RSV-B infection (OR 3.110, 95% CI 1.162–8.326, p=0.024). Fever (≥38.0°C) was independently associated with RSV-A infection (OR 0.297, 95% CI 0.108–0.820, p=0.019).
- These findings may suggest that RSV-B carries a greater risk of bacterial superinfection, while RSV-A tends to provoke a stronger early systemic inflammatory response.
- Despite these biological differences, short-term clinical outcomes including mortality, intubation, and length of stay did not significantly differ between subgroups.
- Further large-scale, multicenter prospective studies are warranted to elucidate the underlying immunological mechanisms and guide subgroup-specific clinical management of RSV in adults.