Aspergillosis Complicating Severe Respiratory Syncytial Virus in ICU Patients: A Retrospective Cohort Study

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Background

- Severe influenza pneumonia has been identified as an independent risk factor for the development of invasive pulmonary aspergillosis (IPA), even in patients without immunocompromise
- Aim to understand the incidence of IPA as well as other co-infections over multiple seasons in patients with RSV pneumonia in the intensive care unite (ICU)

Methods

- Retrospective cohort study from a single-center in Chicago, IL with data collected across 9 flu seasons (March 2009 – March 2018)
- Included patients ≥ age 18 with a positive influenza PCR test who were admitted to ICU with respiratory distress
- IPA defined by both EORTC/MSG and *AspICU* criteria

Results

- 153 ICU patients with RSV during the study period
- IPA incidence was 5.2% (8/153)
- History of male sex, lung disease, hematological malignancy, neutropenia, stem cell transplant, were significant risk factors for development of IPA
- Median ICU LoS was significantly increased in those with development of IPA

Incidence of Non-Aspergillus Coinfections

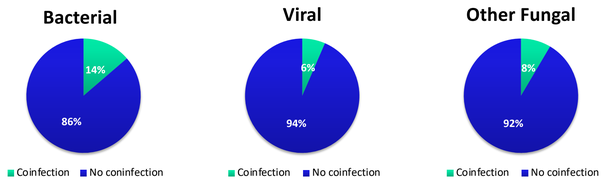

Table 1. Baseline Characteristics and Morbidity/Mortality

Baseline characteristics	All patients with RSV (N=153)	With invasive pulmonary aspergillosis (N=8)	Without invasive pulmonary aspergillosis (N=145)	p-value
Median age, years (IQR)	63 (52, 74)	63 (52, 74)	56 (48, 73.5)	0.481
Male sex	67 (43.8)	7 (87.5)	60 (41.4)	0.022
Median LOS (IQR)	11.6 (7.8, 18.8)	23.7 (13.9, 38.1)	11.6 (7.1, 18.3)	0.014
Median ICU LOS (IQR)	3.1 (1.5, 6.8)	4.8 (1.7, 8.1)	3.1 (1.5, 6.8)	0.468
BMI over 30	58 (37.9)	1 (12.5)	57 (39.3)	0.123
Lung disease	86 (56.2)	1 (12.5)	85 (58.6)	0.022
Heart disease	68 (44.4)	2 (25.0)	66 (45.5)	0.223
Diabetes	47 (30.7)	2 (25.0)	45 (31.0)	0.532
Liver cirrhosis	11 (7.2)	1 (12.5)	10 (6.9)	0.457
Chronic kidney disease	37 (24.2)	3 (37.5)	34 (23.5)	0.401
Rheumatologic Disease	30 (19.6)	28 (19.3)	2 (25.0)	0.439
Known risk factors				
Hematological malignancy	30 (19.6)	7 (87.5)	23 (15.9)	0.000
Stem Cell Transplant	19 (12.4)	4 (50.0)	15 (10.3)	0.009
GVHD	5 (3.3)	0 (0.00)	5 (3.45)	0.762
Solid Organ Transplant	11 (7.2)	1 (12.5)	10 (6.9)	0.457
Immune Suppression not due to transplant	36 (23.5)	2 (25.0)	34 (23.5)	0.601
Solid organ malignancy	15 (9.8)	0 (0.00)	15 (10.34)	0.429
Neutropenia	6 (3.9)	2 (25.0)	4 (2.76)	0.032
Lymphopenia	68 (44.4)	6 (75.0)	62 (42.8)	0.078
Mortality/Morbidity				
Mechanical ventilation	61 (39.9)	2 (25.0)	59 (40.7)	0.313
Renal replacement therapy	19 (12.4)	2 (25.0)	17 (11.7)	0.260
ECMO	0 (0.00)	0 (0.00)	0 (0.00)	n/a
Death within 30 days	22 (14.4)	2 (25.0)	20 (13.8)	0.323
Death within 90 days	26 (16.9)	3 (37.5)	23 (15.9)	0.136
Death within 1 year	29 (18.9)	3 (37.5)	26 (17.9)	0.176
RSV				
RSV A	76 (49.7)	3 (37.5)	73 (50.3)	0.710
RSV B	76 (49.7)	5 (62.5)	71 (48.9)	0.495
RSV treatment with ribavirin	6 (3.9)	1 (12.5)	5 (3.5)	0.279
RSV treatment with IVIG	13 (8.5)	5 (62.5)	8 (5.5)	0.000

Table 2. Patient Characteristics in IPA

	Number of patients in the RSV cohort with IPA (n=8)
BAL culture positive	2 (25.0%)
BAL galactomannan test positive	4 (50.0%)
Serum galactomannan test positive	2 (25.0%)
EORTC/MSG criteria	
Proven	0 (0%)
Probable	7 (87.5%)
Possible	1 (12.5%)
***AspICU* Criteria**	
Proven	0 (0%)
Putative	2 (25.0%)
Colonization	5 (67.5%)
Not classifiable	1 (12.5%)
Initial Treatment	
Voriconazole	8 (100%)
Echinocandins	4 (50.0%)
Isavuconazole	0 (0%)
Posaconazole	0 (0%)
Liphosomal amphotericin B	2 (25.0%)
Combination	4 (50.0%)
No treatment	0 (0%)

Conclusions

- Overall incidence of IPA is low at 5.2% in those with severe RSV pneumonia
- All patients who developed IPA had underlying immunocompromise (87.5% with hematological malignancy, 12.5% with SOT)
- History of male sex, hematological malignancy, neutropenia, stem cell transplant, were significant risk factors for development of IPA
- IPA did not clearly predict morbidity and mortality among these critically ill patients

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