Hyperinflammatory phenotypes may be more important than age and co-morbidities in predicting adverse outcomes in hospitalized patients with Influenza A

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INTRODUCTION

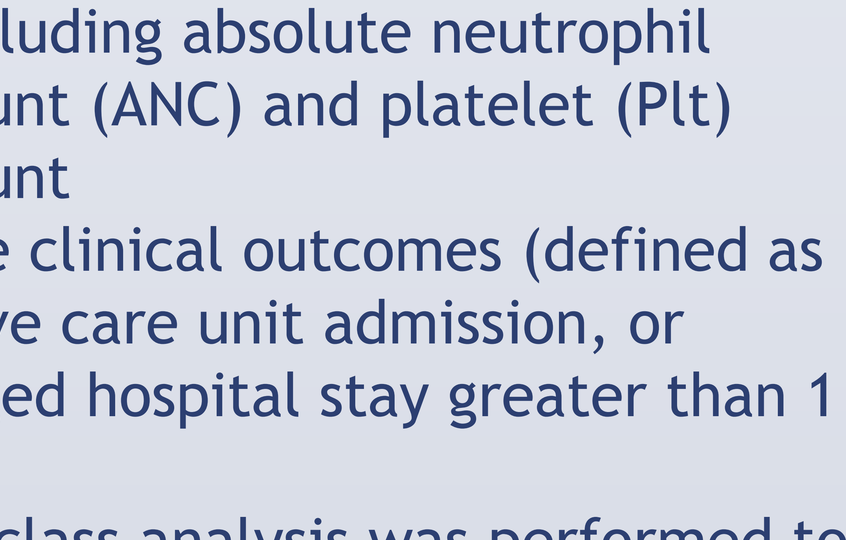
- Influenza A virus (IAV) infection leads to a broad range of clinical outcomes
- May be influenced by the host's inflammatory response
- Understanding distinct inflammatory phenotypes could help
  - Identify patients at higher risk for adverse outcomes
  - Guide targeted treatment strategies

METHOD

- Prospective observational study of 41 hospitalized adult patients with laboratory-confirmed IAV infection by polymerase chain reaction of nasopharyngeal swab
- Baseline clinical and laboratory data were collected
  - Including absolute neutrophil count (ANC) and platelet (Plt) count
- Adverse clinical outcomes (defined as intensive care unit admission, or prolonged hospital stay greater than 1 week),
- Latent class analysis was performed to identify inflammatory phenotypes based on ANC and Plt levels
- Effect of inflammatory phenotypes also assessed using logistic regression adjusted for age

Class 1: low or normal ANC and Plt count

Class 2: high ANC and Plt count



RESULTS

Table 1: Descriptive characteristics of hospitalised patients with influenza A virus infection

Parameter	Total (n=41)	Adverse outcomes (ICU or long hospital stay >7 days) (n=10)	No adverse outcomes (n=31)
Age (years)	61 (±12)	60 (±13)	61 (±12)
Total white cell count ($x10^9$/L)	8.2 (±3.4)	11.0 (±4.4)	7.4 (±2.6)
Absolute neutrophil count ($x10^9$/L)	6.3 (±3.1)	8.4 (±4.2)	5.6 (±2.4)
Platelet count ($x10^9$/L)	232 (±106)	248 (±139)	228 (±96)
Haemoglobin (g/dL)	12.5 (±2.4)	12.4 (±2.8)	12.6 (±2.3)
Hospital length of stay (days)	5 (±3)	9 (±3)	4 (±1)
Required intensive care	4 (9.8%)	4 (40.0%)	0 (0.0%)

Table 2: Multivariable logistic regression, showing the association of inflammatory phenotype on adverse outcomes, adjusting for age

Parameter	Adjusted odds ratio (95% confidence interval)	P-value
Hyperinflammatory phenotype (Class 2)	**3.63 (0.83 – 16.17)**	**0.091**
Age (years)	1.00 (0.94 – 1.06)	0.918

DISCUSSION

- Age and co-morbidities did not correlate with adverse outcomes
- The hyperinflammatory phenotype (35.8%, 15/41), was defined by elevated ANC (>7×10⁹/L) and Plt count (>450×10⁹/L), and had a 40% rate of adverse outcomes, compared with 15.4% in the normo-inflammatory group
- After adjusting for age, the hyperinflammatory phenotype remained associated with higher odds of clinical deterioration
- A hyperinflammatory phenotype was observed in a subset of hospitalized IAV patients and was associated with worse clinical outcomes
- Further validation is required

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