

Should lower respiratory tract secretions from intensive care patients be systematically screened for influenza virus during the influenza season?

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INTRODUCTION AND PURPOSE

- ❖ Influenza is a common cause of admission to the intensive care unit (ICU) during the influenza season and influenza pandemics. However, it may be overlooked, particularly in patients with clinical manifestations that can be explained by alternative infectious or non-infectious causes.
- ❖ Suspicion of influenza may be particularly difficult when respiratory function fails or deteriorates in patients already admitted to the ICU. Data on influenza acquired during an ICU stay are scarce.
- ❖ We assessed the burden of influenza in adult ICUs and the rate of overlooked cases when the routine diagnostic work-up was applied during the influenza season.

METHODS

- ❖ **Design:** From December 15th, 2010 through February 28th, 2011, all tracheal aspirate (TA) samples obtained from adult patients (≥18 years) admitted to our ICUs and sent to the microbiology department were systematically screened for influenza.
- ❖ **Setting:** 1,550-bed tertiary referral teaching institution attending a population of approximately 750,000 inhabitants, with three different adult ICUs (medical, surgical, and cardiac surgery) and a total of 42 beds.
- ❖ **Definitions:** Influenza was defined as **unsuspected** when the testing was not explicitly requested or had not been previously requested in other samples (nasopharyngeal swabs) and the patient was not on empirical antiviral treatment immediately after sample collection. The infection was classified as **nosocomial** if symptoms started after the first 72 hours of hospital admission.
- ❖ **Virological study:** Pandemic influenza A (H1N1)v was detected by RT-PCR following the WHO/CDC protocol. Influenza B was detected using the RealTime ready Influenza B Detection Set (Roche Diagnostics).

RESULTS

- ❖ Overall, 31 patients were diagnosed with influenza (Figure 1).
- ❖ Influenza was **unsuspected** in 15 cases (48.4%) and **acquired in the hospital** in 13 (42%).
- ❖ Infection was due to the 2009 pandemic A H1N1 strain in 27 cases (87%), to influenza B in 3 cases (9.7%), and influenza A H3N2 in 1 case (3.2%).
- ❖ Unsuspected influenza was associated with older age, underlying surgical condition, longer stay in the ICU before diagnosis, nosocomial infection, localized pulmonary infiltrate, delay in initiation of antiviral treatment, and lower rates of pneumonia and ARDS (Table 1).
- ❖ Multivariate analysis revealed the independent risk factors for unsuspected influenza to be **admission to ICU for surgery, localized pulmonary infiltrate, and longer stay in ICU before diagnosis** (Table 2).

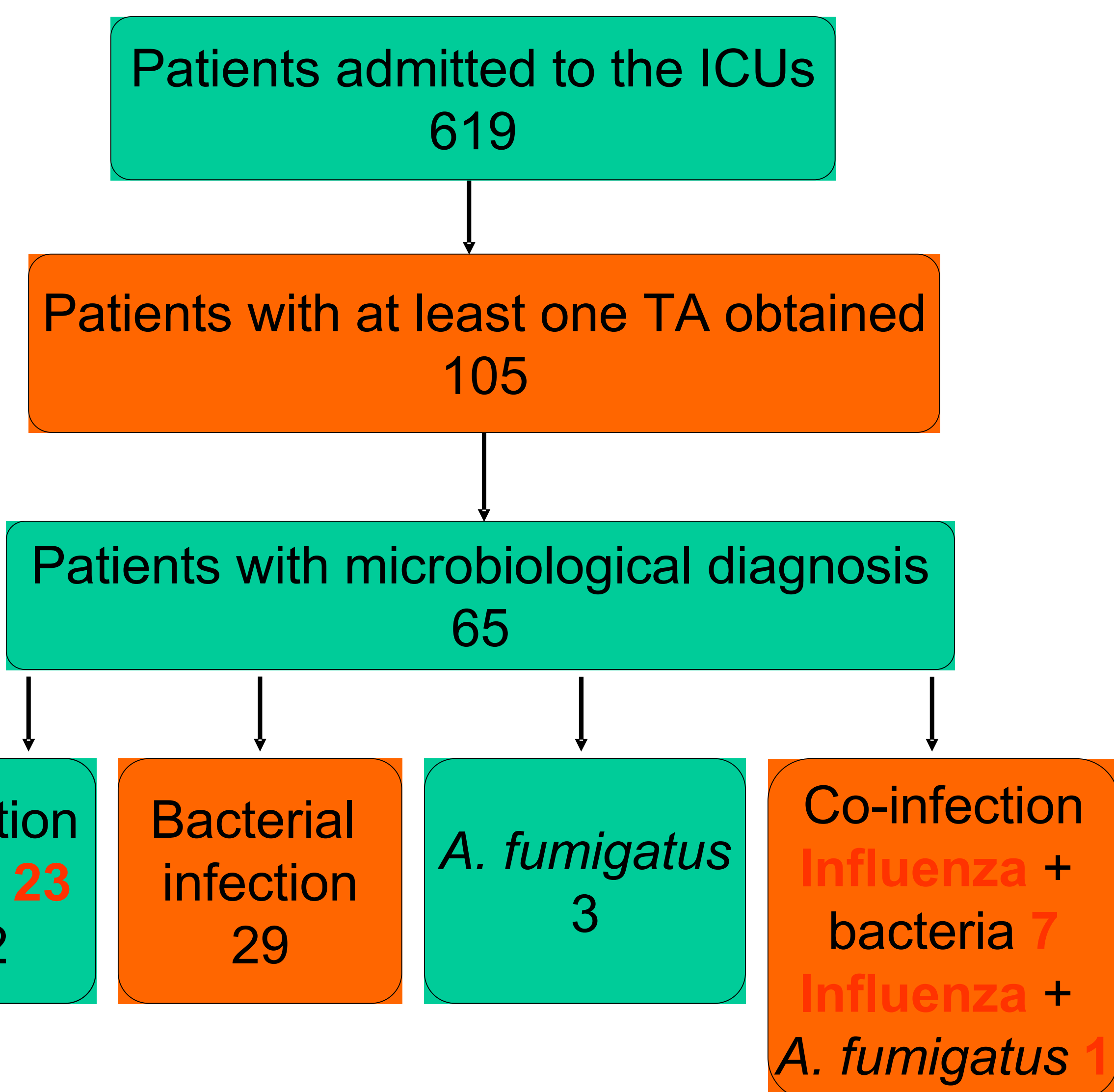


Figure 1: Flow diagram of study patients

	Suspected N=16 (%)	Unsuspected N=15 (%)	p
Age (years)	53, 42-66	69, 60-79	0.008
Male sex	11 (68.8)	9 (60)	0.71
Reason for admission to the ICU			
Severe respiratory failure	11 (68.8)	3 (20)	0.002
Surgery	1 (6.3)	9 (60)	
Cardiac arrest	3 (18.8)	1 (6.7)	
Other	1 (6.3)	2 (13.3)	
Characteristics of influenza			
Days of ICU stay before diagnosis	1, 0-1	4, 1-17	0.01
Days with symptoms before diagnosis	3, 1-6.7	5, 0-9	0.92
Nosocomial	3 (18.8)	10 (66.7)	0.01
Fever	11 (68.8)	11 (73.3)	1
Cough	15 (93.8)	8 (53.3)	0.01
Localized infiltrate on chest x-ray	1 (6.3)	6 (40)	0.04
Viral load at diagnosis	2.37, 1.10-5.42	1.4, 0.23-1.97	0.09
Co-infection	3 (18.8)	5 (33.3)	0.43
Days to antiviral treatment	2, 2-6	9, 4.5-18	0.02
Outcome			
Pneumonia	15 (93.8)	8 (53.3)	0.01
ARDS	12 (75)	4 (26.7)	0.01
Days of ICU stay	11, 4-33	27, 8-50	0.21
30-day mortality	6 (37.5)	3 (20)	0.43

Table 1: Comparison of patients with suspected and unsuspected influenza

	Adjusted odds ratio (95% CI)	p
Surgery	37.1 (2.1-666.6)	0.01
Localized infiltrate on chest x-ray	27.8 (1.3-584.1)	0.03
Days of ICU stay before diagnosis	1.3 (0.9-1.8)	0.07

Table 2: Multivariate analysis of risk factors for unsuspected influenza

CONCLUSIONS

- ❖ Influenza causes more than 30% of cases of respiratory illness among patients admitted to the ICU during seasonal epidemics. It is often overlooked (up to 48.4%), thus leading to a delay in the initiation of antiviral treatment and possible nosocomial transmission of the disease.
- ❖ Microbiology departments should systematically screen for the presence of influenza in respiratory samples obtained from patients with suspicion of lower respiratory tract infection during the seasonal epidemic.