Alternative diagnosis in the ventilator-associated pneumonia suspected bronchoalveolar-lavage negative patient

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Summary

Objective: Other infectious and non-infectious diseases have been proven responsible for mimicking the clinical picture of bacterial VAP. Aim of this study was to determine potential alternative diagnosis in patients suspected of VAP with negative BAL results.

Conclusion: The most frequently found alternative diagnoses are viral pneumonia and non-infectious pneumonitis. Early identification of the exact cause may be vital for initiation of adequate treatment and thereby patient outcome.

Introduction

- Other infectious and non-infectious diseases have been proven responsible for mimicking the clinical picture of bacterial ventilator-associated pneumonia (VAP).
- The state of the art diagnostic strategy for suspected VAP is bronchoalveolar lavage (BAL).
- If BAL is negative, a possible alternative diagnosis might mimick the clinical picture of VAP.
- Early identification of the underlying disease is important in optimizing therapy and may be vital for patient outcome.
- Aim of this study was to determine potential alternative diagnosis in patients suspected of VAP with negative BAL results.

Materials and methods

- Retrospective study at Maastricht University Medical Centre+

Patients

- Intensive care patients (≥18 yr) with a clinical suspicion of VAP and negative BAL results.
- Clinical suspicion of VAP based on clinical, radiological, and microbiological criteria.
- BAL was considered positive if cell differentiation revealed ≥ 2% cells with intracellular organisms and/ or quantitative culture results revealed ≥10^4 cfu/ml.
- Period: January 2001 - October 2006

Data collection

- The most likely alternative diagnosis was determined by 2 independent authors.
- Alternative diagnosis based on records, test results or post-mortem analysis.
- Analysis of alternative diagnosis was split in 3 groups:
  - alternative diagnosis of fever;
  - alternative diagnosis of pulmonary densities on chest X-ray;
  - alternative diagnosis of fever and pulmonary densities existing concurrently.

Results

- 110 patients with suspected VAP and negative BAL results were included.

Alternative diagnosis of fever *(table 1)*

- *Infectious pneumonia* accounted in 11 (16.1%) patients for the cause of fever.

Responsible pathogen	Diagnosis based on
Herpes simplex virus (n=7)	BAL: >10^5 genome equivalents (GE) /ml and in 1 case also confirmed by post-mortem examination
Cytomegalovirus (n=1)	BAL and blood PCR
Pneumocystis jiroveci (n=1)	BAL
Proteus mirabilis (n=1)	BAL: 2x10^2 cfu/ml and confirmed by positive blood culture
Candida albicans (n=1)	BAL: >10^5 cfu/ml

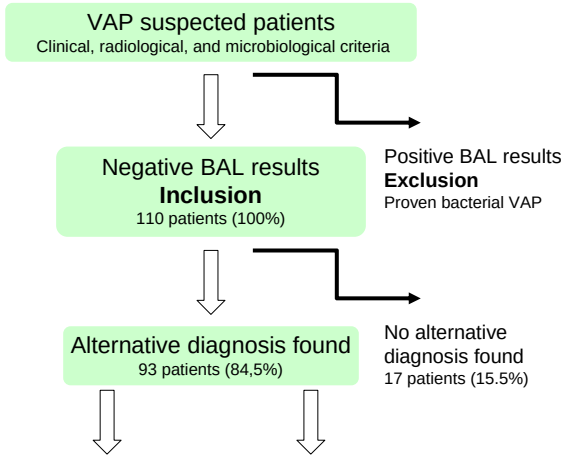

Table 1
Alternative diagnosis of fever

68 of 93 patients

Diagnosis	Patients n (%)
Infectious pneumonia	11 (16.1)
Bacteremia	9 (13.2)
Non-infectious pneumonitis	8 (11.8)
Resorption fever	8 (11.8)
Ischemia	6 (8.8)
Malignancy	4 (5.9)
Other[a]	22 (32.4)
Total	**68 (100.0)**

[a] *Less frequent causes are endocarditis (n=2), pleural empyema (n=2), peritonitis (n=2), abdominal abscess (n=2), catheter related infection (n=2), subarachnoid hemorrhage (n=2), complicated urinary tract infection (n=2), graft-versus-host disease (n=2), pancreatitis (n=1), pulmonary abscess (n=1), pulmonary embolism (n=1), pyelonefritis (n=1), cholangitis (n=1) and multi organ failure e.c.i. (n=1)*

Table 2
Alternative diagnosis of pulmonary densities

84 of 93 patients

Diagnosis	Patients n (%)
Pleural effusion	25 (29.8)
Congestive heart failure	16 (19.0)
Infectious pneumonia	11 (13.1)
ARDS	9 (10.7)
Non-infectious pneumonitis	9 (10.7)
Atelectasis	6 (7.1)
Other[a]	8 (9.5)
Total	**84 (99.9)**

[a] *Less frequent causes are interstitial lung disease (n=1), alveolar hemorrhage (n=1), empyema (n=3), malignancy (n=1), pulmonary abscess (n=1) and pulmonary embolism (n=1)*

Results *(continued)*

- *Non infectious pneumonia (NIP)* was found in 8 (11.8%) of patients.

Cause	Diagnosis based on
Bronchiolitis obliterans with organizing pneumonia (BOOP) (n=3)	2 post-mortem examinations and 1 pathologic examination of a resected lung
Drug induced pneumonia (n=3)	Strong clinical suspicion (n=1) and pathologic examination of lung tissue (n=2). Suspected drugs: Bleomycin, Tegetrol and/or depakine and Amiodarone.
Eosinophilic pneumonia (n=1)	Strong clinical suspicion and blood chemistry
Wegener's granulomatosis (n=1)	History and strong clinical suspicion

- *Bacteremia* was considered in 9 (13.2%) patients. Causes included central venous line infection (n=2), infected ascitis (n=1), urinary tract infection (n=3) and infected hematoma (n=1). In two cases its origin remained obscure.
- *Resorption fever* was considered in 8 (11.8%) patients originating from neurotrauma (n=3), multitrauma (n=2), lung bleeding (n=1), brainstem hemorrhage (n=1) and a postoperative bleeding after thoracic-abdominal aortic aneurysm repair (n=1).
- *Ischemia* was found to be the alternative cause of fever in 6 (8.8%) patients, 5 due to intestinal ischemia and 1 due to a large ischemic cerebrovascular, accident.
- *Malignancy* was suspected to be the origin of fever in 4 (5.8%) patients originating from metastatic ovarian carcinoma, metastatic squamous cell lung carcinoma, metastatic adenocarcinoma of the stomach and Morbus Hodgkin.

Alternative diagnosis of pulmonary densities *(table 2)*

- In 84 of 110 patients an alternative diagnosis of pulmonary densities was found.

Alternative diagnosis of fever and pulmonary densities

- In 59 of 110 patients an alternative diagnosis of fever and pulmonary densities combined was found.
- *Pneumonia* (n=11), *NIP* (n=8), pulmonary abscess (n=1) and pulmonary embolism (n=1) were the cause of fever and pulmonary densities, without a possible additional cause.

Conclusion

- There is a wide spectrum of alternative diagnosis in patients suspected of VAP with negative BAL results.
- The most frequently found alternative diagnoses are viral pneumonia and non-infectious pneumonitis.
- Early identification of the exact cause may be vital for initiation of adequate treatment and thereby patient outcome.

Further information

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