

TITLE : POSTOPERATIVE NOSOCOMIAL PNEUMONIA IS FREQUENTLY POLYMICROBIAL : AN HISTOLOGIC AND BACTERIOLOGIC STUDY

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INTRODUCTION

An experimental study performed in mechanically ventilated baboons recently showed that nosocomial pneumonias are typically polymicrobial¹. This was already suspected in a limited number of critically ill patients who died with nosocomial pneumonia². In this study, we looked at the correlations existing between histologic and bacteriologic findings in a large series of patients who died with nosocomial pneumonia.

METHODS

Patients : From February 1987 to April 1988, 29 critically ill patients (mean age 57 ± 20 yrs) who were initially admitted in the SICU following severe multiple trauma ($n = 9$) or postoperative complications ($n = 20$), were studied. All patients suffered from acute respiratory failure of various origin (ARDS = 13, pulmonary contusion = 3, inhalation pneumonia = 2, bacterial pneumonia = 11) and remained under mechanical ventilation (for a mean duration of 18 ± 15 days) until they died. During their stay in the SICU, most of the patients were considered to have nosocomial pneumonia and received parenteral antibiotics.

Lung specimen collection : In the 30 minutes following death, one entire lung was taken through a post-mortem thoracotomy performed under surgical conditions. The patient was positioned in the lateral decubitus and a large posterior incision was performed in the fifth intercostal space. The entire lung was then carefully inspected, and a small sample (1 cm³) was taken from each lobe suspected of harboring pneumonia for immediate bacteriologic examination. All cultures were incubated for 24 to 48 h in 5 % CO₂ in air at 37°C. Organisms were identified in the usual fashion and were divided for convenience into gram-negative bacilli (GNB) and gram-positive organisms (GPO). Multiple lung specimens (mean 10 per patient) were removed and processed for histologic examination. Pneumonia was histologically defined as the presence of an intense polymorphonuclear leucocyte accumulation within bronchioles and adjacent alveoli. These foci of lung infection were in all cases disseminated within large zones of non specific alveolar damage characterized by the presence of hyaline membranes, interstitial fibrosis, proliferation of pneumocytes II, vascular thrombosis and alveolar edema. These post-mortem lung biopsies were done according to the french law which allows taking organs for purpose of transplantation or scientific research unless the patient put a ban on it before death (law n° 781181, December 22, 1976 followed by the statutory order n° 78501 of March 31, 1978 and the implementation order of April 3, 1978).

RESULTS

1) As shown in figure 1, polymicrobial pneumonia was found in 48.3 % of the patients. In 12 patients (41 %) different microorganisms were found in the different lobe samples whereas in 17 the same microorganisms were found in each lobe sample.

2) Forty six different bacterial species were identified. As shown in figure 2, GNB were largely predominant. Among the 28 GNB isolated, 13 (46 %) were identified as pseudomonas. Among the 11 GPO isolated, 9 (82 %) were identified as staphylococcus.

DISCUSSION

This study clearly demonstrates that nosocomial pneumonia is frequently polymicrobial in critically ill patients under mechanical ventilation. Moreover, it shows that different lung areas can be infected by different microorganisms and that gram-negative bacilli remain largely predominant. These results, which confirm recent experimental studies¹, may have important clinical implications. The identification of several microorganisms when using an appropriate technique for diagnosing nosocomial pneumonia in ventilated patients, should not be always considered as a proof of bacteriologic contamination and should be taken into consideration when choosing parenteral antibiotherapy.

REFERENCES

- 1 - Johanson et al *Am.Rev.Resp.Dis.* 137 : 259, 1988
- 2 - Chastre et al *Am.Rev.Resp.Dis.* 130 : 924, 1984

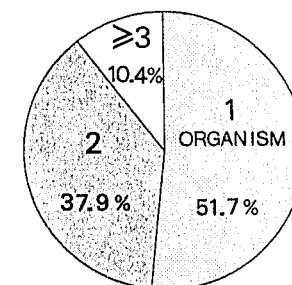


FIGURE 1 : Number of microorganisms found per lung in 29 patients with nosocomial pneumonia

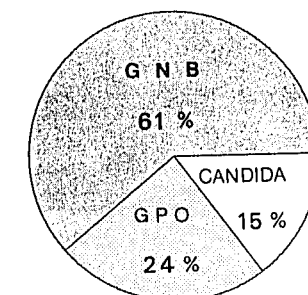


FIGURE 2 : Frequency of gram-negative bacilli (GNB), gram-positive organisms (GPO) and candida among the 46 bacterial species identified