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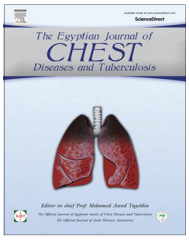

ORIGINAL ARTICLE

Comparison between bronchoscopic BAL and non-bronchoscopic BAL in patients with VAP

Mohammad H. Afify [a], **Enas A. Shaheen** [a], **Samy S. El-Dahdouh** [b], **Hanady M. El-Feky** [a,*]

[a] *Department of Anaesthiology, Intensive Care and Pain Management, Faculty of Medicine, Menoufia University, Abd Elnaser St., Shebein Elkom, Menoufiya, Egypt*
[b] *Department of Chest Diseases and Tuberculosis, Faculty of Medicine, Menoufia University, Egypt*

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KEYWORDS

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Abstract *Background:* The diagnosis of ventilator associated pneumonia (VAP) remains a challenge because the clinical signs and symptoms lack both sensitivity and specificity and the selection of microbiologic diagnostic procedure is still a matter of debate. *Objective*: To compare the diagnostic value of bronchoscopic BAL and non-bronchoscopic protected BAL in patients with VAP. *Materials and methods*: Twenty patients, clinically diagnosed with VAP, were involved in this research; they were evaluated by bronchoscopic and non-bronchoscopic BAL for diagnosis of VAP. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of bronchoscopic and non-bronchoscopic BAL were calculated, taking clinical pulmonary infection score (CPIS) of $\geqslant 6$ as reference standard. *Results*: There was a good microbiologic concordance and strong correlation between bronchoscopic BAL and non bronchoscopic BAL in diagnosis of VAP. There was a high concordance between CPIS score and both procedures' results. Percentage of concordance between CPIS and bronchoscopic BAL was 97.5% and with non bronchoscopic BAL was 95%. Gram negative organisms were the commonest organisms isolated by both techniques. *Conclusion*: Non bronchoscopic BAL is an inexpensive, easy, and useful technique for microbiologic diagnosis of VAP. This finding, if verified, might simplify the approach for the diagnosis of VAP.

Introduction

The diagnosis of ventilator associated pneumonia (VAP) remains a challenge because the clinical signs and symptoms lack both sensitivity and specificity and selection of microbiologic diagnostic procedure is still a matter of debate [1]. Accurate clinical and microbiologic diagnosis of VAP is

* Corresponding author. Tel.: +20 01003274372.
E-mail address: dbasiony@gmail.com (H.M. El-Feky).
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essential not only for selection of appropriate antimicrobials but also to prevent their misuse. The invasive diagnostic methods, including quantitative cultures of distal airway specimens obtained by using bronchoscopic bronchoalveolar lavage (BAL) could improve identification of patients with true VAP and selection of appropriate antibiotics [2,3]. However, bronchoscopy requires technical expertise and adds to the cost of care. In an attempt to overcome these limitations, non-bronchoscopic distal airway sampling methods have emerged, like non-bronchoscopic BAL (NBAL) and non-bronchoscopic PBS [4,5].

Aim of the work

To compare the diagnostic value of bronchoscopic BAL and non-bronchoscopic protected BAL in patients with VAP.

Patient and methods

This prospective comparative study was conducted in intensive care unit (ICU) at Menoufia University Hospitals. Patients older than 17 years who required ventilatory support for more than 48 h or more with clinical and radiological diagnosis of VAP according to CPIS score were enrolled. Patients with diagnosis of community acquired pneumonia or hospital acquired pneumonia before starting of mechanical ventilation and who mechanically ventilated in another hospital for 48 h or more before admission were excluded.

In each patient, Two respiratory samples were collected which include bronchoscopic BAL and NB-BAL. To avoid contamination of the lower airways, the non-bronchoscopic sampling was performed first; before either procedure, the ventilatory settings were adjusted by increasing tidal volume by 100 ml and FiO_2 to 1.0. All the vital signs including heart rate, blood pressure, temperature and oxygen saturation were monitored during the procedure. A special elbow adaptor mounted on the endotracheal tube allows catheter or the flexible bronchoscope to be inserted while the patient is on the mechanical ventilator. The seal on the hole of elbow adaptor was open during the procedure and therefore airway pressure was not maintained during the procedure. Sedation was maintained with boluses of 3–5 mg of intravenous midazolam as required (see Figs. 1 and 2).

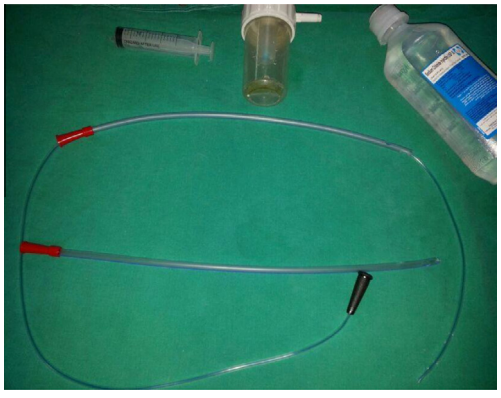

Figure 1 NB-BAL catheters used in the study.

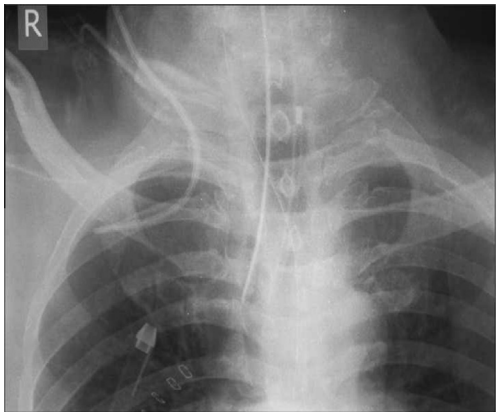

Figure 2 Chest X-ray showing the site of catheter wedge in NB-BAL.

NB-BAL was performed by the double catheter technique. A sterile suction catheter of size 16 Fr was cut 2–3 cm from the distal end to give a final length of about 47–48 cm and inserted through the endotracheal tube and blindly advanced into the distal airways till resistance is felt then the catheter was wedged in that position. A second 50-cm long sterile suction catheter of size 8 Fr was passed through the first catheter and advanced as far as possible and chest X ray was done to confirm that the site of suction tip catheter wedged in the right lung and normal saline (150 ml) was instilled through the inner tube and aspirate was collected in a sterile container by suction.

Then, bronchoscopic BAL, Using (Pentax FB, 18-TV, with internal diameter of 2 mm), any patient having contraindication for fiber-optic bronchoscopy is excluded as; 1 – Severe uncorrected hypoxemia despite the administration of supplemental oxygen. 2 – Unstable cardiovascular or hemodynamic status. 3 – Coagulation defects. The prothrombin concentration should be greater than 70%, and the platelets count greater than 60,000/mm [3].

Once the site had been chosen, the bronchoscope was advanced into a subsegmental bronchus until the tip was wedged. Care must be taken to avoid "over wedging" the bronchoscope, since this can result in additional trauma to the airway and diminish fluid recovery. A good wedge position was confirmed by noting slight airway collapse when gentle suction is applied. A poor wedge position allows leakage of lavage fluid around the bronchoscope. Optimum fluid recovery occurs when the bronchoscope completely occludes the bronchial lumen of a 3rd or 4th bronchial subsegment. Normal saline (commercial 0.9 percent NaCl) was used as the instillate. We used two to three sequential aliquots of 50 mL each. Using tubing with three way stopcock, a saline-filled 50 mL syringe was attached to the side port of the bronchoscope. The first aliquot of saline was instilled slowly and steadily. After the first aliquot of saline was infused, it was recovered immediately into the same syringe by gentle continuous hand suction. Suction should be gentle enough that visible airway collapse should not occur. In patients with marked airway collapse despite gentle suction, the suctioning process was slowed, and discontinuous suction was used to maximize fluid retrieval. When no further fluid could be aspirated, the stopcock was closed and the syringe (but not the tubing) removed. The second saline filled syringe was attached to the tubing