Role of Induction of Sputum in Various Respiratory Diseases of Infective Etiology

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Introduction

Sputum induction is a procedure used for patients who have trouble producing sputum spontaneously. Sputum induction is simple, cost-effective and non-invasive procedure and if successful, often precludes the need for bronchoscopy. Quality of sputum is important for diagnosis of various respiratory disease. Poor quality sputum may miss the diagnosis of TB or other respiratory diseases of infective etiology.¹

Materials and Method

This is hospital based study conducted during February 2018 to August 2018. 100 patients were taken for the study who were not able to produce good quality of sputum. Patients attaining OPD of respiratory medicine with symptoms of fever, cough with or without sputum production etc. are subjected to chest X-ray and sputum smear and culture examination. If patient suspected of having community acquired pneumonia or tuberculosis but no organism found in sputum examination, than patients are subjected to induction of sputum with 3% Normal Saline.

Method of Induction of Sputum

In this study sputum induction was done by ultrasonic nebulization of sterile hypertonic saline (3%) solution. First nebulization with 200mg of salbutamol was given to the patient as pretreatment. Pre-induction spirometry 10 minutes before and 10 minutes after salbutamol nebulization was done. After placing a nasal clip, induction was started with 3% hypertonic saline (5 to 7 ml). Patient was asked to expectorate whenever he/she feels or at every 5 minutes. If sputum sample was inadequate, induction can be continued for another 5 minutes. Nebulization was given maximum for 3 times, every time with 5 to 7 ml of 3% hypertonic saline. FEV1 and PEF is also checked at every 5 minutes. Procedure is stopped after 20 minutes if FEV1 dropped by 20%. Resuscitation equipment was available in the place where the sputum induction was undertaken and a chest physician was available to supervise the procedure. Nebulization was carried out for around 15 minutes and then sputum was collected in sterile container. Induced sputum then subjected to the examination according to the requirement.

Result and Discussion

83% patients produce adequate, mucoid or purulent sputum, in which 66.67% salivary samples converted to mucoid after induction of sputum.

After induction of sputum, total 37% of samples became positive for mycobacterium tuberculosis on smear examination and in 8% sample, microorganism causing pyogenic pneumonia detected and 6% sample positive for both AFB and pneumonia causing organism. Sensitivity of detection of microorganism on smear is 61.45% and specificity is 100%. Positive predictive value is 51% and negative predictive value is 34.69%.

A study by Saurabh Biswas et al showed, 32% patients positive on smear examination after induction as compared to our study observation which turns out to be 37% tuberculosis detection rate.² Smear positivity was 42.5% in a study by Dr. Ajay Upadhyay which is higher than our study.³

References