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Case Study

Significance of Emergency Bronchoscopy; Significance in Essential Emergency Critical Care Setting

Gurjeet Singh

Hospital Selayang, Malaysia 68100 Rawang, Selangor, Malaysia

Corresponding Author's Email: gurjeet.s@live.com

Abstract

Introduction: Emergency bronchoscopy was not a routine procedure in the emergency department. However its use is being significantly advocated in the setting of emergencies. **Case study**: A middle aged male patient presented to them with shortness of breath. **Discussion:** Bronchoscopy performed by emergency physicians who have been certified and who have an area of interest in emergency critical care among the patients who are critically ill, especially those with respiratory impairments have started to become an important therapeutic as well as diagnostic tool. In this article we discuss the procedure involved in emergency bronchoscopy in the emergency department of Hospital Selayang. **Conclusion:** Emergency bronchoscopy services have taken its importance in emergency critical care management of patients.

Keywords: *Bronchoscopy; Emergency Physicians; Respiratory Impairments*

Introduction

Bronchoscopy has been a tool in the diagnostics of airway diseases for a long time and until recently has found its areas of advancement and significance (Rosell & Stratakos, 2020). Bronchoscopy is usually carried out by pulmonologists, respiratory physicians in the medical wards and critical care units of the hospitals (Agrawal, 2021). Until recently, critical care units in the hospitals have been overcrowded and thus the critically ill patients would require monitoring in the emergency department for longer (Owyang *et al.,* 2019) Therefore, the emergency physicians especially the emergency critical care specialist have picked up bronchoscopy as a tool to help in the diagnostics and therapeutics of airway management (Adi *et al.,* 2022).

Case Description

A middle aged male patient presented to them with shortness of breath. Further history taking had indicated the patient had failure symptoms which were attributed to cardiac failure. The patient examined and was shown to have crepitations in the lungs up till the midzone. The ultrasound of the lung was done and showed to have a B profile which indicated acute pulmonary edema. On monitoring it was noted that the patient was not saturating well even on high flow oxygen requirements and non-invasive ventilation. Blood gasses showed that the patient had a type one respiratory failure with a mismatch in the Alveolar arterial gradient, The patient was thus intubated for type 1 respiratory failure to improve oxygenation. The chest x ray inserted in figure 2 shows the grade 4 acute pulmonary edema that the patient was having.

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The emergency physician was consulted and decided to do a bronchoscopy for the patient. The indications in this patient were both therapeutic and diagnostic. The diagnostic aspect was to assess the patient's airways which could be clogged due to thick mucous secretions as were observed in the ETT tube which needed regular suctioning. The therapeutic indication was to do a suctioning of the mucus to clear the airways, improve air flow, improve PEEP and thus improve alveolar oxygenation.

The patient had no contraindications of a bronchoscope and was deemed a suitable candidate. E had no recent myocardial infarction, hypercarbia or unstable bronchial asthma.

The patient was given rocuronium as a paralytic to prevent laryngospasm to minimize complications. The ventilator setting was adjusted to a volume control mode, with an Fio2 of 1, tidal volume on the higher range to increase minute ventilation and prevent co2 retention and maintain oxygenation during the procedure, PEEP was kept at 5 to prevent auto peep during the bronchoscopy, airway pressure alarm was increased as airway pressures might increase above 40 peak pressures on bronchoscopy as the airway is narrowed, Inspiration and expiration was kept at 1:2 and respiratory rate was at 16

The bronchoscopy was done with an assistant, and it showed mucous plugging at both the bronchus at the left and right and also at the terminal branches of the bronchi. Bronchial mucus was flushed with saline and suctioning was a;lso done to clear the airway of the mucus causing obstruction to the airflow. The bronchoscopy lasted about 60 seconds. (Fugure 1 and 1a)

Post procedure there were no complications such as pneumothorax as seen on the x-ray (figure 3), no arrhythmias or bronchospasm. Post procedural x ray shows the increased air-filled lungs, clearing of the mucous and debris and improvement in the lung fields and improvement in the grade of pulmonary edema.

Figures 1 and 1a: Showing emergency bronchoscopy being performed in the emergency department.

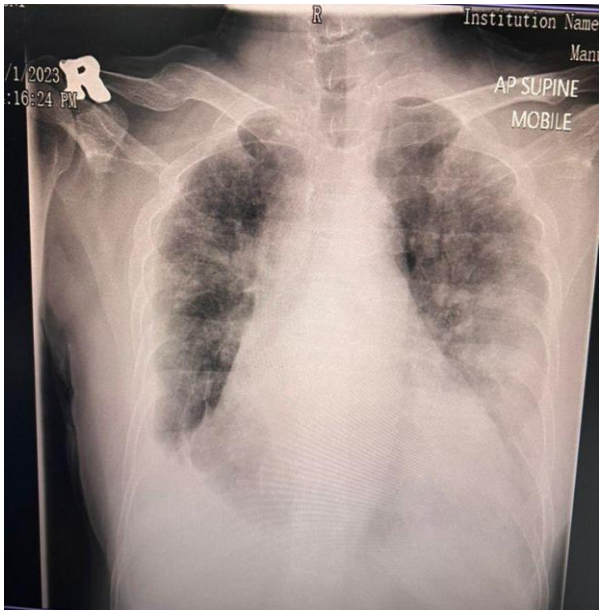

Figure 2 : Pre bronchoscopy x Ray

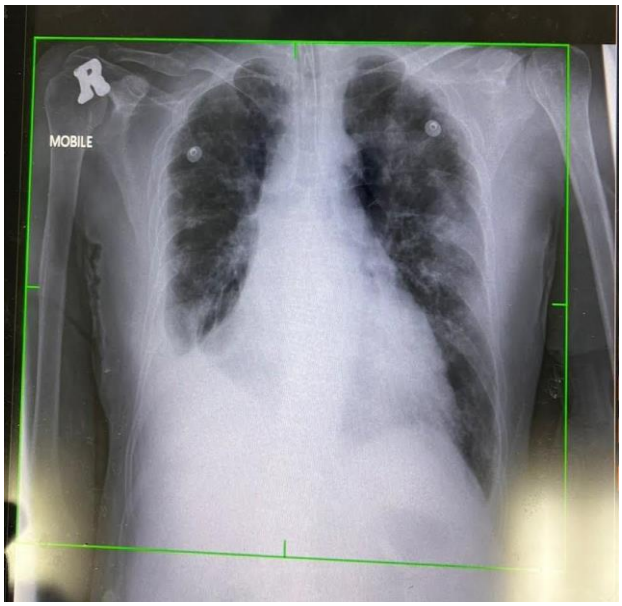

Figure 3: Post bronchoscopy x ray

Discussion

The indications for an emergency bronchoscopy procedure would be for diagnostic and therapeutic purposes.

- Diagnostic: bronchial washing, to assess airway patency
- Therapeutic: Removal of FB, retained secretion, Fiberoptic intubation

Contraindications for a emergency bronchoscopy would be, Uncooperative patient, Recent myocardial infarction, Hypoxemia or hypercarbia and Unstable bronchial asthma

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Complications that can be monitored for after an emergency bronchoscopy would include Pneumothorax, Hypoxemia, Arrhythmia (Tachycardia or bradycardia) and Bronchospasm

Anatomy and landmarks references chart

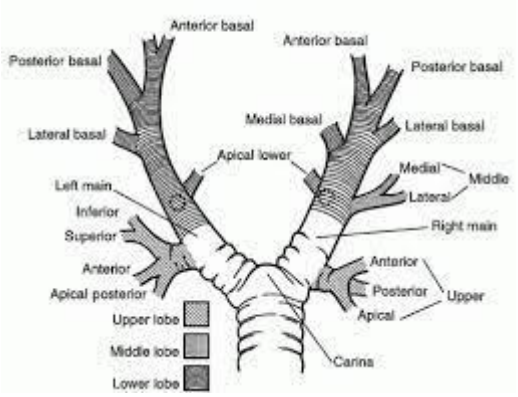

Figure 4: Right and left main bronchus

Right side has anterior, middle and posterior branches, Anterior has apical posterior and anterior branches, Middle has lateral and medial branches, Posterior has anterior posterior middle lateral.

Left side has Superior and inferior branches, Superior has apical posterior anterior, Lower has anterior posterior middle inferior

Preparations for an emergency bronchoscopy must include ET tube must be 2 mm larger than bronchoscope, Adequate sedation, Muscle relaxant may be needed, Stabilize BP, Aspirate NG tube content, Ventilator adjustment: Mode SIMV, Fio2 1, TV 8mls/kg, Peep normal peep, (beware of auto peep), airway pressure mute alarm, i:e ratio 1:2, Lower rr to prevent auto peep, Continuous VS monitor, ETCo2 is a good option, Documentation, Cleaning, Check ETT when finished procedure.

Conclusion

Emergency bronchoscopy services have taken its importance in emergency critical care management of patients. Emergency physicians that have been trained and certified in the procedure can perform this procedure relatively safe and functional knowing the indications and contraindications of select patients. It is a relatively quick procedure and can help in improving the respiratory compromise of the patient by clearing the airway and improving the ventilation as well as airway assessments. This tool proves to be an essential component in emergency critical care services and should be implemented in critical care zones of emergencies.

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