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ANAESTHETIC CONSIDERATIONS IN PATIENT WITH COIN IN TRACHEA'

Anesthesiology

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ABSTRACT

Foreign body can only enter the air passage if there is some interference with the normal reflex action, such as sudden inspiration while eating, playing, fright or laughter. Inhalations of foreign bodies are more common in children as compared to adults. Anaesthetic management for removal of FB is a great challenge to an anaesthetist. Sharing of airway by both anaesthesiologist and surgeon poses difficulty in ventilation. We report a case of inhalation of rare foreign body i.e. coin in an adult patient.

KEYWORDS

Foreignbody trachea; Coin in trachea; Anaesthetic management for brochoscopy

Introduction

Inhalation of foreign body is an uncommon occurrence. Foreign body (FB) can only enter the air passage if there is some interference with the normal reflex action, such as sudden inspiration while eating, playing, fright or laughter.[1] Inhalation of foreign body are more common in children as compared to adults. The larynx performs a very efficient sphincteric function to protect the lower respiratory tract and it is unusual for a foreign body to be inhaled as opposed to being swallowed especially in adults.[2] Symptoms in adults depend on the site of the FB impaction. The classical triad of cough, dyspnea, and cyanosis occurs in only a small percentage of patients. A non-asphyxiating FB may be asymptomatic.[3] The most common foreign bodies recovered from the trachea are peas, beans, almonds, plastics, pins, seeds, metallic objects, denture etc.[4] A case of coins in trachea of an adult, is reported for its rareness. We herein report inhalation of rare foreign body i.e. coin in adult patients.

Case Report

A 50 years old man presented in accident and emergency department of our institution with history of mild respiratory distress and difficulty in speech. He was amusing his grand children by hiding the coin in mouth but it accidently slipped into the trachea. He was otherwise afebrile and acyanotic. His vital signs were normal. On auscultation, there was harsh vesicular breathing with equal air entry on both side of chest. X-ray soft tissue of neck revealed a rounded radio opaque foreign in subglottic region (Fig-1&2). Patient was planned for removal of foreign body. In the operation theatre monitoring included ECG, SpO2 and Noninvasive blood pressure (NIBP). Injection glycopyrrolate 0.2 mg was administered, 100 % preoxygenation was done. Patients were induced with ketamine 2 $mg.kg^{-1}$ and short-acting depolarising muscle relaxant, succinylcholine, 1.5$mg.kg^{-1}$ was administered after ensuring that the patient could be ventilated. Muscle relaxants are used with the aim of abducting the vocal cords for the removal of the FB bronchoscopically. Anaesthesia was maintained with Halothane. Patient was ventilated gently for 1 minute and direct laryngoscopy was performed. On direct laryngoscopy we could visualise shining object in subgllotic area. With the help of magill's forecep we managed to extract the foreign body. Intraoperative as well as postoperative period remained uneventful.

Fig.1 X-ray chest with neck AP view showing coin in trachea

Fig.2 X-ray chest with neck lateral view showing coin in trachea

Discussion

The incidence of foreign body in food passage is more common than in the air passage.[1] The effects of foreign body aspiration are dependent on the site of lodgement, degree and duration of obstruction. Upper airway involvement varies from complete obstruction with hypoxia and cardiorespiratory compromise to partial obstruction with coughing, wheezing, drooling, stridor, cyanosis and respiratory distress.[4, 5] Foreign bodies located in the lower airway lead to pulmonary changes dependent on the type of impaction. Chatterji and Chatterji (1972) described four types: **check valve**; in which air can be inhaled but not exhaled resulting in emphysema, **ball valve**; in which air can be exhaled but not inhaled giving rise to collapse of the bronchopulmonary segment, **by-pass valve**; whereby the foreign body partially obstructs both inspiration and expiration, and **stop valve**; where there is total blockage causing airway collapse and consolidation.[5]

Bronchoaspiration of a FB is not common in adults. Risk factors for the bronchoaspiration of a FB in adults are older age, abuse of sedative medications, neurological disorders (vascular dementia, Parkinson's), mental retardation, trauma with loss of consciousness, dental care, alcoholism, and medicalprocedures.[3,6] The symptoms and sign depend on the size and nature of the foreign bodies as well as the degree of obstruction. Small & smooth metallic foreign bodies such as pin allow uninterrupted passage of air, while a large foreign body may cause a total occlusion of the airway. A large foreign body like a coin or a marble will tend to lodge in the pharynx or trachea and cause immediate and severe respiratory distress, while smaller foreign bodies like peanuts may lodge in the bronchus and after an initial episode of coughing, may occasionally go undetected for a period of time.[7] Coughing, gagging and throat clearing are reflexes that protect the airway and may indicate that obstruction is not total.[4] It is useful to know that on anterior-posterior neck films, coins in the esophagus may

lie in the frontal plane, whereas coins in the trachea often lie in the sagittal plane because of the vocal cords.[8] In our case the foreign body was rounded in shape, approximately 2.3 cm in diameter. It was in saggital plane and was lodged in subglottis. As it was a thin foreign body, it did not produce any significant respiratory distress. X-rays are only useful in radio-opaque foreign bodies.[9] When the FB is not radiopaque, it is not detected in the radiograph, but may be suspected due to the presence of atelectasis, pneumonitis, air trapping, or mediastinal displacementin the exhaled chest radiograph.[3]

Anaesthetic management for removal of FB is still a challenge. Sharing of airway by both anaesthesiologist and surgeon poses difficulty in ventilation. Associated oedema and inflammatory changes in tracheobronchial tree predispose these patients to severe bronchospasm.[10] A major controversy in the anaesthetic management of patients undergoing bronchoscopy for FB removal is whether to control ventilation or to maintain spontaneous ventilation. The risk of controlled ventilation is forcing the FB deeper into the small airways, and the risk for the spontaneously-breathing patient is his unexpected movement or cough. [11] IPPV may push FB distally into smaller airways or may cause ball valve effect resulting in distal airway trapping and making retrieval of the object more difficult with clinical deterioration of the patient. The major disadvantage of the spontaneous ventilation technique is the requirement for a depth of anaesthesia sufficient to prevent patient movement and coughing during the procedure. Coughing occurs if anaesthesia lightens, and may help move the foreign body towards the bronchoscope, but at the same time may make it more difficult for the endoscopist to grasp the object. When halothane is used as the primary anaesthetic during this procedure, concentrations that obliterate airway reflexes may cause decreased myocardial contractility. Desaturation may need to convert it in assisted ventilation. The major advantage cited by proponents of spontaneous ventilation is the lack of a disruption of ventilation when the surgeon is attempting to retrieve the foreign body with the bronchoscope's ocular piece open.[12]

Use of IV inducing agent propofol followed by suxamethonium is most popular technique.[10] Some authors recommend the administration of IV and/or topical lidocaine when using this technique. Lidocaine diminishes airway reflexes and allows the use of a smaller concentration of halothane. These days sevoflurane has replaced halothane as the inhaled anaesthetic of choice. The lack of decreased cardiac contractility with sevoflurane as compared with halothane may obviate this problem during this procedure. The alternative technique for maintenance of general anesthesia during bronchoscopy is continuous infusion of IV anesthetics. Propofol and remifentanil, for example, are noncumulative when used for a relatively short period of time and eliminate the requirement for the bronchoscopist (and other operating room personnel) to inhale anaesthetic vapors when the ventilating system is open during foreign body retrieval. Short-acting muscle relaxants are preferred because the termination of the procedure is often difficult to predict.[12]

With the exception of muscle relaxants, the main purpose of pharmacological agents for patients undergoing bronchoscopy is the blockade of undesirable physiologic responses associated with airway manipulation such as coughing, gagging, laryngospasm, bronchospasm, hypertension, bradycardia and tachycardia. Anticholinergics are usually given prior to bronchoscopy for reduction of airway secretions, attenuation of vagal-mediated bradycardia and blockade of reflex broncho-constriction. If bradycardia is encountered or there is any evidence of hypoxia, priority for management must be given to the anaesthetist and adequate ventilation established.[5] None of these problems were encountered in our patients.

Conclusion

Aspirated foreign bodies continue to present challenges to anaesthetist and otorhinolaryngologists. The major issue involves the accurate diagnosis, speedy and safe retrieval of the foreign body.The timely diagnosis and management of foreign body aspiration is extremely important. Missed or delayed diagnosis can result in respiratory complications ranging from chronic wheezing or recurrent pneumonias to life threatening airway obstruction or lung abscess.[4]

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