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Case Report

Foreign Body Removal Using Bronchoscopy and Argon Plasma Coagulation

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Foreign Body Aspiration can be a life threatening event especially for young children with smaller diameters of airway size. The foreign body can result in body response and granulation tissue formation around the object which makes the foreign body removal difficult. In such situations surgical intervention is usually needed but with interventional pulmonology modalities we can restrict the need of surgery.

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Introduction

Foreign body aspiration (FBA) is common worldwide between children and can be a leading cause of death due to delay in diagnosis and therapeutic procedures.[1,2]

The signs and symptoms of FBA can vary between acute suffocation and death due to chronic and nonspecific respiratory symptoms.[3] For example, a missed foreign body (FB) can present with fever in addition to other signs and symptoms of a pulmonary infection. A plain chest X-ray in suspected situations can help to determine exact diagnosis but it also has both a low sensitivity and specificity.[1] It is well known that in this condition a rigid bronchoscopy is the gold standard for diagnosis and management of FB removal under general anesthesia.[1] Argon plasma coagulation (APC) is a mode of thermal tissue destruction and can be used with both rigid and flexible bronchoscopy. It is a fairly rapid procedure which is determined by heat and tissue interaction.[4] APC is one of the interventional pulmonology techniques which can be used in this field but it is not routinely used for FB removal. In this article, we present an FBA case in which the FB has been extracted by rigid bronchoscopy along with APC.

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Case Report

A 7-year-old male was referred to our interventional pulmonology unit due to a previous history of FBA. He had been in a car accident five days earlier and was admitted to the ICU because of head trauma and loss of consciousness. He had no history of spinal cord injury or spine fracture. Physical examination did not show any significant problem other than loss of consciousness. The patient's GCS was nine. A chest X-ray was performed and (Figure 1) opacity was seen in the middle of the right lung. This was suspected to be the patient's tooth that was localized in the bronchial tree after extraction by trauma. There was no evidence of atelectasis or lobar infiltration distal to the FB region. A rigid bronchoscopy was performed by use of a number 6 rigid lumen under general anesthesia followed by a flexible bronchoscopy in order to evaluate the situational condition of the FB (Figure 2). It was confirmed

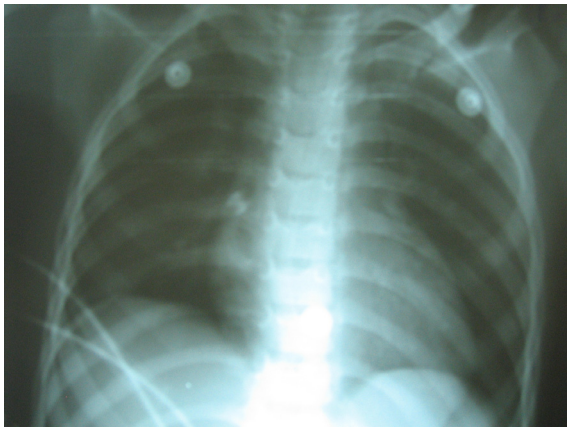

Figure 1. CXR of the aspirated tooth

that the FB was the tooth which was located in the proximal part of the right lower lobe bronchus. Through a flexible bronchoscope, we used multiple forceps including a tripoid type grasping forceps, grasping forceps alligator jaws, grasping forceps Rat tooth jaws and biopsy forceps alligator jaws. However, we were not able to extract the FB. We found severe mucosal elongation and granulation tissue around the FB which had fixed the object in that area due to the length of time that the FB was in the right intermedius bronchus. Transposition of the FB was restricted rendering removal of the FB impossible via routine force of experimental forceps. Therefore, we decided to use APC to remove the tissue that surrounded the FB. APC was performed by 0.5 L/m gas flow and 30 watts in monopolar noncontact form (Figure 3). After this procedure, the FB was released and easily extracted by a basket type of grasping forceps.

Discussion

Acute airway obstruction with imminent suffocation requires immediate intervention to promptly re-open the airway passage.[5,6] The efficacy of interventional pulmonology in diagnosis and management of acute airway obstruction has been established by several minimally invasive diagnostic and therapeutic approaches.[7] Before the development of bronchoscopic intervention, FBA often had a fatal outcome due to acute suffocation with 50% mortality rates.[8] In 1897, Gustav Killian, a German otolaryngologist, performed the first bronchoscopy using a rigid esophagoscope to successfully remove a foreign body (a pig bone) from a farmer's airway. Later, Chevalier Jackson expanded the clinical use of rigid bronchoscopy and supplementary equipment for foreign body extraction.[9]

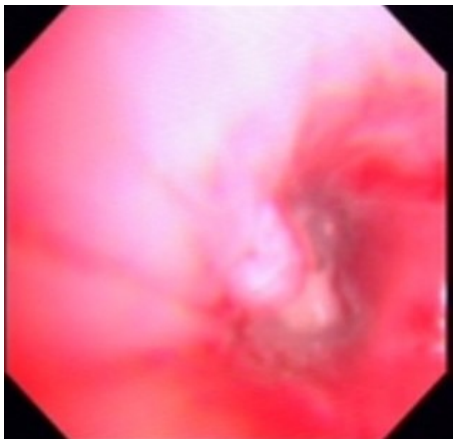

Figure 2. Bronchoscopic aspect of the foreign body

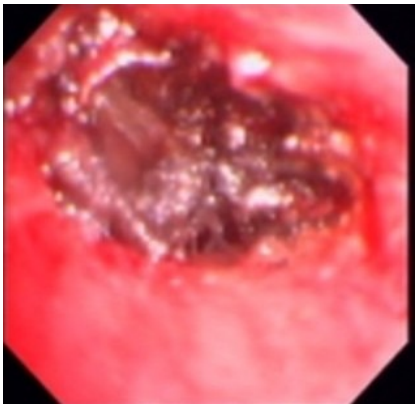

Figure 3. APC was performed around the tooth to remove granulation tissue

During the past several years rigid bronchoscopy has been the procedure of procedure of choice for FB removal. After 1970, rigid bronchoscopy has been rapidly replaced by flexible bronchoscopy in several diagnostic and therapeutic managements. However, rigid bronchoscopy is more useful in FB removal because of a better visualization and instrumentation field.

APC is a noncontact mode of monopolar electrical coagulation where argon gas is used as the conductive medium Indications for APC are any benign or malignant tissue destruction, coagulation of hemorrhage from an endoscopically-visible source, relief of post intubation stenosis and treatment of granulomatous lesions in the airways (lesions located in close vicinity to airway stents).

In this article we are introducing a case of FBA who did not show any significant signs or symptoms for FBA because of loss of consciousness. It is important to know that in any patient with multiple trauma, this condition can

happen and cause a life threatening event. Further evaluation of FBA by either chest X-ray or diagnostic flexible bronchoscopy is recommended in critically ill patients with whom it is not possible to communicate. In this situation, we initially used a rigid bronchoscope with a number 6 lumen in order to have better access and a permanent visual field. Then we used a flexible bronchoscope via a rigid lumen to evaluate the condition of the FB. Several forcipes were used but they were not suitable for removal of the fixed FB. Therefore, we used APC at the site of the complicated area; a procedure which has rarely been reported for FB removal. APC is a useful modality in the intervention for FB removal with granulation tissue formation due to a prolonged length of time following aspiration.

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