

A Case of Radiolucent Foreign Body (Temporary Resin Bridge) Aspiration Accompanied by Inflammatory Polyps

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방사선 투과성 이물 흡인(Temporary Resin Bridge)에 의한 염증성 용종 1예

문설경, 이지명, 정해빈, 송주용, 김성경, 이상학, 윤형규, 이숙영, 김석찬, 문화식

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기관지 이물 흡인은 생명을 위협할 수 있는 응급 질환으로 자세한 병력 청취, 증상, 이학적 검사, 방사선학적 검사를 통해 진단할 수 있다. 하지만 흡인 물질이 방사선 투과성이거나 환자가 흡인 사실을 기억하지 못한다면 진단에 어려움이 따른다. 본 증례는 환자가 방사선 투과성 물질인 임시 수지 가공의치(temporary resin bridge)를 흡인하였으나, 환자가 이를 인지하지 못하였고 흉부 X선에서도 특이소견이 발견되지 않아 기관지 이물 흡인의 가능성을 예측하지 못하였던 경우였다. 또한 이와 관련되어 드물게 발생하는 염증성 용종을 경험하였기에 문헌고찰과 함께 보고하는 바이다. (*Tuberc Respir Dis* 2008;64:456-459)

Key Words: Respiratory aspiration, Synthetic resins, Denture, Polyps

Introduction

Bronchial foreign body aspiration usually occurs in children younger than 3 years old or adults with weakened tracheal defense mechanism but it also rarely occurs in healthy adults. Acute complications of endobronchial foreign body aspiration include asphyxia, cardiac arrest, and pneumothorax while chronic complications range from pneumonia, lung abscess, bronchiectasis and hemoptysis to bronchial stenosis. And thus, early diagnosis and treatment are critical in preventing such complications. However, if the aspiration of a radiolucent foreign body has occurred in a healthy adult patient and has not been recognized by the patient, the diagnosis process becomes a challenging work.

Case Report

A 62-year-old male with tobacco abuse (66 pack-years) was presented to our hospital with symptoms of cough, blood tinged sputum and dyspnea. On physical examination, breathing sounds were coarse and wheezes were heard on right side in the lower lung fields. On peripheral blood examination, the white blood cell count was $6,900/\text{mm}^3$ (neutrophil 47%) while the hemoglobin and the platelet count was 15.5 g/dl and $274,000/\text{mm}^3$ respectively. The arterial blood gas levels were pH 7.43, PCO_2 42 mmHg, PaO_2 72 mmHg, HCO_3^- 26 mmol/L and SaO_2 96%. On pulmonary function test, FVC was 2.49 L (71% predicted), FEV_1 1.64 L (68% predicted) and FEV_1/FVC 68%.

Initial chest x-ray had shown no suspicious evidence of foreign body aspiration (Figure 1A). Chest CT was presented with a focal wall thickening and linear high density in the lumen of right bronchus intermedius (Figure 1B). Additionally, a flexible bronchoscopic examination was conducted to identify the endobronchial lesion and it revealed a foreign material in the proximal

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Received: May. 6, 2008

Accepted: May. 28, 2008

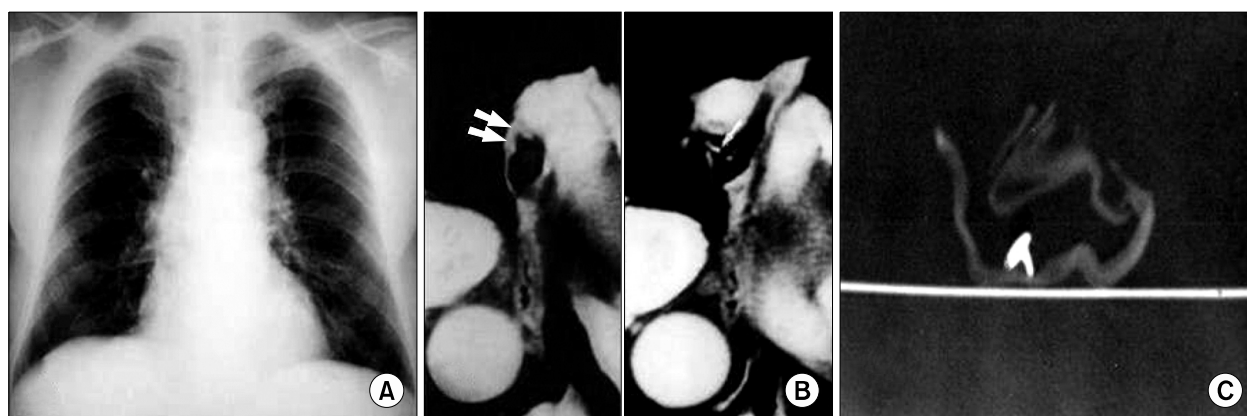


Figure 1. Initial chest X-ray shows no definite abnormalities (A). Chest CT shows focal wall thickening and linear high density in the lumen of right bronchus intermedius (B). After removal of the foreign body, CT was performed with the bronchial foreign body wrapped with gauze. In this CT, the foreign body is of high density (C).

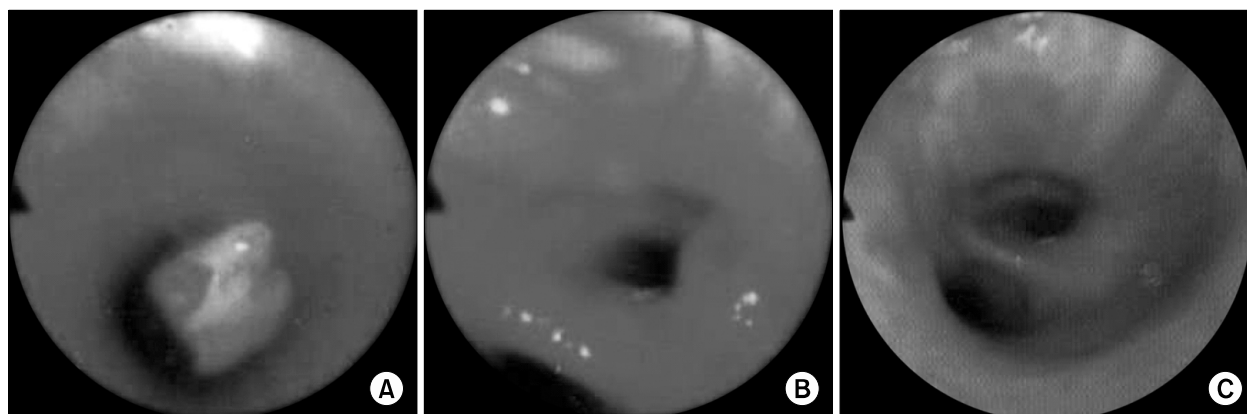


Figure 2. Flexible fiberoptic bronchoscopy, demonstrating a white-yellowish foreign material in the right bronchus intermedius (A). After removal of a foreign material, multiple polypoid endobronchial masses were observed distal to the impacted site (B). Follow up bronchoscopy performed two months later shows mild mucosal elevations with hyperemic changes (C).

portion of right bronchus intermedius (Figure 2A). It was removed using rat-tooth forceps and was revealed as a temporary resin bridge which is often used as an orthodontics tool (Figure 3). Then a biopsy was performed since multiple polypoid protruding masses were observed distal to the impacted site (Figure 2B) and on pathology, localized dysplastic change, granuloma formation and inflammatory cell infiltration were observed (Figure 4).

History taking was done once again in an effort to track the process of the actual aspiration via interview with the patient and he provided an affirmation that he

did lose his temporary resin bridge while he was coughing 2 months ago.

Subsequently, we performed a separate CT on the bronchial foreign body removed by bronchoscopy and this CT showed high density in the foreign material (Figure 1C), which was radiolucent in the previous chest x-ray. This finding enabled us to form a correlation between the result from this CT and the linear high density in the lumen of right bronchus intermedius in the previous chest CT (Figure 1B). Two months later, we conducted the same bronchoscopic examination and at this time, only mild mucosal elevation was found,

without any of the previously noted masses being revealed (Figure 2C).

Discussion

In dealing with the case described above, we had challenges in identifying the presence of foreign body in the patient's bronchus. A variety of foreign materials such as bone fragments, teeth, dentures, pins, vegetable matter, food particles, and nuts can be aspirated in some cases, but this rarely happens with adults, espe-

cially when they are in a conscious and awoken state. The patient in this case did not have a history of depressed sensorium or loss of consciousness and what made the discovery process even more difficult was that the event of aspiration was obscure. This primarily caused challenges in leading to the suspicion of potential foreign body aspiration. The second misleading factor was that the results of the chest x-ray were normal. Typically, while just a simple chest x-ray can lead to discovery of radiolucent foreign body aspiration such as an obstructive emphysema, atelectasis, bronchiectasis, localized pneumonia and hyperinflation during inspiration, it is more common to get normal findings in chest x-rays¹. And this is supported by Sersar et al², who reported 3,300 patients with bronchial foreign body aspiration, and out of these only 23.5% actually revealed the presence of foreign materials via a simple chest x-ray. CT is a more sensitive tool in diagnosing radiolucent foreign body aspiration than simple x-ray. Applegate³ reported that after aspirating LEGO (a plastic block), one of the radiolucent materials, CT revealed a sensitivity of 83% and a specificity of 89%. Otherwise food material, such as peanuts showed a lower sensitivity of 34% and a specificity of 89%.

In some cases, however, both simple x-ray and CT failed to provide any findings of radiolucent materials, thereby making the discovery process very difficult. Therefore, it is crucial to keep in mind the possibility of potential radiolucent foreign body aspiration even

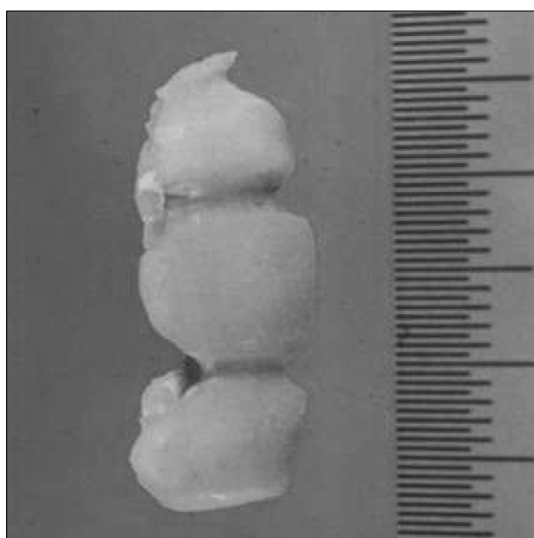


Figure 3. Foreign body removed by flexible fiberoptic bronchoscopy, was revealed to be a temporary resin bridge.

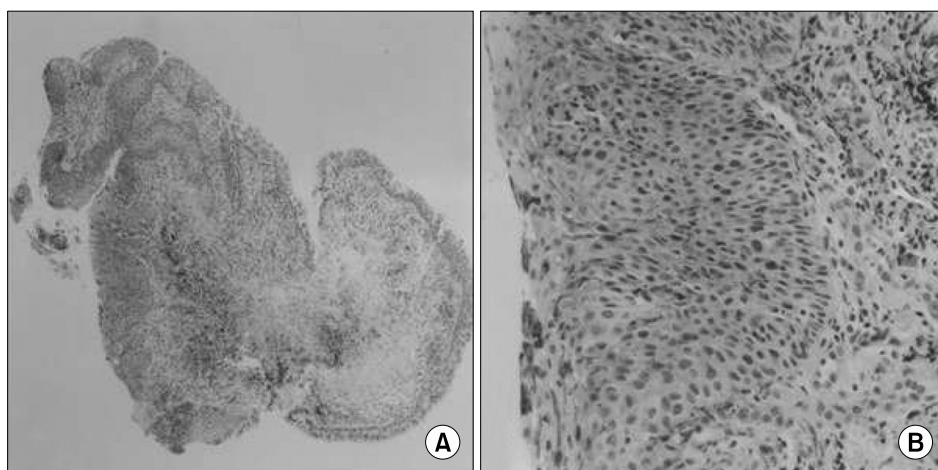


Figure 4. Biopsy specimen of polypoid mass shows squamous metaplasia with focal dysplastic changes, granulation tissue formation, and inflammatory cell infiltration (H&E stain, A, $\times 40$, B, $\times 400$).

when the radiographic finding is normal if a patient has recurrent fever, cough, sputum, blood tinged sputum and chest pain but does not respond to treatments and rather shows complications of an unknown origin. In such situations, the use of an alternative diagnostic tool such as bronchoscopy should be considered as an option.

Currently used prosthetic resins are radiolucent and thus are difficult to be captured in an image form with standard radiographic techniques. Recently, radiopaque dental additive materials, such as triphenylbismuth, were developed to overcome this problem⁴.

In the case of our patient, interestingly, inflammatory polyps were found on the site impacted by entry of the foreign material. Inflammatory polyps, which are a non-tumorous lesion, develop due to fibrotic tissue proliferation and usually occur in association with endobronchial stimulants and hot gas or corrosive material inspiration⁵. Greene et al⁶ reported that aspiration of sunflower seeds causes inflammatory polyps and Berman et al⁷ reported that a plastic piece aspiration leads to the same result as with sunflower seeds. Although focal dysplastic changes were noted by microscopic examination, spontaneous regression occurred after removal of the foreign material. Eventually, the polyps may be the consequence of a hyper-regenerative process following mucosal irritation by resin compounds.

Summary

This case demonstrates the rare occurrence of a radiolucent temporary resin bridge aspiration in adults while

they are in a conscious and awoken state and the resultant formation of inflammatory polyps. Although no unique findings were noted in a chest x-ray, careful history taking accompanied by physical examinations can lead to clinical suspicion of foreign body aspiration in an earlier stage. Moreover, flexible bronchoscopy is a tool useful not only for the evaluation process but also for managing the aspirated foreign material.

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