Fibreoptic Bronchoscopic Removal of Broncholith in Treated Pulmonary Tuberculosis

INTRODUCTION
Broncholithiasis is a rare condition defined as the presence of a calcified fragment of tissue within the lumen of tracheobronchial tree. The incidence of broncholithiasis is 0.1% to 0.2% of all lung diseases and about 0.8% among patients with haemoptysis. Symptoms are nonspecific but patient may have lithoptysis. Walsh classified broncholithiasis into two groups on the basis of site of origin as extrinsic calculi (arising from aspirated foreign bodies including tissue and secretions) and intrinsic calculi (arising within the lung, bronchi and lymph node). Symptoms of broncholith are nonspecific, rarely pathognomonic symptom (lithoptysis) may be present. Diagnosis can be made on clinical ground (expectoration of calcified material), radiological examination or by fibre-optic bronchoscopy. Bronchoscopy is an important component in the diagnostic evaluation of broncholith. Indeed, bronchoscopy is often the only test to document the diagnosis of broncholithiasis. Treatment should be offered in symptomatic patients to avoid catastrophic complications. Therapeutic options include observation, bronchoscopic removal and surgery. Bronchoscopy is safe and effective in the removal of loose broncholith. Bronchoscopy may be an option in selected patients with partly eroding broncholith. We are reporting a case of broncholithiasis in which successful removal of broncholith was performed by fibre-optic bronchoscopy without any complications.

CASE REPORT
Image 1: Chest x-ray showing left upper and mid zone homogenous opacity and calcified lesions with bilateral hilar lymphadenopathy.

Image 2: A. Broncholith in lingular bronchus. B. Broncholith captured with biopsy forceps
A 45 years old male, smoker, farmer was admitted with complaints of cough with white expectoration and off and on low grade fever since 8 months. He also had complaint of blood in sputum since 10 days which was about 10ml per day. Patient denied any history of dyspnoea and chest pain. He had past episode of haemoptysis four months back which was controlled with medications. He was admitted in another health facility prior to admission in our department where he was diagnosed as pneumonia in left upper lobe and was treated with broad spectrum antibiotic with symptomatic medicines. Patient has taken full course of ATT 7-8 years back. Patient did not have any significant medical history. On general physical examination clubbing was evident. Finding on chest examination was consistent with left upper lobe collapse and consolidation of lingular segment. Routine haematological and biochemical tests were within normal limit. HIV test was non-reactive and Mantoux test was 9mm after 72 hours. Two sputum examinations under RNTCP were negative for AFB. Sputum for Gram’s stain and KOH stain does not revealed any pathogenic organism. Sputum was also negative for malignant cell. Chest X-ray showed left upper and mid zone homogenous opacity with calcified lesion and bilateral hilar enlargement with calcification.(Image-1) CECT thorax showed calcified density in lingular bronchus with hilar lymph node calcification in addition to left upper and lingular segment consolidation. Diagnostic Fibre-optic video-bronchoscopy was performed to evaluate the cause of left upper lobe collapse and lingular segment consolidation which revealed a greyish white stony hard foreign body in lingular segment of upper lobe which was loosely attached to the bronchial wall. (Image-2) Toothed forceps was introduced through the working channel of bronchoscope for removal of broncholith. (Image-3) and the broncholith was removed completely and successfully. (Image-4) We also took BAL and were sent for AFB, gram’s stain, pyogenic culture, KOH mount and for malignant cytology but no organism and malignant cells were detected. One day after successfully removal of broncholith haemoptysis controlled.

**DISCUSSION**

The pathogenesis of broncholith can be explained by three mechanisms. First, in the course of chronic inflammation the lymph nodes become calcified and erode in to tracheo-bronchial tree by constant motion created by respiration and beating heart. This is the commonest mechanism. Second, a portion of calcified or ossified bronchial cartilage breaks apart from the wall and remains inside the lumen. Third, inhaled material in the bronchi is mixed up with calcium and develops into broncholith. The first mechanism explained broncholith in our case as in chest X-ray there were hilar enlargement with calcification. Etiology of broncholith in majority of cases is secondary to granulomatous mycobacterial or fungal infections. The most common cause of broncholith worldwide is tuberculosis. Other infectious causes are histoplasmosis, actinomycosis, coccidioidomycosis and cryptococcosis. Silicosis and malignancy are the non-infectious causes. Pulmonary symptoms in broncholithiasis are usually nonspecific, sometimes patients may be asymptomatic and coughing up stones (lithoptysis) is very rare but pathognomic symptom. Common clinical presentations reported in
the literatures are chronic cough, fever, haemoptysis, wheeze, chest pain etc. Complication like recurrent pneumonia, massive haemoptysis, fistula between bronchi and adjacent mediastinal structure has been reported.\textsuperscript{5, 13-15} Diagnosis of broncholith is difficult clinically as symptoms are nonspecific and pathognomonic symptom (lithoptysis) is very rare. In chest X-ray, hilar calcification or parenchymal infiltrations are common radiological findings but the key finding of calcified lymph node material in or near a bronchus is very unusual.\textsuperscript{16} CT thorax and flexible bronchoscopy are the most important diagnostic tools to allow the assessment of the relationship between calcification and bronchus. On CT-scan, however, calcified endo-or peribronchial lymph node can be identified and correctly located, especially on high resolution CT-scan. Post obstructive pneumonitis, atelectasis, parenchymal infiltration, post obstructive bronchiectasis, air trapping, and lung over-inflation are other common findings.\textsuperscript{16, 17} Fibre-optic bronchoscopy is an important component in the diagnostic evaluation of broncholith. Mostly the diagnosis can be made by combination of history, radiological findings and bronchoscopy and now-a-days thoracotomy to rule out malignancy is rarely needed.\textsuperscript{7} In this index case we suspect broncholith on CT thorax which later confirmed by fibre-optic bronchoscopy. Available therapeutic options for treating broncholithiasis are simple observation, surgical resection, bronchoscopic broncholith removal and broncholithectomy. Spontaneous broncholith expectoration may occasionally lead to resolution of symptoms. Eric J Olson et al\textsuperscript{8} experience with the largest series, indicated that lithoptysis was infrequent. Thoracotomy remains indicated in complicated cases with fistula formation, severe haemoptysis, bronchiectasis and uncertainty about the diagnosis.\textsuperscript{18} Preferred operative procedures are segmentectomy, lobectomy and pneumectomy. Rigid bronchoscopy is another option for the broncholith removal with success rates ranging from 67%-87%.\textsuperscript{19} Flexible bronchoscopy as the method for removal of broncholith had been tried by many pulmonologists. However as yet, there is no consisting guideline for broncholithectomoy or broncholithotomy using flexible bronchoscopy.\textsuperscript{20} A variety of methods such as pulling with the forceps, using a balloon catheters and YAG laser incision to broncholithotomy have been performed.\textsuperscript{21, 22} In 2007 there was a first attempt to removal the broncholith by using a cryoprobe with flexible bronchoscope.\textsuperscript{23} A conventional method to remove broncholith is to pull them out with a forceps. This method is applicable when the broncholith is not firmly attached to the bronchial wall. In the present case, broncholith was loosely attached to bronchial wall so we extracted it by pulling with the help of forceps successfully and without complications. 

\textbf{CONCLUSION}

We conclude that broncholith is a rare but distinct and potentially dangerous pulmonary problem. The diagnosis can be made easily with the use of CT scan and fibre-optic bronchoscopy and it can be removed with the help of forceps through working channel easily without major complications even more easily if the broncholith is loosely attached to bronchial wall.

\textbf{REFERENCES}


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