

Tracheobronchial straight metallic pin aspiration in young Jordanian females

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ABSTRACT

Objectives: To define the clinical spectrum of tracheobronchial straight metallic pin aspiration in adults, assess predisposing conditions, evaluate the efficacy of bronchoscopy, and determine the outcome and complications at the largest 2 hospitals in Jordan.

Methods: Retrospective analysis of 60 consecutive clinical cases from 2 referral-based medical centers (32 patients at King Hussein Medical Center [KHMC] and 28 patients at Al-Basheer Hospital). Medical records of adult patients (>13 years of age) who presented with history of straight metallic pin aspiration over 6-year period (July 2000 and July 2006) were analyzed. Clinico-radiological features and location of the pins were studied. The flexible fiberoptic bronchoscopy (FFB) was used for foreign body (FB) identification and removal in all KHMC patients; video assisted rigid bronchoscope under general anesthesia was used at Al-Basheer Hospital.

Results: All patients were females <28 years of age. Fifty-six patients (93%) presented within the first 24 hours after aspiration. Medical history was suggestive of FB aspiration in all patients. Chest x-rays demonstrated the radio opaque pins in all patients. At bronchoscopy, the intermediate bronchus was the most common site of FB lodgment (62%). Ninety-two percent of patients were discharged on the same day of the procedure.

Conclusion: Tracheobronchial straight metallic pins are relatively frequent FB in Jordanian young females and can occur in a very specific clinical setting. Removal of these FBs can usually be accomplished successfully by FFB.

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Aspiration of foreign bodies (FBs) into the tracheobronchial tree is much more common in children than in adults and is infrequently seen in adults <50-years-old.¹ In adults, FB aspiration is usually associated with denture wear, alcohol use and other neurological disorders.¹⁻⁵ Straight metallic pin aspiration, seen primarily in young healthy women has been reported as a new form of FB aspiration mainly in Islamic countries.⁶⁻⁹ In these countries girls start to wear a head cover with the onset of puberty. Straight metallic pins are used extensively for securing facial and headscarfs. The instrument of choice for extracting tracheobronchial FBs was, traditionally, the rigid bronchoscope. However, several reports have showed that flexible fiberoptic bronchoscopy (FFB) is of valuable therapeutic option for adults with FB aspiration.¹⁰⁻¹⁴ This paper looks at the experiences of the largest 2 hospitals in Amman in removing metallic pin aspirated in 60 female patients over a 6-year period. Recommendations and suggestions are proposed to reduce the incidence of this clinical entity.

Methods. The medical records of all adult patients presented with suspected metallic pin aspiration to King Hussein Medical Center (KHMC) and Al-Basheer Hospital, Amman, between July 2000 and July 2006, were retrospectively studied. A total of 60 patients (32 from KHMC, 28 from Al-Basheer hospital) were included into the study. The following data were collected: gender, age, residence, duration of illness, availability of definitive history, x-ray findings, bronchoscopic procedure, associated findings on bronchoscopy, number, type and location of the metallic pin, duration of hospital

stay after its removal, and complications. All patients suspected of metallic pin aspiration who presented to KHMC were subjected to FFB under local anesthesia and mild sedation using intravenous midazolam in a dose of 0.05-0.20 mg/kg body weights and local Xylocaine; 2% spray in the tracheobronchial tree. Video bronchoscopes and standard bronchial biopsy grasping forceps were used. At Al-Basheer Hospital, patients with FB aspiration were admitted to thoracic surgery wards; video assisted rigid bronchoscopy with jet ventilation under general anesthesia was used for pins removal.

Results. Sixty adult patients presented with history of straight metallic pin aspiration during the 6-year period of the study. All patients were females <28 years of age. The median age was 16 years. Fifty-six (93%) reported within 24 hours of the event. Fifty-eight patients (97%) were seen between the months of August and June. The median duration of symptoms prior to presentation was 5 hours. A definite history of choking following FB aspiration was present in 58 (97%) cases. All patients presented with history of intractable cough preceded by a sudden onset of choking after aspiration of the straight metallic pin, which lasted from 10 to 30 minutes (Penetration syndrome). Initially, the history of dyspnea was present in most of the cases, but at emergency room patients were not in respiratory stress. Approximately 55% of patients had pain sensation in the neck. Other symptoms are shown in **Table 1**. In all patients, the radio opaque metallic pins were demonstrated in the plain chest x-ray films. Forty-seven (78%) patients had their FB lodged in the right bronchial tree. In 9 (15%) patients the FB was in the left bronchial tree, mainly in the lower lobes and in 4 (7%) patients the pins were lodged into the trachea. Treatment received included intravenous fluids, oxygen supplementation and bronchodilators. All pins were removed successfully by bronchoscopy (FFB at KHMC, video assisted rigid bronchoscope under general anesthesia at Al-Basheer hospital). At bronchoscopy pins were present in the intermediate bronchus in 62% of patients (**Table 2**). In all KHMC patients, the

aspirated metallic pins were removed successfully from the first attempt. The procedure had to be repeated in 2 cases of Al-Basheer hospital patients. A thoracotomy was performed in another 2 patients after unsuccessful interventions; the straight metallic pin was localized in the lingula (one patient) and posterior segment of the left lower lobe (one patient). In both cases, the tip was impeded in the bronchial tissue. A total of 56 patients (88%) were discharged within the same days of pin removal while 5 patients stayed in the hospital for more than 48 hours because of minor complications, fever and bronchospasm. At both hospitals, no deaths were reported after bronchoscopy.

Discussion. Aspiration of FB into the tracheobronchial tree occurs in all age groups, infants and small children suffer most commonly.^{1-5,15,16} The nature of aspirated FB reported in various studies differs according to lifestyle and eating habits. In a study conducted by Limper and Prakash¹⁶ on 60 consecutive adult patients with tracheobronchial FB aspiration, the most common type of FB was vegetable matter. Mu et al¹⁷ found that nearly 95% of aspirated FBs in children were organic; the most common were animal or fish bones. The second predominant group of aspirated objects consisted of dental equipment or prostheses and endobronchial tube appliances inadvertently lost during dental or medical procedures. Primary neurology disorders were the most common predisposing factors for aspiration in this group of adult patients. Foreign body aspiration can also occur without any predisposing conditions. Straight metallic pins were rather unusual tracheobronchial tree FBs and probably specific to the Middle East.⁶⁻⁹ This is due to the widespread habit of wearing a headscarf by the adolescents and young females in the region. Three to four pins are usually needed to securing the scarf on the head. These pins are held in the mouth between the teeth during scarf fixing and they got aspirated while laughing or talking. Accidental aspiration often results in the pin lodging in the segmental bronchus with the sharp end pointing

Table 1 - Metallic pin aspiration symptoms (n=60).

Complaint	n	(%)
Penetration syndrome	58	(97)
Cough	52	(87)
Breathlessness	47	(78)
Throat pain	33	(55)
Retrosternal chest discomfort	21	(35)
Wheezing	9	(15)

Table 2 - Metallic pin locations (n=60).

Site	n	%
Intermediate bronchus	37	62
Right lower lobe basal segments	7	11
Left lower lobe basal segments	4	7
Trachea	4	7
Right Main bronchus	3	5
Lingula	3	5
Left main bronchus	2	3

cephalad. The epidemiology of tracheobronchial FBs is bimodal and it peaks at the extremes of age. Individuals aged 1-3 years and those in the seventh decade of life at higher risk of FB aspiration.¹⁻⁵ In our study, all patients were healthy females with age <28 years of age (school age group and early university faze). The frequency of straight metallic pin aspiration increased during school time (August-June) since schoolgirls or university female students wear headscarf to cover their hair and head when they are outside. During the summer holiday, we observed that the rate of straight metallic pin aspiration decreased. In 85% of patients, FB aspiration often occurring during the early hours of the morning. The definitive treatment for FB aspiration is almost always its removal by means of a bronchoscope. Flexible fiberoptic bronchoscopy has become popular choice for the removal of FBs in adult population.^{2,10-14} The first report of FB removal with a rigid bronchoscope was published in 1897, and Jackson in 1936 reported the successful removal of bronchial FB with their new bronchoscopic system.¹⁸ The initial reports of FB removal with FFB was published in the 1970s.^{19,20} Since then, a number of studies on the removal of FB with FFB have been published.^{2,10-14,20,21} Despite the advances in optical technology, proper training and experience is crucial to optimizes the outcome and minimizes the risk of complications in tracheobronchial FB removal by a bronchoscope. The sharp end of a foreign body should be freed before grabbing it, because grasping the shaft or the other end of a pointed instrument increases the difficulty in removal as a result of the risk of the object getting caught in the mucosa. Utilizing FFB or rigid bronchoscopy in removing aspirated FBs depends on personal experience and specialty involved in treating such cases. Pulmonologists are more familiar with FFB while thoracic surgeons rely more on the rigid scopes. The rigid bronchoscope is still considered, as the safest instrument in most pediatric centers as using the flexible bronchoscope under local anesthesia in a very young patient is a very difficult procedure. In adult patients, however, a FFB has many advantages over a rigid bronchoscope in the initial diagnosis of aspirated FBs. First, FFB is a relatively easy and a safe procedure in experienced hands. Second, with the use of a FFB under local anesthesia for the visualization of airways, removal of the foreign body can be attempted and avoids the added cost, risk, and morbidity of a secondary invasive procedure such as rigid bronchoscopy under general anesthesia. Third, FFB is superior to rigid bronchoscopy in cases of distally wedged foreign bodies, in mechanically ventilated patients or in cases of spine, jaw, or skull fractures preventing rigid bronchoscope manipulation.¹⁶ At present, FFB are available in different sizes at different age groups. The success rate

of the FFB in removing FBs can be as high as 100% in an experienced hands when a careful case selection is made.²¹ The complication of the straight metallic pin is lesser compared to other organic materials. In our study, there were no significant pre- or post- bronchoscopic complications.

In conclusion, straight metallic pins although rare in the other parts of the world are relatively common tracheobronchial tree FBs in Jordan and probably in other Islamic countries. In adult patients, FFB is a safe procedure for the initial diagnosis and removal of straight metallic pins, which avoids unnecessary general anesthesia, and reduces the hospital costs. The success rate of the FFB in removing FBs can be as high as 100% in an experienced hands. Even just localization of the FB during the initial FFB allows subsequent rigid bronchoscopy to be shorter in duration with fewer complications. In order to minimize pin aspiration frequency, we recommend using bands or snap fasteners, instead of pins, when wearing head cover. However, education is the best preventive measure for decreasing the incidence of this hazardous health problem.

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Related topics

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