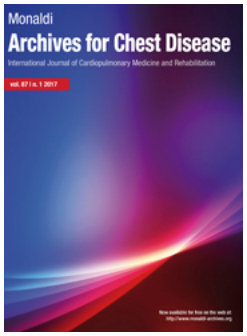

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# Flexible bronchoscopy-assisted removal of aspirated scarf pins from the tracheobronchial tree: the experience of 146 subjects

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**Abstract**

Aspiration of scarf pins is a common problem in specific geographical locations where the Muslim population is high, especially in countries like Egypt, Bangladesh, Middle Eastern countries, and certain regions in India. This condition is also referred to as hijab-pin syndrome. We discuss the largest experience of flexible bronchoscopic extraction of aspirated scarf pins from the tracheobronchial tree. A multicenter retrospective observational study was conducted on 146 patients from 4 different centers in Egypt, Bangladesh, India, and Germany. Flexible bronchoscopy was successful in the extraction of aspirated scarf pins in all 146/146 patients with a 100% success rate. 136/146 (93.15%) patients were females, with the most common age group between 12 and 18 years (34.24%). 132/146 (90.4%) remembered the aspiration event before coming to the hospital. Cough was the predominant presenting symptom. (71.22%). In all 146 cases, the foreign body was identified on a standard chest X-ray. The left main bronchus was the most common site of aspiration, 67/146 (45.89%), followed by the right main bronchus, 56/146 (38.35%). 14 patients (9.58%) had a history of unsuccessful attempts to remove by rigid bronchoscopy, and flexible bronchoscopy was successful in these 14 (100%) patients who had a prior unsuccessful attempt to remove. The current series is the largest in literature and demonstrated an excellent success rate in the removal of the aspirated scarf pin.

**Key words**: scarf pin, hijab pin, foreign body aspiration, metal foreign body, flexible bronchoscopy.

## Introduction

Certain religious traditions warrant women to cover the head using a special costume called scarf (locally called hijab). To secure the scarf, usually these women use long metal pins (Figures 1 and 2) also called hijab pins or scarf pins. These metal pins are sharp at one end while the other end is blunted by a plastic ball-like tip. While holding the scarf around the head, these young girls have the habit of holding the pin between the teeth, while they tie the scarf around the head. Sometimes, accidentally while the pin is held between the teeth, these young girls try to engage in activities like talking or laughing. which poses a risk of aspiration of the pin into the tracheobronchial tree [1].

Aspirated scarf pins represent a specific subset of non-organic foreign bodies in the tracheobronchial tree. The incidence is more in young females who have the habit of wearing scarves around the head for varied reasons. Unlike organic foreign bodies, these metal pins are usually identified on Chest X-Ray as they are radiolucent. These are usually non-obstructive airway foreign bodies presenting with cough as predominant presenting symptom. Flexible bronchoscopy is helpful in identifying the exact location, visualisation and extraction of these metal foreign objects from the tracheobronchial tree. We describe the largest experience of flexible bronchoscopic extraction of aspirated scarf pins in 146 subjects.

## Materials and Methods

This is a retrospective observational study performed at four centres located in Egypt, Bangladesh, Germany, and India. The demographic profile, presenting symptoms and duration, and radiologic findings of 146 patients suspected/witnessed scarf pin aspiration were analysed. The type of bronchoscope used, bronchoscopy findings, location and characteristic of scarf pin, instruments used for retrieval, complications and failure rates were noted.

The data were entered in Microsoft Excel 2019 for analysis. Standard descriptive statistics were performed by median and interquartile range for continuous variables and frequency and percentage for categorical variables.

## Results

### *Patient characteristics*

The current study cohort included 146 patients, of which 136 (93.15%) were females. Flexible bronchoscopy showed 100% success in extracting the airway foreign bodies. The most common symptom was cough (71.22%); 132 (90.4%) patients remembered the event. (Table

1) (Figures 1 and 2) The bronchoscopy characteristics of the study population are described in Table 2. 80% of patients had bronchoscopy performed in less than 7 days. The left main bronchus (45.89%) was the common site of involvement. Multiple scarf pins were observed in four cases. The most common complication was slippage during retrieval. Of 146 cases, 14 patients had prior unsuccessful rigid bronchoscopy retrieval, all underwent successful flexible bronchoscopy retrieval. None of the cases required thoracotomy and no mortality was observed during the procedure. The literature depicting the existing literature on success rate of flexible bronchoscopy till date has been summarised in Table 3.

**Discussion**

The current study presents a clinical and bronchoscopy spectrum of aspirated scarf pins. The scarf pin aspiration has a different age group pattern in comparison to other foreign bodies, The commonly observed age group for scarf pic aspiration is 13 to 20 years. The current study also noted a similar pattern. The finding can be attributed to the younger population who have started learning to veil their scarf. The scarf pin is exclusively used by females hence this gender predominates. In current study also mostly observed in female's patient, however the male children were also found to have scarf pin aspirated [1-7].

The clinical presentation for foreign body aspiration (FBA) includes cough, wheeze, stridor in acute cases. In chronic cases may present as fever, haemoptysis, and breathlessness. The current study had cough as a predominant symptom and majority of the patients remembering the event as caused by vocalisation during holding the scarf pin between teeth. The presentation is similar to the reported literature. The metallic nature of the scarf pin makes it a unique foreign body as it can be recognised in roentgenogram findings in all cases. In reported literature, the more common location is the left bronchial tree for the scarf pin as opposed to other foreign bodies. The current study also reports the left side as a common site for lodging of scarf pins. The pathophysiology is explained by left bronchus being narrower, producing more negative pressure during inhalation activities [1].

The rigid bronchoscopy is a standard procedure for retrieval of most foreign bodies. On the contrary, the flexible bronchoscopy is considered as the preferred method in aspirated scarf pins. Rizk et al reported using rigid bronchoscopy as first choice instrument, with unsuccessful cases undergoing thoracotomy [6]. The choice of instrument could be attributed the operators primarily being surgeons. In present study all cases, including failed rigid bronchoscopy cases, had successful removal. In the present study, the difference in choice of procedure in the

current study is attributed to pulmonologists retrieving the foreign body who are well versed with flexible bronchoscopy as the procedure of choice.

The bronchoalveolar lavage finding in present study reported gram-negative organisms isolated in few cases. This may be related to the chronicity of aspirated foreign bodies and findings are clinically important.

The literature reports that mortality during foreign body aspiration depends on patient-related factors and type of foreign body. Baram et al reported only single case mortality due to massive endobronchial bleeding. In the present study, no mortality was reported.

**Conclusions**

Flexible bronchoscopy-assisted removal of aspirated scarf pins from the Tracheobronchial Tree is a safe procedure, with a highly successful rate.

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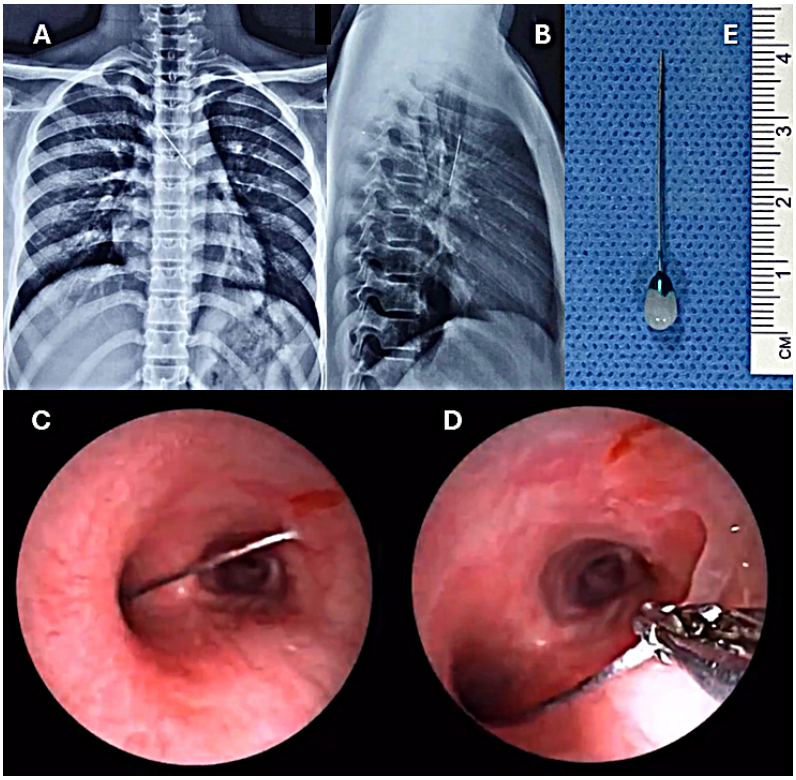


**Figure 1. A) Chest X-Ray PA view demonstrating the foreign body in retrocardiac region; B) lateral X-Ray confirming the location; C) free pointed tip in the posterior basal segment of the left lower lobe bronchus; D) extracted scarf pin; E) aspirated scarf pin.**

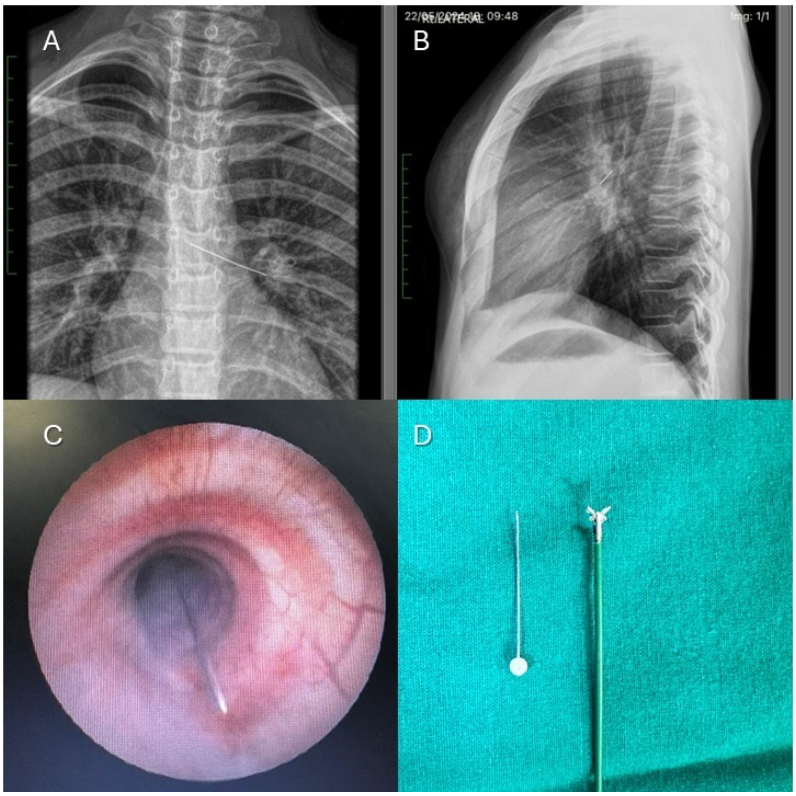


**Figure 2. A) Chest X-Ray PA view reveals foreign body in neck and in trachea; B) lateral X-Ray neck confirms foreign body in supraglotic region. Flexible bronchoscopy was done under local anesthesia and revealed that one pin was in the supraglottic region; C) just above the vocal cords and the other one was lodged in the trachea; D) aspirated scarf pin.**

**Table 1. Demographic characteristics of study population (n=146)**

| Parameter | Number (%) |
|---|---|
| Age group | |
| < 5 years | 6 (4.10) |
| 5-12 years | 44(30.13) |
| 12-18years | 50(34.24) |
| >18 years | 46(31.50) |
| Female | 136 (93.15) |
| Symptoms | |
| Cough | 99 (71.22) |
| Fever | 30 (21.58) |
| Hemoptysis | 16(11.51) |
| Chest pain | 17 (12.23) |
| Breathlessness | 20 (14.38) |
| Stridor | 5 (3.4) |
| Duration of symptoms (days) | |
| <1 | 20 (13.69) |
| 1-3 | 57 (39.04) |
| 4-5 | 14 (9.58) |
| 6-7 | 11 (7.53) |
| >7 | 19 (13.01) |
| Not available | 25 (17.12) |
| Remembrance of event | 132 (90.41) |
| Roentgenogram findings | |
| Foreign body seen | 146 (100) |
| Collapse | 2 (1.36) |
| Consolidation | 5 (3.42) |
| Post-obstructive pneumonia | 1 (0.68) |

**Table 2. Bronchoscopy characteristics of the study population (n=146).**

| Parameter | Number (%) |
|---|---|
| Time between aspiration and bronchoscopy (days) | |
| <1 | 1 (0.68) |
| 1 | 41 (28.08) |
| 2 - 3 | 47 (32.19) |
| 4 - 5 | 11 (7.53) |
| 6 - 7 | 10 (6.84) |
| >7 | 26 (17.80) |
| Cannot remember | 10 (6.84) |
| Type of Anaesthesia | |
| Local anaesthesia | 68 (46.57) |
| General anaesthesia | 78 (53.42) |
| Bronchoscopy findings | |
| Granulation tissue | 10 (6.84) |
| Mucosal edema | 32 (21.91) |
| Purulent secretions | 25 (17.12) |
| Flexible bronchoscope size | |
| 2.8 mm (OD) | 3 (2.05) |
| 3.8 mm (OD) | 3 (2.05) |
| 4.2 mm (OD) | 7 (4.79) |
| 5.2mm (OD) | 2 (1.36) |
| 5.8 mm (OD) | 75 (53.36) |
| 6.3 mm (OD) | 52 (35.61) |
| Location of Foreign Body | |
| Supra Glottic | 1 (0.68) |
| Trachea | 22 (15.06) |
| Main Bronchus | |
| Left | 67 (45.89) |
| Right | 56 (38.35) |
| Foreign body characteristics | |
| Material (pin) | 146 (100) |
| Size (40 mm) | 128 (87.67) |
| Size (20mm) | 18 (12.63) |
| Number | |
| single | 142 (97.26) |
| multiple | 4 (2.74) |
| Edge | |
| sharp | 146 (100) |
| Visual appearance of Foreign Body | |
| Free pointed tip pin | 84 (57.53) |
| Lodged pointed pin tip | 62 (42.47) |
| Bronchoscopy technique (Instrument used) | |
| Basket | 6 (4.2) |
| Balloon | 0 (0) |
| Forceps | 140 (95.8) |
| Complication | |
| Bleeding | 1 (0.72) |
| Slippage | 8 (5.79) |
| Hypoxia | 2 (1.44) |
| Previous Unsuccessful trial of pin removal using rigid bronchoscopy | 14 (10.14) |
| Bronchoalveolar Lavage findings (done in 23 cases only) | |
| Pathogenic organism not isolated | 11 (47.83) |
| Pathogenic organism isolated | 12 (52.17) |
| Pseudomonas aeruginosa | 4 (33.33) |
| Pseudomonas aeruginosa (MDR) | 3 (25) |
| Klebsiella pneumoniae | 1 (8.33) |
| E coli | 1 (8.33) |
| Mixed Respiratory flora | 1 (8.33) |
| Staphylococcus aureus | 2 (16.67) |

**Table 3. Summary of existing literature on success rate of flexible bronchoscopy.**

| S.NO | Author, Country, Year | Number of Cases | FOB successful extraction n (%) | Rigid Bronchoscopy successful extraction n (%) | Thoracotomy extraction n (%) |
|---|---|---|---|---|---|
| 1 | Ali et al, Jordan 2007[4] | 16 | 12 (75) | 3 (18.75) | 1(12.5) |
| 2 | Hamad et al, Egypt, 2010[2] | 73 | NA | 71 (97.26) | 02 (2.74) |
| 3 | Al-Azzawi et al, Iraq, 2013[3] | 20 | 19 (95) | 1 (5) | NA |
| 4 | Taha et al, Iraq, 2013[5] | 5 | 3 (60) | 1 (20) | 1 (20) |
| 5 | Rizk et al, Egypt, 2014[6] | 83 | NA | 78 (93.9) | 5 (6.1) |
| 6 | Fenane et al, 2015, Morocco[7] | 28 | NA | NA | 28 (100) |
| 7 | Baram et al, Iraq, 2017[1] | 27 | 12 (44.44) | 13 (48.14) | 02 (7.4) |
| 8 | Current Study | 146 | 146 (100) | NA | NA |

FOB, flexible Bronchoscopy; NA, not applicable.