

## 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.

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### Introduction

Certain religious traditions require women to cover their heads 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 their 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 higher 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-rays as they are radiolucent.

These are usually non-obstructive airway foreign bodies presenting with cough as the predominant presenting symptom. Flexible bronchoscopy is helpful in identifying the exact location, visualization, 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.

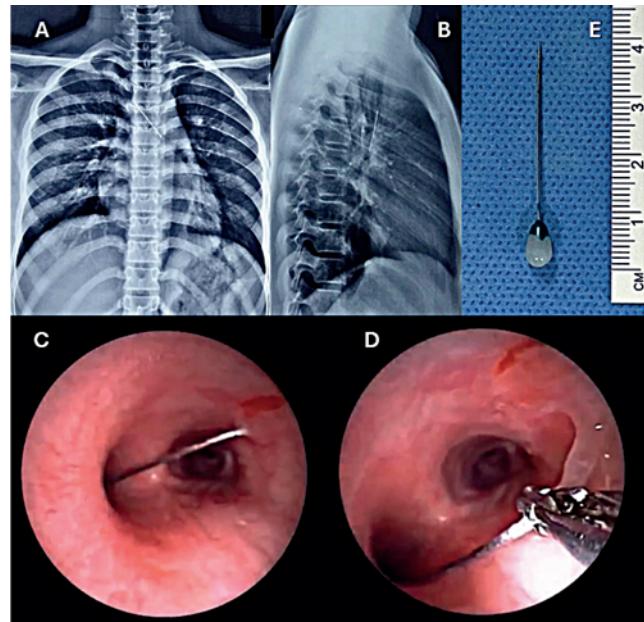
### Materials and Methods

This is a retrospective observational study performed at four centers 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 analyzed. The type of bronchoscope used, bronchoscopy findings, location, and characteristics of the 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 medi-



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

Parameter	Number (%)
Age group	
<5 years	6 (4.10)
5-12 years	44 (30.13)
12-18 years	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)

**Figure 1.** A) Chest X-ray posteroanterior view demonstrating a foreign body in the 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.

an and interquartile range for continuous variables and frequency and percentage for categorical variables.

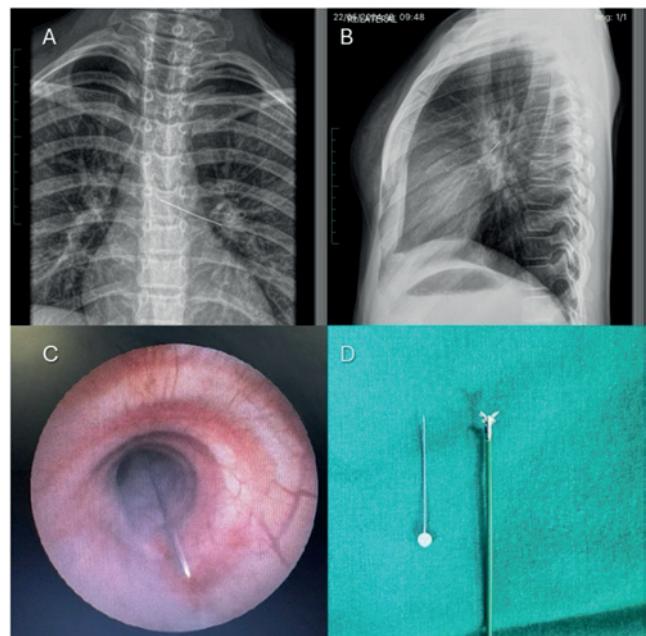
## Results

### Patient characteristics

The current study cohort included 146 patients, of whom 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, and 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 the success rate of flexible bronchoscopy to date has been summarized 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 com-

**Figure 2.** A) Chest X-ray posteroanterior view reveals a foreign body in the neck and trachea; B) lateral X-ray neck confirms a foreign body in the supraglottic 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.

monly observed age group for scarf pin 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 the current study also mostly observed in female patients; however, male children were also found to have scarf pin aspirated [1-7].

The clinical presentation for foreign body aspiration (FBA)

includes cough, wheeze, and stridor in acute cases. In chronic cases may present as fever, hemoptysis, and breathlessness. The current study had cough as a predominant symptom, and the majority of the patients remembered the event as caused by vocalization 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 recognized in roentgenogram findings in all cases. In reported literature, the more common location is

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

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

OD, outer diameter; MDR, multi-drug resistance.

**Table 3.** Summary of existing literature on the 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 <i>et al.</i> , Jordan, 2007 [4]	16	12 (75)	3 (18.75)	1 (12.5)
2	Hamad <i>et al.</i> , Egypt, 2010 [2]	73	NA	71 (97.26)	02 (2.74)
3	Al-Azzawi <i>et al.</i> , Iraq, 2013 [3]	20	19 (95)	1 (5)	NA
4	Taha <i>et al.</i> , Iraq, 2013 [5]	5	3 (60)	1 (20)	1 (20)
5	Rizk <i>et al.</i> , Egypt, 2014 [6]	83	NA	78 (93.9)	5 (6.1)
6	Fenane <i>et al.</i> , Morocco, 2015 [7]	28	NA	NA	28 (100)
7	Baram <i>et al.</i> , 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.



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 the lodging of scarf pins. The pathophysiology is explained by the left bronchus being narrower, producing more negative pressure during inhalation activities [1].

The rigid bronchoscopy is a standard procedure for the retrieval of most foreign bodies. On the contrary, the flexible bronchoscopy is considered the preferred method for aspirated scarf pins. Rizk *et al.* reported using rigid bronchoscopy as the first-choice instrument, with unsuccessful cases undergoing thoracotomy [6]. The choice of instrument could be attributed to the operators primarily being surgeons. In the 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 the present study reported gram-negative organisms isolated in a few cases. This may be related to the chronicity of aspirated foreign bodies, and findings are clinically important.

The literature reports that mortality during FBA depends on patient-related factors and the type of foreign body. Baram *et al.* reported only a single case of 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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Conflict of interest: the authors declare that they have no conflicts of interest regarding the current study.

Ethics approval and consent to participate: no ethical clearance required for case series.

Informed consent: informed consent/parental permission was obtained from all patients/guardians prior to bronchoscopy.

Patient consent for publication: written informed consent has been taken from the patient for publication of the data.

Availability of data and materials: data available from the corresponding author upon request.

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