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Original Research Article

Laryngo-tracheo-bronchial foreign bodies: epidemiological, diagnostic and therapeutic aspects

Bathokédéou Amana[1], Essobozou Plaodezina Pegbessou[2]*, Essobiziou Amana[3], Winga Foma[3], Warou Dolou[4], Stephen Lawson[4], Essohanam Boko[2], Eyawelohn Kpemissi[3]

[1]Department of ENT, Head and Neck Surgery, Teaching Hospital of Lome Commune, Lomé, Togo
[2]Department of ENT, Head and Neck Surgery, Teaching Hospital of Campus, Lomé, Togo
[3]Department of ENT, Head and Neck Surgery, Teaching Hospital of Sylvanus Olympio, Lomé, Togo
[4]Department of ENT, Head and Neck Surgery, Teaching Hospital of Kara, Kara, Togo

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***Correspondence:**
Dr. Essobozou Plaodezina Pegbessou,
E-mail: pessodina@yahoo.fr

ABSTRACT

Background: The objective of the study was to describe the epidemiological, diagnostic and therapeutic aspects of laryngo-tracheo-bronchial (LTB) foreign bodies (FB).
Methods: A 20-year retrospective study, performed in the ENT, head and neck surgery department of Sylvanus Olympio Teaching Hospital in Lomé, dealing with patients treated for this LTB.
Results: Sixty-one cases of LTB FB were collected. The LTB FB represented 3.05 cases per year, 11.71% of the FB airways and 4.08% of ENT FB. Thirty-two patients (52.46%) were male, a sex ratio of 1.10. The average age of patients was 5.08 years, with extremes of 4 months and 43 years. In 31 cases (50.82%), the accident occurred during the meal and in 30 cases (49.18%) during a game. The penetration syndrome was found in 54 cases (88.52%). FB was extracted by rigid tube bronchoscopy in 50 patients (81.97%). The most common site of endoscopy was right bronchus in 30 cases (49.18%) and in 11 cases (18.03%) FB was laryngeal. Organic FB accounted for 31 cases (50.82%) and was dominated by peanuts (29.5%), for non-organic FB they were dominated by pebbles (8.2%). The evolution was favorable in 58 cases (95.08%).
Conclusions: Severe accidental pathology, the prognosis depends on the nature of the body, its seat and the time of care.

Keywords: Lower respiratory tract, Foreign bodies, Bronchoscopy

INTRODUCTION

A laryngo-tracheo-bronchial (LTB) foreign body (FB) is one of the life-threatening otorhinolaryngological emergencies. It is a rare accident, which is preferentially found in children. It is often manifested by a syndrome of penetration.[1-3] Penetration syndrome, when present, is an element of strong suspicion of inhalation leading to urgent management. Early treatment allows the eviction of complications. This management is confronted with the delay in consultation delays and the problem of lack of equipment in developing countries.[4] The objective of this study is to describe the epidemiological, diagnostic and therapeutic aspects of laryngo-tracheo-bronchial foreign bodies at the Sylvanus Olympio (SO) Teaching Hospital in Lomé.

METHODS

This was a 20-year retrospective study during 1 January 1998 to 31 December 2017. It was performed in the ENT, head and neck surgery department of the SO Teaching Hospital in Lomé. Records of patients treated for this LTB. Included in the study were all patients admitted for

LTB FB, for whom endoscopy found FB. Patients admitted for LTB FB, who did not have FB endoscopy and incomplete files were not included in this study. Before 2012, the endoscopy equipment consisted of bronchoscopes of different sizes for children and adults, with non-optical foreign body forceps. The extraction of a foreign body was done by trial and error. From 2012, the acquisition of optical tweezers made it easier to take care of these foreign bodies. The parameters studied include age, sex, origin, circumstances of occurrence, consultation time, reason for admission, clinical and radiological signs, therapeutic and progressive modalities. The data was captured and analyzed using the Epi-info 7.1.2.0 software and the results were formatted using Excel 2013. The Ronald Fisher significance test served as a statistical test, decisions were made with a risk of 5%.

RESULTS

Sixty-one cases of LTB FB were collected, which was 3.05 cases per year. LTB FB accounted for 0.05% of consultations, 11.71% of airways FB and 4.08% of ENT FB. Thirty-two patients (52.46%) were male, a sex ratio of 1.10. The average age of patients was 5.08 years (with extremes of 4 months and 43 years), patients under 15 accounted for 59 cases (96.72%). In 31 cases (50.82%), the accident occurred during the meal and in 30 cases (49.18%) the accident occurred during a game. The penetration syndrome was found in 54 cases (88.52%), followed by recurrent bronchopneumopathy in 6 cases (9.84%) and respiratory distress in 1 case (1.64%). Clinical examination revealed dyspnea in 55 cases (90.16%), cough in 4 cases (6.56%) and fever in 1 case (1.64%). This dyspnea was inspiratory; associated with dysphonia in 11 cases (20.00%), and expiratory in 44 cases (80.00%). A poor general state marked by prostration was observed in 2 cases (3.28%). Thirty patients (49.18%) had bronchial congestion coughs and decreased vesicular murmur. Cervico-thoracic radiography was not performed in 40 cases (65.57%). Of the 21 patients (34.43%) who performed, 11 patients (52.38%) had an X-ray on admission. On the images (Figure 1, 2 and 3), it was objectified a radiopaque FB in 10 cases (47.62%) and atelectasis in 2 cases (9.52%). Two patients (3.28%) were admitted with cervico-thoracic CT. Hyperdense images were noted in the left bronchus (Figure 4). Rigid tube bronchoscopy was performed in 50 cases (81.97%) and Mac Intosch laryngoscopy in 11 cases (18.03%). The optical clamp was used in 31 cases. Thirty FB (49.18%) were found in the left bronchus (Table 1). Thirty-one FB (50.82%) were organic and dominated by peanuts in 26 cases (58.06%). Non-organic FB accounted for 30 cases (49.18%) and were dominated by pebbles in 5 cases (16.68%) (Table 2 and 3). The nature of FB was variable according to the age of the patients (Table 4). The laryngeal seat of fish bones was statistically significant (p=0.01), as were peanuts in the right (p=0.009) and right (right) bronchus (p=0.001). The bronchial mucosa was normal in 48 cases (78.69%), inflammatory in 12 cases (19.67%) with 5 cases (8.20%) bronchorrhea. In all cases, the laryngeal mucosa was normal. The average duration of endoscopy was 28 minutes (with the extremes of 5 minutes and one hour and 20 minutes). In 50 cases (81.97%) the duration of the endoscopy was less than thirty (30) minutes. Five patients (8.20%) underwent endoscopic revision. Among the five: two patients received three times each, two patients twice and one in one case. There was a failure to extract two cases (3.28%): because of the impossibility of grasping a metal ball; and because of the impossibility of highlighting a pin at the endoscopy. The average hospital stay was 28 hours (with extremes of 8 hours and 15 days). Post-endoscopic evolution was favorable in 58 cases (95.08%). Two patients were referred for thoracic surgery after failure of extraction. We recorded a case (1.64%) of deaths from side effects of anesthetic drugs.

Table 1: Distribution of foreign bodies according to seat at endoscopy.

Seat of foreign bodies	Number	%
Right main bronchus	30	49.18
Left main bronchus strain	13	21.31
Larynx	11	18.03
Right superior lobar bronchus	5	8.20
Left superior lobar bronchus	2	3.28
Total	61	100

Table 2: Nature of organic foreign bodies at endoscopy.

Organic foreign bodies	Number	%
Peanuts	18	58.06
But	5	16.13
Fish bones	4	12.90
Galingales	2	6.45
Sesame	1	3.23
Charcoal	1	3.23
Total	31	100

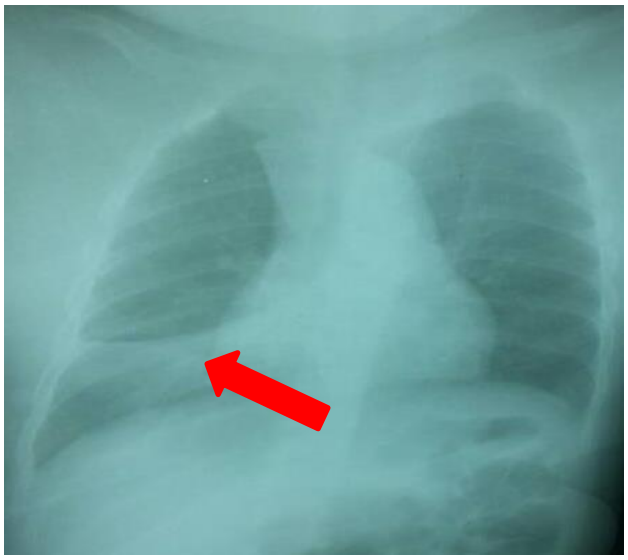

Figure 1: Organic foreign body with atelectasis.

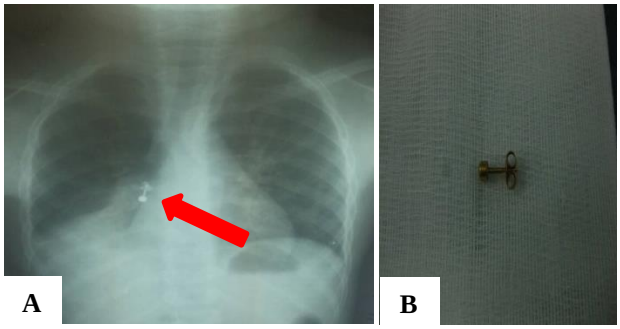

Figure 2: (A) Non organic foreign body with atelectasis, (B) foreign body after removing.

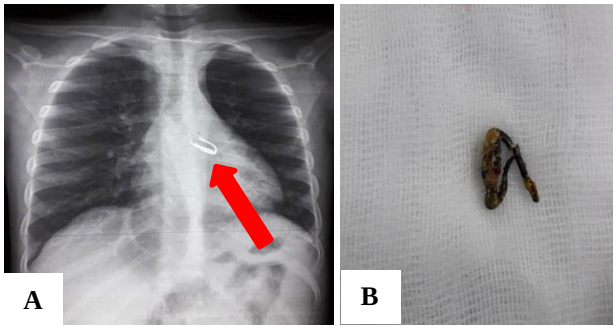

Figure 3: (A) Non organic foreign body, (B) foreign body after removing.

Table 3: Nature of non-organic foreign bodies at endoscopy.

Non organic foreign bodies	Number	%
Pebbles	5	16.69
Seamstress pins	4	13.33
Pen caps	3	10.00
Points	3	10.00
Earrings	3	10.00
Aluminum papers	2	6.67
Whistle pieces	2	6.67
Branch of compass	1	3.33
Spring	1	3.33
Metal screw	1	3.33
Metal ball	1	3.33
Piece of iron	1	3.33
Brad	1	3.33
Laptop key	1	3.33
Broken plastic lighter	1	3.33
Total	30	100

Table 4: Distribution of foreign bodies by age group.

Foreign bodies	Group age (in years)							Total
	≤2	3-5	6-8	9-11	12-14	15-17	≥18	
Aluminum papers	1	1	0	0	0	0	0	2
Pebbles	2	2	1	0	0	0	0	5
Seamstress pins	0	0	2	0	0	0	2	4
Pen caps	1	0	1	1	0	0	0	3
Points	1	0	1	1	0	0	0	3
Earings	1	0	2	0	0	0	0	3
Whistle pieces	0	2	0	0	0	0	0	2
Branch of compass	0	-	0	0	1	0	0	1
Metal screw	0	0	1	0	0	0	0	1
Metal ball	0	1	0	0	0	0	0	1
Spring	1	0	0	0	0	0	0	1
Piece of iron	0	0	1	0	0	0	0	1
Brad	1	0	0	0	0	0	0	1
Laptop key	1	0	0	0	0	0	0	1
Broken plastic lighter	0	0	1	0	0	0	0	1
Peanuts	11	4	2	1	0	0	0	18
But	4	1	0	0	0	0	0	5
Fish bones	3	1	0	0	0	0	0	4

Continued.

Foreign bodies	Group age (in years)							Total
	≤2	3-5	6-8	9-11	12-14	15-17	≥18	
Sesame	1	0	0	0	0	0	0	1
Galingales	1	1	0	0	0	0	0	2
Charcoal	1	0	0	0	0	0	0	1
Total	30	13	12	3	1	0	2	61

DISCUSSION

In the literature and regardless of geographical location, the prevalence of LTB FB is low, as this study where we found 3.05 cases per year.[1,5-7] This is an accident that mainly affects the male sex in the pediatric population.[1-3,6,8-11] The penetration syndrome found in 88.52% of the aces in this study; pathognomonic inhalation of an object. In this case, an exploration endoscopy can be performed, even in the presence of a normal radio-clinical examination.[2,4,12] The radiological aspects encountered after inhalation of a FB vary in depending on the nature of the latter.[13] There are radiopaque FB and radiolucent FB. Radio-opaque FB accounted for 47.62% of the cases in our study, most authors report similar radiological results.[3,14] For radiolucent FB, several indirect signs point to their presence: pulmonary atelectasis, lung abscess, polycystic lung appearance, pulmonary emphysema, systematized opacities, alveolar or white lung images.[2,9,10,13-17] An indirect radiological sign should alert any clinician to the presence of an unknown bronchial FB. CT would be of paramount importance in front of this foreign radiolucent FB, unfortunately it is rarely indicated except in case of endoscopic failure or in anticipation of thoracic surgery.[13-17] The type of endoscopic intervention depends on the headquarters of the FB. Rigid tube bronchoscopy is the preferred mode of extraction for tracheobronchial FB. It allows both good lighting, the possibility of good respiratory support and especially the easy and comfortable introduction of suction tongs and cannulas.[18] In cases where there is doubt about the existence of an FB, or the patient consults in a department of pneumology, a flexible bronchoscopy can be performed.[17,19,20] The nature of FB varies according to socio-cultural, regional conditions, dietary habits and religious context; in our study thirty-one FB (50.82%) were organic and dominated by peanuts, as the country's population likes to eat peanuts.[10,16] All our patients with laryngeal FB were treated with Mac Intosch laryngoscopy with control of the rest of the lower respiratory tract after body extraction.[1] Once inhaled, the migration and location of FB depends on its unique characteristics. The thin, lamellar character of the fish bones explains their laryngeal location.[14] The small size, the body weight associated with an anatomical situation of the right bronchus, explains the predominance of the right bronchial location.[21,22] We report twelve patients (21.32%) whose hospital stay was between 8 and 15 days. These included patients who had undergone several endoscopy sessions and referred patients from another health facility. In the first case, after an extraction failure, it takes at least 72 hours of monitoring before a new endoscopy, which lengthens the duration of hospitalization. In the second case, it was patients from a neighboring country or another distant part of the country, it required a longer post-endoscopic surveillance. Early consultations and the presence of a care team, namely a nurse, anesthesiologist and an ENT doctor, explain the absence of complications in this study, where 95.08% of cases were favorable. Several post-endoscopic complications can be found such as: laryngeal edema, granulomas, pneumothorax, laryngo-tracheo-bronchial and deaths.[1,2,4,17] Due to a lack of emergency personnel, pre-endoscopic tracheostomy can be performed in front of the laryngeal FB to control the risk of acute asphyxia.[4] We evacuated two patients (3.28%) to another country for thoracic surgery. After a futile attempt at extraction, it was a metal ball whose grip was difficult to endoscopy because of the non-adapted material and an invisible pin at the endoscopy because of the inflammatory phenomenon. During our study period, our country did not have a thoracic surgery department that could handle these cases. The thoracotomy is relatively weak in the literature, and this depends on the early endoscopic management of patients with more adapted means of extraction.[3,10,14,23] The indication for thoracotomy is variable: failure endoscopic extraction, FB Vulnerant, cutting and pointed, bronchiectasis, atelectasis, emphysema, pulmonary destruction, lung abscess, pleural involvement.[6,17,24]

CONCLUSION

Inhalation of an LTB FB remains a rare otorhinolaryngological emergency in the general population but preferentially found in the pediatric population. Penetration syndrome is found in more than four-fifths of cases. His research is crucial in the urgent care of patients, the only guarantee of a good prognosis.

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