

**Original Article****A PROSPECTIVE STUDY OF FOREIGN BODIES IN AERO-DIGESTIVE TRACT AT A TERTIARY CARE CENTER IN EASTERN NEPAL****\*Bajarang Prasad Sah<sup>1</sup>, Shyam Thapa Chhetri<sup>1</sup>, Shankar Prasad Sah<sup>1</sup>, Deepak Paudel<sup>1</sup>, Deependra Prasad Sarraf<sup>2</sup>**<sup>1</sup>Department of Otorhinolaryngology and Head and Neck Surgery, <sup>2</sup>Department of Clinical Pharmacology and Therapeutics, B.P. Koirala Institute of Health Sciences, Dharan, Nepal**Submitted: 09-October-2022, Revised: 03-December-2022, Accepted: 16-December-2022****DOI: <https://doi.org/10.3126/mjen.v1i02.51163>****ABSTRACT****Background**

Aero-digestive tract foreign body (FB) is a common emergency dealt by the otolaryngologists. Airways FB have been a major cause of morbidity and mortality. Management of FB depends on the site of impaction and types of it. The study aimed to find out the incidence, types and complications of FB encountered in aerodigestive tract.

**Methods**

A hospital-based prospective study was conducted among the patients with aero digestive FB presented and managed at the department of ENT & HNS from August 2015 to July 2017. A self-designed proforma was used to collect the relevant data. A descriptive analysis was made of the frequency distribution of qualitative variables. The findings were presented as tables and graphs.

**Results**


A total of 276 patients were treated for FB in aero-digestive tract and 158 (57.25%) patients were male. 90 (32.6%) cases of FB occurred in age group of 1-10 years. Ninety six cases of foreign body (34.78%) were chicken bone followed by other bone (20.65%) and coin (18.12%). All cases of coin were seen in children < 13 years old and disc Battery in children < 10 years old.

Out of 276 cases of foreign bodies, 254 (92.03%) were in upper digestive tract and 22 (7.97%) in airways. About 140 (50.72%) were in cricopharynx, 103 (37.32%) in esophagus and 11 (3.99%) in other sites in intestine. Complications were seen in 10 (3.62%) cases and retropharyngeal abscess was the most common (60%).

**Conclusion**

Cricopharynx was the most common site of FB lodgment in the digestive tract. Right main bronchus was the commonest site of lodgment of inhaled FB. Seeds, nuts, whistles, small toys were commonly seen obstructing the airway in children. They need to be trained not to keep these things in the mouth.

**Keywords:** Airway, Chicken bone, Esophagus, Foreign body

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## INTRODUCTION

A foreign body is an endogenous or exogenous substance incongruous with the anatomy of the site where it is found. Although lodgment of a foreign body in the aerodigestive tract is a fairly common in Otorhinolaryngology practices but it carries potential for grave consequences.<sup>1</sup> Aerodigestive foreign bodies have remained a diagnostic challenge to health care professionals. They can become life-threatening emergencies requiring immediate intervention or can go unnoticed for long period. Every effort must be made to avoid a delay in diagnosis because this may lead to a notable increase in complication rates.<sup>2</sup>

Management of foreign body depends on the site of impaction and types of it. Foreign body impacted at easily accessible site can be removed by hook or forceps and those which are not easily accessible site are managed with endoscopic assisted removal. Overall rate of endoscopic intervention may be as high as (63%-76%).<sup>3,4</sup> Mortality rates have been extremely low; compilations of multiple studies including 2 large series report no deaths in 852 adults and 1 death in 2206 children.<sup>5,6</sup> Although aero-digestive foreign bodies have been being managed at B.P. Koirala Institute of Health Sciences (BPKIHS) on emergency basis, no study has been attempted to analyze it. Objective of the study was to find out the types, locations and complications of foreign bodies encountered in aerodigestive tract.

## METHODS

A prospective cross-sectional study was conducted among patients with aero-digestive foreign body presented and managed at department of ENT & Head and Neck Surgery, BPKIHS from August 2015 to July 2017. The minimum sample size was calculated to be 150 using the formula  $Z^2 * p * q / L^2$  where p was 85.19% (Foreign bodies in food passage were found in 85.19% in an Indian study),<sup>7</sup> L was 7% and 10% as non-responders. Non-probability convenience sampling was used. Ethical approval was obtained from Institutional Review Committee, BPKIHS (IERB/014/014). The objective of the study was explained to the patients and written informed consent was taken. A self-designed proforma was used to collect the relevant data. The patients underwent radiological evaluation and rigid endoscopic assessment and forceps removal of the foreign bodies was done under GA. Depending on the location of the foreign body, the appropriate endoscope were used, namely - direct laryngoscope, esophagoscope, and bronchoscope and the appropriate foreign body removal forceps was chosen. All patients undergoing the procedure under GA were observed postoperatively for 24 hours and antibiotics were given for seven days along with analgesics.

The data were entered in Microsoft Excel 2007

(Microsoft, Redmond, WA, USA) and were analyzed by using SPSS (Software Package for Social Sciences) 16 for windows software. A descriptive analysis was made of the frequency distribution of qualitative variables. The findings were presented as tables and graphs.

## RESULTS

A total of 276 cases of foreign bodies were observed during the study period. One hundred fifty eight (57.25%) patients were males and 118 (42.75%) were females. Ninety (32.6%) cases of foreign body occurred in the age group of 1-10 years (Figure 1).

Out of 22, 15 cases of foreign body were seen in airway tract of children aged 1-10 years (Figure 2).

Ninety six cases of foreign body (34.78%) were chicken bone followed by other bone (20.65%) and coin (18.12%) (Figure 3).

All cases of coin were seen in children < 13 years old and disc Battery in children < 10 years old.

Out of 153 cases of chicken and other bones/meat bolus, 145 (94.77%) were seen in patients >10 years and 8 (5.23%) cases were seen in patients <10 years. Out of 276 cases of foreign bodies, 254 (92.03%) were in upper digestive tract and 22 (7.97%) in airways. About 140 (50.72%) were in cricopharynx, 103 (37.32%) in esophagus and 11 (3.99%) in other sites in intestine. Similarly 14 (5.07%) foreign bodies were in right bronchus, 6 (2.17%) in left bronchus, one (0.36%) in trachea and one (0.36%) in subglottis. Out of 22 airway foreign bodies, 12 were seeds; three foreign bodies were berries, two maize, two soybean, two betel nuts, one pea and one bean. Complications were seen in 10 (3.62%) cases and retropharyngeal abscess was the most common (60%) (Figure 4).

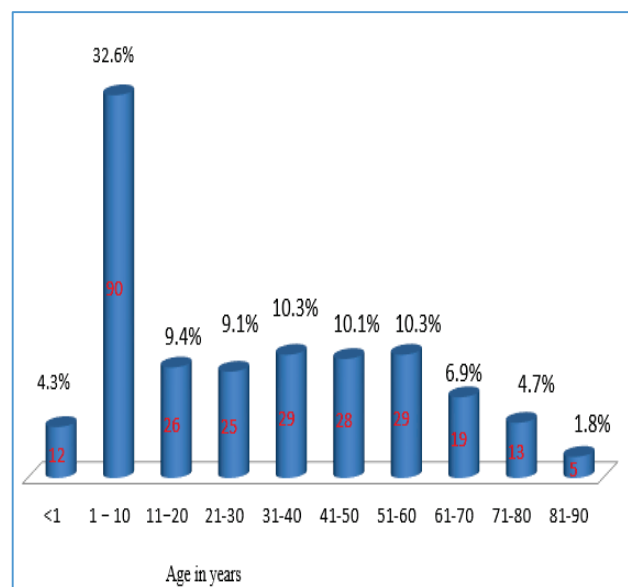


Figure 1: Age-wise distribution of foreign body (n=276)

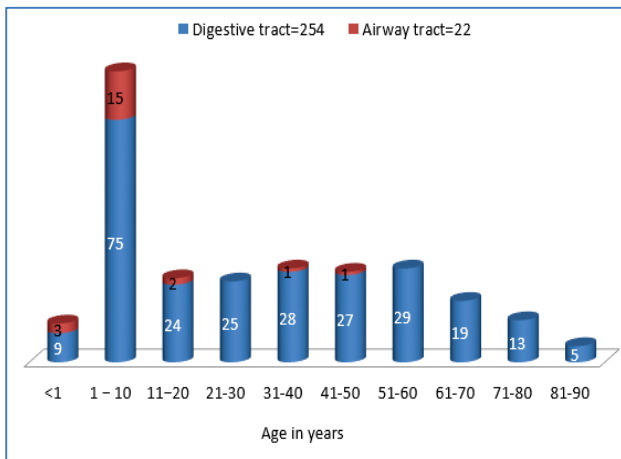


Figure 2: Age group vs site of foreign body (n=276)

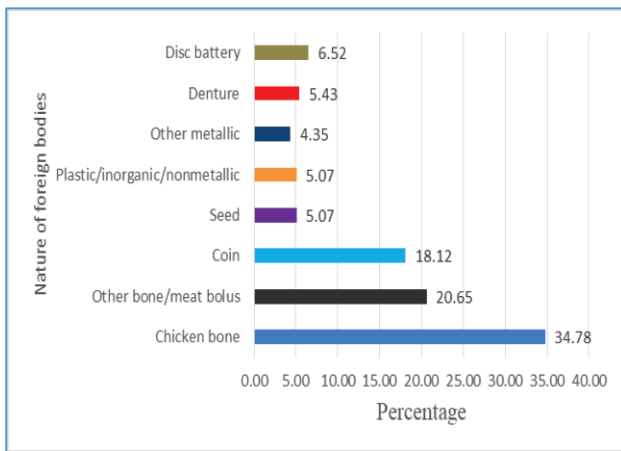


Figure 3: Types of the foreign body seen in the patients (n=276)

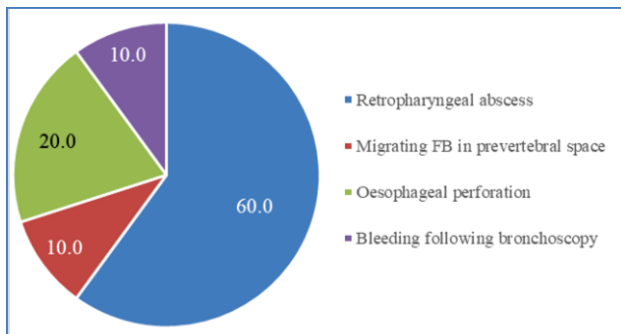


Figure 4: Complications due to foreign body (n=10)

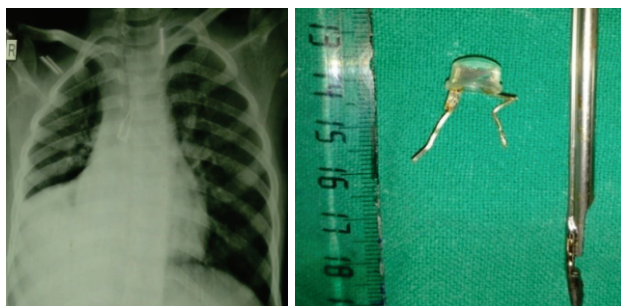


Figure 5a: X-ray chest showing FB in right bronchus

Figure 5b: FB LED bulb after removal.



Figure 6a: X-ray soft tissue neck lateral view showing radiopaque shadow of denture

Figure 6b: FB denture after removal



Figure 7a: X-ray soft tissue neck lateral view showing radiopaque shadow of FB Esophagus

Figure 7b: FB Chicken bone

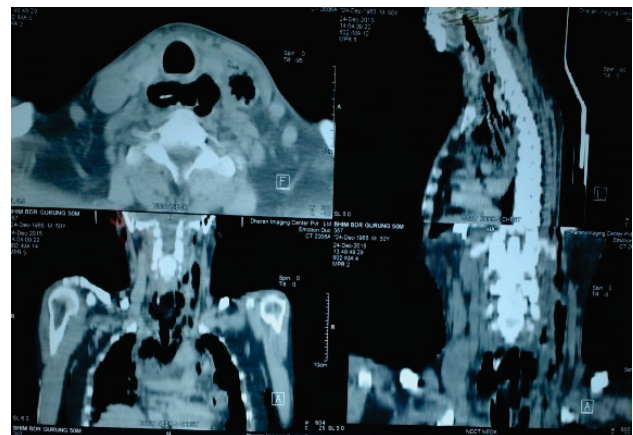


Figure 8: CT Scan Neck and chest showing Complication of FB Esophagus (Neck Abscess & Mediastinitis)

**DISCUSSION**

Foreign body (FB) is generally ingested accidentally but occasionally it may be also homicidal or suicidal.<sup>8,9</sup> Management of aerodigestive FB patients was revolutionized by the technique and instruments developed by Chevalier Jackson in 1904 and the mortality decreased from more than 20% to 2%.<sup>10</sup> In the present study, majority of FB were found in food passage and only 7.97% FB were in airway passage. In a study by Hung and Lin, 76% and 24.7% FBs were in food passage and air passage respectively.<sup>11</sup> Brooks found them to be 80% and 20% respectively.<sup>12</sup> Approximately one third (32.6%) of the patients in our



study belonged to the age group of 1–10 years. In contrast to this, majority of the patients fall within the five year of age group (43.8%) in other studies.<sup>8,13</sup> Most of the FBs are ingested by children younger than five years with the peak incidence between six months and three years, as a sequel to natural tendency to put things in their mouth.<sup>14</sup> FBs were located at cricopharynx in majority (50.72%) of the patients with digestive tract FBs. In a large series of Kamat et al, 50.5% FBs in food passage were also seen in cricopharynx.<sup>15</sup> This is owing to poor peristalsis, sphincteric action, and narrow diameter of cricopharynx.<sup>16</sup> In our study, majority of the patients showed vegetable FBs, with seeds being the common. Most of the other studies report same findings.<sup>8,17</sup> We observed bone chips and coins to be the commonest types of FB in food passage which was similar to other reports.<sup>8,18-20</sup> The reason for bone chip to be commonest FB in our study may be owing to the fact that meat is a very common food in our part of world. Most common FBs in children were coins; but marbles, button, disc batteries were also reported. In adults, common FBs were bones, dentures, and metallic wires. According to Asif et al., a peanut was the most common FB, retrieved in 45 patients (55.6%). Other FBs included whistles (18.5%), maize seeds (13.6%), bean seeds (6.2%), nuts (2.5%), a sewing needle with thread, dice, and dentures (1.2% each).<sup>21</sup> The FBs that have gone beyond the esophagus pass uneventfully through the intestinal tract in 70%–80% cases.<sup>22</sup> Smooth foreign bodies do not pose much threat but may cause airway obstruction. If sharp foreign bodies like, chicken bone, safety pin, fish bones are not retrieved at the earliest, they may penetrate oesophageal wall and cause complications. Therefore urgent intervention is required for sharp foreign bodies in airways or food passages.

In our study, in airway group, the youngest patient was

aged three months, while the oldest was 45 years. The FBs were encountered in the right main bronchus in 14 (63.6%) patients, whereas, they were in the left main bronchus in six (27.3%) of them. In most published series, the FBs tend to be localized in the right bronchial tree.<sup>23,24</sup> Explained by the vertical nature of the right main bronchus, its larger diameter, the greater air flow through it, and the localization of the carina to the left of the midline of the trachea.<sup>23,25</sup>

Retropharyngeal abscess was the most common complication in the present study. Anaesthetic complications, oesophageal perforation, mediastinitis, pulmonary complications, erosion of oesophageal wall and oesophageal stricture are some of the complications related with the foreign bodies reported in other studies.<sup>8</sup> Long-standing FB may cause recurrent pneumonia or ulceration, fistulae, mediastinitis, pneumothorax, abscess and stricture.<sup>26</sup> The present study has some limitations. The study had small sample size. The study was conducted at a single center and hence the findings should be implanted with caution.

## CONCLUSION

FBs in aerodigestive tract are a challenging emergency for otorhinolaryngologists. FB in airway is life-threatening and should be managed immediately. Rigid oesophagoscopy and bronchoscopy are the treatments of choice for aerodigestive tract FBs. Cricopharynx was the most common site of FB lodgment in the digestive tract. Right main bronchus was the commonest site of lodgment of inhaled FB. Seeds/nuts/whistles/small toys were commonly seen obstructing the airway in children. They need to be trained not to keep these things in the mouth.

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**Conflict of interest:** None

**Ethical approval:** Yes

## REFERENCES

- Chinski A, Foltran F, Gregori D, Ballali S, Passali D, Bellussi L. Foreign Bodies in the Oesophagus: The Experience of the Buenos Aires Paediatric ORL Clinic. *Int J Pediatr.* 2010;2010:490691. doi: 10.1155/2010/490691
- Mu L, He P, Sun D. The causes and complications of late diagnosis of foreign body aspiration in children. Report of 210 cases. *Arch Otolaryngol Head Neck Surg.* 1991;117(8):876–9. DOI: 10.1001/archotol.1991.01870200070010
- Palta R, Sahota A, Bemarki A, Salama P, Simpson N, Laine L. Foreign-body ingestion: characteristics and outcomes in a lower socioeconomic population with predominantly intentional ingestion. *GastrointestEndosc.* 2009;69(3 Pt 1):426–33. doi: 10.1016/j.gie.2008.05.072.
- Weiland ST, Schurr MJ. Conservative management of ingested foreign bodies. *J Gastrointest Surg.* 2002;6(3):496–500. doi: 10.1016/s1091-255x(01)00027-0.
- Velitchkov NG, Grigorov GI, Losanoff JE, Kjossev KT. Ingested foreign bodies of the gastrointestinal tract: retrospective analysis of 542 cases. *World J Surg.* 1996;20(8):1001–5. doi: 10.1007/s002689900152.
- Blaho KE, Merigian KS, Winbery SL, Park LJ, Cockrell M. Foreign body ingestions in the Emergency Department: case reports and review of treatment. *J Emerg Med.* 1998;16(1):21–6. doi: 10.1016/s0736-4679(97)00229-1.
- Gupta R, Poorey VK. Incidence of foreign bodies in aerodigestive tract in vindhya region: our experience. *Indian J Otolaryngol Head Neck Surg.* 2014;66(2):135–41. doi: 10.1007/s12070-013-0644-8.
- Ray R, Dutta M, Mukherjee M, Gayen GC. Foreign body in ear, nose and throat: experience in a tertiary hospital. *Indian J Otolaryngol Head Neck Surg.* 2014;66(1):13–6. doi: 10.1007/s12070-012-0529-2.
- Cascini F, Longo F, Polacco M, Scafetta I. Foreign object ingestion in complex suicide: a case report and review of the literature. *Forensic Sci Int.* 2012;219(1-3):e1–3. doi: 10.1016/j.forsciint.2011.11.015.]
- Webb WA, McDaniel L, Jones L. Foreign bodies of the upper gastrointestinal tract: current management. *South Med J.* 1984;77(9):1083–6. doi: 10.1097/00007611-198409000-00006.

11. HUNG WC, LIN PJ. Foreign bodies in air and food passages; a clinical observation in Taiwan. *AMA Arch Otolaryngol.* 1953;57(6):603-12. doi: 10.1001/archotol.1953.00710030627002.
12. Brooks JW. Foreign bodies in the air and food passages. *Ann Surg.* 1972;175(5):720-32. doi: 10.1097/0000658-197205000-00012.
13. Endican S, Ear Joseph P. Nose and throat foreign bodies in Malayasian children: analysis of 1037 cases. *Int J PaediatrOtolaryngol.* 2006;70(9):1539–1545. doi: 10.1016/j.ijporl.2006.03.018.
14. Webb WA. Management of foreign bodies of the upper gastrointestinal tract: update. *GastrointestEndosc.* 1995;41(1):39-51. doi: 10.1016/s0016-5107(95)70274-1.
15. Kamath P, Bhojwani KM, Prasannaraj T, Abhijith K. Foreign bodies in the aerodigestive tract-a clinical study of cases in the coastal belt of South India. *Am J Otolaryngol.* 2006;27(6):373-7. doi: 10.1016/j.amjoto.2005.11.011.
16. Rijal KC, Koirala KP, Khadgi A. Surgical procedure among patients with foreign body obstruction in food passage in a tertiary care hospital: a descriptive cross-sectional study. *JNMA J Nepal Med Assoc.* 2021;59(237):460-463. doi: 10.31729/jnma.5704.
17. Sersar SI, Rizk WH, Bilal M, El Diasty MM, Eltantawy TA, Abdelhakam BB, et al. Inhaled foreign bodies: presentation, management and value of history and plain chest radiography in delayed presentation. *Otolaryngol Head Neck Surg.* 2006;134(1):92-9. doi: 10.1016/j.otohns.2005.08.019.
18. Koirala K, Rai S, Chhetri S, Shah R. Foreign Body in the Esophagus-Comparison Between Adult and Pediatric Population. *Nepal Journal of Medical Sciences.* 2012;1(1):42–44. <https://doi.org/10.3126/njms.v1i1.5797>.
19. Shrestha A, Gurung RB, Sharma P, Shrestha R, Shrestha P. Endoscopic management of foreign body impaction in the upper gastrointestinal tract in a tertiary care centre of Nepal. *Kathmandu Univ Med J. Kathmandu Univ Med J.* 2020;70(2):139-43. PMID: 33594019
20. Rishi B, Manita P, Ramesh P. Types of foreign body in ear, nose and throat in Western part of Nepal. *Glob J Oto.* 2017; 4(3):555640. . DOI: 10.19080/GJO.2017.04.555640
21. Asif M, Shah SA, Khan F, Ghani R. Analysis of tracheobronchial foreign bodies with respect to sex, age, type and presentation. *J Ayub Med Coll Abbottabad.* 2007;19(1):13-5. PMID: 17867472
22. Hu T, Zhang J, Liu Y, Chen L, Cen W, Wu W, et al. Evaluation of the risk factors for severe complications and surgery of intestinal foreign bodies in adults: a single-center experience with 180 cases. *Gastroenterol Rep (Oxf).* 2022;10:goac036. doi: 10.1093/gastro/goac036.
23. Ramos MB, Fernández-Villar A, Rivo JE, Leiro V, García-Fontán E, Botana MI, et al. Extraction of airway foreign bodies in adults: experience from 1987-2008. *Interact Cardiovasc Thorac Surg.* 2009;9(3):402-5. doi: 10.1510/icvts.2009.207332.
24. Swanson KL, Prakash UB, McDougall JC, Midthun DE, Edell ES, Brutinel MM, et al. Airway foreign bodies in adults. *Journal of Bronchology.* 2003;10(2):107–111. DOI: 10.1097/00128594-200304000-00004.
25. Ryan B, Yendamuri K, Yendamuri S. Anatomical considerations in bronchoscopy. *J Thorac Dis.* 2017;9(Suppl 10):S1123-S1127. doi: 10.21037/jtd.2017.08.116.
26. Yahyaoui S, Jahaouat I, Brini I, Sammoud A. Delayed diagnosis of esophageal foreign body: A case report. *Int J Surg Case Rep.* 2017;36:179-181. doi: 10.1016/j.ijscr.2017.05.028.