Review Article

Ear, Nose, and Throat Foreign Bodies in Pediatric Age

Santosh Kumar Swain, Krishna Chandra Mallik[1]

Department of Otorhinolaryngology, IMS and SUM Hospital, Siksha "O" Anusandhan University, Bhubaneswar, [1]Department of Otorhinolaryngology, SLN Medical College, Koraput, Odisha, India

Abstract

Ear, nose, and throat foreign bodies (FBs) in pediatric age group are one of the most common emergencies managed by otorhinolaryngologists. FB in the ear, nose, and throat may cause significant morbidity and may need costly management if not treated in time. The diagnosis of the FB is based on the history from parents or caregivers, physical examination, and imaging. Successful removal of the FB depends on the site of FB, type of the FB, availability of the instruments, and skill of the clinicians attempting for FB removal. The attempts of the FB removal from the ear, nose, and throat by untrained or inexperienced health professionals may lead to complications. It is a necessity to educate the caregivers or parents for close monitoring their children for close monitoring and avoid such FB insertion. This review article focuses on the prevalence, factors related to the FB insertion into the ear, nose, and throat in pediatric age, clinical presentations, and current management. This article will surely increase awareness among the emergency physicians, pediatricians, family physicians, and otolaryngologists for dealing with pediatric patients with FB in the ear, nose, and throat and help them to resolve this problem to a great extent.

Keywords: Ear, foreign body, nose, pediatric age, throat

Introduction

A foreign body (FB) is an object in the body part which is not meant to be, and it can cause harm by its presence. FB needs immediate medical attention for safety of the patient. FB insertion in the ear, nose, and throat is commonly found in children and often encountered by primary care clinicians, pediatricians, and otolaryngologists.[1] FB in pediatric population is often found below 5 years of age.[2] The high prevalence of the FB in children is attributable to the inquisitive nature of the children and their nature to explore the environment.[2] Different types of FBs are seen such as nonliving and living. The nonliving FBs are classified into organic and inorganic and hygroscopic (hydrophilic) or nonhygroscopic (hydrophobic).[3] The FB in the ear may lead to pain and injury to the tympanic membrane and ossicles, which may occur at the time of FB removal.[4] Insertion of the FB at the nose and pharynx may cause life-threatening condition as FB may accidentally enter into the esophagus or laryngotracheobronchial airway, which potentially leads to serious situation such as perforation of the esophagus or gastrointestinal tract and obstruction of the airway.[5] The diagnosis may be delayed as this event often unobserved, and the clinical presentations are nonspecific, so there may be misdiagnosis in initial period. The FB removal needs a skilled otolaryngologist. Majority of the ear and nose FBs are removed by the forceps, ear syringing, and suctioning. FB at the pharynx and the laryngotracheobronchial tree is considered as a medical emergency which needs immediate removal. Imaging, flexible, or rigid endoscopy is required for confirming the diagnosis. Clinicians should have a high index of suspicion for FB in pediatric patients with unexplained airway symptoms. Extensive awareness to the public is required for preventing such FB insertion into the ear, nose, and throat.

Methods of Literature Search

Research articles regarding FB in the ear, nose, and throat in children were searched through a multiple systemic approach. First, we conducted an online search of the Scopus, PubMed, Medline, and Google Scholar databases with the FB insertion

Address for correspondence: Prof. Santosh Kumar Swain, Department of Otorhinolaryngology, IMS and SUM Hospital, Siksha "O" Anusandhan University, Bhubaneswar - 751 003, Odisha, India.
E-mail: santoshvoltaire@yahoo.co.in

Submitted: 11-Jun-2020 **Accepted:** 27-Jun-2020
Published Online: 16-Sep-2020

Access this article online

Quick Response Code:

Website: www.medjbabylon.org

DOI: 10.4103/MJBL.MJBL_37_20

How to cite this article: Swain SK, Mallik KC. Ear, nose, and throat foreign bodies in pediatric age. Med J Babylon 2020;17:238-43.

in the ear, nose, and throat of children. The abstracts of the published articles were identified by this search method and other articles identified manually from citations. This manuscript reviews the details of FB in the ear, nose, and throat of the children along with certain important medical problems. This review article presents a baseline from where further prospective trials for FB insertion in the ear, nose, and throat of the children could be designed and helps as a spur for further research.

Prevalence

FBs in the ear, nose, and throat constitute 11% of all the emergencies faced by otolaryngologists.[6] In approximately 22% cases of the ear, nose, and throat FBs, severe complications may happen which represent the morbidity associated with FB, so the ear, nose, and throat FBs should be managed properly in time with the help of skilled clinicians.[7] The FBs have geographic and social peculiarities. The FBs such as cotton seeds and fragments are often found in developing countries, whereas small plastic pieces are the most common FBs seen in developed countries.[8] FBs in the ear, nose, and throat are prevalent in children and found in 50.1% of the pediatric patients below the age of 4 years and common in age below 8 years.[9] Majority of the FBs are seen in the male child.[9] The incidence of the FB impaction in the ear, nose, and throat is approximately 5.7%, which shows that it is common in the community.[10] Otolaryngologists are often habituated to the ear, nose, and throat FB in day-to-day practice.

Pediatric Age and Ear, Nose, and Throat Foreign Bodies

The FB insertion in children is often voluntary in nature.[11] Certain factors aggravate the FB insertion in the ear, nose, and throat among children such as desire or curiosity toward exploring the orifices, boredom, fun making, imitation, mental retardation, and insanity.[12] Attention deficit hyperactive disorder(ADHD) is another psychological factor for causing self-insertion of the FBs in the ear or nose and approximately 25% of them are also associated with previous FB insertion.[13] FB insertion in the ear, nose, and throat in pediatric age also depends on the presence or absence of the caregivers and availability of the object or FB.[14] FBs in the ear, nose, and throat are most commonly found in younger children of age <5 years.[6] Sigmond Freud described anal and phallic Oedipal stages after the development of the oral stage where a child to anal manipulation predisposes and also provides pleasure for manipulating the different orifices such as ear, nose, and throat.[15] The early childhood has a time for exploration and interactions with the surroundings. When the child moves by walking or crawling, they try to access the different objects which have to be duly explored. Lack of attention by the parents helps the child to reach the objects and contributes toward FB insertion. Ear, nose, and throats are common orifices to the high coincidence of such FBs. These FBs are often found in the ear canals, followed by the nasal cavity and then oropharynx.[9] One author suggested the FBs in specific orders of frequency such as ears, nasal cavity, pharynx, esophagus, and laryngotracheobronchial trees.[16]

Study showed that FB insertion in children are often associated with low socioeconomic status.[6] Irritation due to local pathology may predispose for inserting FB in the ear and nose.[17] Repeated insertion of the FB is more common in the nasal cavity than ear and throat as the nose is an easy accessibility to the child's hand.

Ear Foreign Bodies

Ear is one of the most common sites for FB insertion in children. Children are not only insert FB in their ear but their siblings and friends are also sometimes responsible to insert FB in the ear. The FB in the ear can be organic or inorganic. Organic FBs have a tendency to cause inflammatory reactions. In the ear, these organic FBs may predispose to otitis externa, suppurative otitis media, and decreased hearing.[18] The common FBs in the ear seen include paper piece, cotton wool, bean, bead, plastic, eraser, insect, seed, and popcorn kernel. In most of the cases, FB is found in the bony part of the external auditory canal. Insects [Figure 1] sometimes enter into the external auditory canal and partially inserted into the wax if the ear can have wax where the insect struggles and creates abrasions. This struggling of the insects in the external auditory canal may cause injury to the tympanic membrane. Common clinical presentations for FB in the ear are aural fullness, earache, bleeding, and ear discharge. Sometimes, it may be asymptomatic, and FB found incidentally during routine examination of the ear by otoscope. Although FBs are commonly seen in external auditory canal, atraumatic and quick removal of FB in a child is often challenging for otolaryngologists. Successful removal of the FB from external auditory canal depends on the type of FB, cooperation of the child, types of instruments, and skill and experiences of the otolaryngologists who are attempting for removal of FB.[19] Removal of the FB from the ear usually done by

Figure 1: Insect in the external auditory canal

otomicroscope or otoendoscope with successful outcome. FB in the ear is usually unilateral, but it can be found in bilateral ear, and sometimes, multiple FBs are also seen in the ear.

Nose Foreign Bodies

FB in the nose is a common presentation of the children at the emergency department. The nose is divided into the two nasal cavities by the nasal septum. Each nasal cavity is subdivided into three passages by the turbinates (superior, middle, and inferior). The nasal FBs are often seen in the floor of the nasal pathway, just below the inferior turbinate, or at the upper part of the nasal cavity anterior to the middle turbinate.[20] Commonly found nasal FBs are buttons, beads, pebbles, toy parts, food, paper, candle wax, cloth, and button batteries.[21] Children with nasal FB usually present either as visibility of the FB in the nasal cavity or unilateral offensive discharge from the nasal cavity. Unilateral, purulent, and foul-smelling discharge in children is thought as FB in the nose until proved otherwise. Along with the growth and cognitive improvement, the FB insertion into the nostrils reduces significantly, which are often seen in patients with psychiatric diseases. FB in the nose is often unilateral although it can be seen in both sides.[22] Sometimes, there may be multiple FBs in the nasal cavity. Organic FBs may cause inflammatory reactions, so FB impaction in the nasal cavity may lead to infective rhinosinusitis, FB granuloma, and perforation of the nasal septum.[21] The less common presentations of the nasal FB are epistaxis and nasal obstruction.

Throat Foreign Bodies

The throat (pharynx) is superiorly bounded by the skull base and below by the cricoid cartilage. The hypopharynx is adjacent to the larynx. The hypopharynx continues with the esophagus, whereas the larynx continues with trachea and bronchi. Impaction of the FB at the esophagus is a serious clinical entity. Delay in the diagnosis and removal may lead to life-threatening situations. The diagnosis is based on the proper history taking, detail physical examination, and imaging study. Frequently seen swallowing FBs are coins, parts of playing objects, chicken bone, fishbone, and mutton piece.[23] Coin is the most common FB in the throat among the children.[23] All types of the FBs in the pharynx are considered as a medical emergency and require the protection of the airway. The FB at the airway may significantly cause morbidity and mortality in children which need immediate intervention. Common FBs in the throat are food bolus, coins, fishbones, piece of the plastic, and balloons.[24] Button battery in the airway gives a serious threatening to the airway because of its chemical.[25] Open safety pin [Figure 2] is a life-threatening FB and it should be removed carefully otherwise may cause injury to the surrounding structures including major blood vessel. Children often present with chocking sensation, dysphagia, and odynophagia. Pharyngeal FBs are suspected when children present with cough, breathing difficulty, or hoarseness of voice.[24]

Figure 2: X-ray soft tissue of the neck (lateral view) showing foreign body in the larynx

Diagnosis

The diagnosis of the FB is mainly based on clinical presentations and history. Patient history is an important part for getting the diagnosis. Older children often give a history of the FB lodgment in the ear, nose, and throat. However, younger children are usually brought by their tensed parents or caregivers. A high index of suspicion of FB should be required by the clinicians for dealing with these children. During clinical examination, direct visualization is helpful for identifying and localizes the FBs. Imaging like X-ray help to find the radio-opaque FBs but not helpful for identifying the radiolucent FBs. X-ray may help to locate fishbone and chicken bones. The nasal FBs are easily diagnosed by 2.7 mm size rigid nasal endoscope and flexible nasopharyngoscope in children. This method is not only confirming the diagnosis but also helpful for removal of the FBs. Majority of the nasal FBs are present at the anterior part of the nasal cavity because of the extension of the inferior turbinate.[26] Examination under microscope or otoendoscope confirms the presence of the FB in the ear and helps for removal of the FB. Sometimes, the small fishbone may be buried at the pharyngeal mucosa over the tonsils or base of the tongue and missed by the clinicians. The imaging may not be helpful for confirming the fishbone and so unreliable in these cases.[27,28] X-ray chest is routinely advised in FB at the airway such as larynx, trachea, and bronchus [Figure 3]. X-ray of soft tissue of the neck with lateral and anterior-posterior view often confirms the metallic FB which appears opaque [Figure 4]. Computed tomography scan is sometimes confirmed in the FB airway when confusion arises from the X-ray.

Treatment

FB removal from the ear, nose, and throat is often considered as a simple procedure; however, certain complications may arise which need the help of the otolaryngologist. The successful outcome depends on several factors such as type of the FB, site

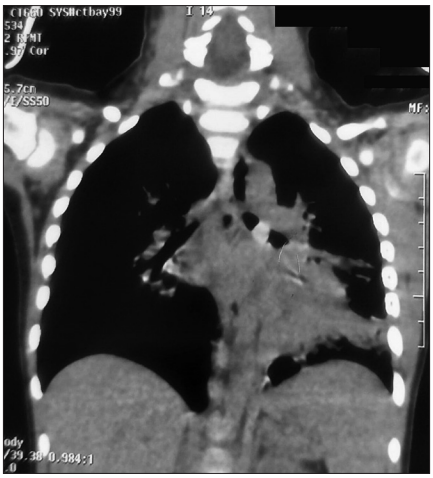

Figure 3: Chest X-ray showing radio-opaque foreign body in the left bronchus

Figure 4: X-ray of the neck and chest showing round radio-opaque foreign body (coin) in the esophagus

of the FB, clinician's dexterity, availability of the equipment, and child's cooperation.[6] Late management of these cases may lead to severe complications along with difficulty for removal of the FB. Early and atraumatic removal of the FBs is usually a challenge for an otolaryngologist. There is no single technique utilized for removal of the FB with successful outcome. There are different techniques and instruments used for FB removal from the ear, nose, and throat [Table 1]. The permanence of the FBs in the ear, nose, and throat, for example, more than 72 h and repeated attempt for removal of the FB, enhances the risk for complications. FB removal from the ear is done with the help of the otomicroscope which is a preferred mode of FB removal. FB can be removed with the help of the microscope or otoendoscope under intravenous sedation or general anesthesia for minimizing the trauma to the tympanic membrane and external auditory canal. General anesthesia is preferred when the child is not cooperative or associated with otitis externa. There are several methods available for removal of the FB from the ear. In the ear, the most common method for FB removal is by syringing. Other instruments used for removal of the FB from the ear are forceps, fine hook, and suctioning can be utilized. Live insects in the ear should be first killed by drowning in the water or oil or methylated spirit, followed by the syringing.[26] Ear syringing is helpful to remove the nonhygroscopic FBs from the external auditory canal. Ear syringing is usually avoided in case of perforated tympanic membrane and hygroscopic FBs such as vegetable FB. Suctioning with negative pressure can be helpful, especially when FB is associated with discharge in the ear or nose. Another method for removal of the FB from the ear is extraction of the FB by cyanoacrylate glue.[17] The complications during ear FB removal may be due to irregular shape of the FBs, namely the irregular stone, period, or duration of the FB lodgment in the ear, which may be associated with otitis externa, cooperation of the child during the FB removal, and finally, skill of the surgeon.

Majority of the nasal FBs are removed easily at the outpatient department without much complication. It can also be removed with the help of FB hook in an awake child by tightly holding the trained staff. However, in cases of crying, anxious patients, or inexperienced clinicians, there is a chance of FB going more inside and cause injury to surrounding area or may enter into the airway which can lead to life-threatening situation. The removal of the FB from the nasal cavity is accomplished with the help of the wax hook, Eustachian tube catheter, or forceps.[29] The difficult nasal FB of the children can be removed under general anesthesia with oral intubation.

Majority of the pharyngeal FBs are visible during direct examination of the throat. Hence, these FBs can be easily removed, whereas the invisible FBs need rigid or flexible scopes for removal.[30] Sometimes, small fishbone may be buried at the base of the tongue or pharyngeal mucosa which may be missed by the clinicians. Hence, in these cases, endoscopic removal should be done with careful observation by the clinicians. FB from the pharynx is removed by grasping through the forceps in the larynx. The esophageal FB is removed under general anesthesia. If a child presents with respiratory difficulty after aspiration of the FB then immediately the child should undergo rigid bronchoscopy by an experienced pediatric otolaryngologists and senior anesthetist. The rigid bronchoscopy along with proper forceps such as graspers, suckers, and optical forceps is ideal for successful removal of the FB from the laryngotracheobronchial airway. During bronchoscopy, the rigid bronchoscope usually passed to the lower end of the trachea and then two bronchi are inspected carefully. FB is usually lodged at the right bronchus as it is larger and more vertical in comparison to the left side. The division of each bronchus is also checked carefully. FB in bronchus is grasped firmly and withdrawn slowly by appropriate instrument under the guidance of the rigid bronchoscope for preventing the FB fall into the deeper part of the bronchial tree. The bronchial secretions can be cleaned gently with the help of the fine-bore suction catheter. If there is more than one FB, the bronchopulmonary segments can be inspected

Table 1: Different techniques and instruments used for foreign body removal from the ear, nose, and throat

Location of the FB	Techniques and instruments used
Ear	Usually done under microscope or otoendoscope and rarely with forehead light. Ear syringing or aural suctions are often used for removal of FB. Hartmann aural forceps, Jobson Horne probe, and Billeau ear loop are used to remove FB
Nose	Lange choanal hook and Hartmann nasal dressing forceps are used to remove FB from nasal cavity. FB is sucked out by Frazier angled nasal suction
Oropharynx	Topical anesthetic spray is applied at the oropharynx.Then tongue is depressed by tongue depressed and the FB is removed by Tilley dressing forceps
Hypopharynx	Done under GA by pediatric rigid laryngoscope with fiber-optic light carrier (Storz). Then, FB is removed with straight laryngeal serrated alligator forceps with double action jaws (Storz)
Larynx	Done under GA, the larynx is checked by rigid pediatric laryngoscope with fiber-optic light carrier (Storz) without intubation and the FB is removed by straight laryngeal serrated alligator forceps with double action jaws (Storz)
Tracheobronchial tree	Done under GA by rigid ventilating pediatric bronchoscope with proximal illumination (Storz or Wolf). Nuts, peas, and coffee beans are removed by bronchoscopic peanut grasping forceps with double action jaws (Storz) whereas other hard irregular FBs are removed by bronchoscopic alligator grasping forceps with double action jaws (Storz)
Esophagus	Done under general anesthesia with the help of the rigid pediatric esophagoscope with distal illumination (Storz) and the FB is removed by esophagoscope alligator grasping forceps with double action jaws (Storz)

GA: General anesthesia, FB: Foreign body

thoroughly. The FB in the esophagus in children can be removed by the rigid esophagoscopy or flexible gastroscope or esophagoscope. The impacted bolus in the esophagus can be removed proximally piecemeal or distally pushed into the stomach. There is a high chance of complications during FB removal performed by the medical professionals with inadequate training in otorhinolaryngology practice.

Conclusion

The FB in the ear, nose, and throat are commonly encountered in clinical practice of the otolaryngologists. The site and nature of the FB are important factors for successful removal. History of previous attempt for removing the FB is also an important factor to be considered before managing this case. FB may be associated with significant complications if not removed immediately. The removal of the FB from the ear, nose, and throat among children requires skilled pediatric otolaryngologists and appropriate instruments. Preventive measures are more helpful by giving education to the caregivers of the children. Adult persons should not insert anything into the ear, nose, and throat in front of the children which will avoid copying behavior of the child. FB insertion in the ear, nose, and throat and its complications should be added to the public health for awareness among the parents and caregivers.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Oyama LC. Foreign Bodies of the Ear, Nose and Throat. Emerg Med Clin North Am 2019;37:121-30.
2. Akenroye MI, Osukoya AT. Uncommon, undeclared oesophageal foreign bodies. Niger J Clin Pract 2012;15:244-6.
3. Carney AS, Patel N, Clarke R. Foreign bodies in the ear and the aerodigestive tract in children. In: Scott-Brown's Otorhinolaryngology, Head and Neck Surgery, 7th ed. London, UK: Edward Arnold; 2008. p. 1184-93.
4. Gregori D, Salerni L, Scarinzi C, Morra B, Berchialla P, Snidero S, *et al*. Foreign bodies in the nose causing complications and requiring hospitalization in children 0-14 age: Results from the European survey of foreign bodies injuries study. Rhinology 2008;46:28-33.
5. Pecorari G, Tavormina P, Riva G, Landolfo V, Raimondo L, Garzaro M. Ear, nose and throat foreign bodies: The experience of the Pediatric Hospital of Turin. J Paediatr Child Health 2014;50:978-84.
6. Mukherjee A, Haldar D, Dutta S, Dutta M, Saha J, Sinha R. Ear, nose and throat foreign bodies in children: A search for socio-demographic correlates. Int J Pediatr Otorhinolaryngol 2011;75:510-2.
7. Heim SW, Maughan KL. Foreign bodies in the ear, nose, and throat. Am Fam Physician 2007;76:1185-9.
8. Ansley JF, Cunningham MJ. Treatment of aural foreign bodies in children. Pediatrics 1998;101:638-41.
9. Mangussi-Gomes J, Andrade JS, Matos RC, Kosugi EM, Penido Nde O. ENT foreign bodies: Profile of the cases seen at a tertiary hospital emergency care unit. Braz J Otorhinolaryngol 2013;79:699-703.
10. Adedeji TO, Sogebi OA, Bande S. Clinical spectrum of ear, nose and throat foreign bodies in North Western Nigeria. Afr Health Sci 2016;16:292-7.
11. da Silva BR, Souza LO, Camera MG, Tamiso AG, Castanheira LV. Foreign bodies in otorhinolaryngology: A study of 128 cases. Int Arch Otorhinolaryngol 2009;13:394-9.
12. Fasunla J, Ibekwe T, Adeosun A. Preventable risks in the management of aural foreign bodies in Western Nigeria. Internet J Otorhinolaryngol 2006;7:1-5.
13. Perera H, Fernando SM, Yasawardena AD, Karunaratne I. Prevalence of attention deficit hyperactivity disorder (ADHD) in children presenting with self-inserted nasal and aural foreign bodies. Int J Pediatr Otorhinolaryngol 2009;73:1362-4.
14. Afolabi OA, Salaudeen AG, Alabi BS, Lasisi AO. Correlation of aural foreign bodies with handedness: An observational study in a Nigerian tertiary hospital. J Clin Med Res 2010;2:79-82.
15. Carney AS. Foreign bodies in the ear and the aerodigestive tract in children. In: Gleeson MJ, ed. Scott Brown's otolaryngology. 7th ed. Canada: Hodder Arnold Publishers; 2008. p. 1184-93.
16. Endican S, Garap JP, Dubey SP. Ear, nose and throat foreign bodies in Melanesian children: An analysis of 1037 cases. Int J Pediatr Otorhinolaryngol 2006;70:1539-45.
17. Mishra A, Shukla GK, Bhatia N. Aural foreign bodies. Indian J Pediatr 2000;67:267-9.
18. 18.Mingo K, Eleff D, Anne S, Osborne K. Pediatric ear foreign bodies retrieval: A comparision across specialties. American Journal of Otolaryngology 2020;41:102167.
19. Thompson SK, Wein RO, Dutcher PO. External auditory canal foreign

body removal: Management practices and outcomes. Laryngoscope 2003;113:1912-5.
20. Swain SK, Sahu MC. An unusual complication of nasal foreign body in a pediatric patient: A case report. Pediatric polska 2017;92:111-3.
21. Chan TC, Ufberg J, Harrigan RA, Vilke GM. Nasal foreign body removal. J Emerg Med 2004;26:441-5.
22. Swain SK, Sahu MC, Baisakh MR. Nasal myiasis in clinical practice. Apollo Med 2018;15:128.
23. Pokharel R, Adhikari P, Bhusal CL, Guragain RP. Oesophageal foreign bodies in children. JNMA J Nepal Med Assoc 2008;47:186-8.
24. Bloom DC, Christenson TE, Manning SC, Eksteen EC, Perkins JA, Inglis AF, *et al*. Plastic laryngeal foreign bodies in children: A diagnostic challenge. Int J Pediatr Otorhinolaryngol 2005;69:657-62.
25. Swain SK, Pattnaik SK, Das A, Sahu MC. Button battery aspiration in children: Our experiences in a tertiary care teaching hospital of eastern India. Pediatria Polska 2017;92:382-8.
26. Ogunleye AO, Sogebi RO. Otic foreign bodies in children in Ibadan, Nigeria. Nigerian Journal of Surgical Research 2005;7: 305-8.
27. Sundgren PC, Burnett A, Maly PV. Value of radiography in the management of possible fishbone ingestion. Ann Otol Rhinol Laryngol 1994;103:628-31.
28. Swain SK, Pani SK, Sahu MC. Management of fish bone impactation in throat-Our experiences in a tertiary care hospital of eastern India. Egyptian Journal of Ear, Nose, Throat and Allied Sciences 2017;18:27-30.
29. Afolabi OA, Suleiman AO, Aremu SK, Eletta AP, Alabi BS, Segun-Busari S, *et al*. An audit of paediatric nasal foreign bodies in Ilorin, Nigeria. South African Journal of Child Health 2009;3:64-7.
30. Swain SK, Bhattacharyya B, Sahu MC. An unusual cause of long-standing foreign body sensation in throat. Annals of Indian Academy of Otorhinolaryngology Head and Neck Surgery 2019;3:82.