

Challenges in the management of ENT foreign bodies during COVID-19 Pandemic - Experience at a tertiary care centre.

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Research Article

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Abstract

The novel coronavirus disease 2019 (COVID-19) pandemic has put unprecedented challenges on the medical community. ENT surgical procedures are associated with very high risk of transmission of the virus due to aerosol generation. Management of ENT emergencies due to foreign bodies during ongoing COVID-19 was challenging. This is a prospective study done in our tertiary care centre from March 2020 to June 2020, during COVID-19 pandemic, where patients were referred from primary health facility after unsuccessful attempt. The challenges encountered in the management of these cases, precautions taken and protocols followed are being discussed. The foreign bodies should be removed by trained personnel using Personal Protective Equipment taking all precautions to minimize aerosol generating procedures and limit the length of these procedures whenever possible. Additionally, the use of povidone-iodine in varying concentrations is emphasized in reducing the viral load in the aerodigestive tract, thus proving to be safe to both the patients and the treating doctors.

Introduction

Foreign body (FB) ingestions are commonly encountered emergency in the field

of otorhinolaryngology [1]. They are commonly observed in the pediatric population. Ingestion of foreign bodies by adults is generally accidental, seen commonly in edentulous patients and under the influence of alcohol [2–5].

Tracheo-bronchial foreign bodies are a commonly encountered emergency in the pediatric age group. They can get lodged at any site from supraglottis to the terminal bronchioles [6]. Diagnosis requires high index of suspicion by the otolaryngologists, even in the absence of a positive history in order to prevent morbidity and mortality [7]. As delayed diagnosis is associated with increased incidence of complications [8], when the child presents with history suspicious of FB aspiration or with clinical or radiological evidence of tracheo-bronchial foreign body, it is considered an emergency and should be treated immediately [7].

The complications induced by esophageal foreign bodies in adults are associated with a high mortality rate and are more common and serious than complications in children. However, some patients with impacted foreign bodies do not go to the hospital for help but stay at home for observation. This prolongs the time from ingestion to effective treatment and causes greater harm and an economic burden for the patient [9].

The choice of treatment is influenced by many factors, including the patient's age and clinical condition, the size and the shape of the ingested foreign body, the anatomical location, the physician's skill level, the instruments available, and the surgeon's preference [10].

The novel coronavirus disease 2019 (COVID–19) pandemic has put unprecedented challenges on the medical community. Physicians and other health care workers who perform and participate in

examinations and procedures on the head and neck region and airway are at particularly high risk of exposure and infection from aerosol and droplet contamination.

During the initial national lockdown period, though varied guidelines were proposed by different organizations there was no universal protocol existing on the management of ENT emergency procedures involving aerosol generation [11].

This article is based on the management of emergencies due to FBs during COVID-19 pandemic, with respect to the challenges encountered in the management of these cases, precautions taken and protocols followed.

Materials And Methods

This is a prospective study done in the Department of Otorhinolaryngology at KLES Dr. Prabhakar Kore Hospital and Medical Research Centre from March 2020 to June 2020, during COVID-19 pandemic. Patients from hotspot areas of COVID-19, with presentation of varied FB in the region of ear, nose and aerodigestive tract are discussed.

Patients were screened for symptoms of COVID-19, like fever, dry cough, headache, myalgia, digestive disorders, acute anosmia without nasal obstruction, acute dysgeusia including history of travel and contact with positive patients. In our set up, systematic precautions were taken for all procedures irrespective of the patient's COVID-19 status, due to the high percentage of asymptomatic patients and false negative Polymerase Chain Reaction (PCR) [12].

Initial examination of the patient was done with PPE (Personal protective equipment), on OPD basis and FBs from ear, nose, throat were removed. Those patients with the history of FB ingestion/aspiration were subjected to plain X-ray of the neck. In patients who were subjected to Computed tomography (CT scan) of neck, additional screening of CT-chest was done, to rule out the pneumological signs in favour of COVID-19.

Those patients with unsuccessful attempts of FB removal on OPD basis were admitted and subjected to the following preoperative and intraoperative protocols, where the FB removal was done in an operating room under suitable anaesthesia.

Pre-operatively all patients were given Povidone-iodine (PVP-I) 0.5% PVP-I solution prepared by diluting (1 ml of 10% PVP-I in 20 ml of sterile water or purified water or 1 ml of 5% PVP-I in 10 ml of sterile water or purified water). It was administered in a dose of 4-5 drops into each nostril 10 min prior to examination. Before inducing, nasal pack with PVP was used and nasal douching was done 2 times prior to the day of procedure [13]. Nasal irrigation constituted of 240 mL of 0.4% PVP-I solution (dilution of 10 mL of commercially available 10% aqueous PVP-I into 240 mL of normal saline with a sinus rinse delivery bottle) [14]. For **Oral/oropharyngeal wash** 10 ml of the 0.5% PVP-I solution was then introduced

into the oral cavity and used as a mouthwash. It was ensured the solution was distributed throughout the oral cavity for 30 seconds and then gently gargled for another 30 seconds before spitting out [13].

The procedure was performed in designated operating room with negative pressure. Only essential personnel were allowed in the operating room and all staff including the anaesthetists wore Personal Protective Equipment(PPE) which comprised of FFP2 mask, gloves, gown, eye protection and a cap [15,16,17].

High quality HMEF (Heat and Moisture Exchanging Filter) rated to remove at least 99.97% of airborne particles 0.3 microns or greater placed in between the face mask and breathing circuit or between face mask and reservoir bag was used for the patient by the anaesthetic team. Rapid sequence induction was followed after pre-oxygenation for 5 minutes with 100% FiO₂, to avoid manual ventilation of patients lungs and potential aerosolization of virus from the airways. Further, the anaesthetic team suggested that during intubation and extubation, the surgeons team was kept out of the scenario to minimize the risk of aerosol exposure. All patients were prescribed prophylactic antiemetics in view of reducing the risk of vomiting and possible viral spread [18].

Results

The study included a total of 17 patients who presented to us during COVID-19 pandemic with presentation of varied FB in the region of ear, nose and aerodigestive tract, with clinical or radiological evidence or a high index of suspicion of foreign body aspiration/ insertion.

According to table- 1, Out of 17 patients about 58.8% (10 cases) were children less than 5 years of age, 17.6% (3 cases) were in the age group of 5-10 years. Majority of the patients 70.5% were males (12 cases). The male:female ratio was 2.40:1.

Patients were screened for symptoms of COVID-19 including history of travel and contact with positive patients.

The removal of FB was successful in 8 (47%) patients on OPD basis, which was performed in a designated room wearing PPE. Those patients with unsuccessful attempts were admitted, investigated and subjected to procedures like otoendoscopy, diagnostic nasal endoscopy, bronchoscopy or esophagoscopy based on the anatomical site of the FB. Out of 17 patients, 3 patients presented with FB from ear, 8 from nose and 6 from aerodigestive tract as shown in the table-2

Amongst these, 2 cases presented with complications, of which one was an adult patient with esophageal FB with mediastinitis and radiological signs of perforation as seen in the Image-1, for which oesophagoscopy and FB removal was done under GA (general anaesthesia). Post operatively, the patient was started on broad spectrum antibiotics and managed conservatively. The other was a paediatric patient who presented with stridor since 4 days which led to the suspicion of aspiration of FB, on examination there was absent breath sounds on left side of chest. Plain radiograph of chest showed

collapse of the left lung. The FB could not be visualized. Hence, the patient was subjected to CT chest which showed FB in the left main bronchus as seen in the Image-2, for which bronchoscopy and FB removal was done under GA. Intra-operatively there was significant edema and congestion with purulent discharge of bronchial walls due to delayed presentation. Additionally surgeon faced challenges of fogging due to PPE which restricted the vision. Hence multiple attempts were made to remove the FB successfully. Image 3 shows some of the FB removed during this study.

Discussion

ENT surgical procedures are associated with very high transmission risk of COVID-19 due to high aerosol generation during surgeries in the upper aerodigestive tract and aerosolization during prolonged operative procedures [17].

It is suggested that the viral load appears highest in the nasopharynx. The human saliva is the next highest region with 1.2×10^8 infective copies per ml. These areas are main reservoirs to seed the lower airway and also contribute to aerosolized transmission of the virus [13]. It is important to categorise the procedures according to their degree of urgency. Assess the risks and benefits of all ENT surgical procedures according to the prevalence of COVID-19 [19].

During the initial pandemic period, the availability of the testing kits were scarce,

and screening of the patient was solely dependant on the symptoms, history of travel, contact with the positive patients and plain radiograph of the chest.

Later with the availability of testing kits, preoperative workup to test for COVID-19, nasopharyngeal/oral swab with RT-PCR (*Reverse transcription polymerase chain reaction*) was performed in high risk procedures, such as diagnostic nasal endoscopy, bronchoscopy or esophagoscopy. The sensitivity of thoracic CT-scan(Computed Tomography) is above 90%. If a CT-scan is required in the usual preoperative assessment, a complementary chest CT-scan must systematically be done [12].

Systematic precautions should be taken for all procedures irrespective of the COVID-19 status of the patient. We adopted the below measures for all our cases

Pre-operative measures:

Povidone-iodine (PVP-I), a widely available topical broad spectrum antiseptic with virucidal activity against a wide range of common viruses, including SARS-CoV (Severe acute respiratory syndrome-related coronavirus) and MERS-CoV (Middle East respiratory syndrome coronaviruses), has been suggested for nasal and oral application as a perioperative infection control strategy. The use of nasal and oral application of PVP-I every 2–3 hourly, upto 4 times a day was considered in patients and/or health care providers who are involved in high-risk procedures in asymptomatic patients and COVID-19 hotspots respectively [14].

Intra-operative measures:

Otolaryngologists should wear full Personal Protective Equipment (PPE) consisting of FFP2 (filtering facepiece) mask, overcoat, cap and protective glasses. These should be thrown into dedicated infected waste bins in the examination room following the procedure except for the protection glasses that can be decontaminated and reused [12].

It is essential to follow the COVID-19 recommendations during intubation and extubation, and take all perioperative precautions designed to prevent the risk of aerosolisation of viral particles. Optimize personnel, experienced individuals should perform the procedures expeditiously with the fewest assistants possible, thus minimizing exposure time.

In case of confirmed or suspected COVID-19 patients, FFP2 mask should be worn by all staff members present in the operating theatre. The procedure should be performed in negative pressure operating rooms, with air filtration/purification system.

Close circuits when possible, tracheal intubation with cuffed tube (closed system) is preferred over supraglottic airway devices or facemasks (partially closed systems) or THRIVE (Transnasal Humidified Rapid-Insufflation Ventilatory Exchange)/jet ventilation (open systems) [20].

Amongst many challenges in using PPE, fogging is a commonly encountered problem which hampers the visualization of the surgeon while operating on delicate structures. Additionally, the low temperature of the operating room contributes to faster fogging. Hence, these procedures should be attempted by only skilled personnel trained in handling the above situations.

Conclusion

Foreign bodies are one of the commonest emergencies in the field of Otorhinolaryngology. Delayed presentation leads to increased morbidity and mortality. Before performing any emergency/elective procedure, COVID-19-specific preoperative planning and preparation is important, considering the high transmission rate and prolonged aerosolization of this virus. Teams should seek to minimize aerosol generating procedures and limit the length of these procedures whenever possible. They also need training in the appropriate use of respirators and PPE donning and doffing in order to minimize the risk of contracting the virus. Only trained personnel with sufficient experience should perform the procedures so that the resources are utilised efficiently.

Declarations

Funding: No funding

Conflict of interest: Nil

Ethical approval: Not required

Ethics

The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research. Approval number - MDC/DOME/373

Consent

Both Informed and written consent was obtained from the patients.

Competing interests: The authors declare no competing interests.

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Tables

Due to technical limitations, Tables 1-2 are provided in the Supplementary Files section.

Figures

Image -1: CT- Neck sagittal (a) and axial view (b) showing radio-paque FB at the level of cricopharynx with collection.

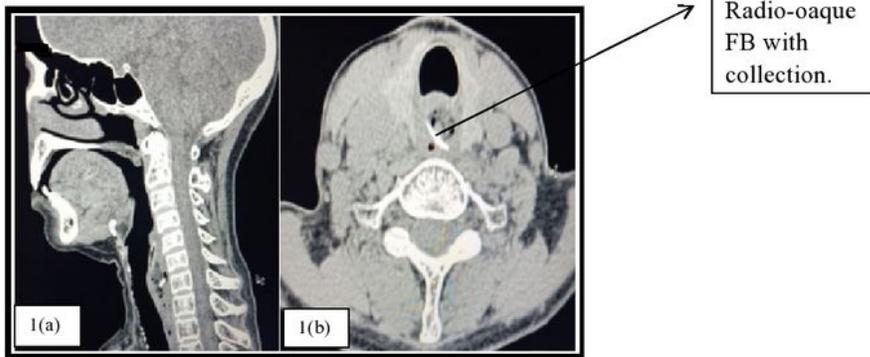


Image -2: (A) - Plain radiograph chest showing collapse of left lung, (B) - CT thorax coronal and axial view showing FB at the level of left main bronchus with collapse of left lung.

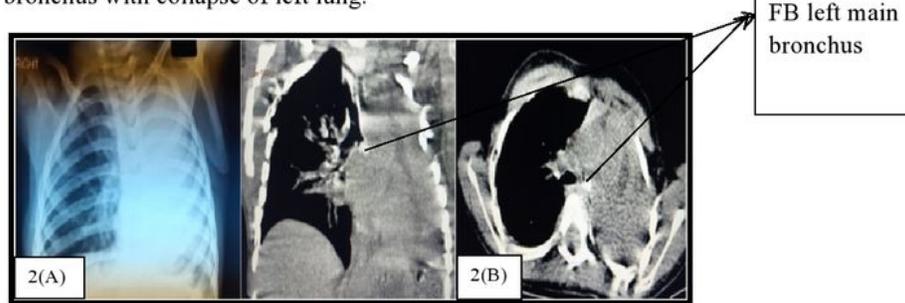
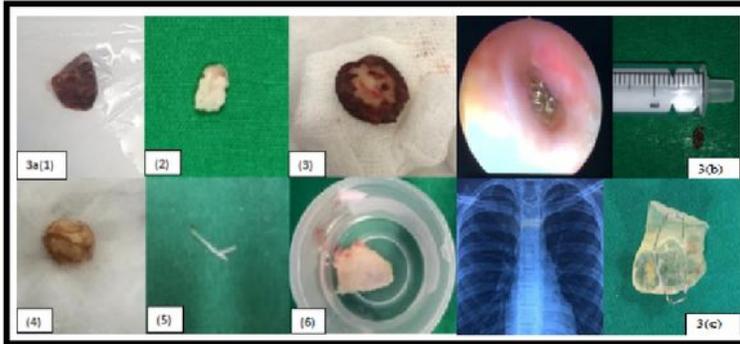


Figure 1

Image -1: CT- Neck sagittal (a) and axial view (b) showing radio-paque FB at the level of cricopharynx with collection. Image -2: (A) - Plain radiograph chest showing collapse of left lung, (B) - CT thorax coronal and axial view showing FB at the level of left main bronchus with collapse of left lung.

Image -3 (a,b,c) Showing foreign bodies removed during ongoing COVID-19 pandemic.



3a (1) Betel nut, (2) Chicken bone, (3) Tamarind seed, (4) Ground nut, (5) Fish bone, (6) Mutton bone. 3(b)Otoenoscory showing coiled ball pen spring adherent to tympanic membrane. 3(c) Plain radiograph chest showing dental brace at the level of cricopharynx.

Figure 2

Image -3 (a,b,c) Showing foreign bodies removed during ongoing COVID-19 pandemic.

Supplementary Files

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- TABLE.docx