Discovery of hazardous foreign bodies observed during anesthetic practice

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ABSTRACT

Background: **In anesthesia practice, obstructing materials like thick mucus secretion, debris or blood clots, and food particles accumulate in the oropharynx. If not properly removed, they could cause airway obstruction with concurrent hypoxia which may end fatally.**

Objectives: **This study aims to highlight the importance of forgetting foreign objects in the airway in order to allert anesthesiologists about the hazards of missed foreign bodies in the oropharynx which could lead to disastrous situation.**

Patients and Methods: **During the period from 2012-2014, out of 2300 patients presented for surgical operation under general anesthesia with endo-tracheal intubation, 22 patients were recorded to have accidental discovery of hazardous foreign bodies retained in the oropharynx and were included in this study with an incidence rate of 0.96%. Cases in this study were classified as patient-related or surgery-related. Foreign bodies were identified with the aid of laryngoscopy and were removed by suction hand piece or Magill's forceps.**

Results: **The main age group was between 21-40 years accounting for 45.5%. Male: female ratio was 1.2:1. Overall, 59.1% were related to patients' causes, while 40.9% were related to surgery. The commonest type of foreign body observed was cardamom (38.5%) among patient-related cases, and tissue remnants in 66.7% of surgery-related cases.**

Conclusion: **Missed foreign bodies are not uncommon and anesthesiologists should be aware of inspecting the mouth and throat of the patient thoroughly before endotracheal intubation and extubation to reduce the hazard of foreign body inhalation.**

Key words: Foreign bodies, Anesthetic Practice

اكتشاف أجسام غريبة خطرة تمت ملاحظتها خلال ممارسة التخدير

الخلفية: خلال عملية التخدير هناك بعض المواد مثل بقايا الطعام او الخثر الدموية قد تعلق في مجرى التنفس وتسبب انسداد مجرى الهواء. اذا لم يتم إزالتها بشكل صحيح، مما يؤدي الى نقص الأكسجة في الدم.

الأهداف: لتسليط الضوء على خطورة نسيان اجسام غريبة في مجرى التنفس اثناء العمليات الجراحية وتنبيه أطباء التخدير حول مخاطر الأجسام الغريبة في تجويف الفم والبلعوم مما قد يؤدي إلى حالة كارثية.

المرضى والطريقة: خلال الفترة من ٢٠١٢–٢٠١٤، من أصل ٢٣٠٠ مريضا تعرض لعملية جراحية تحت التخدير العام مع تنبيب الرغامي، تم تسجيل اكتشاف عرضي لأجسام غريبة خطرة لدى ٢٢ مريضا شوهدت في البلعوم وأدرجت في هذه الدراسة وتمثل ٠,٩٦%. حيث تم تقسيم الحالات الى مجموعة مرتبطة بالمريض واخرى مرتبطة بالعملية الجراحية. كما تم مشاهدة الاجسام الغريبة بالاستعانة بناظور الحنجرة واستخراجها باستخدام اداة الشفط أو ملقط ماكيل.

النتائج: كانت الفئة العمرية الرئيسية بين ٢١–٤٠عاما ونسبة الذكو: الإناث ١.٢: ١. (٥٩.١٪) من العدد الكلي كانت مرتبطة بالمرضى. في حين أن الحالات المرتبطة بالعملية الجراحية تمثلت بنسبة ٤٠.٩%. كانت مادة الهيل اكثر شيوعا في الحالات المرتبطة بالمريض (٣٨.٥%)، وبقايا انسجة في الحالات المرتبطة بالجراحة (٦٦.٧%).

الاستنتاج: ان الاجسام الغريبة في مجرى التنفس ليست نادرة الحدوث وهذا يتطلب من اطباء التخدير التفتيش بشكل جدي داخل فم المريض وحلقه المريض جيدا قبل تنبيب الرغامي وكذلك قبل استخراج الأنبوب للحد من خطر استنشاق اي جسم غريب.

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INTRODUCTION

Keeping a clear airway is a fundamental goal of the anesthesiologist. However, many circumstances hamper achieving this aim during the course of anesthesia such as oropharyngeal foreign material which may cause airway blockage. Food particles may be seen after regurgitation or vomiting,[1] debris or blood clots are commonly observed in operations involving nasal and oral cavities,[2] dislodged tooth is another frequently seen object.[3] Anesthesiologists perform suction to remove any foreign body in the pharynx before extubation to prevent its entrance into the trachea. Any missed foreign body in the oropharynx may be inhaled causing airway obstruction with subsequent hypoxia and atelectasis. Some foreign bodies may result in complications like mucosal trauma, or abscess formation on long-standing cases.[4-6] The diagnosis of inhaled foreign body in conscious patient depends on history, examination, radiography, and perhaps endoscopy.[7-10] In the anesthetized patient, the event comes accidentally and requires attention to be discovered before progressing to threats. Proper observation particularly during intubation and extubation helps in early recognition to prevent complications that may end fatally.[11]

This study aims to shed a light on frequency and types of hazardous foreign bodies in the oropharynx documented during anesthetic practice.

PATIENTS AND METHODS

In a period of two years from July 2012- July 2014 busy daily work, out of 2300 patients presented for surgical operation under general anesthesia with endo-tracheal intubation, 22 (0.96%) were recorded to have accidental discovery of hazardous foreign bodies during laryngoscope, they were analyzed in this study (Figure-1). Cases were categorized as patient-related or surgery-related. The time of their detection is also considered and classified into three groups: group A during intubation, group B before extubation and group C during recovery from anesthesia. Foreign bodies were discovered by the aid of a laryngoscope and were removed by Magill's forceps or suction handpiece. Most of the foreign bodies were photographed and documented. Data were analyzed statistically using SPSS version 15.0. Results were considered statistically significant when the P-value is less than 0.05.

RESULTS

Twenty-two patients were reviewed in this study. Their characteristics are demonstrated in (Table-1). The main age group was between 21-40 years accounting for 45.5%. Patients < 10 years constitute 31.8%. The remaining were between 11-20 years representing 22.7%. Overall, male:female ratio is 1.2:1 corresponding to 54.5%:45.5%.

Table 1. Characteristics of patients with missed foreign bodies with their relevant causes participating in this study

Characteristics		Causes				Total	
		Patient-related		Surgery-related			
		No.	*%*	*No.*	*%*	*No.*	*%*
Age (y)	*< 10*	5	38.5	2	22.2	7	31.8
	11-20	4	30.8	1	11.1	5	22.7
	21-40	4	30.8	6	66.7	10	45.5
Gender	*Male*	10	76.9	2	22.2	12	54.5
	Female	3	23.1	7	77.8	10	45.5
Total		**13**	**100.0**	**9**	**100.0**	**22**	**100.0**

Thirteen cases (59.1%) were categorized to have patient-related causes, while 9 cases (40.9%) had surgery-related causes (Table-2). Cardamom, chewing gum, missed deciduous tooth and fish bone were among patient-related foreign bodies, 38.5%, 23.1%, 23.1% and 15.4% respectively. The predominant surgery-related foreign bodies were tissue remnants corresponding to 66.7%. Other surgery-related foreign bodies were retained pack (22.2%) and one slipped nasal splint (11.1%).

Table 2. Types of removed foreign bodies.

Category	Type	No.	%
Patient-Related 13(59.1%)	cardamom	5	38.5
	Gum	3	23.1
	Deciduous teeth	3	23.1
	Fishbone	2	15.4
Sub-total		13	100.0
Surgery-related 9(40.9%)	Tissue remnant	6	66.7
	Retained pack	2	22.2
	Nasal Splint	1	11.1
Sub-total		9	100.0

(Table-3), represents the time of foreign body detection and removal. Most foreign bodies (68.2%) were identified before extubation by direct visualization with the aid of a laryngoscope during inspection of the oral cavity for checkup. Of all patient-related, 61.5% were identified during extubation, whereas 38.5% were seen accidentally at the time of intubation. Regarding surgery-related cases, a higher percentage of foreign bodies was determined and removed before extubation (77.8%). Only 22.2% were discovered and removed during the recovery period, so they were considered to be overlooked.

Table 3. Timing of foreign bodies removal

	Patient-related		Surgery-related		Total	
Timing	***No.***	***%***	***No.***	***%***	***No.***	***%***
Group A:Intubation	5	38.5	0	0.0	5	22.7
Group B: Extubation	8	61.5	7	77.8	15	68.2*
Group C: Recovery	0	0.0	2	22.2	2	9.1
Total	13	100.0	9	100.0	22	100.0

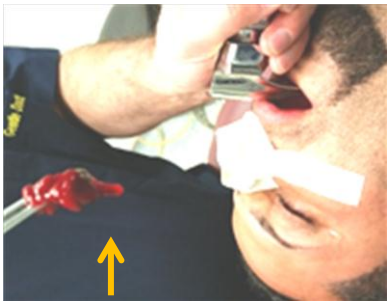
***: There is statistically significant difference between intubation, extubation and recovery groups P<0.05.**

Tissue remnant (Retained nasal cartilage)

Tonsil bed sponge pack

Thick nasal secretion near epiglottis

Tissue remnant (Small pieces of adenoids)



Big clot

Chewing gum

Figure 1. Samples of foreign bodies seen in the pharynx in different stages of anesthesia

DISCUSSION

During anesthesia, sedation with the loss of swallowing and cough reflexes predispose to remaining of materials in the mouth with subsequent aspiration. There are some dynamics that enhance the passage of any retained material into the air tract like air drive caused by the use of positive pressure ventilation with bag and mask, besides encouraging the patient to breath deeply and to cough during recovery. The outcome could be exaggerated by accumulated saliva, blood or debris. The interesting observation in this study is the detection of foreign bodies that seem to be overlooked by the patient or by the surgeon and even by the anesthesiologist. Different hazardous foreign bodies were lodged in the mouth with potential risk to cause respiratory obstruction; others were found in the nasopharynx mainly from nasal operations in the form of tissue remnants and medical elements. The results of this study showed that patient-related foreign bodies were 59.1%, and surgery-related were 40.9%. Patient-related foreign bodies include chewing materials, deciduous teeth, and fish bones. Chewing, particularly cardamom and gum, is relatively a common habit among many people in our locality used for different purposes. Cardamom is used as medical herb[12] while gum is used to relieve anxiety and thirst.[13,14] Individuals who present for surgery may forget the presence of these chewing materials in their mouth. Cardamom was seen in a higher percentage than gum 38.5% and 23.1% respectively. Bevacqua &Cleary[15] reported a case of unnoticed chewing gum adhered to tracheal tube cuff causing difficulty in ventilation. Other authors also described cases of accidents related to chewing gum.[16] Fishbone is another patient-related object that was surprisingly seen in the oropharynx in two instances. Literature highlight the topic of fish bone impaction.[17-20] Indeed, a loose tooth may fall during manipulation and subsequently missed. An estimated incidence of dental trauma in literature varies from 0.02% to 0.07%.[21,22] Three cases (23.1%) of a missed tooth identified in the oral cavity of children presented for tonsillectomy and were seen at time of extubation probably manipulated by the mouth gag. In regard to surgery-related foreign bodies, 6 cases (66.7%) of tissue remnants in form of nasal bone shell and nasal cartilage were seen dislodged in the post-nasal space and recognized by light reflection during laryngoscopy before extubation, while a piece of adenoid tissue was found attached to tracheal tube shaft. On the other hand, materials like throat pack and gauze swab during certain operations like oral, nasal and dental procedures are prone to be missed or forgotten. This remark has been addressed in some literature [23,24] in spite of many methods used to decrease the chance of forgetting throat pack.[25-27] In operations like cleft palate, the surgeon inserts the pack after draping and toweling because a fully retrieved operating field is required, therefore, it is unwise to leave a portion of the pack redundant or attached to the tracheal tube as recommended. In this study, despite approval of removal by the surgeon and the nurse, it appeared that a second one was unintentionally inserted by the surgeon and was missed causing severe airway obstruction discovered during recovery. On other occasion a gauze pack was revealed in the recovery after tonsillectomy causing airway obstruction which is unlike the case reported by Ammar et al[28], in which there was absolute dysphagia following adenotonsillectomy resulted from forgotten gauze pack obstructing the esophagus. This mishap was also reported by Cem, et al[29] following adenotonsillectomy. More surprising finding in this study is the detection of a plastic nasal splint seen suspended from the post nasal space and explained by a loose fixation suture and forceful packing of the nose make it slipped down into the oropharynx.The problem was

exaggerated by trismus and accumulated saliva. Dealing carefully with this by triple airway maneuver technique, the slipped portion was identified by direct vision with the aid of laryngoscope and Magill's forceps was removed successfully. Gupta[30] recorded two cases of retained foreign bodies from surgical instruments but fortunately, removed easily as they were accessible. Therefore, careful handling of the splint is required with close monitoring during nasal packing or use an alternative. Performing laryngoscopy provides an opportunity to detect missed foreign materials. This is evident in this study as considerable cases were identified with the aid of a laryngoscope both at the time of intubation (22.7%) and before extubation (68.2%) when inspecting the oral cavity and the throatPrompt removal helped in preventing fatal mishaps.

In conclusion, it is a good practice to inspect the upper airway passages during all stages of anesthesia as this conduct helped in observing unnoticed foreign bodies in the oropharynx and by this mean can significantly reduce undesirable mishaps. Patients, surgery, and surgical tools play a considerable role in this context with variable instances. Personal habits profoundly contribute to missed foreign body in our locality, so this needs detailed history and oropharyngeal checking. Patients of different ages and gender are prone to this problem. Anesthesiologists should have an index of suspicion for the possibility of the presence of a foreign body in the mouth and throat to reduce the hazard of inadvertent foreign body inhalation.

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