

# Synchronized Techniques Resolve Difficult Case of Laryngeal Meat Impaction: A Case Report and Brief Review of Current Management

G El Sherbiny

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## Abstract

Airway obstruction by aspirated foods such as meat represents a true emergency. The management of this crisis is definitely aimed at removal of the foreign object. The removal in some patient is accomplished by emergency physician but when the foreign object is distal to the oropharynx, a great challenge is encountered. We report a case of difficult laryngeal meat impaction unresolved by techniques recommended by American Heart Association (AHA) and European Resuscitation Council (ERC). 1, 2 When the exhausted patient became uncooperative, synchronized techniques of sub diaphragmatic thrust and coughing while on sitting position became a successful alternative.

## INTRODUCTION

The techniques of coughing, back blows, chest thrusts, and abdominal thrusts (Heimlich manoeuvre) are well reported and accepted as effective managements of a choking conscious person.<sup>3</sup> The abdominal thrust manoeuvre we describe when applied as a single technique is in popular use and highly recommended. Synchronizing abdominal thrust and coughing as a successful intervention for difficult laryngeal food impaction is not mentioned in literatures. Though we heard such combined techniques had been used by laymen, to our knowledge, it has not been yet reported officially.

## CASE REPORT

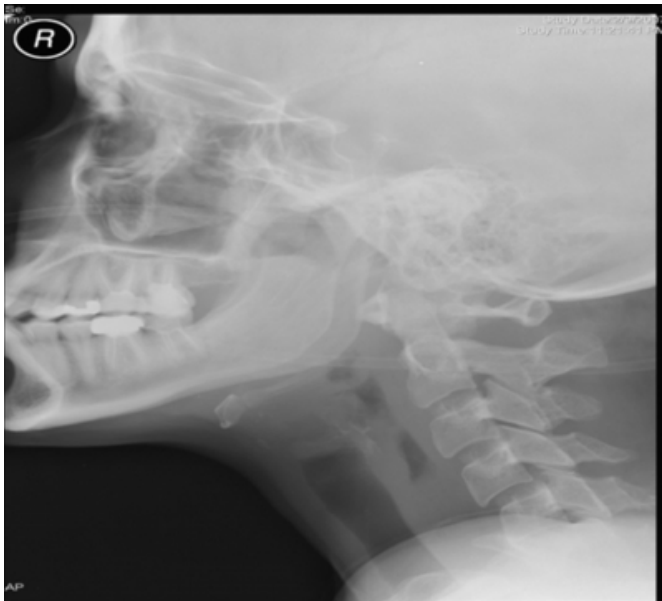
A 31 years old lady clutching her neck came in walking to the emergency room 15 minutes after allegedly choked with meat during dinner. She looked anxious, could not speak nor breathe but was able to cough weakly. Vital signs were within normal limits. There was an obvious respiratory distress as manifested by tachypnea, working ala nasai and accessory muscles, and with indrawing chest muscles. Chest rise was symmetric. Decreased equal bilateral air entry was noted on chest auscultation.

The highly irritable patient was taken to resuscitation room. Five back blows were done without effect followed by five abdominal thrust (Heimlich maneuver) without success. Alternating five back blows and abdominal thrust were

executed continuously for 15 minutes without relief. The patient became more anxious, uncooperative, and complained of exhaustion that she could no longer tolerate further back blows and Heimlich maneuver and insisted on sitting on the bedside. No foreign object was visualized by oral examination. Direct laryngoscopy without sedative was attempted but not tolerated. High concentration of oxygen was administered. While specialist consultant was contacted for possible bronchoscopy, there was a standby preparation for possible cricothyrotomy and endotracheal intubations. The patient was encouraged to keep on coughing but the force of her cough became very weak. X-rays were done; chest X-ray was normal while neck X-ray showed a filling defect of the upper airway below the hyoid bone. (Figure 1)

**Figure 1**

Figure 1: The Neck X-ray



The patient kept on coughing desperately and deteriorated but remained conscious. Slight facial cyanosis was noted but her extremities were well perfused. Application of pressure and gentle thrust on her abdomen at sitting position synchronized with coached coughing while supporting her back was initiated which expelled out the portion of meat (Figure 2) within five minutes. The patient had an immediate relief after 40 minutes of struggle. There was no any complication noted and she was discharged ambulatory after three hours.

**Figure 2**

Figure 2: The larynx-shaped meat which caused the impaction.



## **BRIEF REVIEW OF CURRENT MANAGEMENT OF SEVERE AIRWAY OBSTRUCTION**

AHA guidelines state to attempt to relieve the obstruction

only if signs of severe obstruction develop.<sup>1</sup> The emergency physician has three options to relieve an obstruction: attempt to expel the foreign body out with manoeuvres, perform laryngoscopy to attempt removal under direct visualization, or control the patient's airway. When the patient remains conscious, removal of the obstructing object is the main aim which could be possibly achieved with various manoeuvres.

The UK Resuscitation Council cites that a spontaneous cough is likely to be more effective and safer than any manoeuvre a rescuer might perform.<sup>4</sup> Coughing may dislodge the foreign object spontaneously. Any first aid manoeuvres may be potentially detrimental by converting a partial airway obstruction into a complete airway obstruction. Many studies have reported back blows, abdominal thrusts and chest thrusts to be successful in relieving foreign body airway obstruction in conscious victims. Heimlich manoeuvre theoretically expel air from the lungs and dislodge the entrapped food or other material. Thrusts to the subxiphoid region produce high airway pressures, which may dislodge a foreign body. Chest thrusts and back blows generate high airway pressure as well which may also expel the foreign body out. The ERC guidelines for conscious victim with severe airway obstruction recommends initial application of five back blows, if fails to relieve obstruction then give five abdominal thrusts. If the obstruction is still not relieved, alternating five back blows with five abdominal thrusts should be continued.<sup>2</sup> The AHA recommends that the abdominal thrust be applied in rapid sequence until the obstruction is relieved.<sup>1</sup> International Liaison Committee on Resuscitation (ILCOR) suggests that more than one technique may be needed to relieve airway obstruction in adults.<sup>3</sup>

Direct laryngoscopy may permit the removal of a foreign body from the larynx. It is a risky procedure for a conscious or semiconscious patient who may not be able to tolerate instruments in the mouth without sedative medication, which might result in the inhalation of the foreign body. Objects generally amenable to emergency room removal are those in the oropharynx, best removed with magill forceps under direct laryngoscopic visualization performed after topical anesthesia.<sup>5</sup> Enwo, et.al reported a successful foreign body removal with a carefully timed laryngoscope blade inserted into the mouth of a semiconscious patient without the aid of sedative drugs.<sup>6</sup> Bodart highlighted that subspecialty consultation is the safest and most expeditious means for foreign body removal.<sup>7</sup> As a general rule, early

bronchoscopy is the key to reducing morbidity and mortality in any patient with a suspected foreign body. If any partial airway is present, high-concentration oxygen and the gentlest support should be given until rigid bronchoscopy is available. Rigid bronchoscopy is best done in the operating room or specialized suite, by experienced specialist with adequate back-up resources. In unusual circumstances, flexible bronchoscopy under local anaesthesia may suffice for foreign body location and removal.<sup>8</sup>

Endotracheal intubation is possibly required and should be anticipated at any moment the patient loses consciousness. It should be highlighted that direct laryngoscope visualization prior to intubation is crucial as the foreign body may be forced more distally during intubation and may cause more harm. Intubation may force the foreign body distally, especially if the endotracheal tube tip is passed beyond the carina. Bair, et.al described a case of grape aspiration which obstructed the right main stem bronchus as the result of intubation prior to bronchoscopy. The resuscitation developed a large pneumothorax and right lung atelectasis causing arrest.<sup>8</sup> Surgical cricothyrotomy or emergency tracheostomy (needle cricothyrotomy in young children) is indicated if intubation fails because of positioning of the foreign object. Cricothyrotomy, which may be the only life-saving option in extremis, may bypass proximal obstruction and provide sufficient oxygenation to bridge the time gap to definitive care by surgical subspecialists.

## **DISCUSSION**

In adults, 75% of foreign bodies lodge in the proximal airways (larynx, trachea, main bronchi).<sup>9</sup> Airway foreign bodies usually pass beyond the laryngeal inlet<sup>5</sup> and may cause fatal obstruction. There are many known techniques on the current practice which can be easily and effectively performed to force foreign body out but not absolutely guaranteed. When a difficult case comes to the emergency room anticipate the possibility of going through various techniques that would save the life of the patient.

The reported case manifested clear signs and gave concise history that lead to a certain diagnosis as difficult foreign body airway obstruction. The patient's inability to breathe and speak highly indicated severe airway obstruction requiring quick intervention. Severe airway obstruction requires immediate interventions to avoid permanent disability or death. Logically, foreign body lodged distally may not be visualized through an oral examination. Because

the majority of foreign bodies in the airway are food, they are not radiopaque in which radiography usually could not detect but could help to localize the site impaction. Thus an X-ray could be of great help to management plans. The neck X-ray clearly showed filling defect along the laryngeal area suggesting that an impaction was distal to the oropharynx. It is true that spontaneous cough usually dislodges out the foreign body, making any first aid manoeuvres potentially detrimental by aggravating the obstruction but there are cases however that coughing efforts of the patient could offer less help. Spontaneous coughing alone may be insufficient to force out the foreign object in some difficult cases, particularly if the patient has been weakened and exhausted.

The popular first aid interventions recommended on current medical practice include back blows, abdominal thrust, and chest thrust. Such recommendations are known as highly successful but may also be ineffective. The recommended manoeuvres may become intolerable and exhaustive as in the case of our patient who could no longer stand up yet remained conscious but uncooperative. When the conscious patient becomes uncooperative and deteriorating, it puts the physician into a tough spot, unable to fully perform what is supposed to be done yet could not proceed to the next possible life saving measure.

This case hinted few lessons and reminders. An attempt to do direct laryngoscopy without sedative in a conscious patient is hardly possible as in our case. The instrument was intolerable and could potentially cause more harm. Specialist consultation for bronchoscopy needs to be considered as an urgent requirement in any speculated difficult airway obstruction. An emergency physician cannot just watch an exhausted, conscious breathless patient whose spontaneous coughing became very weak. An uncooperative patient could not just be abandoned either. As the patient remains conscious, it is very crucial to make a wise decision aimed to save the patient. The patient may appear in critical situation but absence of general cyanosis would mean there is still a thread line passage for oxygen in the airway. High concentration of oxygen supply should be one of the main priorities.

Current medical literatures prove that airway obstructions are not relieved by a single technique and more than one technique is required to relieve obstruction. There should be a technique applicable on an exhausted sitting patient who maintains weak coughing efforts. That still has yet to be

figured out. Lay bystanders would usually apply pressure on the person's abdomen in a situation described. It may sound folkloric but applying pressure on the abdomen while the patient coughs is believed to be helpful and is observed by laymen for years as we heard. Abdominal thrusts works much like the Heimlich manoeuvre except that Heimlich manoeuvre is performed while standing and the hands of the rescuer are positioned below the subxiphoid region while abdominal thrust are done in other positions with the hands positioned between the subdiaphragmic and umbilical areas. As it is known, an abdominal thrust lifts the diaphragm and forces enough air from the lungs to create an artificial cough. The cough is intended to move and expel an obstructing foreign body in an airway<sup>10</sup>. An abdominal thrust synchronized with the spontaneous feeble coughing is believed to yield greater force. For the patient who is still able to cough, we believe that the combined forces of spontaneous coughing and the upward air from the lungs caused by pressure exerted on abdomen play an important role in expelling the foreign body out. We instructed the patient to cough and applied gentle abdominal thrust in synchronized fashion. We performed the synchronized techniques in rapid sequence with careful timing. It was successful in forcing out the "larynx-shaped" meat (Figure 2) within five minutes of application. Looking back on the anatomy of the larynx, it is broad above presenting the form of a triangular box flattened behind and at the sides, and bounded in front by a prominent vertical ridge. It is narrow and cylindrical below. The average length in females is about 36 mm (3.6 cm). The expelled meat which was almost 40 mm (4 cm) assumed the shape described which clearly implies that it was lodged on the entire larynx. The slit at the middle was believed to be the thin passage of air. While the combined synchronized techniques of abdominal thrust and

spontaneous coughing was successful in this case report, further studies is required to verify the scientific mechanism of such strategy.

## CONCLUSION

In real practice when standard procedures are not effective in resolving critical situation, physician needs flexibility and broadmindedness to try a safe alternative method which could possibly help. When an evidence-based management seems ineffective, application of a safe alternative which could become an evidence to base on in the future should be given a thought.

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**Author Information**

**Gamal Mohamed El Sherbiny, MBBCH, MRCSEd (A&E)**

Registrar, Main A&E Department #65, King Khalid University Hospital