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Gastric Rupture as Complication of Heimlich Maneuvre: Case Report

Albinas Tamosiunas*, Narimantas E Samalavicius, Jonas Jurgaitis and Agnė Cizauskaite

Department of Surgery, Klaipeda University Hospital, Lithuania

ABSTRACT

Background: Foreign body airway obstruction (FBAO, a.k.a. choking) is life-threatening situation, which requires an instant intervention. Among techniques to eliminate foreign body and relieve obstruction, most used is Heimlich maneuver. However, it can itself cause severe damage.

Case Description: We report case of gastric rupture after successful foreign body elimination. Clinical signs were weak, diagnosis was based mostly on radiological evidence of wast quantity of free air in abdominal cavity. Urgent laparotomy revealed gastric rupture, repaired with hand-sewn sutures.

Conclusions: Complications due the resuscitation, although rare, can be life threatening, so should be taken into account in every case. Public awareness and knowledge about aid and self-aid in case of choking could be improved.

***Corresponding author**

Albinas Tamosiunas, Department of Surgery, Klaipeda University Hospital, Liepojos str. 41, Klaipeda, Lithuania.

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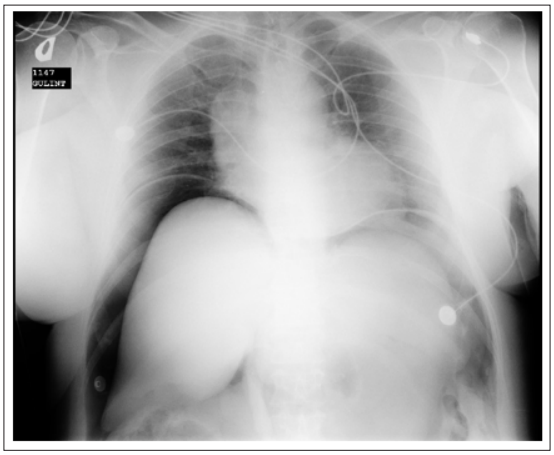
Introduction

Foreign body airway obstruction (FBAO, a.k.a. choking) is life-threatening situation, which requires an instant intervention. There is a range of different effective techniques to eliminate foreign body and relieve obstruction- back blows, abdominal thrusts, chest hrusts/compressions, manual removal of obstructions from the mouth, Magill forceps, and recently introduced suction-based airway clearance devices. While European Resuscitation Council guidelines propose step-wise approach for conscious patient with ineffective cough – deliver 5 back-blows and only then go for abdominal thrusts, American Heart Association relies only on abdominal thrusts. However, resustitation itself can cause severe damage. We present a case of gastric rupture, in accordance with the CARE reporting checklist [1].

Case Presentation

61-years old woman with history of early onset Alzheimer's disease and being cared at home, choked while eating. Her husband successfuly applied Heimlich maneuver, respiration and consciousness restored, woman was brought to Klaipeda university hospital within 2 hours. Upon arrival she was conscious, although contact limited due the dementia. Vital signs were stable. Neurological evaluation found no acute neurological damage. Physical evaluation revealed slightly distent and tender abdomen, weak peristaltics. Blood tests revealed only increased WBC – 18,96 x10e9/l, and slightly increased creatinine level (128,6mcmol/l). HGB and CRP levels were normal (153g/l and 0,33mg/l respectively). Plain chest x-ray (fig. 1) even in supine position showed large quantity of free air in abdominal cavity. Under suspicion of gastric perforation, urgent laparotomy was performed. Inside the abdominal cavity was found large quantity of air and vast haematoma in lesser omentum. However, there was no spillage of gastric content. Dissection of lesser omentum revealed gastric rupture along the lesser curvature from subcardia till angle (approx. 10cm long). Lesion was repaired with two-layered sutures. Postoperative course uneventful, yet recovery slow, gastrostasis up to 1200ml per day stayed for three days. Liquids resumed on postop. day 4, discharged after two weeks.



Figure

Discussion

According to United States National Safety Council, foreign body airway obstruction is the fourth leading cause of unintentional

injury-related death, reaching the death toll of 5325 cases in year 2021, what makes average rate of 1,6 deaths per 100000 population. The incidence of non-fatal choking is in fact unknown because successful elimination of foreign body often do not results in visits to a hospital.

In 1975 Henry J Heimlich described abdominal thrust, it rapidly became a mainstay of management of choking [2]. Classic Heimlich maneuver is performed by grasping fist with other hand, placing the thumb side of fist against the victim's abdomen, slightly above the navel and below the rib cage, and pressing fist into the victim's abdomen with a quick upward thrust. There are also alternative versions of abdominal thrust: circumferential, horizontal" thrust, self-administered abdominal upward thrust or chair thrust (victim positions themselves above a high backed chair, with the chair back positioned below the upper half of the abdomen, below the ribcage. Using gravity, bodyweight and arms for additional force, the victim allows the back of the chair to thrust up into their abdomen). As shown in study by Pavitt and coauthors, all these alternatives provided similar peak oesophageal pressure (with exception of chair thrust, which provided significantly higher pressure), what makes them valid and feasible [3].

Heimlich himself observed as complication only broken ribs, but the same year Visintine et al. published case report of gastric rupture following Heimlich maneuvre [4]. Since then, many various abdominal, thoracic and vascular lesions were described. These complications, although conditionally rare, are itself life-threatening or even lethal. Most victims of choking are little children, elderly or otherwise fragile persons, all of whom are more prone to injury due the excessive strenght of thrust. Furthermore, these persons are less likely to express their complaints immediately and coherently, so necessary surgical interventions can be delayed. Therefore we suggest, that persons after Heimlich maneuver performed, should undergo observation in Emergency room or correcponding department (according to hospital policy). Besides, many publications about Heimlich maneuver complications suggest extensive education and training. With all our agreement, there are several considerations to have in mind. As shown in the rewiew by Wang, in only 10 out of 37 complication cases Heimlich maneuver was performed by healthcare practitioner [5]. While healthcare professionals do more or less often renew their resuscitation skills, layperson education still is debatable topic. European Resuscitation Council in 2021 guidelines declares goal to enable every citizen to provide the basic skills to save a life (with more regard to CPR, but FBAO can be enlisted as well), but also admits, that key stakeholders to be targeted are political and governmental (education, healthcare, etc.) authorities, who manage healthcare systems [6].

Authorities in different countries have very different attitudes, principles and resources available, so there is no universal formula to be implemented. While hands-on training of every citizen is logistic challenge for every country, at least theoretic education is much easier achieved. Most relevant areas of intervention involves teaching at the schools and the visual posters in the places to eat, meantime encouraging every person to dare to save those in the need without delay. As shown in study by Igarashi et al., bystanders attempted to remove foreign body only in 42% of cases – what is topic of greatest concern, because target time to restore ventilation is only 4 minutes, while airway obstruction more than 10 minutes significantly increases incidence of death or vegetative state [7]. Having in mind possible indifference of surrounding people and danger of choking while eating alone, even more important is ones ability to self-resuscitation (e.g. self-administered abdominal upward thrust or chair thrust, as mentioned above).

And finally, several thoughts about general attitude towards complications. It is quite common feature in papers about Heimlich maneuvre complications, to blame "impropriate" or "incorrect" application of maneuvre. In our opinion, this statement is pernicious and should not be used. First of all, there is no clear treshold of "correct" and "incorrect" regarding complications, there are no described major mistakes, that could inevitably lead to visceral injury. Lesions of internal organs are mere consequence of decreased individual resistance to force applied. Secondly, avoiding to use sufficient force trying not to do possible harm (with possible following legal accusation – for medical personal as well as for bystanders) may lead to ineffective resuscitation with almost certain death or at least irreversible hypoxic brain damage. So the effort to reopen airway has to be maximalized, yet collateral damage also should be taken into account.

Conclusions

Foreign body airway obstruction is life-threatening emergency, which outcomes greatly depends on immediate successful resuscitation. Visual information about first aid in case of choking should be commonplace in every catering establishment. All proposed foreign body elimination techniques can cause injury, therefore every patient after successful airflow restoration should undergo medical evaluation.

Acknowledgement

The authors have no conflicts of interest to declare.

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