

Management of Foreign Body Airway Obstruction



Foreign Body Airway Obstruction Care

Last Full Review: ILCOR 2020; American Red Cross Scientific Advisory Council 2019

Last Update: 2023

Are any techniques for removing a foreign body obstruction more effective and safer than other techniques?

Red Cross Guidelines

- Lay responders or healthcare professionals attempting to resolve a complete foreign body airway obstruction in a conscious adult or child should first provide up to 5 back blows until the foreign body is relieved or, if not relieved, transition to up to 5 abdominal and/or chest thrusts. If the foreign body is not relieved, they should continue with cycles of 5 back blows followed by 5 abdominal and/or chest thrusts until the obstruction is relieved.
- Lay responders or healthcare professionals attempting to resolve a complete foreign body airway obstruction in a conscious infant should first provide up to 5 back blows until the foreign body is relieved or, if not relieved, transition to up to 5 chest thrusts. If the foreign body is not relieved, they should continue with cycles of 5 back blows followed by 5 chest thrusts until the obstruction is relieved.
- Lay responders or healthcare professionals attempting to resolve a complete foreign body airway obstruction in an unconscious adult, child or infant should provide cycles of cardiopulmonary resuscitation (compressions and ventilations) with an additional step. After each set of compressions and before ventilations, open the mouth, look for an object, and if seen, remove it with a finger sweep. Never do a finger sweep if an object is not seen.
- Healthcare professionals with appropriate training may consider the use of Magill forceps to remove a foreign body obstructing the airway.

Evidence Summary

A 2020 ILCOR systematic review ([Couper et al. 2020, 174](#)) and Consensus on Science with Treatment Recommendations ([Olasveengen et al. 2020, S41](#)) evaluated interventions to remove foreign body airway obstruction in adults and children with foreign body airway obstruction (FBAO) in any setting using finger sweeps, back blows/slaps, abdominal thrusts, chest thrusts and suction-based airway clearance devices. Outcomes included survival, survival with good neurological outcome, return of spontaneous circulation, relief of airway obstruction, injury, and complications. The 2020 International Liaison Committee on Resuscitation (ILCOR) review agrees with existing American Red Cross Scientific Advisory Council reviews on this topic.

Back Blows/Slaps

Observational studies were identified for the outcomes of survival, relief of FBAO, and injuries/complications but were judged to be at very serious risk of bias and to have a high degree of heterogeneity. Thus, meta-analysis was not performed, and results of individual studies were felt to be difficult to interpret. Very low-certainty evidence from one case series reported survival in 13 children under the age of 5 treated for FBAO with the use of back blows ([Vilke et al. 2004, 196](#)). Three case series reported relief of FBAO in 75 persons with the use of back blows ([Vilke et al. 2004, 196](#); [Igarashi et al. 2017, 1396](#); [Redding 1979, 475](#)). Four case reports ([Guinane and Lee 2018, 1272](#); [Nowitz et al 1998, 129](#); [Patterson et al. 1993, 741](#); [Rakotoharinandrasana et al. 2003, 43](#)) describe injuries/complications in persons who received back blows ([Olasveengen et al. 2020, S41](#)).

Abdominal Thrusts

The review of abdominal thrusts for FBAO ([Olasveengen et al. 2020, S41](#)) identified observational studies evaluating outcomes of survival, relief of FBAO, and injuries or complications, with an overall very low certainty of evidence due primarily to very serious risk of bias due to confounding for the individual studies. No meta-analysis was performed because of this and heterogeneity. Two case series reported survival in 189 persons treated using abdominal thrusts; six case series reported relief of FBAO in 417 persons cared for using abdominal thrusts, and 49 case reports identified 52 reports of injuries/complications in those cared for using abdominal thrusts ([Olasveengen et al. 2020, S41](#)).

Chest Thrusts/Compressions

Only observational studies were identified evaluating use of chest thrusts and compressions for the outcomes of survival with favorable neurological outcome, relief of FBAO, and injuries/complications ([Olasveengen et al. 2020, S41](#)). Because of heterogeneity and very serious risk of bias due to confounding,

meta-analysis was not performed, and results of individual studies were felt difficult to interpret. Very low-certainty evidence from one observational study ([Kinoshita et al. 2015, 63](#)) of 138 persons with FBAO was reported to show benefit for the outcome of survival with favorable neurological outcome with use of chest thrusts/compressions compared with control. One case series reported 28 cases with relief of FBAO using chest thrusts/compressions, while four studies reported five cases of injuries/complications following use of chest thrusts/compressions for FBAO ([Olasveengen et al. 2020, S41](#)).

Finger Sweep

Only observational studies were identified for the outcomes of survival, relief of FBAO, and injuries/complications. Because of heterogeneity and very serious risk of bias due to confounding, meta-analysis was not performed, and it was felt that individual studies were difficult to interpret. One case series was included that reported survival in six FBAOs with use of a finger sweep, while two case series reported relief of 36 FBAOs with use of a finger sweep. Injuries/complications were reported in 10 cases of FBAO from eight case reports following blind finger sweeps ([Olasveengen et al. 2020, S41](#)).

Magill Forceps

One observational study enrolled 240 FBAOs and reported an association with increased survival with favorable neurological outcome with the use of Magill forceps by Emergency Medical Services personnel compared with no use of Magill forceps (RR, 3.96; 95% CI, 1.12–13.00; 107 more/1000 survived with the intervention, 95% CI, 8 more persons/1000 to 324 more/1000 survived with the intervention) ([Sakai et al. 2014, 53](#)). This same study did not show a benefit from the intervention for the outcomes of survival. Four case series reported relief of FBAO in 417 patients treated with Magill forceps ([Olasveengen et al. 2020, S41](#)).

Suction-Based Airway Clearance Devices

A single convenience sample case series with very low-certainty evidence reported survival and relief of FBAO in nine adults with use of a suction-based airway clearance device ([Olasveengen et al. 2020, S41](#)).

FBAO Removal by Bystanders

A single observational study ([Igarashi et al. 2017, 1396](#)) with very low-certainty evidence from 41 patients with FBAO found benefit for the outcome of survival with favorable neurological outcome following FBAO

removal by bystanders (74% versus 32% in the control, $P=0.0075$) ([Olasveengen et al. 2020, S41](#)). A weak recommendation is made by ILCOR ([Olasveengen et al. 2020, S41](#)) for the initial use of back slaps in persons with FBAO and an ineffective cough. It is suggested that abdominal thrusts be used in adults and children with an FBAO and an ineffective cough where back slaps are ineffective ([Olasveengen et al. 2020, S41](#)).

It is suggested by ILCOR that ([Olasveengen et al. 2020, S41](#)):

- Rescuers consider the manual extraction of visible items in the mouth, and it is suggested to not use a blind finger sweep with FBAO.
- Appropriately skilled individuals consider the use of Magill forceps to remove FBAO in out-of-hospital cardiac arrest with an FBAO.
- Chest thrusts are used in unconscious persons with an FBAO.
- Bystanders undertake interventions to support FBAO removal as soon as possible after recognition.

An updated scientific review by American Red Cross Scientific Advisory Council ([American Red Cross Scientific Advisory Council 2020](#)) on FBAO completed in 2019 included additional case series and reports describing successful use of back blows/slaps, chest thrusts and abdominal thrusts, as well as one study in healthy volunteers that evaluated airway pressure changes during different methods of applying abdominal thrusts. No change was made to guidelines with this updated review.

Insights and Implications

The Red Cross guidelines and ILCOR recommendations are similar for the initial efforts to resolve a complete FBAO with use of back slaps/blows. Red Cross provides the option for abdominal and/or chest thrusts and provides guidance for management of unconscious patients with complete foreign body airway obstruction using cardiopulmonary resuscitation (CPR), similar to treating any other unresponsive person who is not breathing normally. The ILCOR systematic review noted reports of harm associated with use of back blows, abdominal thrusts, chest thrusts/compressions and blind finger sweeps and suggests that management should balance the benefits and harms of interventions ([Couper et al. 2020, 174](#)). In conscious individuals, ILCOR also notes that encouraging coughing at first may be effective and is felt unlikely to cause harm ([Olasveengen et al. 2020, S41](#)). Use of CPR for an unconscious patient is a simple method to allow lay responders and healthcare professionals to incorporate the techniques of assessment, chest thrusts, finger sweeps as indicated, and re-assessment.

Negative Pressure Anti-Choking Devices

Last Full Review: American Red Cross Scientific Advisory Council 2023

Negative pressure anti-choking devices are emerging as a possible adjunctive or primary treatment for choking. These products are readily available to the public and manufacturers are urging their inclusion in standard first aid.

Red Cross Guidelines

- For conscious adults and children with a complete foreign body airway obstruction, back slaps or back blows should be used initially, when feasible.
- When back slaps or back blows are ineffective for relief of foreign body airway obstruction, abdominal thrusts should be used in adults and children (older than 1 year).
- For unconscious adults and children with complete foreign body airway obstruction, chest thrusts should be used.
- The manual extraction of visible items in the mouth may be considered following interventions for choking.
- Rescuers should not perform blind finger sweeps in the mouth of a choking person.
- Suction-based, negative pressure anti-choking devices should not be used routinely.
- If standard first aid for management of choking or foreign body airway obstruction is not effective or not feasible, anti-choking devices may be considered for attempted relief of airway obstruction.

Evidence Summary

A 2020 systematic review ([Dunne et al. 2022, 3846](#)) evaluated the effectiveness of negative pressure anti-choking suction devices compared to traditional techniques, including abdominal thrusts, chest thrusts or compressions, and/or back blows. This systematic review was evaluated by the American Red Cross Scientific Advisory Council ([American Red Cross Scientific Advisory Council: Resuscitation 2023](#)) with use of the Assessing the Methodological Quality of Systematic Reviews-2 (AMSTAR-2) checklist ([Shea et al. 2017, j4008](#)) combined with a Task Force assessment of the review findings and implications for costs, health equity, resource requirements, stakeholder acceptability and potential for harm. The systematic review ([Dunne et al. 2022, 3846](#)) included two manikin studies, a single cadaveric trial and two case series. Of the manufactured negative pressure anti-choking devices studied, one was noted to have a combined dislodgement success rate of 94.3% on first attempt. However, the evidence included in the systematic review for the primary outcome was rated as very low, and the review concluded that weaknesses in the available data and lack of unbiased trials resulted in insufficient evidence to support or discourage their use.

The American Red Cross Scientific Advisory Council review concluded that these devices should not be used as first-line treatment for choking or a foreign body airway obstruction, but would likely not cause significant harm if used on a choking person who has received standard treatment without success—including back blows, abdominal thrusts or chest thrusts—and there is no other option. The devices represent an increase in resource requirements, including additional cost and training. In addition, there is concern that these devices may inadvertently be used by well-intentioned members of the public as a primary means to care for foreign body airway obstruction, thereby delaying care while trying to access the device, read instructions and operate it without training ([Rodriguez-Ruiz et al. 2020, 133](#)).

The American Red Cross Scientific Advisory Council analysis of the systematic review agrees with the findings with a recommendation to adhere to current guidelines for the management of choking and foreign body airway management (i.e., back slaps or back blows, abdominal thrusts or chest thrusts, or compressions). However, if standard treatment is not working or not feasible, a weak recommendation was made by the American Red Cross Scientific Advisory Council to consider the use of an anti-choking device. This recommendation is in light of the potential survival benefit when traditional care is used without success and/or it is the only option. Additional research is urgently needed to evaluate the role of negative-pressure airway clearance devices as a choking intervention.

Insights and Implications

A recent retrospective analysis ([Dunne et al. 2022, 3846](#)) of choking events treated with two different anti-choking devices included data solicited from persons who self-identified to manufacturers as having used an anti-choking device before July 1, 2021. Resolution of choking symptoms was reported for Device #1 in 123 events and for Device #2 in 60 events. Abdominal thrusts were used as co-interventions in 37.9% of cases with Device #1 and in 31.1% with Device #2, while back blows were co-interventions in 39.5% of cases with Device #1 and 41% with Device #2. Adverse events that were reported included disconnection of mask or bellows during intervention, one lip laceration and one avulsed tooth. A second planned phase of this study will be a prospective, industry-independent evaluation.

The Red Cross guidelines for the management of foreign body airway obstruction, such as a person who cannot breathe or has an ineffective cough, are unchanged by the current American Red Cross Scientific Advisory Council review, except for the option to consider using an anti-choking device if recommended standard interventions have been exhausted and fail to work, or those interventions are not feasible.