

Best airway and ventilation strategy during CPR and after resuscitation



After cardiac arrest a combination of basic and advanced airway and ventilation techniques are used during cardiopulmonary resuscitation (CPR) and after a return of spontaneous circulation (ROSC). Current guidelines are based predominantly on evidence from observational studies and expert consensus; thus, the optimal combination of airway techniques and oxygen and ventilation targets during CPR and after ROSC is uncertain, according to a review article in the journal *Critical Care*.

Current evidence supports a stepwise approach to airway management based on patient factors, rescuer skills and the stage of resuscitation. Observational data suggest that early lay-bystander compression-only CPR can improve survival after sudden cardiac arrest. Chest compressions are easy to learn and do for most rescuers and do not require special equipment. Studies show that lay rescuer compression-only CPR is better than no CPR.

During CPR, airway interventions range from compression-only CPR with or without airway opening, mouth-to-mouth ventilation, mouth-to-mask ventilation, bag-mask ventilation (with or without an oropharyngeal airway) or advanced airways (supraglottic airways [SGAs] and tracheal intubation using direct or video laryngoscopy).

On arrival of trained rescuers, bag-mask ventilation with supplemental oxygen is the most common initial approach and can be aided with an oropharyngeal or nasopharyngeal airway. During CPR, the bag-mask is used to give two breaths after every 30 compressions. A pre-specified per-protocol analysis reported a significantly higher survival to discharge among those who actually received conventional CPR (30:2) compared with those who received continuous compressions.

"During CPR, rescuers should provide the maximum feasible inspired oxygen and use waveform capnography once an advanced airway is in place," the article notes. "Comparisons between airway techniques are difficult as most patients have more than one airway technique during CPR, airway interventions depend on patient and event factors that are not reported (e.g., arrest location and access, obesity), rescuer ability determines technique success and early-ROSC patients are less likely to need an advanced airway."

The article says the optimal oxygen requirement for CPR and after ROSC remains uncertain — too little is harmful, too much could be harmful, and what's just right and how it should be measured and targeted are uncertain. Currently, guidelines recommend giving the maximum feasible inspired oxygen during CPR based on the premise that restoring depleted oxygen levels and correcting tissue hypoxia improves survival.

After ROSC, rescuers should titrate inspired oxygen and ventilation to achieve normal oxygen and carbon dioxide targets. The article points out that after ROSC for both in-hospital cardiac arrest (IHCA) and out-of-hospital cardiac arrest (OHCA), most patients have a post-cardiac arrest syndrome, are comatose with impaired airway reflexes and ventilation and/or have an indication for tracheal intubation based on their underlying condition. Meanwhile, patients who remain conscious and do not require airway interventions tend to have an initial shockable rhythm, are treated early with defibrillation and have better outcomes.

"Tracheal intubation enables controlled ventilation to facilitate onwards transportation to the emergency department after OHCA, cardiac catheterisation laboratory or intensive care unit," the article explains. "Drug-assisted intubation by critical care teams for both IHCA and OHCA patients with ROSC using a protocol-based approach (e.g., with ketamine or midazolam, fentanyl and rocuronium) can be safe and effective."

There is clinical equipoise regarding the optimal airway, ventilation and oxygenation strategy during CPR and after ROSC, according to the article, adding that ongoing randomised controlled trials should provide new insights.

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