Continuous flow insufflation of oxygen (CFI) in out-of-hospital cardiac arrest

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Three Part Question
In [adult patients with out-of-hospital cardiac arrest], does the [use of CFI (continuous flow insufflation of oxygen) compared to standard ventilation strategy following paramedic guidelines] has shown [any benefits on the patient's outcomes on his arrival and discharge from the hospital]?

Clinical Scenario
A witnessed non traumatic out-of-hospital cardiac arrest occurs in your neighbourhood and the paramedics are rapidly called on scene. Basic Life Support (BLS) guidelines are applied and ventilation may be necessary at this point.

Search Outcome
Altogether 3 papers was found in Medline and 4 in EMBASE, of which 3 were duplicates. No papers were found by scanning the references of relevant papers. All 4 relevant papers are summarized in the table 1.

Relevant Paper(s)

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yu H and Al 2012 China</td>
<td>Passive oxygen insufflation CPR (intervention group n=848) and traditional CPR (control group n=962) Adult patients, non traumatic OHCA (1810 patients)</td>
<td>Systematic review</td>
<td>Return of spontaneous circulation (ROSC)</td>
<td>No significant difference of ROSC (Chi2 = 1.07; P = 0.58; I2 = 0%; RR</td>
<td>Presented as a letter to the editor. Poor explanations on methods, results and search strategies.</td>
</tr>
<tr>
<td>Study Authors</td>
<td>Study Design</td>
<td>Location</td>
<td>Patient Population</td>
<td>Interventions</td>
<td>Outcome Measures</td>
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<td>Bertrand C and Al 2006 France</td>
<td>Multicentre, Randomized Prospective, Controlled Study (RCT)</td>
<td>Standard endotracheal intubation and mechanical ventilation (MV; Control group n = 457) Use of CFIO through a multichannel endotracheal tube at a flow rate of 15 l/min (Intervention group n = 487) Comparable group characteristics Adult patients, non traumatic OHCA, not responding to initial defibrillation (n = 944)</td>
<td>Return of spontaneous circulation (ROSC)</td>
<td>Survival at discharge</td>
<td>CFIO 21% vs MV 20% p = 0.99</td>
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<tr>
<td>Saissy JM and Al 2000 France</td>
<td>Multicentre, Randomized Prospective, Controlled Study (RCT)</td>
<td>Adult patients, non traumatic OHCA with asystole (n = 95) IPPV group (n= 47) intubated with a standard endotracheal tube and ventilated with standard IPPV. CIO group (n=48) for whom a modified tube was inserted, and in which CIO at a flow rate of 15 L/min</td>
<td>Return of spontaneous circulation (ROSC)</td>
<td>Survival at hospital admission</td>
<td>CFIO 17% vs MV 16% p = 0.81</td>
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<tr>
<td>Bobrow BJ et Al 2009 USA</td>
<td>Observational non-randomized retrospective study</td>
<td>Adult non traumatic out-of-hospital cardiac arrest (n=1,019) Passive ventilation (PV) with non-rebreather mask intervention group (n = 459) Bag-valve-mask ventilation (BMV) control group (n = 560 ) Comparable group characteristics</td>
<td>Neuro-intact survival to hospital discharge</td>
<td>Return of spontaneous circulation (ROSC)</td>
<td>Adjusted OR 1.2; 0.8 to 1.9 (CI 95%)</td>
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</tbody>
</table>
Comment(s)
Continuous flow insufflation of oxygen doesn’t seem deleterious in OHCA patients. The French studies have showed some significant differences on non-patient oriented outcomes such as blood gasses, epinephrine doses, and hemodynamics status (SpO2) but have failed to show any benefit on survival or return of spontaneous circulation (ROSC). External validity is slightly restrained in the above studies given that those EMS systems differ from BLS-based EMS systems. Also, delivery of continuous flow insufflation of oxygen might also differ from the boussignac endotracheal multichannel tube to the oro-pharyngeal device, adding complexity to compare different studies together. The b-card device is another non-invasive open system allowing a continuous insufflation of oxygen during cardio-pulmonary resuscitation (CPR). A pre and post-implementation study using this device with Combitube in OHCA is currently underway in Quebec City.

Clinical Bottom Line
Continuous flow insufflation of oxygen does not improve survival nor ROSC compared to standard bag-mask ventilation or endotracheal intubation and mechanical ventilation in OHCA patients in different EMS systems.

References