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Minimum oxygen flow needed for vital support during simulated post-cardiopulmonary resuscitation: 13AP1-2

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Background and Goal of Study: According to the ERC and AHA guidelines, FiO₂ should be titrated to the lowest level to achieve an O₂Sat ≥94%. The goal of this study was to determine the minimum oxygen flow (OF) needed and the time to reach it during post cardiac arrest care.

Materials and Methods: Experimental analysis consisted of a simulated post cardiac arrest situation. Four different resuscitators with reservoir were tested: Mark IV, Spur II, Revivator Plus and O-TWO, which were connected to a test lung. Four different OF were tried (2, 5, 10 and 15 lpm). An oxygen paramagnetic analyzer was used. Three measures of FiO₂ for each model and flow were carried out. Tidal volume administered was of 500-600 ml at 12 bpm. The same investigator ventilated the lung simulator with each bag.

Different situations with associated pre-fixed PAFi and consequent FiO₂ were proposed for patients after return of spontaneous circulation: No pulmonary pathology, FiO₂ 0.2; acute lung injury, FiO₂ 0.32; severe acute hypoxaemia, FiO₂ 0.8. Data was recorded into program Datex- Ohmeda S5 Collect. Statistical analysis was performed using SPSS 15.0. P≤0.05 was statistically significant.

Results and Discussion: FiO₂ of 0.32 or more was obtained using any of the OF and resuscitators tested. Using 2 lpm, it took 30s. with Mark IV (34.8 (1.3)), Revivator (35.7 (1.5)) and SpurII (34.4 (2.1)); and 35s. with OTWO (36.3 (4.3)). Using 5 lpm, it took 15 s. with Revivator (34.3 (1.5)); 20 s. with Mark IV (44.9 (6.9)); 25s. with SPUR II (52.6 (8.3)); 30s. with OTWO (42.4 (4.4)). Never was FiO₂ of 0.80 reached using 2 or 5lpm OF with almost any of the devices. Using 10 or 15 lpm, a FiO₂ of 0.80 was obtained, after 40 s. and 35s. respectively, with Mark IV (for 10 lpm: 84.2 (0.9); for 15 lpm: 85.6 (0.3); and Revivator (10 lpm: 86 (2); 15 lpm: 84.3(1.5)). FiO₂ of 0.80 or more was achieved at 50s. using SpurII (10 lpm: 88.9 (4.5); 15 lpm: 87.1 (6.4)) and OTWO (10 lpm: 88.6 (2.3); 15 lpm: 87.8 (0.1)). Clinically and statistically significant differences (IC 95%) were found during the first 60s. between Mark IV and OTWO at 10 lpm (p= 0.012); Spur II and OTWO at 15 lpm (p= 0.027).

Conclusions: For patients with no pulmonary pathology it would be enough to ventilate them without reservoir and with environmental air. Those presenting acute lung injury, could be ventilated with any of the resuscitators with 2 lpm. Presenting severe hypoxaemia, ventilation with 10 lpm should be enough.

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