POSTER 21-62

Efficacy of a CPR-Assist Device During Prolonged Manual Chest Compressions

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Purpose: The purpose of this investigation was to compare the compression rates and percentage of correct-depth compressions during five minutes of uninterrupted CPR with and without use of a CPR-assist device.

Methods: This was a prospective, randomized, controlled experimental trial performed in a laboratory classroom. Ten volunteers (eight male, two female), AHA-certified in CPR, participated. Subjects were assigned randomly to perform five minutes of uninterrupted chest compressions during simulated two-rescuer CPR: one trial unassisted; and one trial using the CPR-assist device. The CPR-assist device is a firm rubber pad, resting between the rescuer's hands and victim's chest, with a pressure manometer and a metronome. There was a one-hour rest period between trials. A respiratory pause was inserted after every fifth compression. CPR was performed on a mannequin (Laerdal Skillmeter Recording Annie) and data were recorded after each minute of compressions. Rescuers were blinded to the skill meter readings, which report the rate of compressions and the percent of compressions that were within the appropriate depth for adults. Data were analyzed with repeated measures ANOVA and Chi-square.

Results:

Table 1—CPR compressions per minute

	Time (Minutes)				
Device	1	2	3	4	5
No	93.2	91.8	93.8	93.9	94.7
Yes	84.6	90.4	93.2	94.5	94.9

Rate differences nonsignificant by ANOVA

Table 2—Percent correct-depth CPR compressions

	Time (Minutes)				
Device	1	2	3	4	5
No	54.2	35.1	37.4	35.7	35.7
Yes	46.5	67.2*	64.7*	64.6*	64.1*

*Chi-square, $p < 0.001$

Conclusions: In this study, the CPR-assist device increased the percentage of correct-depth compressions after one minute of CPR. Further evaluation is warranted to determine if such a device enhances in-field CPR performance.

POSTER 22-91

Comparison of Various Ventilation Devices in a Swine Pneumothorax

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Purpose: Bag-valve-mask devices (BVM), manual transport ventilators (MTV), and automatic transport ventilators (ATV) are three available options for out-of-hospital artificial ventilation. Use of MTV and ATV has been limited by concern for causing or worsening pneumothorax (PTX). The purpose of this study was to compare the effect of ventilation with BVM, MTV, and ATV in a swine PTX model.

Methods: This was a randomized cross-over study. Six fasted swine (21.2–24.5 kg, mean = 23.5 kg) were sedated with IM ketamine and xylazine and paralyzed with pancuronium; anesthesia was maintained with a continuous IV infusion of alpha chloralose. The swine were intubated with a 5.0 mm cuffed endotracheal tube. A lung injury was created with hemostats under direct visualization after the pleural cavity was entered by sharp dissection. A 16 Fr. Foley catheter was inserted and sealed in the pleural space at the injury site. Prior to each trial, a pneumothorax was created by instilling 300 ml of air through the Foley catheter. Each swine underwent 10 min ventilation trials (to simulate out-of-hospital transport times), rate = 12–14 breaths per minute, with BVM, MTV, and ATV by the same investigator. Following each trial, PTX size was determined by withdrawing air through the Foley catheter. ANOVA for Repeated Measures (alpha = 0.05) was utilized for statistical analysis.

Results:

	BVM	MTV	ATV
PTX (ml)	339.8 ±35.9	327.8 ±28.9	321.8 ±22.2
$ETCO_2$(mmHg)	38.6 ±6.8	37.1 ±7.0	33.9 ±4.1
Change in pH (units)	-0.03 ±0.10	-0.02 ±0.05	0.08 ± 0.05*
Systolic BP (mmHg)	97.5 ±13.3	101.67 ±16.3	110.67 ±12.6

*ANOVA Repeated measures, $p = 0.033$

Conclusion: This study does not support concern for expansion of PTX by transport ventilators. There is no difference in the extent of PTX expansion produced by ventilation with BVM, MTV, or ATV. Prospective evaluation is warranted to determine the efficiency of these ventilation techniques.

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