re-assessed 2 months post MI. The average absolute improvement in EF was 0.07 (SD 0.11). Patients were grouped by the degree of EF recovery (no recovery, n = 106, modest [0.01 to 0.09] EF improvement, n = 94, and large [0.10 or greater EF increase] improvement, n = 122). During an average follow-up of 4 years 24 fatal (n=17) or non-fatal (n=7) cardiac arrests and 30 deaths were observed. The relationship between degree of LV recovery and outcome was assessed using Cox multivariable models.

RESULTS: The average age of participants was 61 years, most (85%) were male, and 75% underwent revascularization post-MI. The use of beta-blockers (94%), statins (91%), and ACE inhibitors or angiotensin receptor blockers (94%) was high. The three EF recovery groups were similar in most respects, apart from higher peak troponin values in the patients with no EF recovery ($p = 0.002$). A strong linear relationship ($p < 0.001$) in the rate of fatal or non-fatal cardiac arrest over 3 years by degree of EF recovery was observed: no recovery (16.9%), modest recovery (8.3%), and large recovery (3.0%). The risk (hazard ratio) of cardiac arrest was 3.9-fold higher in patients with no EF recovery versus those with modest or large recovery, despite adjustment for important covariates, including peak troponin, revascularization and medications ($p < 0.001$). Similar results were observed for mortality.

CONCLUSION: Significant recovery in EF over the initial 2 months post-MI is common with contemporary management. Patients with no improvement in EF over this time period have a 3.9-fold higher risk of cardiac arrest versus patients in whom recovery occurs. Patients without recovery of LV function in the initial 2 months post-MI may benefit from interventions such as a prophylactic ICD. This hypothesis is being prospectively evaluated in two large ongoing studies.

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MICROVOLT T-WAVE ALTERNANS AS A PREDICTOR OF MORTALITY AND SEVERE ARRHYTHMIAS IN PATIENTS WITH LEFT-VENTRICULAR DYSFUNCTION: A SYSTEMATIC REVIEW AND META-ANALYSIS

CJ van der Avoort, KB Filion, N Dendukuri, JM Brophy
Montréal, Québec

BACKGROUND: Implantable cardioverter defibrillators (ICDs) are an effective but expensive treatment for the prevention of death in patients with left-ventricular dysfunction. Microvolt T-wave alternans (MTWA) may help identify which patients will derive the largest benefit from ICDs but studies to date have been largely inconclusive. Our objective was to systematically review and quantify the evidence for MTWA utility as a predictor of mortality and severe arrhythmic events.

METHODS: We systematically searched the literature using MEDLINE, EMBASE, Current Contents, the Cochrane Library, INAHTA, and the Web of Science to identify all primary prevention randomized controlled trials and prospective cohort studies examining MTWA in patients with left-ventricular dysfunction. The search was limited to English publications between January 1990 and May 2007 and excluded secondary prevention studies. The primary outcome was a composite of mortality and severe arrhythmias. Data were synthesized using Bayesian hierarchical models with non-informative priors.

RESULTS: We identified no randomized trials and 8 prospective cohort studies involving a total of 1,946 patients, including 332 positive, 656 negative, 84 indeterminate, and 874 non-negative (which includes both positive and indeterminate tests) MTWA test results. The risk of mortality or severe arrhythmic events was higher in patients with a positive MTWA compared to a negative test result (RR=2.7, 95% credible interval (CrI)=1.4, 6.1). Similar results were obtained when comparing non-negative MTWA to a negative test (RR=2.6, 95% CrI = 1.4, 5.8). There were insufficient data to make any statements regarding the predictive utility of an indeterminate test (positive vs indeterminate: RR=1.1, 95%CrI=0.4, 3.9; indeterminate vs negative: 2.5, 95%CrI=0.8, 5.4).

CONCLUSION: A positive MTWA test result appears to modestly predict increased mortality or severe arrhythmic events in those with left ventricular dysfunction. Future studies should examine the impact of MTWA on ICD cost-effectiveness for primary prevention.

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AUTOMATED HIGH FREQUENCY VENTILATION DURING EXPERIMENTAL CPR: A NEW APPROACH TO RESUSCITATION

P Dorian, X Hu, H Leong-Poi, A Ramadeen, I Mangat
Toronto, Ontario

PURPOSE: Experimental and clinical studies suggest over-ventilation during cardiopulmonary resuscitation (CPR) is common and reduces maximum obtainable 'cardiac output' from chest compressions. Automated ventilation during CPR has not been previously tested.

METHODS: This prospective study compared hemodynamic (using solid state Millar transducers), gas exchange, and ventilation parameters during experimental CPR using 100% O2 and manual bag ventilation (6 - 8 breaths/min) to automated ventilation using a compressed gas powered, non-electronic, pressure limited, pressure and flow triggered device (Oxylator, CPR Medical Devices) set at maximum inspiratory pressure of 12 mmHg, PEEP = 1.5 mmHg, max flow 30 L/min. The device automatically delivers inhalations when airway pressure falls to 1.5 mmHg and stops when pressure reaches 12 mmHg, delivering 1 breath for every decompression during manual chest compression.

Twelve pigs underwent 5 min of electrically induced, untreated ventricular fibrillation (VF). They were randomly assigned to CPR using manual or automated ventilations (n = 6 each), together with continuous manual chest compressions at 95 - 110/min, 3 - 5 cm depth. All measures were made after 2 min of CPR.

RESULTS:

Table

Ventilatory and hemodynamic parameters for manual vs. automated ventilation

	Manual Ventilation	Automated Ventilation
Peak airway pressure (mmHg)	42 ± 11*	12 ± 2
Trough airway pressure (mmHg)	0.4 ± 0.8	2.3 ± 1.4
Arterial PO_2	272 ± 97*	136 ± 75
End Tidal CO_2	16 ± 2.6*	28 ± 7
Ventilations/min	6 - 8	95 - 110
Arterial PO_2 - End Tidal CO_2	11 ± 7	11 ± 5
Peak inspiratory flow - l/min	102 ± 13*	30
Coronary perfusion pressure (mmHg)	22 ± 9	25 ± 7
Peak aortic "systolic" pressure (mmHg)	72 ± 19	77 ± 20
Peak aortic "diastolic" pressure (mmHg)	25 ± 9	24 ± 5
Right atrial "diastolic" pressure (mmHg)	3 ± 4	-2 ± 10
Carotid artery flow velocity (% of baseline)	49 ± 24	84 ± 35

**p < 0.05; all comparisons between manual and automated ventilation are NS unless indicated. Values are mean ± standard deviation.*

After 3 min of CPR, all animals were successfully externally defibrillated.

CONCLUSIONS: Automated high frequency, low pressure ventilation during experimental VF is associated with hemodynamics and gas exchange similar to that achieved with guideline recommended manual ventilation and avoids the risk of over-ventilation and barotrauma.