Prehospital Rate/Rhythm Control Interventions Improve Outcomes for Patients Presenting in Atrial Fibrillation with Rapid Ventricular Response

Christine O'Neil, MEd, NRP, Louis B. Fornage, MD, Stephen R. Dowker, BS, EMT, Eric R. Wanta, BA, NRP, Ryan S. Lewis, MS, Paramedic, Lawrence H. Brown, PhD

PREHOSPITAL CARE RESEARCH FORUM

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OBJECTIVE

To compare the outcomes of patients presenting to Emergency Medical Services (EMS) with atrial fibrillation with rapid ventricular response (AfRVR) who did and did not receive prehospital rate/rhythm control intervention(s).

METHODS

STUDY DESIGN

Retrospective cohort study

DATA SOURCE & TARGET POPULATION

- ESO Data Collaborative research database:
  - Jan 1, 2020 to Dec 31, 2020
- 9-1-1 medical responses for AfRVR:
  - Atrial fibrillation on first EKG
  - Heart rate ≥ 110
- Age 16 to 100 years

MEASURES & OUTCOMES

- AfRVR treatment
  - Vagal maneuvers
  - Medication (e.g., diltiazem, verapamil, propranolol, etc.)
  - Cardioversion
- Primary outcome: emergency department (ED) discharge to home
- Secondary outcomes: length of stay (LOS); mortality

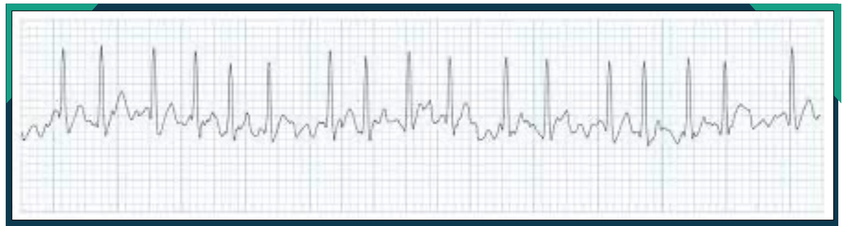
DATA ANALYSIS

- Propensity-matching based on demographics, clinical characteristics, and comorbidities
- Adjusted risk-difference with 95% confidence interval
- Number needed to treat (NNT) with 95% confidence interval

RESULTS

PATIENT CHARACTERISTICS

- 40,276 eligible AfRVR patient encounters
  - 10,234 encounters with outcome data available
    - Mean ± SD age: 74 ± 13
    - 45% male / 55% female
    - Mean ± SD initial heart rate: 137 ± 23



ED Discharge to Home

Intervention Patients: 37.4%
Non-intervention Patients: 28.9%

Adjusted Difference
+7.6% (CI: +3.6%; +11.6%)

NNT
14 (CI: 9; 28)

Overall Mortality

Intervention Patients: 3.9%
Non-intervention Patients: 7.2%

Adjusted Difference
-2.9% (CI: -4.8%; -1.0%)

NNT
35 (CI: 21; 100)

RESULTS (continued)

Final analysis based on 8,832 propensity-matched patient encounters

Unadjusted Outcomes

	No Intervention	Intervention
Patient Encounters, N	7,456	1,376
ED Discharge to Home, N (%)	2,154 (28.9)	515 (37.4)
ED LOS (median (IQR) hours)	5.1 (3.4-12.2)	4.7 (3.2-12.2)
Hospital LOS (median (IQR) days)	4.8 (2.9-7.9)	4.0 (2.3-7.2)
Overall Mortality, N (%)	592 (7.2)	59 (3.9)

Propensity-Matched Treatment Effects

Outcome Measure	Effect (CI)	NNT (CI)
ED Discharge to Home	+7.6% (+3.6; +11.6)	14 (9; 28)
ED LOS (hours)	-1.0 (-2.9; +0.9)	n/a
Hospital LOS (days)	-0.7 (-1.3; -0.1)	n/a
Overall Mortality	-2.9% (-4.8; -1.0)	35 (21; 100)

**ED LOS is discharged patients only; Hospital LOS is admitted patients only*

LIMITATIONS

- Emergency department and hospital outcome data were available for only 25% of all AfRVR patients
- Propensity matching might not fully account for all potential confounders

CONCLUSION

Among propensity matched AfRVR patients with similar demographic, clinical and comorbidity profiles, prehospital rate or rhythm control interventions were associated with increased likelihood of ED discharge to home, shorter hospital length of stay for admitted patients, and reduced overall mortality.

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