Time to First Compression using Medical Priority Dispatch System Compression-First Dispatch-CPR Protocols

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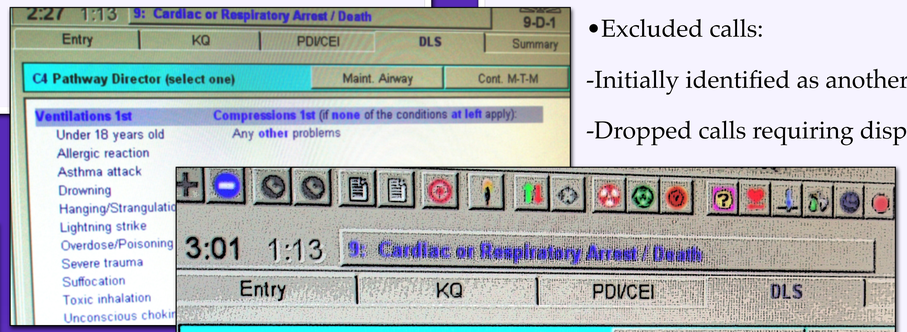
Background

- Without bystander CPR, cardiac arrest survival decreases 7%-10% for every minute of delay until defibrillation
- Dispatcher-assisted CPR has been shown to increase the rates of bystander CPR and cardiac arrest survival
- Rapid delivery of uninterrupted chest compressions is a key component of successful resuscitation
- Changes to recent versions of the Medical Priority Dispatch System (MPDS) emergency medical dispatch (EMD) protocols have altered the pathway for cardiac arrest pre-arrival instructions
- The effect of these changes on time to first compression is

Objective

To quantify the time to first compression for all cardiac arrest calls to a 911 center utilizing MPDS EMD protocol versions 11.2, 11.3, and 12.0.



EMD CPR Pre-Arrival Instruction screens, Version 12

Setting

- Wake County, NC, is a mixed urban/ suburban county encompassing 831 square miles with a 2009 population near 897,000.
- Approximately 65,000 emergency medical calls to 911 annually
- 75 emergency medical dispatchers
- Approximately 1,500 basic life support firefighter first responders
- 225 advanced life support personnel
- Trained emergency medical dispatchers utilizing the MPDS EMD protocol process all medical emergency calls
- Raleigh-Wake Emergency Communications Center (RWECC) is sole ambulance dispatch center for county,
  - One of less than one hundred accredited EMD centers worldwide

Methods

- All calls identified as cardiac arrest at case entry by dispatchers at RWECC were eligible for inclusion
- Each cardiac arrest call is reviewed by a specially trained emergency medical dispatcher who serves as the quality improvement (QI) coordinator
- QI coordinator records specific event times for these calls, including time of chest compression initiation
- MPDS versions 11.2, 11.3, and 12 were in use by RWECC during the data collection period: October 2005 - March 2010

•Excluded calls:

-Initially identified as another chief complaint

-Dropped calls requiring dispatcher callback

-Any cardiac arrest calls requiring mouth-to-mouth ventilation prior to chest compressions

•Calls with barriers to effective communication (language issues, difficulty positioning the patient, emotional distress, etc.) ***not*** excluded

Data Analysis

- Time to first compression for adult cardiac arrest cases across MPDS protocol versions was primary outcome measure
- Kruskal-Wallis test used to examine differences in TTFC across the three protocol versions
- Under the assumption that EMD experience may potentially confound the TTFC, the overall relationship between TTFC and months of EMD experience was analyzed using Pearson correlation.
  - Differences in TTFC between novice (12 months experience or less) and experienced (greater than 12 months) EMDs were compared using Student's t-test

Results

- 778 cases identified
  - 259 excluded
    - met exclusion criteria, missing data, etc.
- Overall Mean for time to first compression
  - 240.8 (±68.8) seconds
- No significant variation across protocol versions
  - p = 0.08, see Table 1 below
- Dispatcher experience also shows little variation
  - No difference in mean time to first compression between novice and experienced dispatchers
    - p = 0.97


EMD protocol cardset

MPDS Protocol Version	N	Mean	Std. Deviation	Minimum	Maximum
11.2	213	238.5	81.8	104.0	752.0
11.3	210	249.0	83.8	104.0	845.0
12.0	102	252.9	80.0	101.0	686.0

Table 1

Limitations

- Outcome daa unavailable, thus time to first compression effect on survival unknown
- QI compliance scores for individual calls not considered
- Demographic data for callers not available

Conclusions

- Overall time to first compression approximately 4 minutes with little variation across protocol versions
- Improvement over earlier MPDS protocol version that included pulse check and mouth-to-mouth ventilation instructions
- Does not compare favorably with older, non-MPDS protocols that included pulse checks and mouth-to-mouth ventilation
- Data suggest that the current MPDS D-CPR protocols have not yet been fully optimized with respect to minimizing time to first compression in cardiac arrest calls