Prehospital adrenaline administration for out-of-hospital cardiac arrest: The picture in England and Wales

Scott Booth¹, Chen Ji¹, Jasmeet Soar², A. Niroshan Siriwardena³, Rachael Fothergill⁴, Robert Spaight⁵, Gavin D. Perkins^{1,6}, OHCAO collaborators

WARWICK

Purpose: Studies show significant variability in adrenaline administration between/ within EMS systems worldwide, but there is a paucity of UK data. This study aimed to describe epidemiology and outcomes for OHCA patients receiving prehospital adrenaline by EMS in the UK.

Materials and Methods: Retrospective observational study. Data on adult OHCA patients receiving adrenaline from eight English and the Welsh ambulance service regions analysed from two sources: 2010-2013 data from the PARAMEDIC RCT, and 2013-2015 data from the UK OHCA registry. Chi-square tests were used to test differences in proportions of adrenaline administration between regions. Descriptive statistics were used to report patient demographic and clinical characteristics, bystander response, EMS response time and outcomes.

Results: EMS in England and Wales treated 47,737 OHCA patients with 36,998 (77.5%) administered adrenaline (Figure 1). Administration varied between EMS regions (Table 1, Figure 2), ranging from 62.2-86.3% (overall difference $p<0.001$) for all patients, 59.9-85.3% (overall difference $p<0.001$) for shockable and 66.0-91.0% (overall difference $p<0.001$) for non-shockable rhythm patients.

Figure 1: Data flow for OHCA patients administered adrenaline by EMS in England/Wales 2010-2015

The mean age of OHCA patients administered adrenaline by EMS was 71.0 years (SD = 16.4 years) and 63.0% were male. The bystander CPR rate was 54.2% (for non-EMS witnessed OHCA patients). The majority of OHCA patients had a cardiac aetiology (88.6%), whilst the initial cardiac rhythm was non-shockable in 78.1% of patients. Furthermore, the mean EMS response time was 7.8 minutes (SD = 7.1 minutes). For outcomes, the ROSC at hospital transfer rate was 22.8% and survival to discharge was 2.9% for patients administered adrenaline.

Figure 2: Adrenaline administration by EMS region in England/Wales 2010-2015

	Total adrenaline admin/resus attempted	Mean %	% range between EMS regions	X ²
All patients	36,998/47,737	77.5	62.2 – 86.3	P<0.0001
Shockable rhythm	7845/11,339	69.2	59.9 – 85.3	P<0.0001
Nonshockable rhythm	28,007/34,184	81.9	66.0 – 91.0	P<0.0001

X² = difference in proportions of adrenaline use between all EMS regions
Table 1: EMS adrenaline administration for OHCA patients in England/Wales 2010-2015

Conclusions: A high proportion of OHCA patients received prehospital adrenaline from EMS between 2010-2015 in England and Wales, with significant variability in administration found between EMS regions. Patients administered adrenaline had an overall low survival to discharge rate.

1 University of Warwick Medical School; 2 Southmead Hospital, Bristol; 3 University of Lincoln; 4 London Ambulance Service; 5 East Midlands Ambulance Service; 6 Heart Of England NHS Foundation Trust