Initial Hyperoxia is Associated with Survival in Post-Arrest Patients Enrolled in the PATH Database

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Introduction

- During cardiac arrest most patients are placed on 100% oxygen with assisted ventilations
- After return of spontaneous circulation (ROSC), 100% oxygen is typically continued for an extended time
- Recent human data suggests that arterial hyperoxia is associated with worse outcomes
- We hypothesized that neurologically intact survivors would be more likely to be normoxic rather than hypoxic or hyperoxic

Normoxia	PaO_2 = 60-300 mm Hg
Hypoxia	PaO_2 < 60 mm Hg
Hyperoxia	PaO_2 > 300 mm Hg

Methods

- A retrospective chart review was performed of 179 post-arrest patients treated with therapeutic hypothermia (TH) who were entered into the Penn Alliance for Therapeutic Hypothermia (PATH) database, a national multi-institution from 11 institutions
- Demographic variables were analyzed using chi-square tests and linear regression
- Chi-square analyses were performed to assess the relationship between hypoxia, normoxia, hyperoxia, mortality, and neurologic outcomes at 1st post-arrest arterial blood gas and at 6 hours, 12 hours, 24 hours, and 48 hours post-arrest

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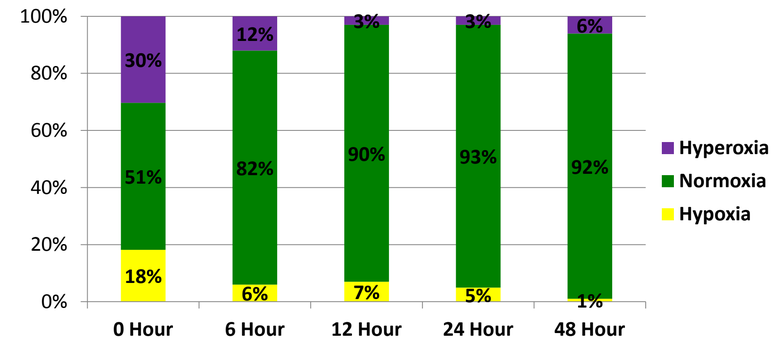
Table 1: Demographics

DEMOGRAPHICS	#	%
Total Patients Treated with TH	179	
Sex		
Male	97	54
Ethnicity		
African American	72	40
Caucasian	95	53
Asian	6	3
Other/Unknown	6	3
Initial Rhythm		
VT/VF	52	31
Disposition		
Survived to Discharge	66	37
Neurologically Intact	50	76
Neurologically Disabled	16	24

Results

- Mean age: 59.6 ± 16.4 years
- Duration of TH: 23.1 ± 7.4 hours
- Duration of rewarming : 13.5 ± 6.3 hours
- An increasing percentage of patients had PaO_2 values in the optimal range at consecutive time points (51% 0 hr; 82% 12 hrs; 90% 24 hrs; 93% 36 hrs; 92% 48 hrs; Figure 1)
- Significantly higher initial mean PaO_2 values were found in survivors than non-survivors (242 vs. 187 mmHg; p=0.03)
- Initial hyperoxia was associated with improved survival vs. normoxia or hypoxia (p=0.01; Figure 2)
- There was no relation between oxygen values at any point post-arrest and neurologic outcomes

Figure 1: Percent of Patients with Normoxia, Hyperoxia, and Hypoxia



Conclusions

- In a cohort of patients enrolled in the PATH database, we found
  - increasing percentages of patients had arterial oxygen levels optimized after ROSC
  - improved outcomes in patients with hyperoxic initial PaO_2 values when compared to normoxic or hypoxic values
  - no relationship between the arterial oxygen values and neurologic outcomes at any time point post-arrest

Figure 2: Mortality and Initial PaO_2 Value