Gender Differences in Cardiac Arrest Survivors Who Receive Therapeutic Hypothermia (poster)

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Introduction:

The AHA recommends therapeutic hypothermia (TH) as the standard of care for patients who experience return of spontaneous circulation with coma following cardiac arrest. Differences in outcomes by gender have not been well-defined for patients undergoing TH.

Study Objectives:

We set out to determine gender differences in mortality and cerebral performance category (CPC) scores at discharge in survivors of cardiac arrest who received TH.

Methods:

This retrospective cohort study used abstracted data from an existing database of patients who had an ICE alert from January 1, 2005, to September 19, 2013, at a Level-1 Trauma Center with an annual ED census of 75,000. Included patients were those meeting criteria for an ICE alert (an institutional protocol designed to expedite mild TH for post cardiac arrest patients). Standard quality assurance data points were reviewed and compared by gender, such as age, time to TH set point, mortality and CPC scores. Chi-square and Wilcoxon rank sum tests were used; significance set at 0.05.

Table 1. Cerebral Performance Categories (CPC)

1	Good cerebral performance: Conscious, alert, and able to work and lead a normal life. Might have minor psychological or neurological deficits (mild dysphasia, non-capacitating hemiparesis, or minor cranial nerve abnormalities).
2	Moderate cerebral disability: Conscious; sufficient cerebral function for part-time work in a sheltered environment or independent activities of daily life (dress, travel by public transportation, food preparation). Such patients may have hemiplegia, seizures, ataxia, dysarthria, dysphasia, or permanent memory or mental changes.
3	Severe cerebral disability: Conscious; patient dependent on others for daily support (in an institution or at home with exceptional family effort) because of impaired brain function. Has at least limited cognition. This category includes a wide range of cerebral abnormalities--from patients who are ambulatory, but have severe memory disturbance or dementia precluding independent existence, to those who are paralyzed and can communicate only with their eyes, as in the locked-in syndrome.
4	Coma/vegetative state: Not conscious, unaware of surroundings, no cognition. No verbal and/or psychological interaction with environment.
5	Brain death: Certified brain dead or dead by traditional criteria.

Table 2. Cross Classification of Patient Characteristics by Patient Gender

Variable	Overall n=330 (%)	Male n=198 (%)	Female n=132 (%)	P-value
Age, mean (SD)	61.7 (15.0)	60.7 (15.4)	63.2 (14.3)	0.14
Previously Healthy	35 (10.6)	26 (13.1)	9 (6.8)	0.07
Hx Coronary Disease	99 (30.0)	58 (29.3)	41 (31.1)	0.73
Hx Heart Failure	66 (20.0)	39 (19.7)	27 (20.4)	0.87
Hx Arrhythmia	42 (12.7)	26 (13.1)	16 (12.1)	0.79
Hypertension	186 (56.4)	111 (56.1)	75 (56.8)	0.89
COPD	67 (20.3)	37 (18.7)	30 (22.7)	0.37
Renal Disease	54 (16.4)	30 (15.1)	24 (18.2)	0.47
Obesity (>35 BMI)	72 (21.8)	35 (17.7)	37 (28.0)	0.03
Insulin Dependent DM	39 (11.8)	22 (11.1)	17 (12.9)	0.63
NIDDM	71 (21.5)	42 (21.2)	29 (22.0)	0.87

Table 3. Cross Classification of Treatment Characteristics by Patient Gender

Variable	Coding	Male n (%)	Female n (%)	P-value
CPC Prior	CPC-1	175 (88.4)	108 (81.8)	
	CPC-2	14 (7.1)	17 (12.9)	
	CPC-3	7 (3.5)	4 (3.0)	
	Unknown	2 (1.0)	3 (2.3)	0.25
Admit ECG	Abnormal-LBBB	13 (7.1)	14 (10.6)	0.19
	Abnormal-STEMI	42 (22.8)	18 (13.6)	0.08
	Abnormal- Other	117 (63.6)	80 (60.6)	0.78
	ECG not done/Unknown	15 (7.6)	11 (8.3)	0.80
	Normal	11 (5.6)	9 (6.8)	0.64
Witnessed	Yes	166 (84.7)	105 (80.2)	
Bystander CPR	Yes	99 (51.3)	55 (43.7)	
	n/a (arrested with medical person present)	30 (15.5)	29 (23)	0.20
Shock	Yes	71 (36.8)	64 (49.6)	0.02
Initial Rhythm	PEA	66 (33.3)	44 (33.3)	1.0
	VT/VF	62 (31.3)	22 (16.7)	0.003
	VT/VF/AED advised shock	30 (15.2)	23 (17.4)	0.58
	Asystole	37 (18.7)	40 (30.3)	0.02
	Unknown	3 (1.5)	3 (2.3)	0.61
Angiography	Yes	99 (52.9)	35 (29.2)	<0.001
Obey Commands	Yes	60 (32.1)	35 (28)	0.44
CPC at Discharge	CPC-1	28 (14.1)	12 (9.1)	
	CPC-2	20 (10.1)	15 (11.4)	
	CPC-3	12 (6.1)	7 (5.3)	
	CPC-4	6 (3)	5 (3.8)	
	CPC-5	77 (38.9)	55 (41.7)	
	n/a	55 (27.8)	38 (28.8)	0.82
		Median (IQR)	Median (IQR)	
Arrest to Hypothermia	Time (minutes)	175 (157.5)	135 (160.0)	0.07
Time to Target Temperature	Time (minutes)	440 (270)	310 (270)	0.003
ICU LOS	Time (days)	6 (6)	5 (6)	0.14

Table 4. The Association Between Mortality and Gender Controlling for Potential Confounding Factors

			95% CI		
Variable	Coding	OR	Lower	Upper	P-value
Gender	Male	1.0	-	-	-
	Female	0.46	0.23	0.92	0.03
Obese	No	1.0	-	-	-
	Yes	2.39	1.08	5.26	0.03
MI Witnessed	No	1.0	-	-	-
	Yes	0.41	0.16	1.01	0.05
Bystander CPR	No	1.0	-	-	-
	Yes	0.61	0.38	0.95	0.03
Age	Continuous	1.03	1.01	1.05	<0.001
Shock	No	1.0	-	-	-
	Yes	2.75	1.45	5.19	<0.001
ECG	Normal	1.0	-	-	-
	Abnormal LBBB	1.71	0.28	10.37	0.56
	Abnormal STEMI	1.36	0.29	6.43	0.69
	Abnormal Other	0.94	0.23	3.84	0.94
	Not Performed	0.38	0.04	3.39	0.39
Initial Rhythm	PEA	1.0	-	-	-
	VT/VF	0.28	0.12	0.65	<0.001
	VT/VF/AED Advised Shock	0.62	0.25	1.52	0.3
	Aystole	0.88	0.35	2.17	0.78
	Unknown	0.24	0.03	2.18	0.2
Angiography Performed	No	1.0	-	-	-
	Yes	0.2	0.09	0.42	<0.001

Results:

There were 330 subjects analyzed, 198 male and 132 female. The mean subject age (standard deviation) was 61.7(15.0). There was no significant difference in age between men, 60.7(15.4), and women, 63.2 (14.3), p=0.14. There were no statistically significant differences by gender in history of CAD, CHF, arrhythmia, HTN, COPD, renal disease, IDDM/NIDDM or those previously healthy. However, obesity (>35 BMI) was more likely in women (37, 28.0%) than men (35, 17.7%), p=0.03. Women (64, 49.6%) were more likely than men (71, 36.8%) to have shock, p=0.02. Men (62, 31.3%) were more likely to have ventricular tachycardia/fibrillation as an initial rhythm than women (22, 16.7%), p=0.003. Women (40, 30.3%) were more likely than men (37, 18.7%) to have an initial rhythm of asystole. While there was no difference in arrest to initiating hypothermia, there was a significant difference in time to target temperature (in median minutes, IQR): Men 440 (270) versus women 310 (270), p=0.003. Overall, there was no statistical difference in CPC at discharge. Crude mortality was not different between genders: Males, 67.7%; females, 70.5%, p=0.594. However, after controlling for differences in age, obesity, shock and other variables, females were less likely to die (OR=0.46, 95% CI: 0.23-0.92, p=0.03) than males.

Conclusion:

There is no statistically significant difference in CPC or crude mortality between genders. After adjusting for confounders, females were 54% less likely to die than males.