Original Contribution

Gender disparities in percutaneous coronary intervention in out-of-hospital cardiac arrest

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A R T I C L E   I N F O

A B S T R A C T

Background: Quality of post-arrest care is considered a significant factor for overall survival and neurological outcomes in out-of-hospital cardiac arrest (OHCA). However, previous studies suggested gender differences in invasive treatments including percutaneous coronary intervention (PCI). In this study, we evaluated gender disparities in the delivery of PCI among OHCA patients.
Methods: All adults OHCA patients with presumed cardiac etiology and sustained ROSC between 2013 and 2016 were included in the study. Main exposure was gender and primary outcome was PCI treatment. Multivariable logistic regression was used to analyze the association between gender and PCI treatment, adjusting for patient, community, prehospital, and hospital factors. The time interval from return of spontaneous circulation (ROSC) to PCI and survival outcomes were also analyzed as secondary and tertiary outcomes.
Results: A total of 20,675 patients were included for final analysis. Multivariable analysis showed that female patients were significantly less likely to receive PCI compared to males with adjusted odds ratio (OR) of 0.40 (95% CI 0.30–0.53). However, among those who received PCI, there were no significant associations between gender and time from ROSC to PCI (≤90 vs. >90 min). Overall survival outcomes were not significantly associated with gender after adjusting for PCI and other confounding factors (OR = 0.87, 95% CI 0.71–1.08 for survival to discharge and OR = 0.87, 95% CI 0.70–1.08 for good neurological recovery).
Conclusions: Among sustained ROSC patients following OHCA, female patients were significantly less likely to undergo PCI than males. Further studies are warranted to reduce gender disparities in caring for post-arrest patients.

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1. Introduction

Out-of-hospital cardiac arrest (OHCA) remains one of the most important disease categories due to its high incidence and low survival rates worldwide [1]. Over the past decades, there have been many efforts to improve the outcomes of OHCA through time sensitive and sequential actions at both prehospital and hospital levels, which are well emphasized in the "Chain of Survival" concept. Quality post-arrest care is considered to make a significant contribution to overall survival after cardiac arrest. The 2010 American Heart Association (AHA) recommended adding fifth link to the chain of survival concept for post-resuscitation care [2]. Several interventions have been shown to improve outcomes following cardiac arrest, including therapeutic hypothermia or targeted temperature management (TTM) [3, 4] and immediate coronary angiography with percutaneous coronary intervention (PCI) [5].

Successful PCI has been shown to be an independent predictor for survival and improved neurological outcomes for patients with OHCA, regardless of the presence or absence of ST-segment elevation myocardial infarction (STEMI) [6, 7]. Moreover, recent studies showed a strong association between early PCI and both survival and good neurological recovery after OHCA [8]. However, there are several factors that may influence the use of PCI. Previous studies suggested that age [9, 10], gender [10] underlying diseases [11], and socioeconomic status [12] are independent influencing factors of PCI use in patients with acute coronary syndrome.

In the past decades, several studies have reported generally consistent pattern of less intensive treatment of acute myocardial infarction in women across a variety of settings [13-15]. Therefore, efforts in reducing gender differences in health care use have received prominent

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attention in the research. In 2014 Academic Emergency Medicine Consensus Conference Cardiovascular Resuscitation Working Group identified sex- and gender-specific OHCA research as one of the research priorities in emergency medicine [16]. However, limited studies focused gender disparities in treatments of OHCA patients. Therefore, the objective of this study was to investigate gender disparities in the delivery of PCI among OHCA patients.

2. Methods

This study was approved by the Institutional Review Board at the research site, and the Korea Center for Disease Control and Prevention (CDC) approved the use of the data in this study.

2.1. Study design and data source

This study was a cross-sectional, observational study using a nationwide, prospective OHCA database of Korea. The national OHCA registry database, which includes all cases of OHCA in the country, has been compiled since 2006 via collaboration between the Korea Centers for Disease Control and Prevention (CDC) and the Central Fire Services (CFS). Data for all EMS-assessed OHCA patients were collected from the EMS run sheet and the in-depth cardiac arrest EMS registry, and Utstein information was collected and stored in each provincial EMS headquarters as electronic forms [17]. Hospital resuscitation, post-resuscitation, and outcome data were collected by retrospective medical record review by trained medical record reviewers. The quality management is managed by the Korea CDC Data Quality Control (DQC) team composed emergency physicians, epidemiologists, statistical experts, representatives from the fire departments and medical record review experts. They not only complete the information using Utstein template, but provide a standard manual for data abstraction and provide feedback on collected data monthly [18].

2.2. Study setting

The national fire department operates EMS systems exclusively and the EMS system has 16 provincial headquarters. Approximately 1350 ambulance stations cover about 100,000 km^2 and 51 million people across the nation, and the mean time interval from call to arrival is about 6 min and the mean time to transport is about 6 min [19]. All ambulances offer single-tiered basic life support (BLS) service staffed by emergency medical technicians (EMTs). Both intermediate EMTs and basic EMTs provide BLS with automated external defibrillator (AED). The intermediate EMTs can supply intravenous fluids and perform laryngeal mask airway insertion under direct medical control [20]. They are also directed not to stop CPR and cannot declare death on scene and during transport without consultation with a physician. Though AED is available nationwide in public place, the use rate is extremely low and most prehospital defibrillation was done by EMS [21, 22]. Due to only 0.8% return of spontaneous circulation (ROSC) rate of OHCA patients, all patients with OHCA are recommended to be transported to the nearest hospital emergency departments (ED). All EDs are designated as levels 1 through 3 by the government based on the human resources, essential instruments and equipment, service levels, and size of the department. Usually level 3 EDs provide basic emergency care and are operated by general physicians. By law, level 1 and 2 EDs are staffed by emergency physicians 24 h a day and provide more advanced emergency care services. Currently, there are 20 level 1 EDs, 120 level 2 EDs and approximately 340 level 3 EDs in Korea and they all are re-evaluated annually [23]. There is no standardized protocol for emergent coronary angiography (CAG), and protocols differ according to the capability of each hospital.

2.3. Study population

This study included all EMS-assessed patients with OHCAs of presumed cardiac etiology who were 18 years of age or older on the day of incident from January 2013 to December 2016. The inclusion criteria were those with sustained ROSC with known information on PCI.

2.4. Main outcomes

The primary outcome was whether PCI was performed or not. The secondary outcome was the time interval from ROSC to PCI. For this analysis, only patients who received PCI and had information on time of ROSC, ED arrival time, and time of PCI were included (n = 1700; male = 1489 and female = 211). For patients who had ROSC in ED, the time from ROSC to PCI was defined as the time from ROSC to the time that ballooning occurred or a stent was placed in coronary arteries, and for those who had prehospital ROSC, the time from ROSC to PCI was defined as door-to-balloon time. The time interval from ROSC to PCI was dichotomized into ≤90 min (earlier PCI group) and >90 min (prolonged PCI group) based on the American Heart Association guidelines for PCI for patients with STEMI [24]. We also evaluated survival at discharge and good neurological recovery as tertiary outcomes. Good neurological recovery was defined as a cerebral performance category score of 1 (good cerebral performance) or 2 (moderate cerebral disability; able to perform daily activities independently).

2.5. Measurements

The main exposure of interest was gender. We also collected other variables as followed: the year of arrest, day of the week (weekends or weekdays), time of the day (0600–1759 as day or 1800–0559 as night), age, comorbidities (hypertension, diabetes mellitus, heart disease, stroke, and cancer), place of arrest (public, private, ambulance or others), witness status, bystander CPR, primary electrocardiogram (ECG) rhythm on scene (shockable or non-shockable rhythms), prehospital defibrillation by a layperson or EMS providers, EMS response time interval (time interval from call to arrival of ambulance at the scene), scene time interval (time interval from arrival at and departure from the scene), transport time interval (time interval from departure from the scene to arrival at the ED), time interval from EMS call to ROSC, time interval from ROSC to PCI, targeted temperature management (TTM), and levels of ED (levels 1,2, and 3).

2.6. Statistical methods

The distributions of selected characteristic were compared by gender. Categorical variables were reported as percentages and analyzed with Chi-squares test and continuous variables were presented as
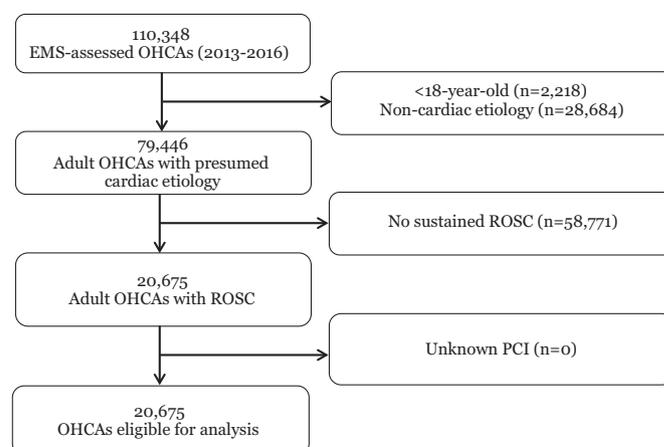

Fig. 1. Study population.

medians and interquartile range (IQR) and analyzed with Wilcoxon signed-rank test. To evaluate the outcomes, multivariate logistic regression models were used to estimate the odds ratios (OR) and 95% confidence intervals (CI). We considered all possible confounder variables to influence on main outcomes: patient factors (age), time factors (year of arrest, day of the week (weekdays vs. weekends), and time of ED admission (day vs. night)), community factors (place of arrest and bystander CPR), EMS factors (type of primary cardiac rhythm on ECG identified at the scene, EMS defibrillation, EMS response time, and time from arrest to ROSC), and hospital factors (levels of ED and TTM).

We also performed subgroup analyses to evaluate the association between gender and PCI in particular subgroups, including age groups of ≤75 or >75 years, patients with or without comorbidities (hypertension, heart disease, diabetes mellitus, stroke, and cancer) and TTM (hypothermia).

All variables in the final model were assessed for multicollinearity, which was not detected for all models. A two-tailed p value <0.05 was considered to be statistically significant. All statistical analyses were conducted using SAS software, version 9.4 (SAS institute Inc., Cary, NC, USA).

3. Results

3.1. Baseline demographic characteristics

Between 2013 and 2016, there were 110,348 EMS-assessed OHCA patients registered at nationwide OHCA registry. Patients with

Table 1
Baseline demographic characteristics.

| | Total | Gender | | p-Value[*] |
| | | Female | Male | |
	N (%)	N (%)	N (%)	
Total	20,675(100.0)	6959(33.7)	13,716(66.3)	
Age				
18–64	9381(45.4)	2280(32.8)	7101(51.8)	
65–74	4661(22.5)	1479(21.3)	3182(23.2)	
75 and older	6633(32.1)	3200(46.0)	3433(25.0)	
Median (IQR), year	67.3 (55.0–77.6)	73.5 (59.6–81.7)	64.2 (53.7–75.0)	<0.001
Metropolitan				
Metropolitan	10,926(52.8)	3619(52.0)	7307(53.3)	0.08
Week				0.11
Weekdays	14,612–70.7	4967(71.4)	9645(70.3)	
Weekends	6063(29.3)	1992(28.6)	4071(29.7)	
Day				0.05
Day (0600–1759)	12,517(60.5)	4278(61.5)	8239(60.1)	
Night (1800–0559)	8158(39.5)	2681(38.5)	5477(39.9)	
Past medical history				
Diabetes mellitus	5334(25.8)	1903(27.3)	3431(25.0)	<0.001
Hypertension	8102(39.2)	3069(44.1)	5033(36.7)	<0.001
Heart disease	3902(18.9)	1359(19.5)	2543(18.5)	0.09
Stroke	1854(9.0)	696(10.0)	1158(8.4)	<0.001
Cancer	2175(10.5)	683(9.8)	1492(10.9)	0.02
Place of arrest				<0.001
Public	4579(22.1)	968(13.9)	3611(26.3)	
Private	13,630(65.9)	5092(73.2)	8538(62.2)	
Ambulances	2466(11.9)	899(12.9)	1567(11.4)	
Witness				
Witnessed	13,181(63.8)	4386(63.0)	8795(64.1)	0.22
Bystander CPR				
Chest compression	9955(48.1)	3369(48.4)	6586(48.0)	0.6
Primary cardiac rhythm				
Shockable	5787(28.0)	1188(17.1)	4599(33.5)	<0.001
Prehospital defibrillation				
By bystanders	193(0.9)	38(0.5)	155(1.1)	<0.001
By EMS providers	6898(33.4)	1572(22.6)	5326(38.8)	<0.001
EMS time interval, median (IQR)				
Response time, min	6 (5–9)	6 (5–9)	6 (5–9)	0.89
Scene time, min	9 (6–14)	9 (6–13)	10 (6–14)	0.06
Transport time, min	6 (4–10)	6 (4–10)	6 (4–10)	0.7
Time from EMS call to ROSC				
Median (IQR), min	17 (12—23)	17 (12–24)	16 (12—22)	0.01
Time from ROSC to PCI[a]				0.14
≤90 min	821(48.3)	92(43.6)	729(49.0)	
>90 min	879(51.7)	119(56.4)	760(51.0)	
Median (IQR), min	92 (68–165)	101 (70–170)	92 (67–163)	0.14
Targeted temperature management				
Hypothermia	2066(10.0)	519(7.5)	1547(11.3)	<0.001
Level of ED				
Level 1 or 2	17,140(82.9)	5601(80.5)	11,539(84.1)	<0.001
Percutaneous coronary intervention				
PCI performed	1885(9.1)	231(3.3)	1654(12.1)	<0.001
Survival outcomes				
Survival to discharge	4958(24.0)	1163(16.7)	3795(27.7)	<0.001
Good neurological recovery	3007(14.5)	587(8.4)	2420(17.6)	<0.001

[*] p-Value based on chi-square test for categorical variables and Wilcoxon rank sum test for continuous variables.

[a] Numbers are based on the patients who received PCI and had time information on ROSC, ED arrival, and PCI (n = 1700; male = 1489 and female = 211). For prehospital ROSC patients, time from ROSC to PCI was calculated as door-to-balloon.

Table 2
Associations between gender and study outcomes.

	n/N (%)	Unadjusted	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]
		OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Primary outcome: PCI performance						
Male	1654/13,716 (12.1%)	1.00	1.00	1.00	1.00	–
Female	231/6959 (3.3%)	0.25 (0.22–0.29)	0.30 (0.26–0.35)	0.40 (0.30–0.54)	0.40 (0.30–0.53)	–
Secondary outcome: time from ROSC to PCI ≤ 90 min[e]						
Male	729/1489 (49.0%)	1.00	1.00	1.00	1.00	–
Female	92/211 (43.6%)	0.81 (0.60–1.08)	0.86 (0.64–1.17)	1.29 (0.73–2.27)	1.31 (0.74–2.31)	–
Tertiary outcome: survival outcomes						
Survival to discharge						
Male	3795/13,716 (27.7)	1.00	1.00	1.00	1.00	1.00
Female	1163/6959 (16.7)	0.52 (0.49–0.56)	0.67 (0.62–0.72)	0.80 (0.65–0.98)	0.81 (0.65–0.99)	0.87 (0.71–1.08)
With PCI	1256/1885 (66.6)	1.00	1.00	1.00	1.00	–
Without PCI	3702/18,790 (19.7)	0.12 (0.11–0.14)	0.15 (0.13–0.16)	0.38 (0.30–0.50)	0.41 (0.31–0.53)	–
Good neurological recovery						
Male	2420/13,716 (17.6)	1.00	1.00	1.00	1.00	1.00
Female	587/6959 (8.4)	0.43 (0.39–0.47)	0.58 (0.53–0.64)	0.79 (0.64–0.97)	0.78 (0.63–0.97)	0.87 (0.70–1.08)
With PCI	1005/1885 (53.3)	1.00	1.00	1.00	1.00	–
Without PCI	2002/18,790 (10.6)	0.10 (0.09–0.12)	0.13 (0.12–0.14)	0.40 (0.32–0.51)	0.42 (0.34–0.53)	–

Abbreviations: PCI = percutaneous coronary intervention; ROSC = return of spontaneous circulation, n/N = number, OR = odds ratio, CI = confidence interval.
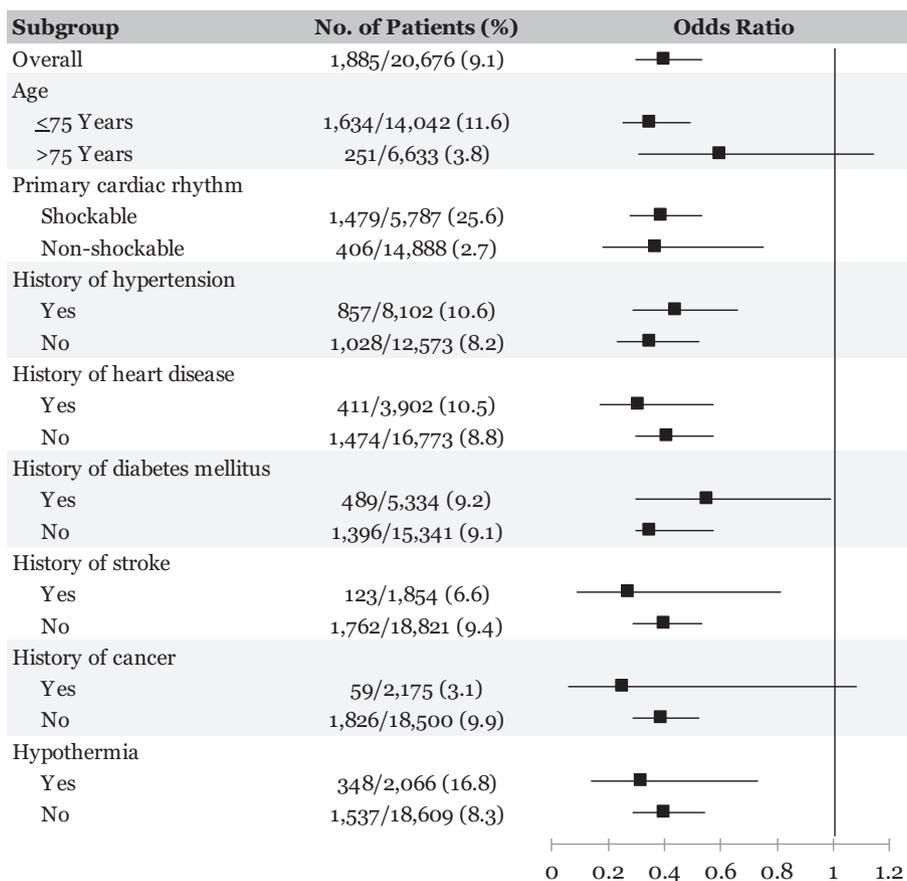For prehospital ROSC patients, time from ROSC to PCI was calculated as door-to-balloon.
[a] Model 1 adjusted for patient factors (age, year of arrest, week, and time of arrest).
[b] Model 2 adjusted for patient-community/EMS factors (Model 1 + comorbidities, metropolitan, place of arrest, witness, bystander CPR, EMS defibrillation, EMS response time, primary cardiac rhythm at the scene, and time from EMS call to ROSC).
[c] Model 3 adjusted for patient-community factors, EMS factors and hospital factors (Model 2 + hypothermia and level of ED).
[d] Model 4 adjusted for PCI in addition to factors adjusted in Model 3.
[e] Numbers are based on the patients who received PCI and had time information on ROSC, ED arrival, and PCI (n = 1700; male = 1489 and female = 211).

Subgroup	No. of Patients (%)	Odds Ratio
Overall	1,885/20,676 (9.1)	
Age		
≤75 Years	1,634/14,042 (11.6)	
>75 Years	251/6,633 (3.8)	
Primary cardiac rhythm		
Shockable	1,479/5,787 (25.6)	
Non-shockable	406/14,888 (2.7)	
History of hypertension		
Yes	857/8,102 (10.6)	
No	1,028/12,573 (8.2)	
History of heart disease		
Yes	411/3,902 (10.5)	
No	1,474/16,773 (8.8)	
History of diabetes mellitus		
Yes	489/5,334 (9.2)	
No	1,396/15,341 (9.1)	
History of stroke		
Yes	123/1,854 (6.6)	
No	1,762/18,821 (9.4)	
History of cancer		
Yes	59/2,175 (3.1)	
No	1,826/18,500 (9.9)	
Hypothermia		
Yes	348/2,066 (16.8)	
No	1,537/18,609 (8.3)	

Fig. 2. Subgroup analysis for association between gender and PCI treatment by age, in female patients compared with male patients. Multivariable odds ratios (95% CI) presented in this figure are odds ratios of female patients and their association with PCI, when compared with male patients (reference group; OR = 1.00). Abbreviations: n = number, CI = confidence interval, TTM = targeted temperature management. *Adjusting factors are same as the Model 3 in Table 2.

exclusion criteria who were younger than 18 years of age (n = 2218), non-cardiac etiology (n = 28,684) and no sustained ROSC (n = 58,771) were excluded. For the final analysis, 20,675 patients with information on PCI treatments were included (Fig. 1).

Among 20,675 eligible patients, 33.7% (n = 6959) were female and females had a higher median age than male patients (73.5 (IQR 59.6–81.7) vs. 64.2 (53.7–75.0), p < 0.001). Female patients had more underlying diseases than male patients with diabetes mellitus (27.3% vs. 25.0%, p < 0.01), hypertension (44.1% vs. 36.7%, p < 0.01) and stroke (10.0% vs. 8.4%, p < 0.01), while history of cancer was more frequent in males (10.9% vs. 9.8%, p = 0.02). Male patients were also shown to have higher rates of shockable rhythm, prehospital defibrillation, shorter time from EMS call to ROSC, receive more targeted temperature management (TTM) than female patients (p < 0.001 for all) (Table 1).

3.2. Main outcomes

Table 2 shows the associations between gender and study outcomes. Both univariable and multivariable analyses showed that female patients were significantly less likely to receive PCI compared to male patients (fully adjusted OR = 0.30, 95% CI 0.28–0.50).

However, results from our secondary outcome show that there were no significant associations between gender and time from ROSC to PCI (≤90 vs. >90 min) among those who received PCI (fully adjusted OR = 1.31, 95% CI 0.74–2.31).

For survival outcomes, female patients were statistically significantly associated with lower survival to discharge and good neurological recovery with odds ratios of 0.81 (95% CI 0.65–0.99) and 0.78 (0.63–0.97), respectively, even after adjusting for patient, community/ EMS, and hospital factors. However, when PCI treatment status was added in the model, association between gender and survival outcomes were no longer significant (adjust OR = 0.87, 95% CI 0.71–1.08 for survival to discharge and adjusted OR = 0.87, 95% CI 0.70–1.08 for good neurological recovery).

Not receiving PCI treatment was a statistically significant factor for worse survival to discharge and good neurological recovery outcomes (fully adjusted OR = 0.41, 95% CI 0.31–0.53 for survival to discharge and fully adjusted OR = 0.42, 95% CI 0.34–0.53 for good neurological recovery) (Table 2).

3.3. Factors associated with PCI

We also evaluated other factors besides gender, which were presumed to be associated with decision whether to undergo PCI or not. Age <75 years old (OR = 1.45; 95% CI 1.05–1.99), having shockable rhythm (2.33; 1.42–3.82), metropolitan as place of arrest (1.37; 1.13–1.67), having history of hypertension (1.54; 1.25–1.89), and level 1 or 2 ED (2.49; 1.69–3.67) were associated with significantly higher rate of PCI performance, while ED admission at night (0.76; 0.62–0.93), history of heart disease (0.59; 0.49–0.75) and cancer (0.60; 0.37–0.97), and prehospital defibrillation (0.29; 0.16–0.51) were associated with significantly lower rate of PCI performance. The results were shown in the Supplementary Table 1.

3.4. Subgroup analysis

The inverse associations between being a female gender and receiving PCI treatment were consistently observed among different subgroups of patients regardless of having comorbid conditions and hypothermia status. However, in older patient group with age over 75 years and the group with history of cancer, no significant gender differences in PCI treatment were observed (Fig. 2).

4. Discussion

This study shows that female OHCA patients are significantly less likely to undergo PCI than male OHCA patients, controlling for key covariates. To our knowledge this is the first study to evaluate gender disparities in PCI with OHCA patients using a national registry.

Gender disparities in treatment of AMI have been well implicated in previous studies that women are less likely to receive guideline-recommended pharmacotherapy and invasive procedures compared with men [25, 26]. With landmark studies in early 1990s, less intensive treatment of AMI in women, as compared with men, have been continuously reported for the past few decades [14, 27]. Vaccarino et al. [13] examined temporal trends in sex and racial differences in the use of guideline-based management for patients hospitalized with AMI. Using the National Registry of Myocardial Infarction, they found persisted treatment differences according to both sex and race without much variation between 1994 and 2002, with larger differences for rates of reperfusion therapy and coronary angiography. A recent study by Heer et al. [28] also examined the coronary angiography and PCI registry of the German Society of Cardiology from 2007 and 2009 and found sex-associated differences in PCI in Germany. The authors found that only 27.8% of all PCIs were performed in women despite the fact that mortality rates due to coronary heart disease in Germany are almost the same in both genders.

Although sex differences in terms of clinical characteristics and pathophysiological mechanisms were well reported, the reasons for gender disparities in treatments are still remained to be unclear. It is well documented that female OHCA patients tend to be older and have higher prevalence of comorbidities than their male counterparts [29, 30]. Female OHCA patients in our study were also older and had more comorbidities than male patients, suggesting such differences in baseline characteristics may have influenced physicians' decision-making on whether or not the patient should undergo PCI. However, our analyses with adjustment for these factors showed that the gender differences in PCI were regardless of these factors. It is also known that women experience a later onset of CHD than men and are more likely to have normal coronary angiograms when presenting with chest pain, therefore treated less aggressively than men.

Several studies on STEMI patients showed gender as independent predictor of first door to device time [10, 31]. Using a national AMI registry in Switzerland, Pilgrim et al. found an increased risk of a delay in door-to-balloon time of >90 min in females STEMI patients who received PCI compared with their male counterparts irrespective of their age [10]. However, in our OHCA patients, among the patients who underwent PCI, time from ROSC to PCI was similar in both female and male patients. We also found that female gender was significantly associated with lower survival outcomes, in terms of both survival to discharge and good neurological recovery after adjusting for demographic, community, and hospital factors. However, when PCI treatment status was added in the model, gender was no longer significantly associated with survival outcomes.

Unconscious bias among medical personnel and its effects on their decision making on treatment has also been identified in several epidemiologic studies. In a controlled experiment, Schulman et al. [32] assessed physicians' recommendations for managing chest pain using a computerized survey instrument and actors representing each of the possible combinations of race, sex, and age. Multivariable analysis showed that female patients were 40% less likely to be referred for cardiac catheterization than men, after controlling for the physicians' assessment of the probability of coronary artery disease, patient age, the level of coronary risk the type of chest pain, and the results of an exercise stress test (OR = 0.60, 95% CI 0.4–0.9). Using the National Registry of Myocardial Infarction database in the United States, Peterson et al. [33] also found that despite very clear and widely-adopted American College of Cardiology/American Heart Association STEMI guidelines, there were still disparities in STEMI treatments among women that

they were significantly less likely to receive revascularization or discharge lipid-lowering therapy relative to their counterparts. Moreover they found that gender disparities continue to persist in AMI care, in some regards, these disparities appeared to be getting worse. Based on these study results, one may hypothesize that a patients' sex may influence a physician's recommendation with respect to treatment regardless of the patient's clinical presentations.

We had some limitations in this study. First, there were differences in the protocols for PCI procedure among the participating hospitals included in this study. While most hospital EDs in Korea generally follow the international guidelines, there is no national standard protocol for reperfusion therapy. Second, information on post-resuscitation ECG and vital sign after ROSC were not available in our national OHCA database. Current guidelines provide different recommendations on PCI in OHCA patients based on whether or not ST elevation on ECG is present [34]. It is possible that in our study females are less likely to have STEMI on ECG than males, which may have exerted interaction effects with physician's decision on performing PCI or not. However, a previous study by Bosson et al. [35] found that although female OHCA patients were less likely to have STEMI on the ECG than males (23% vs. 32%), the magnitude of the differences between female and male OHCA patients not receiving emergency coronary angiography (11% vs. 25%) or PCI (5% vs. 14%) were far greater. In our study, female OHCA patients receiving PCI were 0.40 times of those in male OHCA patients (adjusted OR 0.40; 95% CI 0.30–0.53). We assume that even if our female OHCA patients were less likely to have STEMI compared with male counterparts, its magnitude is far less than that of rate of not receiving PCI.

5. Conclusion

In this large national registry study, we found significant gender disparities in the use of PCI. Among OHCA patients with sustained ROSC, female patients were significantly less likely to undergo PCI than male patients. The present study provided important insights that despite the significant advancement in the care of OHCA patients and rise of evidence-based treatments and standardized guidelines, gender disparities in post-resuscitation treatments still exist. Further studies are warranted to explore the mechanisms of these disparities, as well as to minimize these gaps in post-resuscitation care for OHCA patients.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ajem.2018.06.068.

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