Sex Differences in Patients with Cardiogenic Shock Requiring Extracorporeal Membrane Oxygenation

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Objectives

The use of extracorporeal membrane oxygenation (ECMO) for patients in cardiogenic shock has significantly increased over the past decade. Our study assesses differences in outcome and baseline characteristics between male and female patients placed on venoarterial extracorporeal membrane oxygenation for cardiogenic shock.

Methods

- Retrospective analysis of 574 adult patients placed on VA-ECMO for cardiogenic shock at our institution between Jan 2007-Dec 2018 (comparing baseline characteristics and outcomes).
- Propensity score matching (PSM) was used to compare outcomes
- Primary endpoint: in-hospital mortality
- Secondary outcomes: limb ischemia (LI), LI interventions, distal perfusion cannula placement, stroke, bleeding, and continuous venovenous hemofiltration (CVVH) initiation

Results

- Unadjusted comparison: Male patients were more likely to have coronary artery disease, hypertension, and hyperlipidemia. Female patients were more likely to have chronic obstructive pulmonary disease (COPD), a higher baseline lactate, and centrally cannulated ECMO *(Table 1)*.
- After propensity score matching (PSM): No difference in outcome was seen between males and females *(Table 2)*.
- Deceased female patients were more likely to have chronic kidney disease (OR=2.67 CI[1.09-6.53]; p=0.032) and less likely to have primary graft dysfunction (OR=0.04 CI[0.01-0.27]; p=0.001) compared to females surviving to discharge.
- Deceased males were more likely to have coronary artery disease (OR=2.25 CI[1.34-3.78]; p=0.002) and higher lactate (OR=1.14 CI[1.08-1.21]; p<0.001), and less likely to have primary graft dysfunction (OR=0.28 CI[0.11-0.71]; p=0.007) compared to males surviving to discharge.

Conclusions

- Female patients presented with different risk factors than male patients.
- After adjusting for these baseline differences, there was no difference in in-hospital mortality and adverse events between male and female patients.
- There was a large gap between the number of female patients and male patients throughout the duration of our study period *(Figure 1)*.

Table 1

Pre-ECMO Variables	Male Patients (n=394)	Female Patients (n=180)	p-value
Age, median [IQR]	61.0 [50.0-68.0]	61.0 [47.0-70.0]	0.833
BMI, median [IQR]	28.1 [24.7-31.9]	28.8 [24.3-34.3]	0.330
Diabetes, n(%)	134 (34.0%)	54 (30.0%)	0.393
CAD, n(%)	**230 (58.4%)**	**83 (46.1%)**	0.008
CHF, n(%)	136 (34.5%)	55 (30.6%)	0.401
HLD, n(%)	**223 (56.6%)**	**80 (44.4%)**	0.009
HTN, n(%)	276 (70.1%)	112 (62.2%)	0.078
COPD, n(%)	**28 (7.1%)**	**26 (14.4%)**	0.008
Prior CVA, n(%)	45 (11.4%)	20 (11.1%)	1
CKD, n(%)	126 (32.0%)	52 (28.9%)	0.519
Smoking, n(%)	81 (20.6%)	30 (16.7%)	0.326
Lactate, median [IQR]	**4.5 [2.1-8.3]**	**5.4 [2.7-9.7]**	0.007
Etiology, n(%)			0.245
ADHF	56 (14.2%)	25 (13.9%)	
AMI	95 (24.1%)	33 (18.3%)	
ECPR	36 (9.1%)	17 (9.4%)	
Graft	48 (12.2%)	15 (8.3%)	
Other	43 (10.9%)	28 (15.6%)	
PCS	116 (29.4%)	62 (34.4%)	

Figure 1

Patient Volume over Time — Male, Female
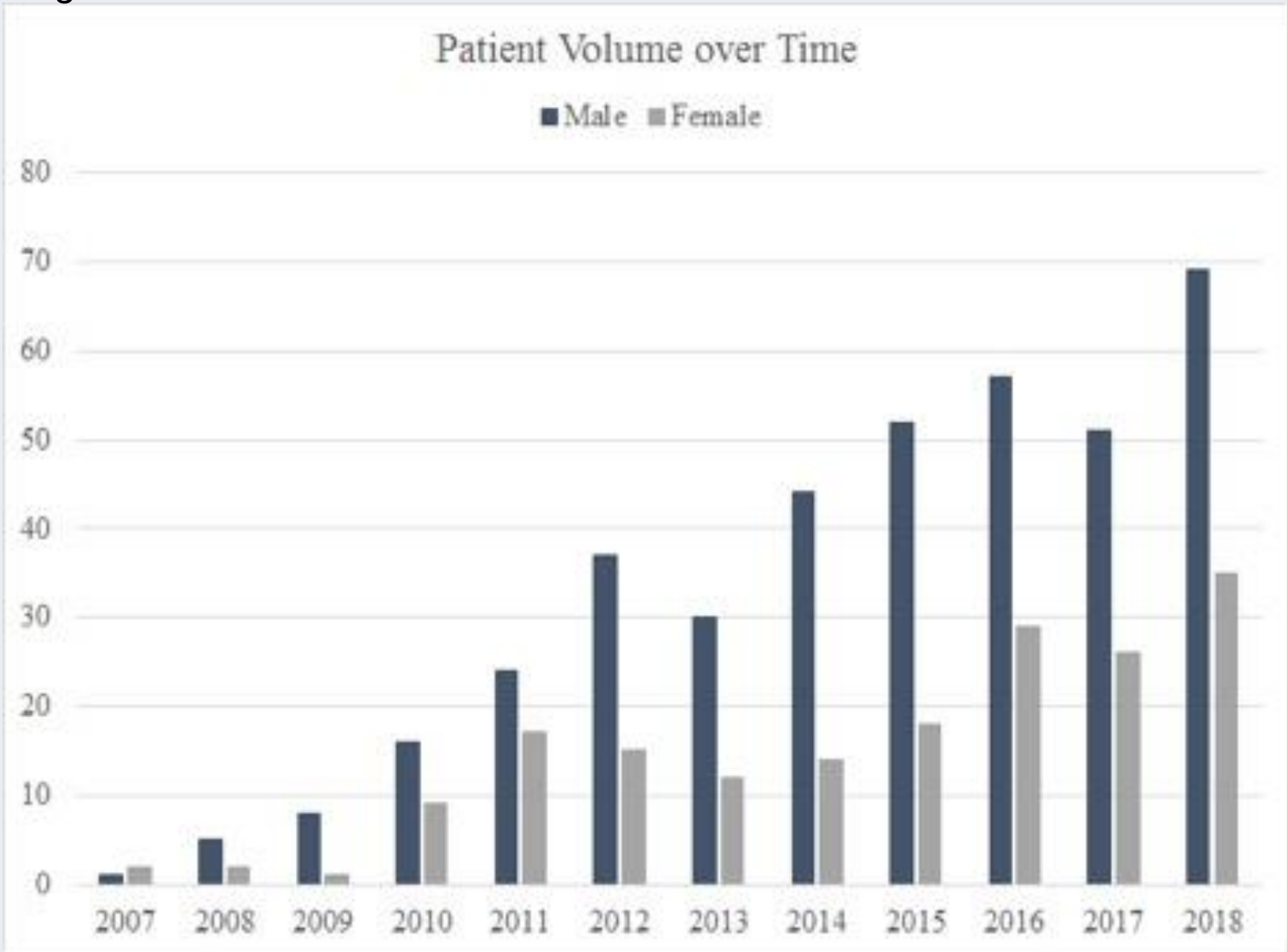
Table 2

Outcome (Post-PSM)	Male Patients (n=171)	Female Patients (n=171)	p-value
In-Hospital Mortality	103 (60.2%)	97 (56.7%)	0.583
Limb Ischemia	81 (47.4%)	78 (45.6%)	0.828
Distal Perfusion Cannula	74 (43.3%)	68 (39.8%)	0.583
LI Surgery	26 (15.2%)	22 (12.9%)	0.641
Bleeding	85 (49.7%)	84 (49.1%)	1
CVVH Initiated	67 (39.2%)	56 (32.7%)	0.260
CVA	14 (8.2%)	16 (9.4%)	0.848
In-Hospital Mortality	103 (60.2%)	97 (56.7%)	0.583