

Gender Differences in Clinical Characteristics and Outcomes in Patients with Acute Pulmonary Embolism.

An analysis of 1000 PERT activations.

Maria Obeidat¹, Milena Jani², Dana Marsy³, Erin Vandyke⁴, Glenn Vanotteren⁵, Michael Knox⁵, Wael Berjaoui⁵, Joseph Pitcher⁵, Trevor Cummings⁵, Nabin K Shrestha³, Renzo Loyaga-Rendon^{1,2}

1: Michigan State University College of Human Medicine, Grand Rapids, Michigan; 2: Advanced Heart Failure and Transplant Cardiology Section, Frederik Meijer Heart and Vascular Institute, Corewell Health West; 3: Corewell Health Research Institute, Corewell Health West; 4: Advanced Radiology Services, CHW; 5: Division of Pulmonary and Critical Care, Corewell Health West

Background

Pulmonary embolism (PE) is ranked the third most common cause of cardiovascular death, after myocardial infarction and stroke. The management of acute PE requires a multidisciplinary team approach. Since the implementation of the Pulmonary Embolism Response Team (PERT) in 2019, 1000 patients have been evaluated. Our objective was to evaluate the clinical characteristics and outcomes in this population according to gender.

Methods

- We retrospectively evaluated all the PERT activations recorded in The PERT Consortium™ Registry at our institution between November 2019 to March 2024.
- Patients were classified according to their gender.
- Epidemiological, clinical, echocardiographic, and laboratory characteristics at the time of presentation and treatment modalities were compared between males and females.
- Survival analysis at one month and one year was compared between genders.

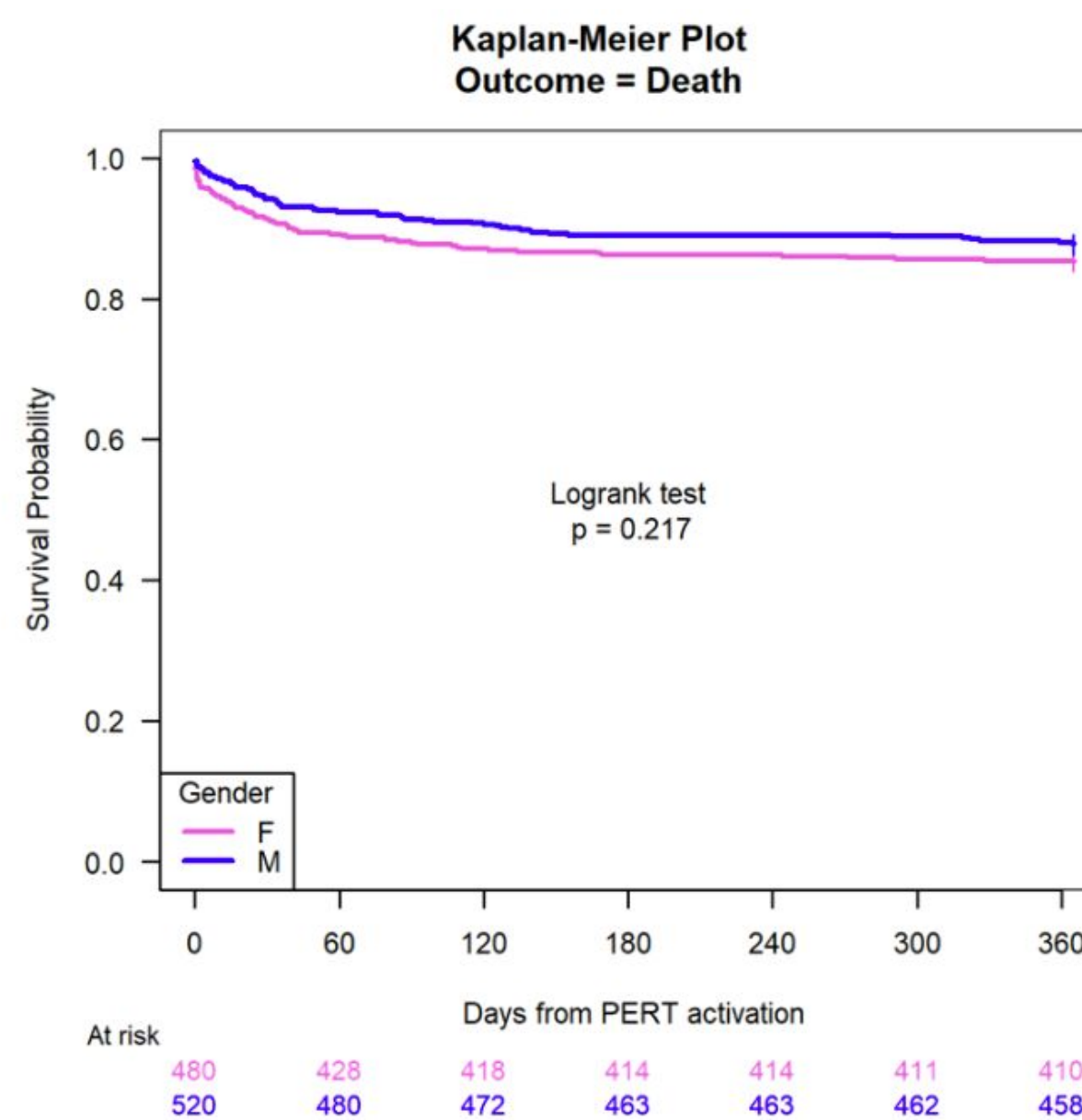
Table 1. Comparison of characteristics according to gender

	Female (n = 480)	Male (n = 520)	Overall (n = 1000)	p-value
Age, yr	64 ± 17	62.4 ± 14.8	63.2 ± 15.9	0.028
BMI, kg/m ²	35.5 ± 10.4	32.2 ± 8.1	33.8 ± 9.5	<0.001
Risk Factors for PE				
Smoking, n(%)	71(14.79)	135(25.96)	206(20.6)	<0.001
Active Malignancy, n(%)	44(9.17)	55(10.58)	99(9.9)	0.45
On Hormones, n(%)	102(21.25)	24(4.62)	126(12.6)	<0.001
Reduced mobility, n(%)	138(28.75)	123(23.65)	261(26.1)	0.069
Clinical Presentation				
Dyspnea, n(%)	391(81.46)	437(84.04)	828(82.8)	0.25
Hypoxia (SaO ₂ < 90%), n(%)	201(41.88)	187(35.96)	388(38.8)	0.058
Cough, n(%)	110(22.92)	160(30.77)	270(27)	0.005
Leg pain, n(%)	61(12.71)	63(12.12)	124(12.4)	0.785
Syncope, n(%)	45(9.38)	43(8.27)	88(8.8)	0.544
Imaging studies				
Echocardiogram was performed, n(%)	129(26.88)	137(26.35)	266(26.6)	0.744
Imaging study = DVT - Venous Ultrasound, n(%)	185(38.54)	215(41.35)	400(40)	0.353
CT pulmonary angiogram was performed, n(%)	467(97.29)	513(98.65)	980(98)	0.073
Right heart strain on CT, n(%)	368(76.67)	389(74.81)	757(75.7)	0.356
Laboratory				
Positive Troponin, n(%)	363(75.62)	355(68.27)	718(71.8)	0.001
Elevated BNP/NT-proBNP, n(%)	235(48.96)	191(36.73)	426(42.6)	<0.001
Hemoglobin (g/dL)	13.6 ± 12.6	15.2 ± 16.4	14.4 ± 14.7	<0.001
Platelet count	231.8 ± 89	209.3 ± 87.3	220.1 ± 88.8	<0.001
Treatment strategy, within 24 hrs				
Catheter based, n(%)	256(53.33)	303(58.27)	559(55.9)	0.125
IVC filter, n(%)	55(11.46)	70(13.46)	125(12.5)	0.345
Surgical embolectomy, n(%)	4(0.83)	3(0.58)	7(0.7)	0.716
Systemic IV thrombolysis, n(%)	11(2.29)	11(2.12)	22(2.2)	0.846

Results

- A total of 1000 patients were included in our study. The population was predominantly white (88%) and 48% were female.
- Women were older (64 vs 62.4; p = 0.028), had higher BMI (35.5 vs 32.2; p<0.001), and were more likely on hormones (21% vs 5%; p<0.001) than male counterparts.
- Females also have a significantly higher positive Troponin (76% vs 68%; p=0.001) and Pro-BNP (49% vs 37%; p<0.001).
- Males were more likely to be smokers (26% vs 15%; p<0.001).
- There is no significant difference in the severity of PE, active malignancy, and COVID-19 infection between genders.
- The proportion of Catheter based intervention within 24 hours was similar between females and males (53% vs 58%; p=0.125).
- The 30-day survival was 91.3% for females and 94.2% for males (p=0.064), while the one-year survival was 85.4% for females and 87.9% for males (p=0.217).

Figure 1. Kaplan-Meier Plot for 1 year survival



Conclusion

- Women who presented with acute PE and were evaluated by the PERT team at our institution were older, had a higher BMI, were less often smokers, and more likely on hormones than males.
- The severity of PE, the treatment strategies, and survival was similar between females and males.
- To further investigate the differences between females and males in this population, we are planning to compare their one-year follow-up clinical and echocardiogram data.