Age Related Outcomes in Patients with Acute Type B Aortic Dissection: An Analysis of Over 16,000 patients

Mahnoor Imran[1], Danial Ahmad[1,2], Derek Serna-Gallegos[1,2], James Brown[1], Sarah Yousef[1], Floyd Thomas[1,2], Yisi Wang[1,2], Dave West[1], Danny Chu[1], Pyongsoo Yoon[1,2], Johannes Bonatti[1,2], David Kaczorowski[1,2], Francis Ferdinand[1,2], Ibrahim Sultan[1,2]

(1) Division of Cardiac Surgery, Department of Cardiothoracic Surgery, University of Pittsburgh

(2) Heart and Vascular Institute, University of Pittsburgh Medical Center

Disclosures

- None

Background

- **Population based epidemiologic studies of aortic dissection are needed**
- **Advanced age is a risk factor for poor prognosis after cardiac surgical procedures**
- **Age > 70 years is an independent predictor of surgical mortality in patients with Type B aortic dissection[1,2]**

1. Circulation. 2006;114(1 Suppl):I357-I364.
2. Methodist Debakey Cardiovasc J. 2023;19(2):59-69.

Aim

- Report the age-related clinical characteristics and comorbidities associated with acute Type B aortic dissections

- Describe the age-related difference in outcome of patients with a acute Type B aortic dissection

Methods

- Retrospective observational study
- Data: National Inpatient Sample (NIS) database
- Period: 2016 to 2020
- Inclusion: All Acute Type B Aortic Dissection
- Analysis: Multivariable regression analysis
- Primary stratification was among the age groups: <65 years, 66-75 years, and >75 years

Baseline Characteristics

Variable	Group 1: Age ≤ 65 years	Group 2: Age 66 – 75 years	Group 3: Age ≥ 75 years	P-Value
Length of Stay	6.00 (3.00-12.00)	6.00 (3.00-11.00)	5.00 (2.00- 9.00)	<.001
Female	2610 (30.59%)	1627 (41.85%)	2440 (55.95%)	<.001
Comorbidity				
Diabetes Mellitus	2163 (25.35%)	1253 (32.23%)	1137 (26.07%)	<.001
Dyslipidemia	2707 (31.73%)	1884 (48.46%)	2186 (50.13%)	<.001
Coagulation Disorder	1736 (20.35%)	756 (19.44%)	662 (15.18%)	<.001
Heart Valve Disorder	1627 (19.07%)	778 (20.01%)	1003 (23.00%)	<.001
Hypertension	7439 (87.19%)	3434 (88.32%)	3833 (87.89%)	0.1713
Coronary Artery Disease	1878 (22.01%)	1396 (35.91%)	1730 (39.67%)	<.001
Congestive Heart Failure	1719 (20.15%)	967 (24.87%)	1338 (30.68%)	<.001
Cerebral Vascular Disease	1219 (14.29%)	557 (14.33%)	617 (14.15%)	0.9686
Peripheral Vascular Diseases	1238 (14.51%)	609 (15.66%)	720 (16.51%)	0.0089
COPD	1218 (14.28%)	1009 (25.95%)	1062 (24.35%)	<.001

In Hospital Outcomes

Variable	Group 1: Age ≤ 65	Group 2: Age 66 – 75	Group 3: Age ≥ 75	P-Value
In hospital mortality	**648 (7.59%)**	**419 (10.78%)**	**729 (16.72%)**	**<.001**
LOS (Length of stay)	6.00 (3.00-12.00)	6.00 (3.00-11.00)	5.00 (2.00- 9.00)	<.001
Patient Disposition at Discharge				<.001
Home	4479 (52.50%)	1552 (39.92%)	1033 (23.69%)	
Short term hospital for inpatient care	595 (6.97%)	245 (6.30%)	221 (5.07%)	
Discharged/transferred to tertiary care facility	**1225 (14.36%)**	**909 (23.38%)**	**1346 (30.86%)**	
Discharged/transferred to Home under Home Health Service Organization	**1405 (16.47%)**	**735 (18.90%)**	**1020 (23.39%)**	
Against Medical Advice	178 (2.09%)	27 (0.69%)	10 (0.23%)	
Expired	**648 (7.59%)**	**419 (10.78%)**	**729 (16.72%)**	
Discharged alive, destination unknown	2 (0.02%)	1 (0.03%)	2 (0.05%)	

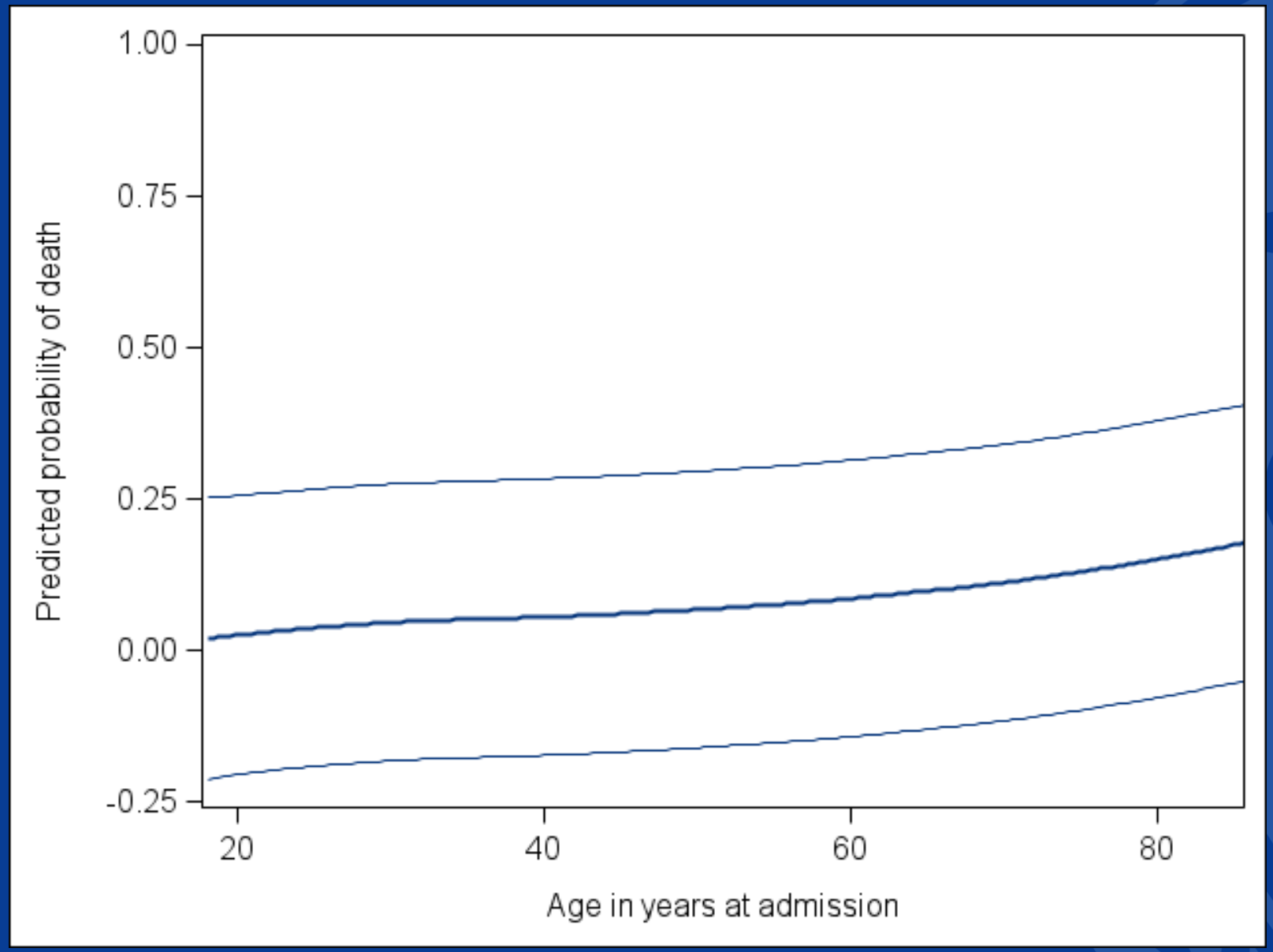
In Hospital Outcomes (Cont.)

Variable	Group 1: Age ≤ 65	Group 2: Age 66 – 75	Group 3: Age ≥ 75	P-Value
Myocardial Infarction	**313 (3.67%)**	**191 (4.91%)**	**216 (4.95%)**	**<.001**
Heart Failure	**1048 (12.28%)**	**571 (14.69%)**	**679 (15.57%)**	**<.001**
Arrhythmia	**1720 (20.16%)**	**1110 (28.55%)**	**1364 (31.28%)**	**<.001**
Pneumonia	**795 (9.32%)**	**408 (10.49%)**	**462 (10.59%)**	**0.0286**
Respiratory Failure	361 (4.23%)	169 (4.35%)	146 (3.35%)	0.028
Acute Kidney Injury	3072 (36.01%)	1244 (32.00%)	1231 (28.23%)	<.001
Urinary Tract Infection	**535 (6.27%)**	**344 (8.85%)**	**596 (13.67%)**	**<.001**
Bowel Ischemia	312 (3.66%)	77 (1.98%)	73 (1.67%)	<.001
Stroke	171 (2.00%)	63 (1.62%)	58 (1.33%)	0.0174
Sepsis	**409 (4.79%)**	**209 (5.38%)**	**238 (5.46%)**	**0.1814**
Permanent Pacemaker	**37 (0.43%)**	**22 (0.57%)**	**30 (0.69%)**	**0.1606**

Multivariable Mixed-effect Logistic Regression Model for In Hospital Death

Variable	Odds Ratio	95% CI	p-value
Age (years) (ref: Group 1 <65 years)			
Group 2: 66-75 years	**1.614**	**1.347,1.933**	**<.0001**
Group 3: >75 years	**2.729**	**2.199,3.385**	**<.0001**
Female	1.083	0.980,1.197	0.117
Hospital bedsize ref: Small			
Medium	1.034	0.833,1.283	0.762
Large	1.108	0.924,1.330	0.269
Hospital location (ref: Rural)			
Urban, nonteaching	1.008	0.676,1.503	0.970
Urban, teaching	1.021	0.734,1.421	0.902
Urgent vs elective	**3.090**	**2.422,3.942**	**<.0001**
Coagulation Disorder	1.695	1.431,2.007	<.0001
Other Cardiac Condition	2.374	2.017,2.794	<.0001
Coronary Artery Disease	0.930	0.820,1.055	0.261
Congestive Heart Failure	1.078	0.942,1.234	0.275
Cerebral Vascular Disease	**2.593**	**2.203,3.052**	**<.0001**
Peripheral Vascular Disease	**1.314**	**1.175,1.470**	**<.0001**
COPD	1.045	0.866,1.260	0.649
Total charges	1.017	1.008,1.026	<.0001

Non-linear Relationship Between Age and Probability of Death



Limitations

- Retrospective observational nature impacts the validity of these findings
- Due to the administrative nature of this database, errors in diagnosis codes can not be ruled out however previously validated ICD codes were used

Conclusions

- Advancing age is associated with increased morbidity and mortality in patients with acute Type B aortic dissections likely due to baseline comorbidity burden

- Preoperative conversations with patients and support members regarding outcomes may help adjudicate appropriate candidates for surgery