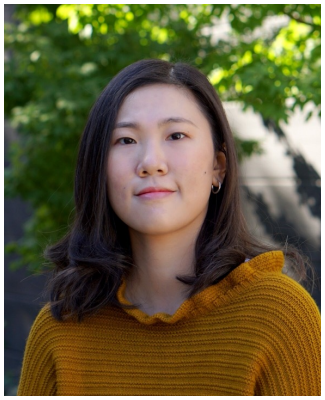
Comparative analysis of the treatment of asymptomatic and symptomatic complex aortic aneurysms

Jennifer Ci, Thu Vu, Lily Wang | UW Biostatistics
Dr. Sara Zettervall MD, MPH | UW Vascular Surgery
Spring 2023

UNIVERSITY of WASHINGTON

Our Team

Jennifer Ci



Thu Vu

Lily Wang

Dr. Sara Zettervall, MD, MPH

Dr. Kirsten Dansey, MD, MPH

Scientific Background

> Complex Aortic Aneurysm

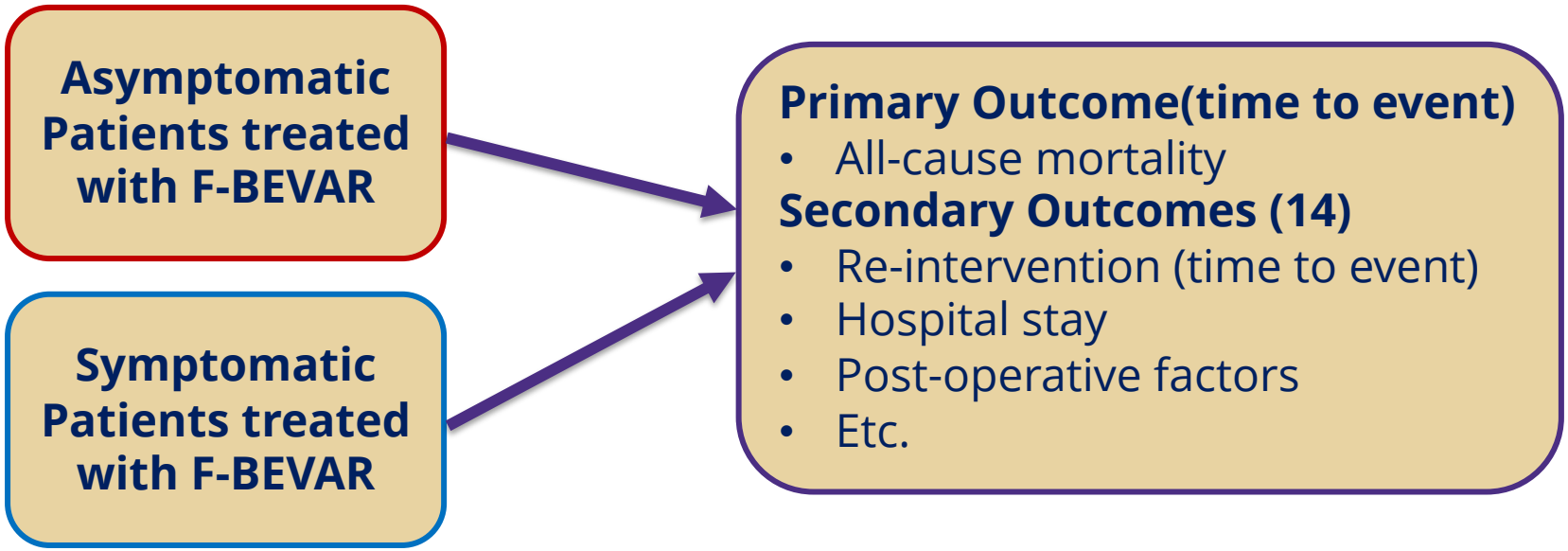
- **Thoraco-abdominal aortic aneurysm (TAAA)**: involves the aorta in both the chest and abdomen at the level of vital branches to the intestines and kidneys
- Open aortic repair associated with 20% mortality

> Fenestrated-Branched Endovascular Aortic Repair (F-BEVAR)

- Safer alternative to open repair
- Custom devices for each patient based on their unique anatomy
- **Further research needed for surgical practice and perioperative management**

Primary Objective

> To compare outcomes of asymptomatic and symptomatic patients with complex aortic aneurysm treated with F-BEVAR



Data Source

> Vascular Quality Initiative (VQI)

- Large, multi-center database
- 14 major vascular registries

> Thoracic and Complex EVAR

- Over 25,000 procedures from 2010 to 2022

> Recorded Variables

- Patient demographics
- Comorbidities
- Operative and anatomic differences
- Short-term and long-term outcomes

Population of Interest

- **Patients with Complex Aortic Aneurysm treated with F-BEVAR**

- **Primary Covariate: Asymptomatic or Symptomatic**
  - **Asymptomatic**: Presenting no symptoms, elective (planned procedure)
  - **Symptomatic**: Presenting symptoms, urgent or emergent (procedure given within 24 or 4 hours of presentation, respectively)

- **Excluded patients with aortic ruptures**

Methods

- **Cox Proportional-Hazards**
  - Primary Outcome: All-Cause Mortality
- **Logistic Regression using GEE with working independence**
  - Binary Secondary Outcomes
- **Clustered by Center (147)**

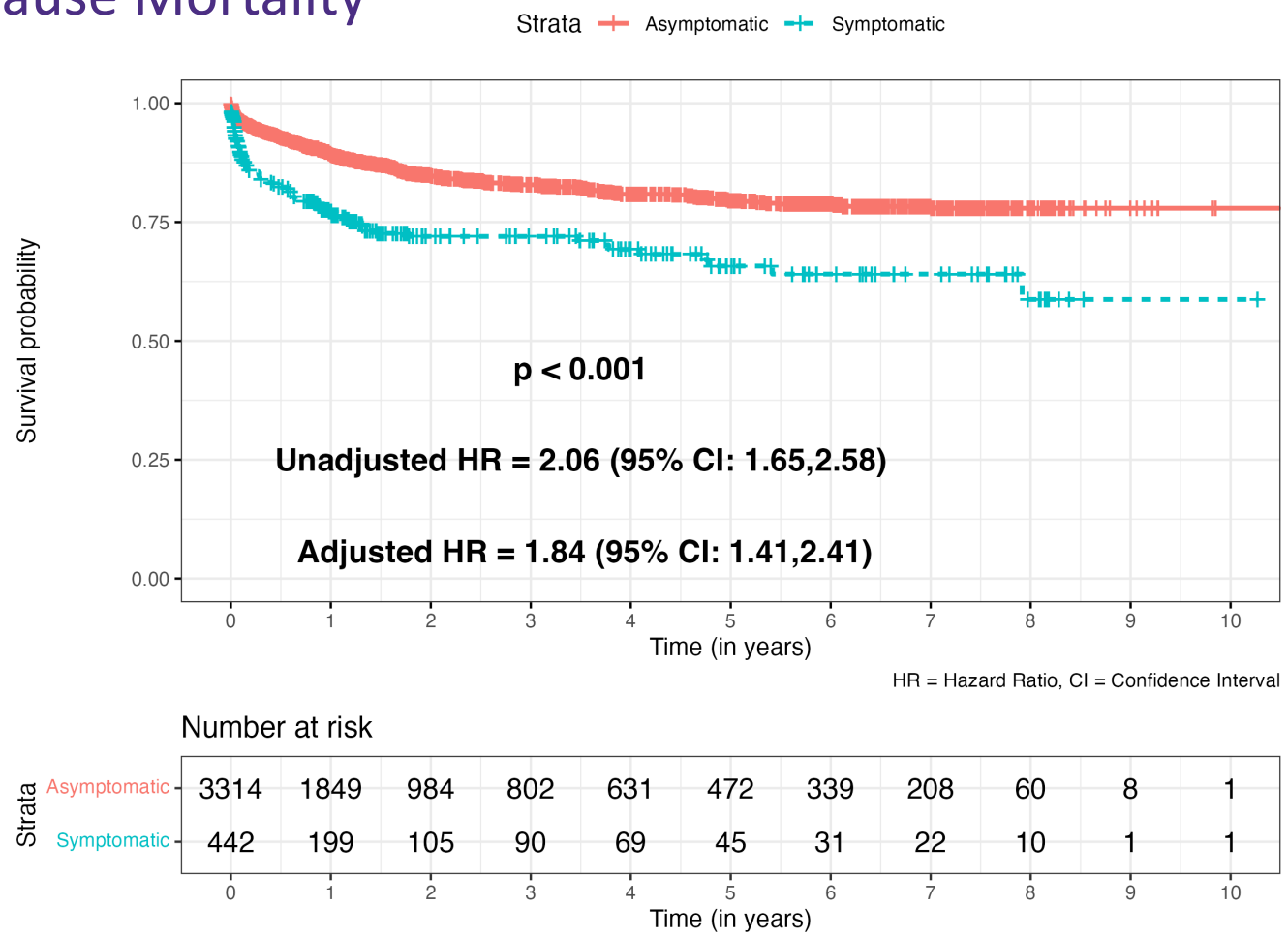
- **Confounders**
  - Expert consultation
  - Univariate analysis
  - Include: demographics, comorbidities, clinical & perioperative factors

Descriptive Statistics

Variable	Asymptomatic (N=3315)	Symptomatic (N=442)	Overall (N=3757)
Age			
Mean (SD)	73.5 (7.89)	70.8 (10.1)	**73.2 (8.23)**
Sex			
Female	800 (24.1%)	177 (40.0%)	977 (26.0%)
Male	2515 (75.9%)	265 (60.0%)	**2780 (74.0%)**
Mortality			
Yes	**390 (11.8%)**	**94 (21.3%)**	**484 (12.9%)**
No	2925 (88.2%)	348 (78.7%)	3273 (87.1%)
Follow-Up Days			
Median [IQR]	**398 [15, 1046]**	**309 [11, 660]**	391 [13, 1015]

Primary Outcome Results

All-Cause Mortality



Year 1

A: 0.89

S: 0.77

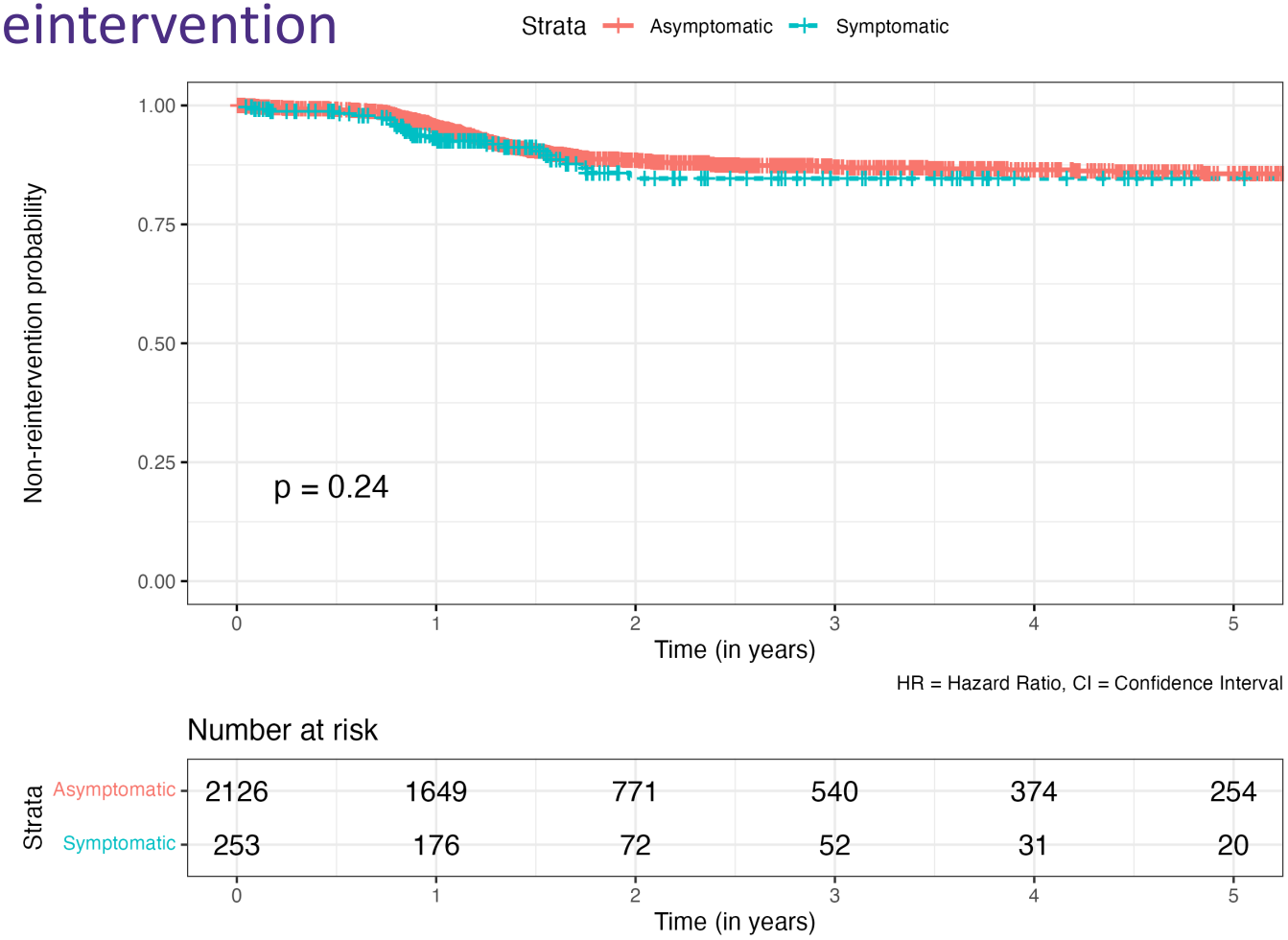
Year 5

A: 0.79

S: 0.66

Secondary Outcome Results

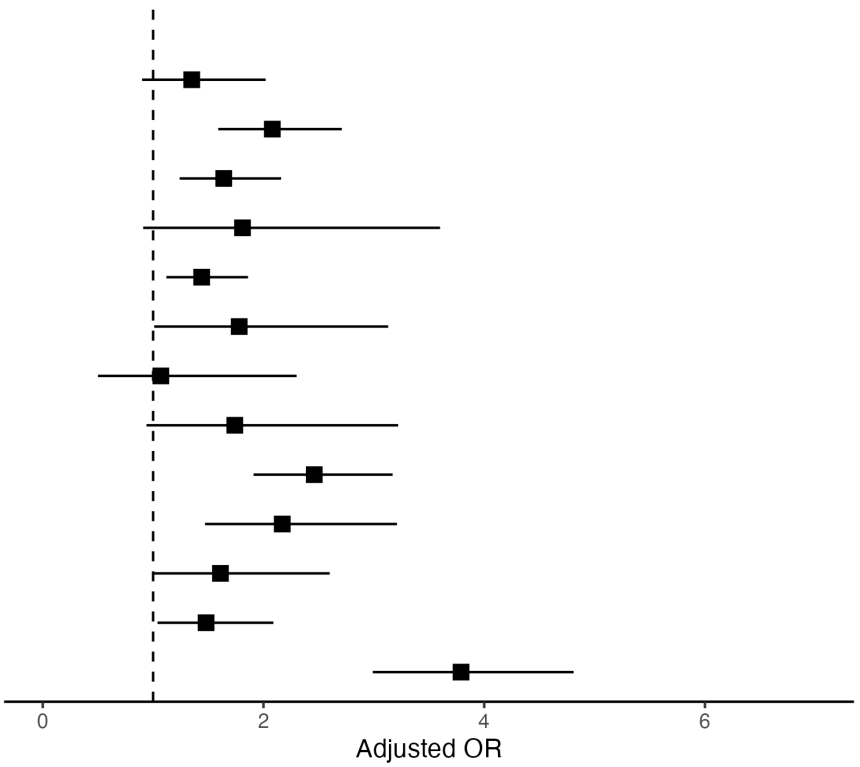
First Reintervention



Secondary Outcome Results

Multivariate Logistic Regression Models

Outcome	Adjusted OR (95% CI)	p-value
GFR Reduction (>=50%)	1.35 (0.90-2.02)	0.15
★ ICU Stay (>4 days)	2.08 (1.59-2.71)	**<0.001**
★ Post Treatment of All Branches (yes)	1.64 (1.24-2.16)	**<0.001**
Post-op Cerebrovascular Stroke (yes)	1.81 (0.91-3.60)	0.09
★ Post-op Complications (yes)	1.44 (1.12-1.86)	**0.004**
★ Post-op Dialysis (yes)	1.78 (1.01-3.13)	**0.047**
Post-op Intestinal Ischemia (yes)	1.07 (0.50-2.30)	0.87
Post-op Leg Ischemia/Emboli (yes)	1.74 (0.94-3.22)	0.08
★ Post-op Length of Hospital Stay (>7 days)	2.46 (1.91-3.17)	**<0.001**
★ Post-op Respiratory (yes)	2.17 (1.47-3.21)	**<0.001**
★ Post-op Spinal Ischemia (yes)	1.61 (1.00-2.60)	**0.05**
★ Re-intervention (yes)	1.48 (1.04-2.09)	**0.03**
★ Total Length of Hospital Stay (>7 days)	3.79 (2.99-4.81)	**<0.001**



Exposure = Symptomatic (Ref: Asymptomatic), OR = Odds Ratio, CI = Confidence Interval

Conclusions

- **Survival differs between asymptomatic and symptomatic patients**
  - Mortality higher for symptomatic patients
- **Hospital/ICU Stay & some post-op factors differs**
  - Overall, symptomatic has higher odds
- **Increase effort to detect patients with TAAA before presenting symptoms**
- **Provide evidence for insurance companies to cover F-BEVAR procedures**

Limitations & Next Steps

> Limitations

- Retrospective analysis of all hospitals participating in the VQI
- Coding errors, missing data, self-reported data
- Possible other variables not accounted for

> Next Steps

- Submit to and present at the Western Vascular Society Meeting
- Publish results in the Journal of Vascular Surgery
- Future projects focusing on other subgroups (sex and race)

Acknowledgments

Dr. Lloyd Mancl, PhD
Dr. Patrick Heagerty, PhD
Dr. Sara Zettervall, MD, MPH
Dr. Kirsten Dansey, MD, MPH

Thank you! Questions?