

# Primary Intimal Tear Distribution in Patients with Acute DeBakey I Aortic Dissection

Lauren V. Huckaby, MD, MS; Helen O'Leary, BS; Alexander P. Nissen, MD; Bradley G. Leshnower, MD



EMORY  
UNIVERSITY

# Primary Intimal Tear in Acute Aortic Dissection

- The primary intimal tear (PIT) represents the site of aortic wall structural failure preceding propagation of blood flow through the layers of the aortic wall
- Operative strategies have focused on resection of the PIT to prevent future aortic events
- Pathogenesis of PIT formation is not fully understood

**We sought to characterize PIT location in patients with acute DeBakey I aortic dissection**



# Methods

- 529 consecutive patients undergoing operative repair (2004-2019)
- Tears were identified intra-operatively by direct inspection (n=283)
- Categorized by longitudinal and radial orientation, location within aortic arch, presence of multiple tears

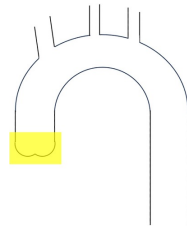


# PIT Location

## Longitudinal Orientation

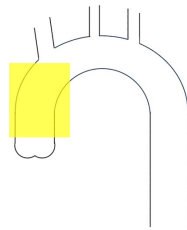
### Root (n=118)

- Coronary level (n=41, 34.7%)
- Sinotubular junction (n=77, 65.3%)

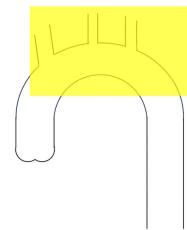


### Ascending (n=65)

- Proximal (18.5%)
- Mid (56.9%)
- Distal (24.6%)

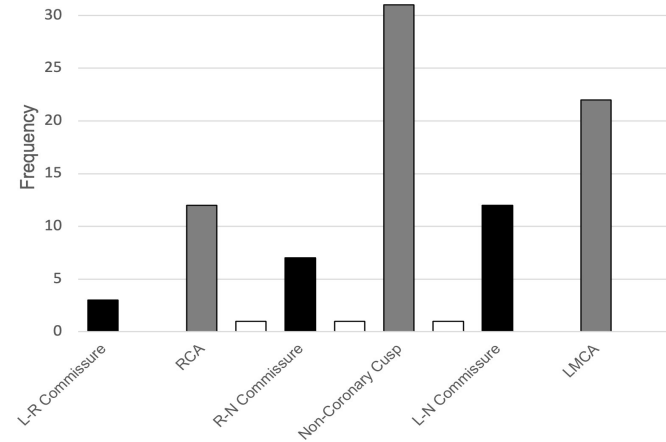
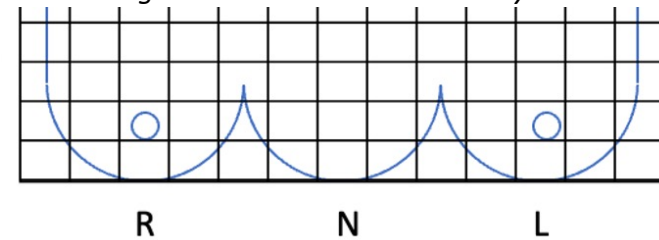


### Arch (n=51)

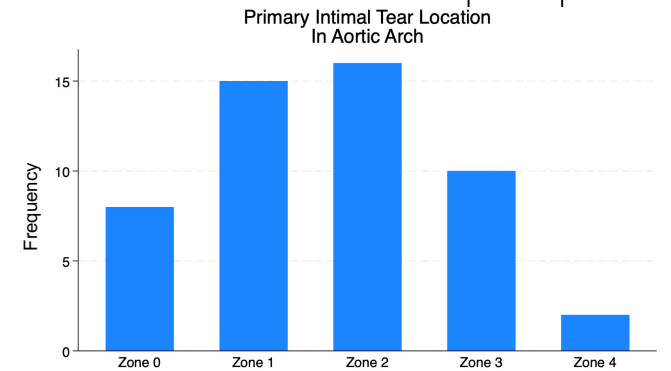
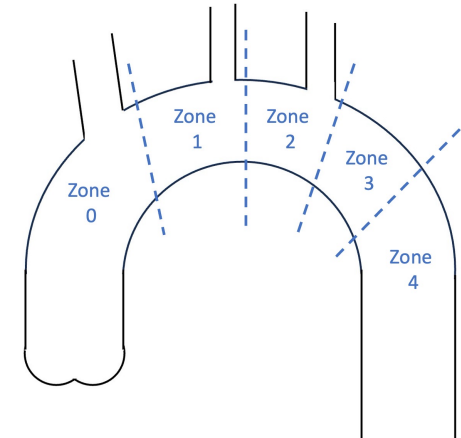


## Radial Orientation

*Categorized in relation to coronary ostia*



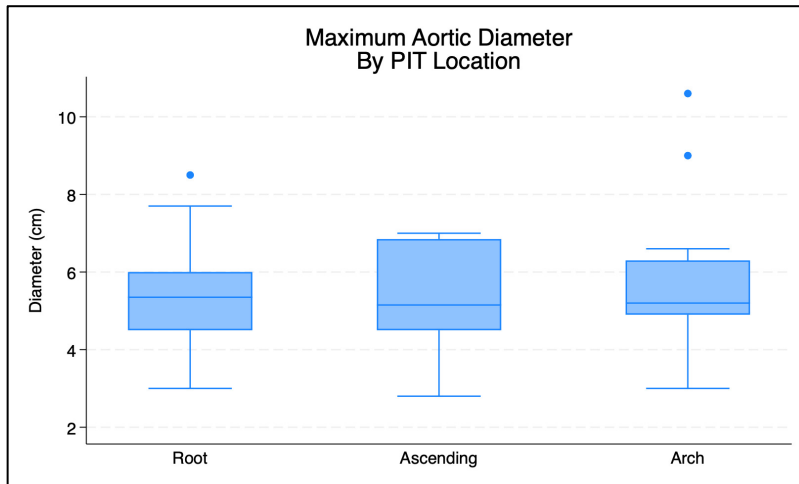
## Arch Tears



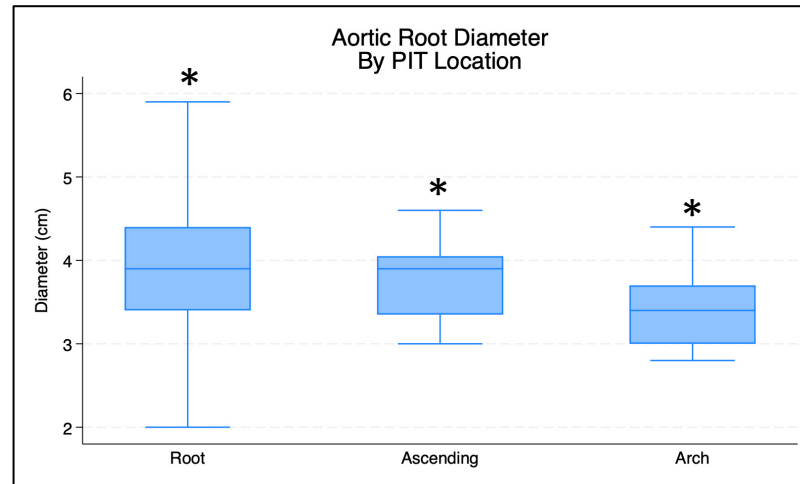
# Patient Characteristics

	Root N=118	Ascending N=65	Arch N=51	P-value
Age (years) – mean (SD)	53.0 (14.0)	58.3 (13.7)	56.9 (11.0)	0.136
Male Sex – no. (%)	86 (72.9)	47 (72.3)	37 (72.6)	0.996
Body mass index (kg/m <sup>2</sup> ) – median [IQR]	27.5 [24.4,33.1]	27.1 [23.1,31.1]	31.2 [25.1,34.6]	0.110
Diabetes – no. (%)	76 (68.5)	25 (41.0)	30 (61.2)	0.002
Hypertension – no. (%)	110 (97.4)	57 (93.4)	49 (100.0)	0.134
Prior sternotomy – no. (%)	18 (15.3)	6 (9.2)	10 (19.6)	0.275

**Baseline characteristics were similar between the groups**



p=0.088



p=0.001

**Root PIT was associated with greater aortic root dimensions but similar maximum aortic dimensions**

# Operative Approach

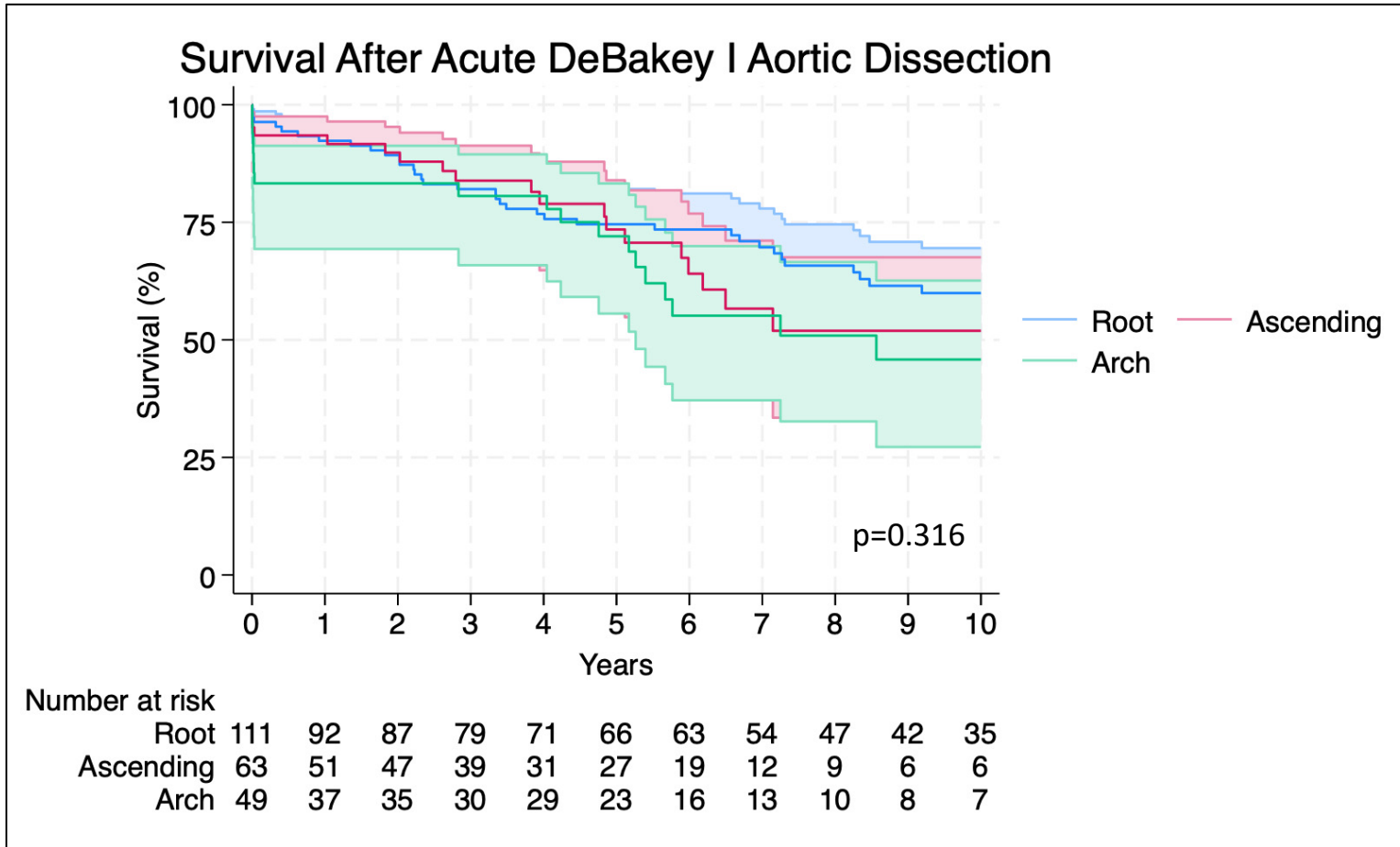
	Root PIT N=118	Ascending PIT N=65	Arch PIT N=51
Aortic Valve Replacement	16.2%	7.7%*	7.8%*
Root Replacement	40.2%*	20.0%*	13.7%*
Hemiarch Replacement	94.0%*	93.9%*	60.8%*
Total Arch Replacement	6.0%*	6.2%*	41.2%*
Frozen Elephant Trunk	8.6%	12.3%	19.6%

Circulatory arrest time (but not cardiopulmonary bypass or cross-clamp times) varied by PIT location

	Root	Ascending	Arch	P-value
Median time	35 minutes	39 minutes	48 minutes	0.004

\* Indicates p<0.05

# Long-Term Survival by PIT Location



Short-term and long-term survival were similar in all groups

# Post-operative Outcomes

- Permanent neurologic dysfunction was more common in the arch PIT group (p=0.011)

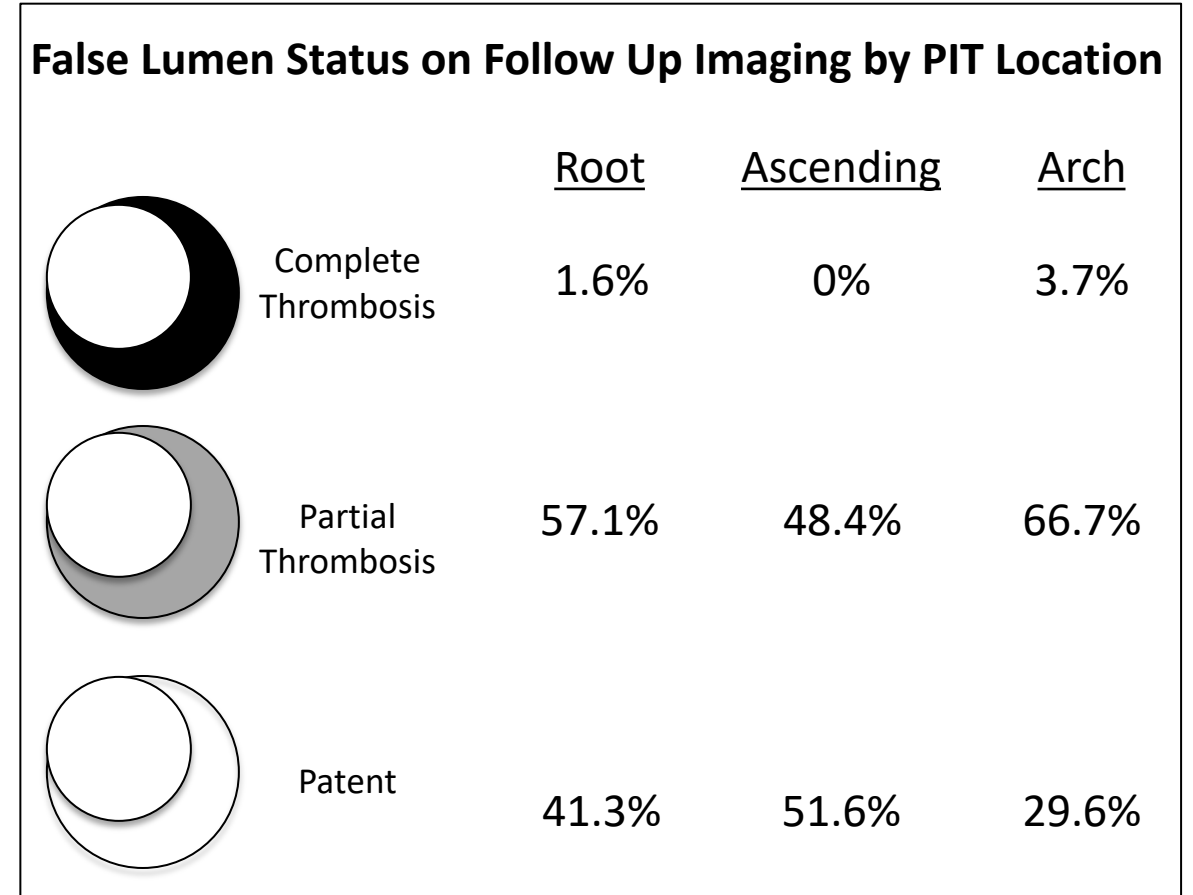
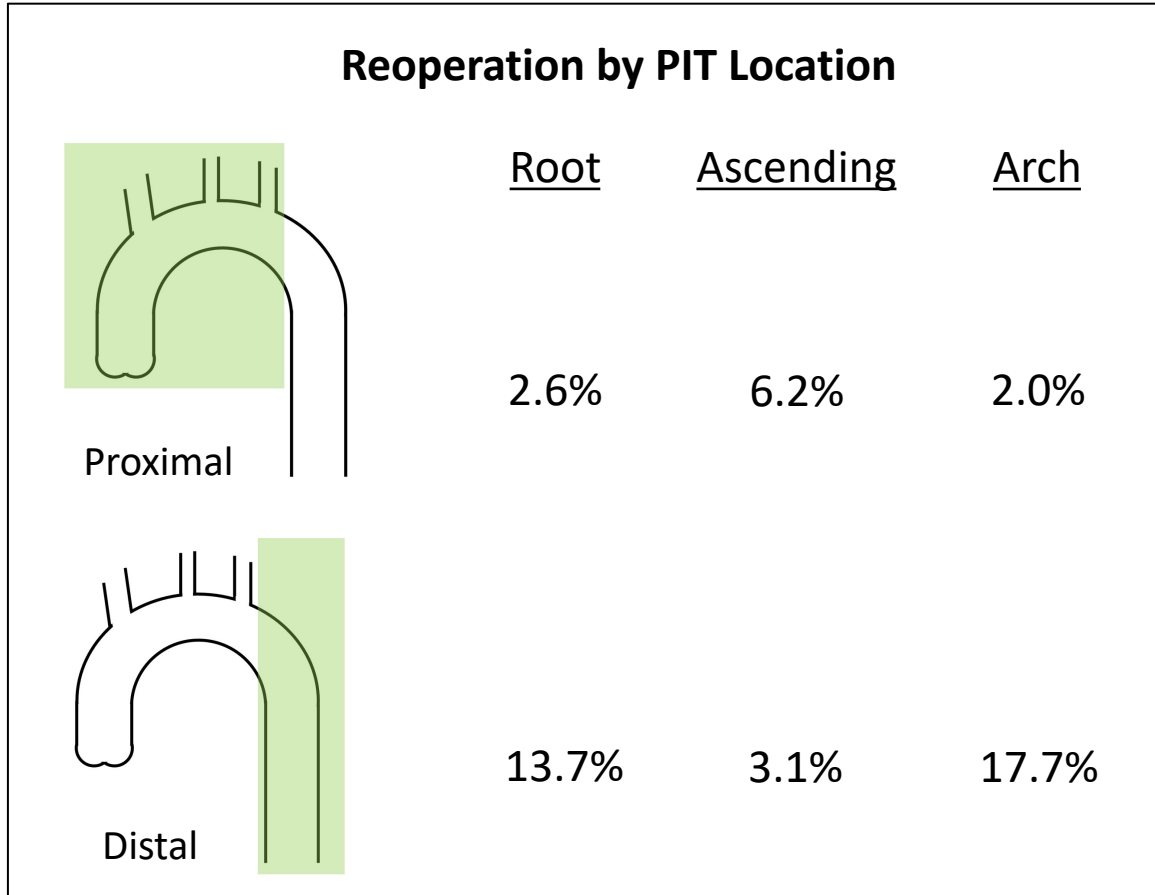
Root	Ascending	Arch
6.0%	6.1%	19.6%

- Rates of stroke, new renal failure requiring dialysis, bleeding requiring return to the OR, and need for tracheostomy were not significantly different (p>0.05)





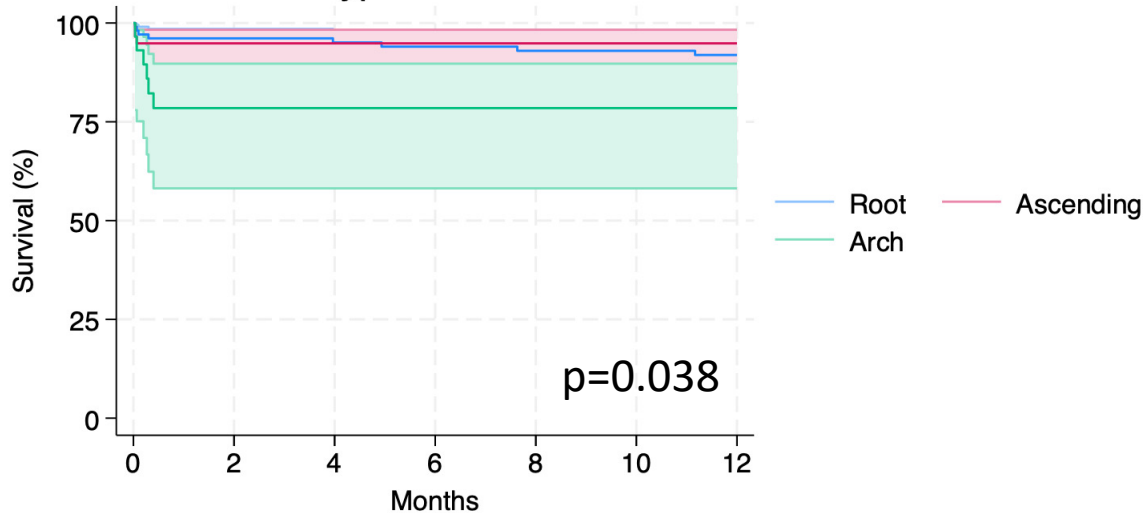
# Future Aortic Events



**No differences in reoperation or false lumen thrombosis based on PIT location**

# Outcomes of Hemiarch Replacement

Survival After Hemiarch Replacement For Acute Type A Aortic Dissection

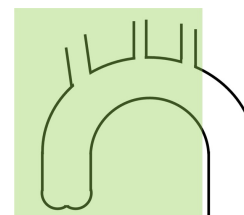


Number at risk	0	2	4	6	8	10	12
Root	105	92	91	89	88	88	87
Ascending	59	50	50	50	50	49	48
Arch	29	21	21	21	21	21	21

## Reoperation

Root	Ascending	Arch
2.7%	4.9%	3.2%

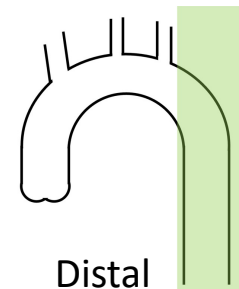
For hemiarch replacement, rates of proximal reoperation were equivalent in all PIT locations



Proximal

13.6%	3.3%	16.3%
-------	------	-------

Rates of distal reoperation were highest in the root and arch PIT groups ( $p=0.068$ )



Distal

Hemiarch replacement was associated with increased 1-year mortality in patients with arch PIT



EMORY  
UNIVERSITY

# Conclusions

- PIT location is related to post-operative outcomes in surgical repair of acute DeBakey I dissection
  - In particular, hemiarch replacement is associated with inferior short-term outcomes in patients with a PIT in the aortic arch
- Understanding of PIT location, particularly in DeBakey I dissection, may provide insight into pathogenesis of aortic dissection and contribute to risk prediction in patients with aortic aneurysm



# Thank you

Lauren.Victoria.Huckaby@emory.edu



EMORY  
UNIVERSITY