

# Evaluation of radiographic predictors of adverse outcomes in medically managed Acute Type B Aortic Dissection patients

M. Ahad Khattak, Mohammad Zafar, Asanish Kalyanasundaram, Hesham Ellauzi, Zachary Perez, Bulat Ziganshin, John Elefteriades

# BACKGROUND

Literature & guidelines describe high-risk radiographic imaging findings in Acute Type B Aortic Dissection patients that are thought to correlate with adverse long-term outcomes.

## High-Risk Imaging Findings

Maximal aortic diameter >40 mm

False-lumen diameter >20–22 mm

Entry tear >10 mm

Entry tear on lesser curvature

Increase in total aortic diameter of >5 mm between serial imaging studies

Bloody pleural effusion

Imaging-only evidence of malperfusion

## High-Risk Features in Uncomplicated Acute Type B Aortic Dissection

## What we want to predict and prevent.

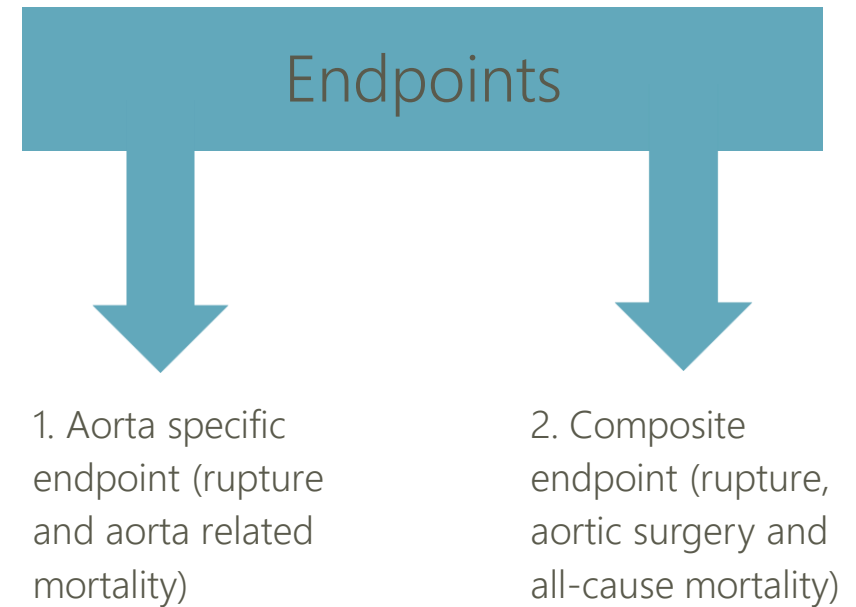
The Images on the left show a catastrophic ruptured descending aortic dissection (coronal and axial views) with extensive extravasation of blood, descending aorta displacement to the right, and near obliteration of the normal descending aorta outline.



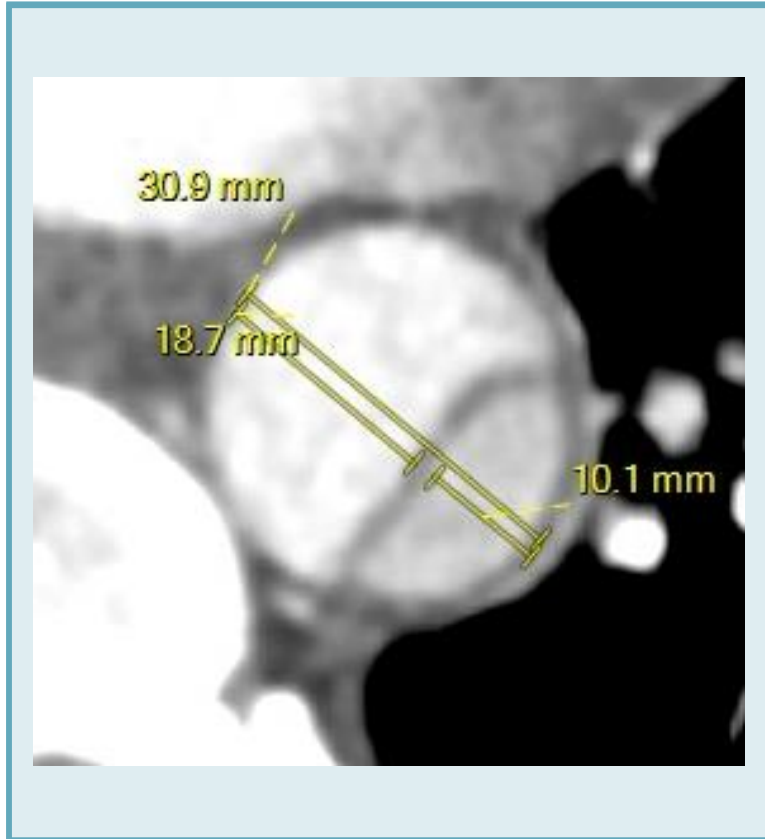
# Objective

- We sought to determine the clinical validity of these radiographic anatomic features as predictors of adverse outcome.
- Anatomic features were reevaluated in serial scans and descending aortic growth rates were computed
- Outcomes were measured as two endpoints- an Aorta Specific Endpoint and a Composite endpoint.

Radiographic Features
Maximal descending aortic diameter
True and false lumen diameters
Maximal ascending aortic diameter
Dissection origin location (greater vs. lesser curvature)
Degree of false lumen thrombosis
Branch vessel perfusion
True vs false lumen supply



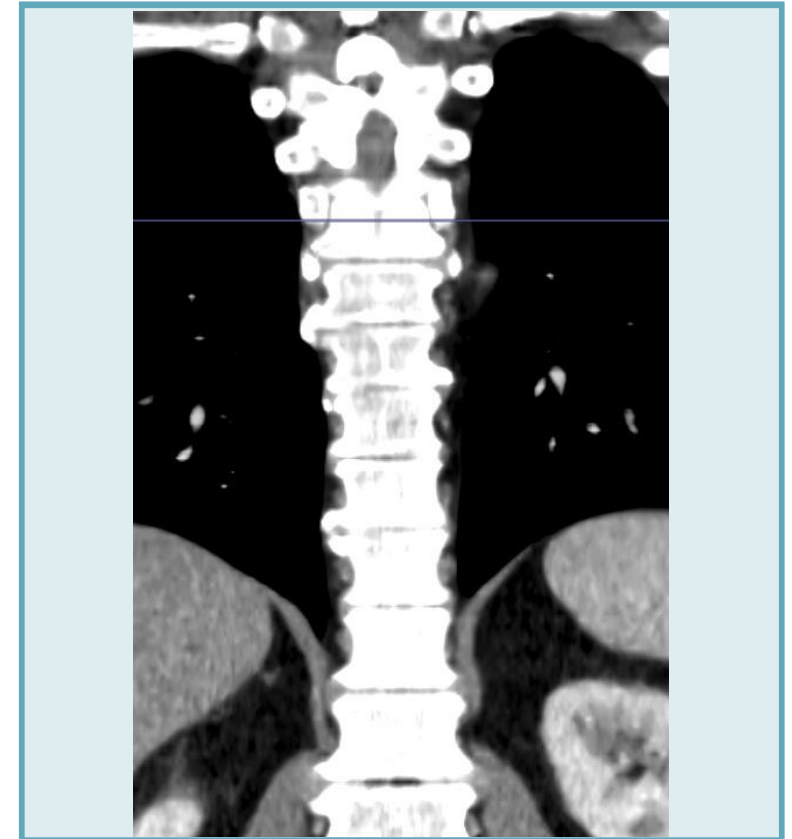
# Measurement Conventions



**Image 1:** Maximal Descending Aortic measurements.  
Descending Aortic Diameter: 30.9  
True Lumen Diameter: 10.1 mm  
False Lumen Diameter: 18.7 mm

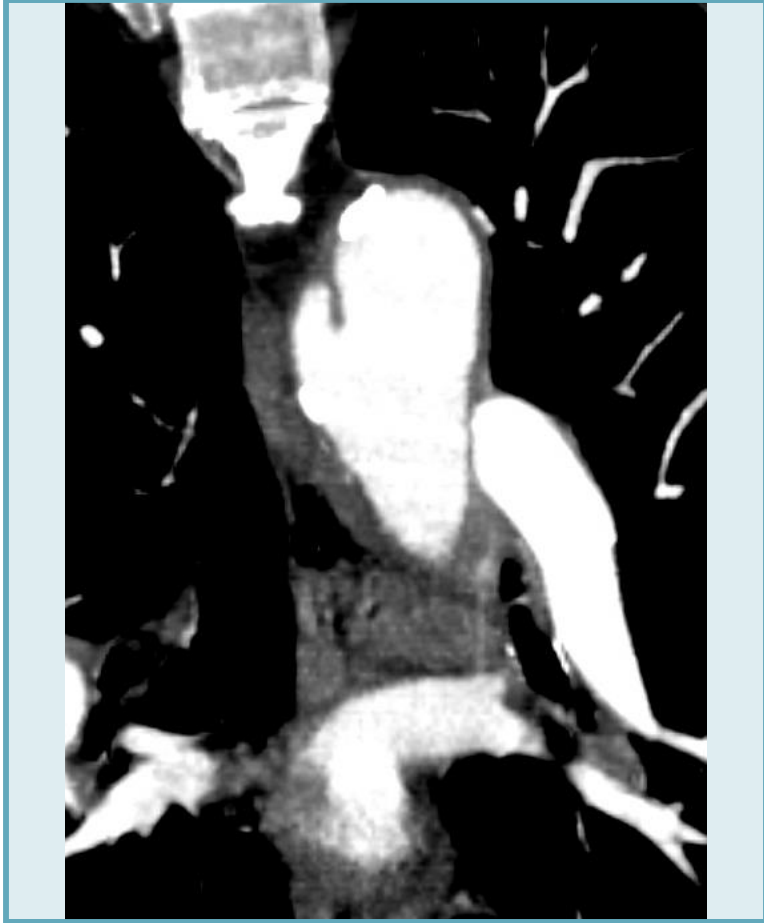


**Image 2:** Descending aortic diameter measurement taken perpendicular to the long axis of the aorta

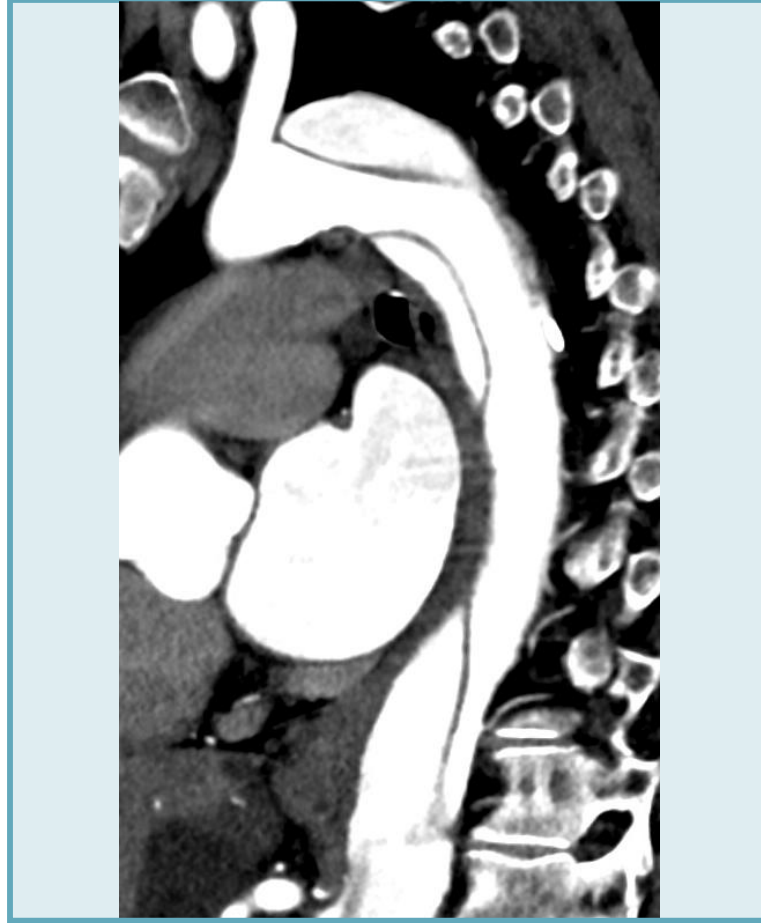


**Image 3:** Maximal descending aortic diameter measured was located at T6

# Dissection Morphologies-1



**Image 4:** Dissection Origin at the Lesser Curvature of the Aorta



**Image 5:** Dissection Origin at the greater curvature of the Aorta



**Image 6:** Low Degree of Thrombosis



# Dissection Morphologies-2

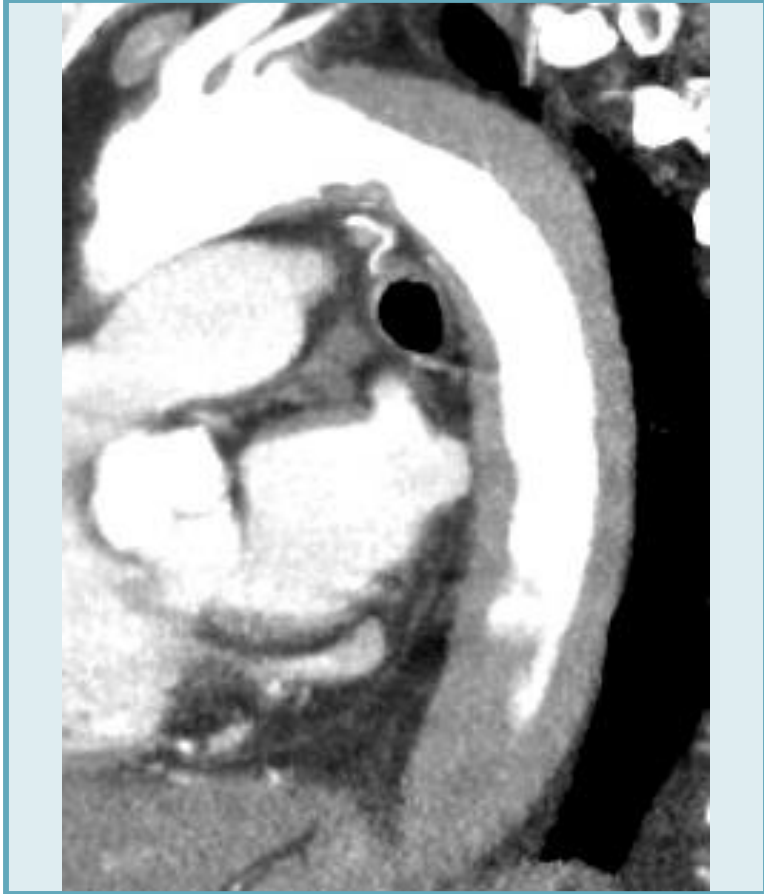


Image 7: High degree of thrombosis

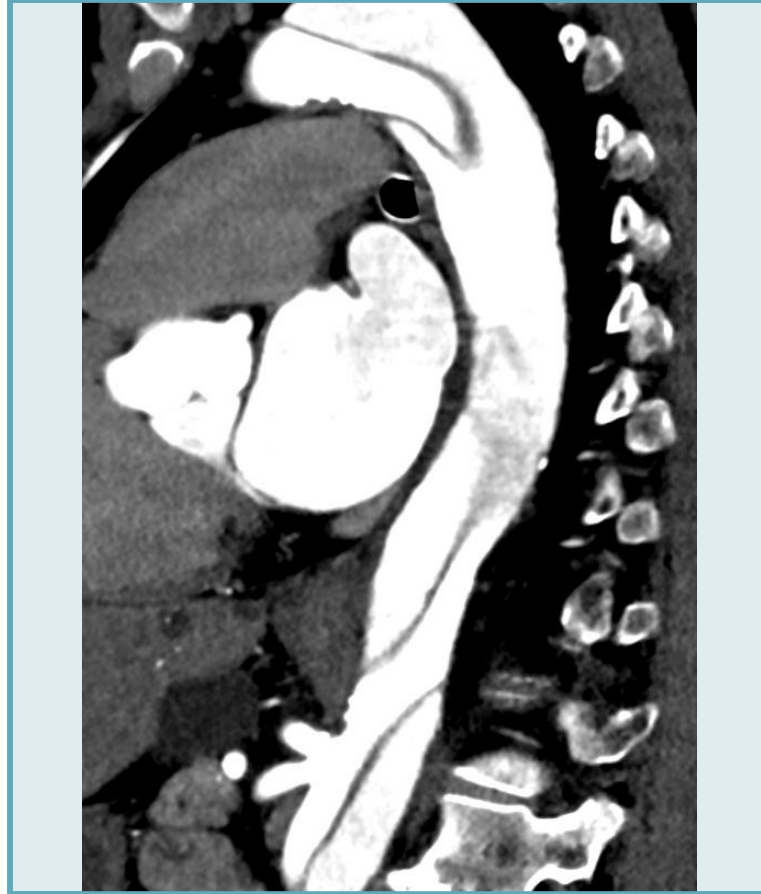


Image 8: Branch vessel morphology (sagittal view)

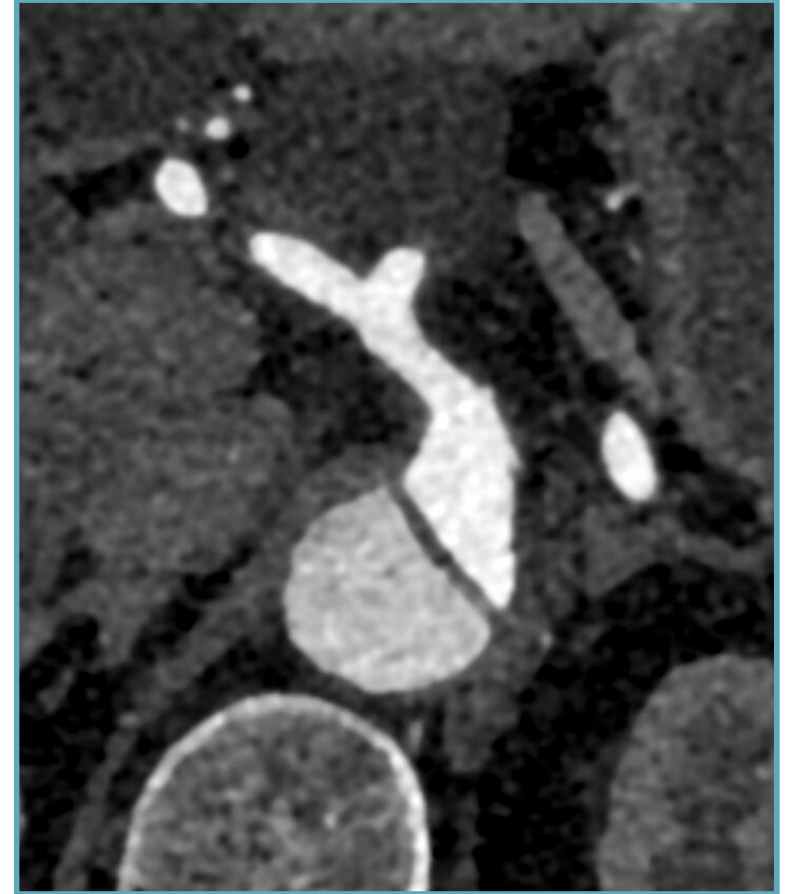


Image 9: Branch vessel morphology(axial view)

# Patient Details

- A total of 81 uncomplicated, medically managed Acute Type B Aortic Dissection patients were investigated.
- 48(59.3%) were males and 33(40.7%) were females.
- The mean age at presentation was 60 years.
- The mean follow-up duration was 4.7 years.
- The median aortic growth rate was 0.41 mm/year.



# Patient Details

High Risk Feature	Number of Patients	Alive and rupture free(%)	All Cause Death(%)	Aortic Rupture(%)	Aortic Death(%)	Follow up duration until aortic death (years)
Maximal Aortic Diameter >40mm	39	17(43.5%)	21(60%)	1(2.6%)	4(11.4%)	3.8
False lumen Diameter >20mm	35	20(57.1%)	14(40%)	1(2.9%)	5(14.3%)	3.3
Lesser curvature entry tear	3	2(66.7%)	1(33.3%)	0	0	

- The patients were followed up for a mean duration of 4.7 years.

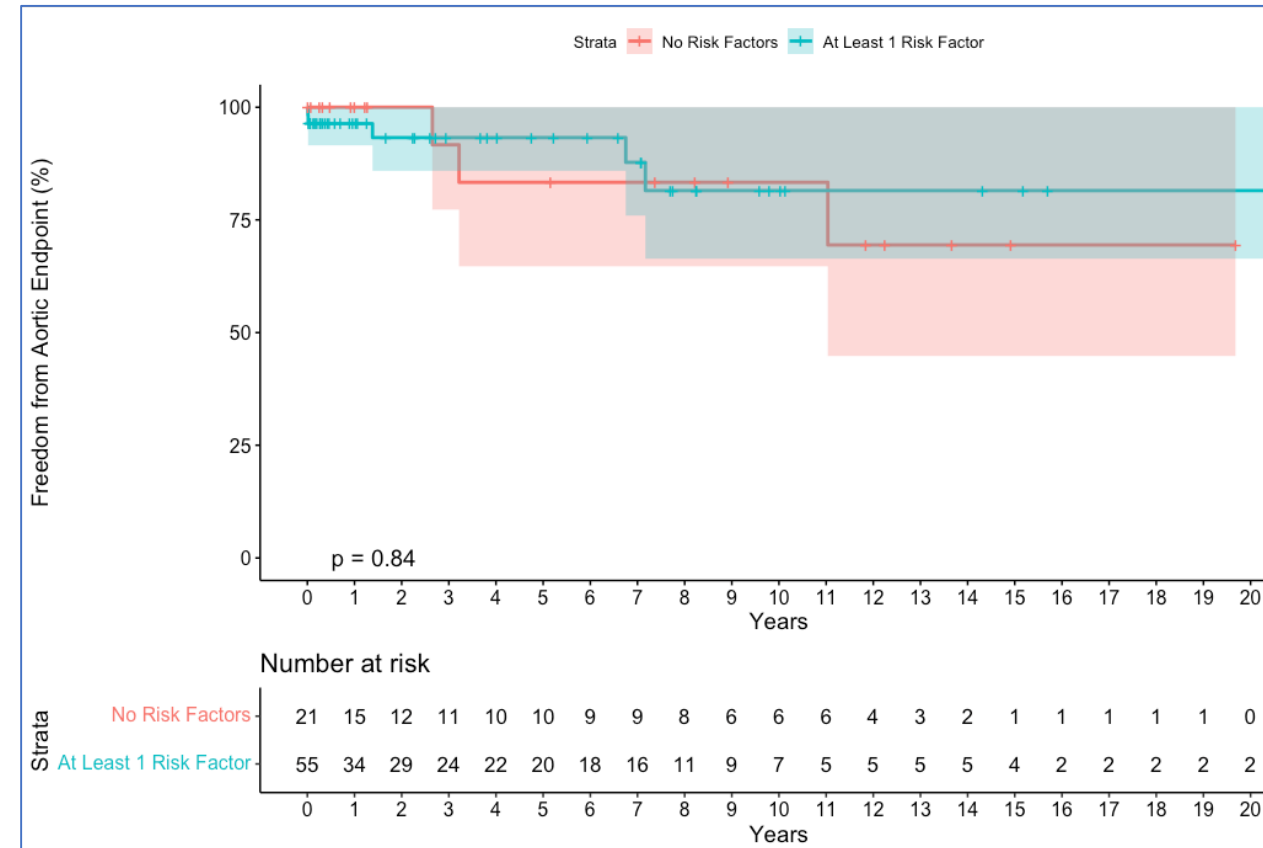
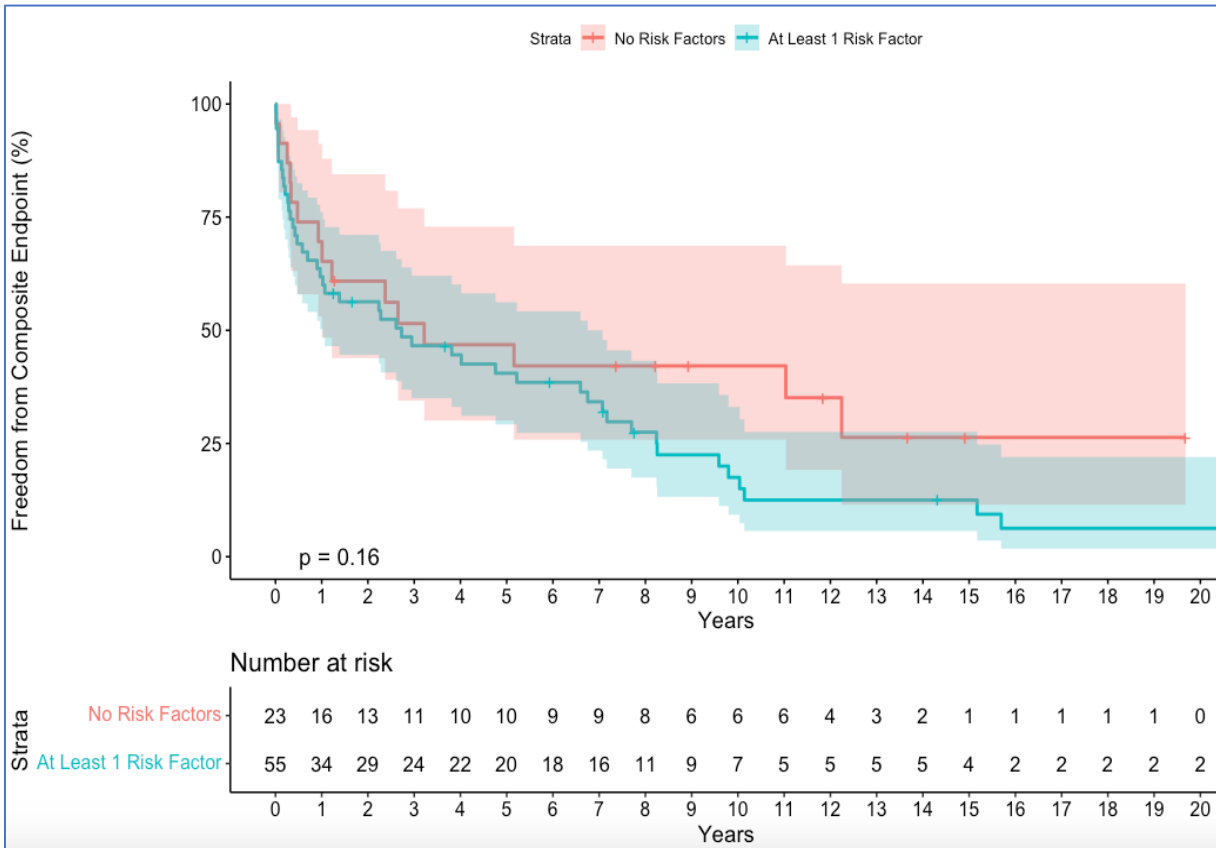
# Results

- No radiographic factor emerged as a significant predictor for adverse events in both univariate and multivariate regression.
- However, for the composite endpoint, maximal descending aorta diameter ( $p < 0.001$ ) and true lumen diameter ( $p = 0.033$ ) were significant predictors in univariate analysis.
- Multivariate analysis, though, did not reveal any significant predictors.

# Kaplan-Meier Curves for Composite and Aortic Endpoints

## Composite Endpoints (including all cause death)

## Aortic Endpoints



Note that aortic deaths occurred late (mean 3.03 years) after acute presentation, arguing against need for early intervention

# Conclusion

- We do not confirm prior expectations regarding the value of anatomical variables in prediction of adverse aortic events after acute type B aortic dissection.