

# Respiratory-Induced Dynamics of the BeGraft Stent in FEVAR

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# Disclosure

Speaker name: Christopher Cheng

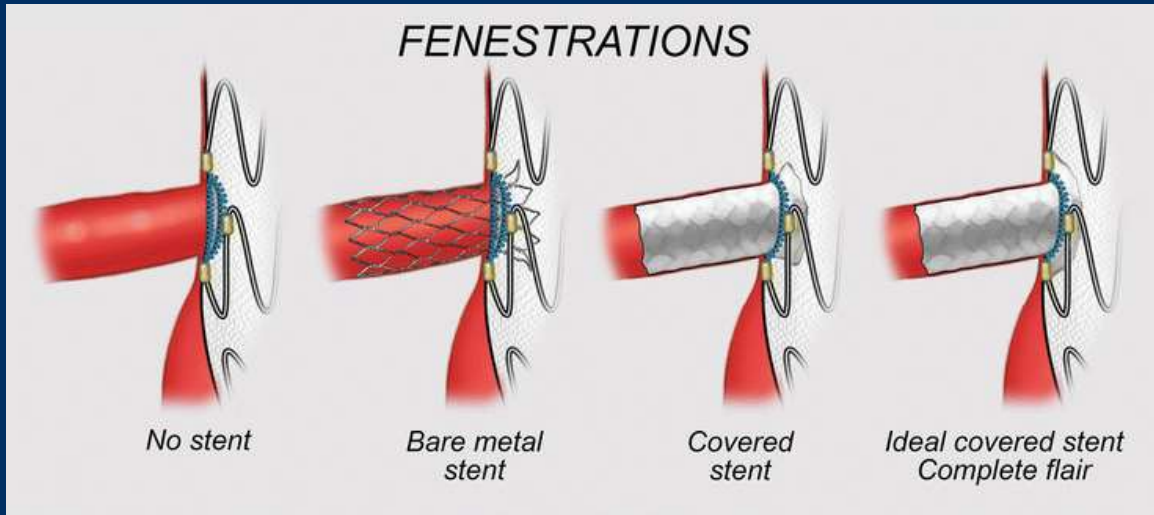
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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)
  
- I do not have any potential conflict of interest



# Increased adoption of fenestrated EVAR with a variety of bridging stent grafts



Bentley BeGraft (CrCo/PTFE)

Mendes BC, Oderich GS (2017), Endovascular Aortic Repair, pp 360

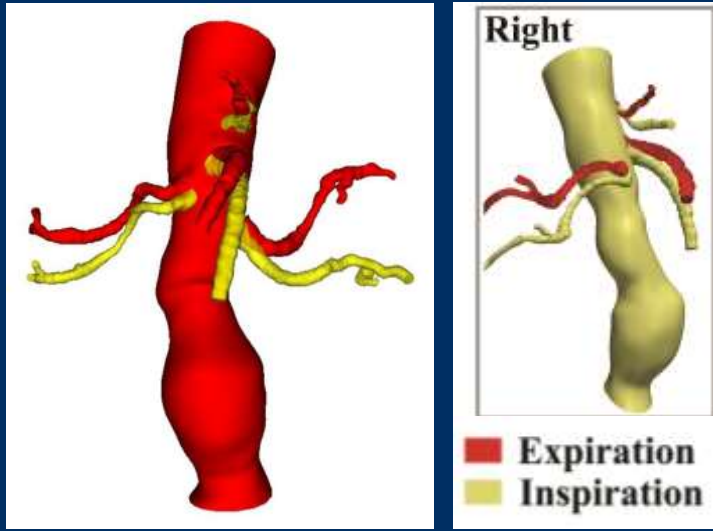


Atrium iCAST (SS/PTFE)



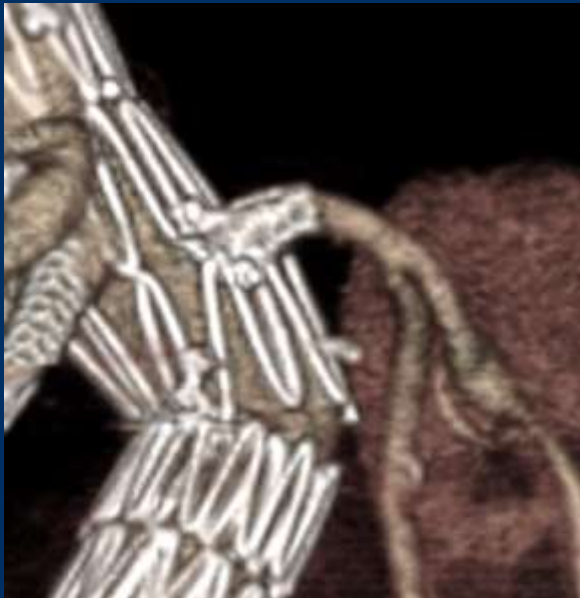
Gore VBX (SS/PTFE)

# Influence of bridging stents largely unknown



Diaphragmatic motion from breathing causes cyclic renovisceral vessel motion

Direct impact of fEVAR on branch vessel dynamics had not yet been studied



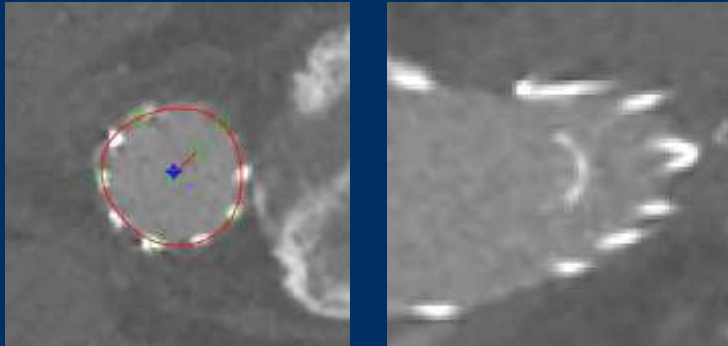
Prospective recruitment of 12 patients undergoing fEVAR of TAAAs (Oct2019-Feb2020)

Patients treated with 4-vessel Cook ZFEN endograft and Bentley BeGraft for bridging stents

Pre- and post-operative CTAs with inspiratory and expiratory breath-holds

# Modeling & Data Analysis

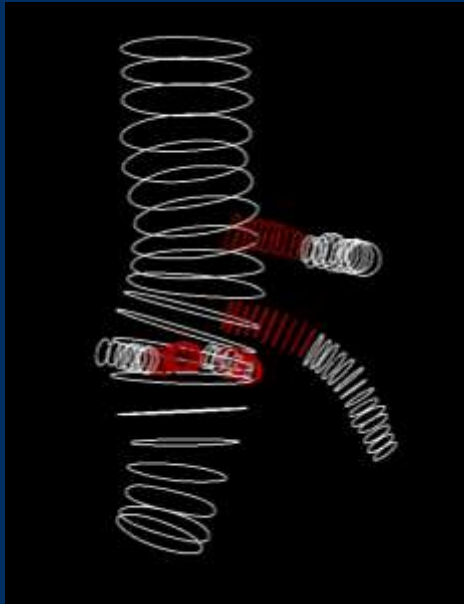
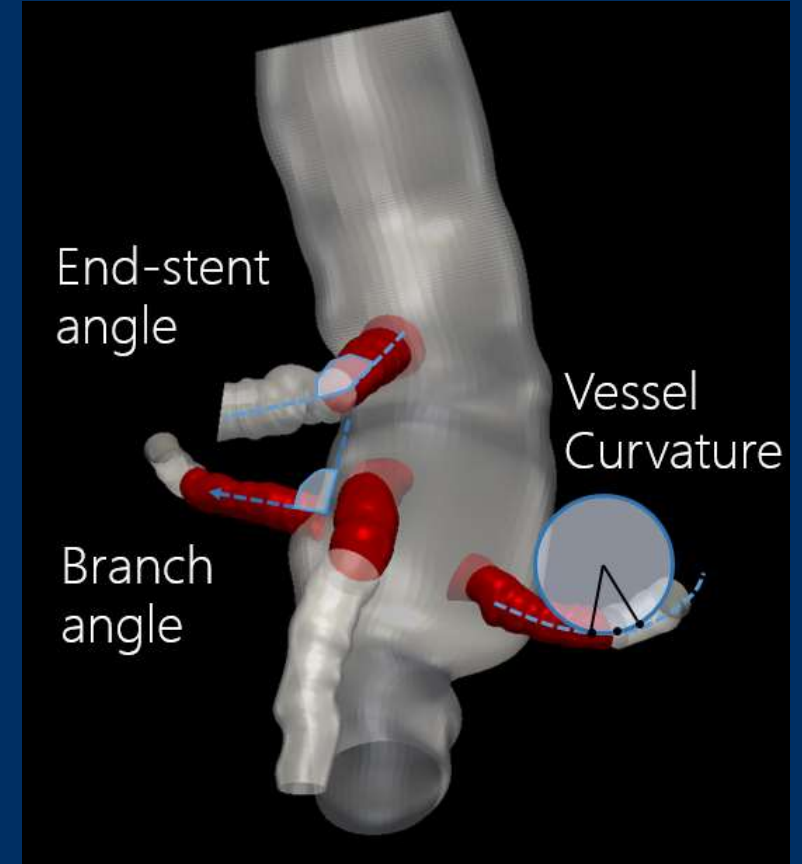
Contour Segmentation



Centerline Extraction



Anatomic Quantification



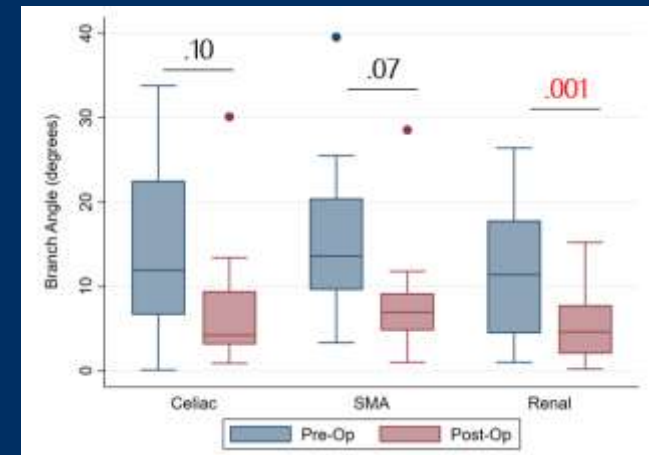
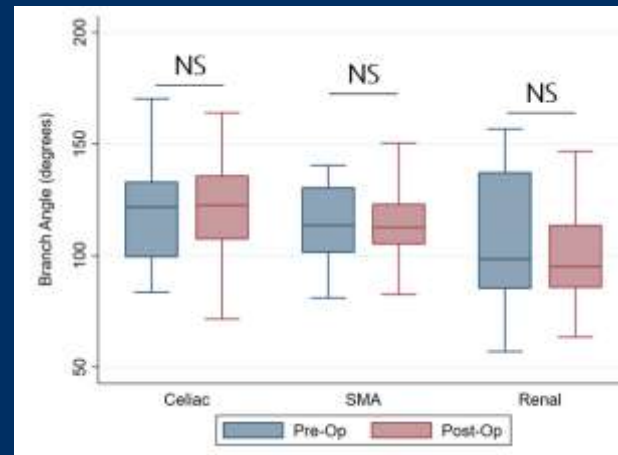
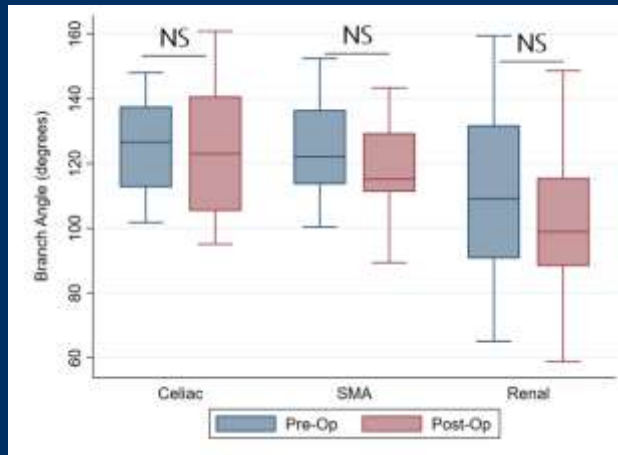
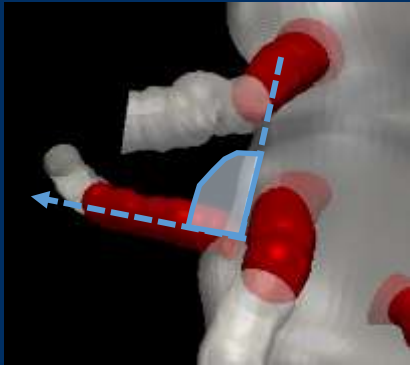
# Branch Angle and End-Stent Angle

Inspiration

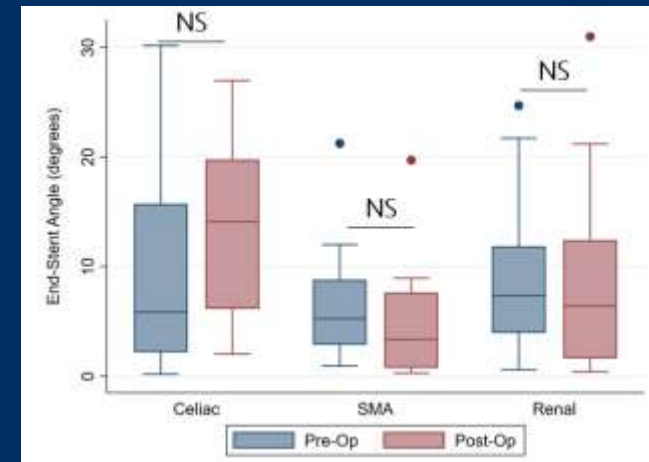
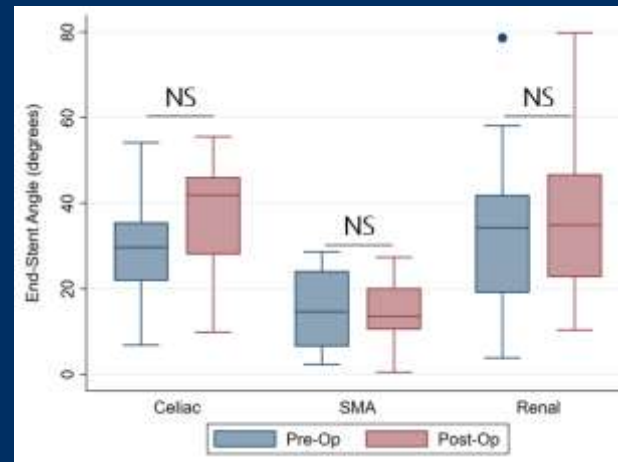
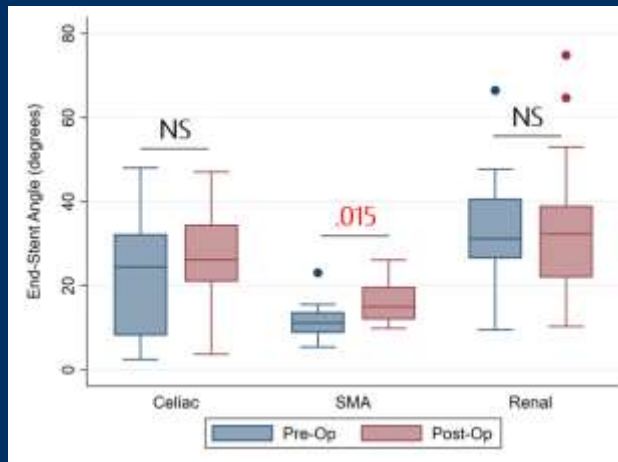
Expiration

Respiratory Change

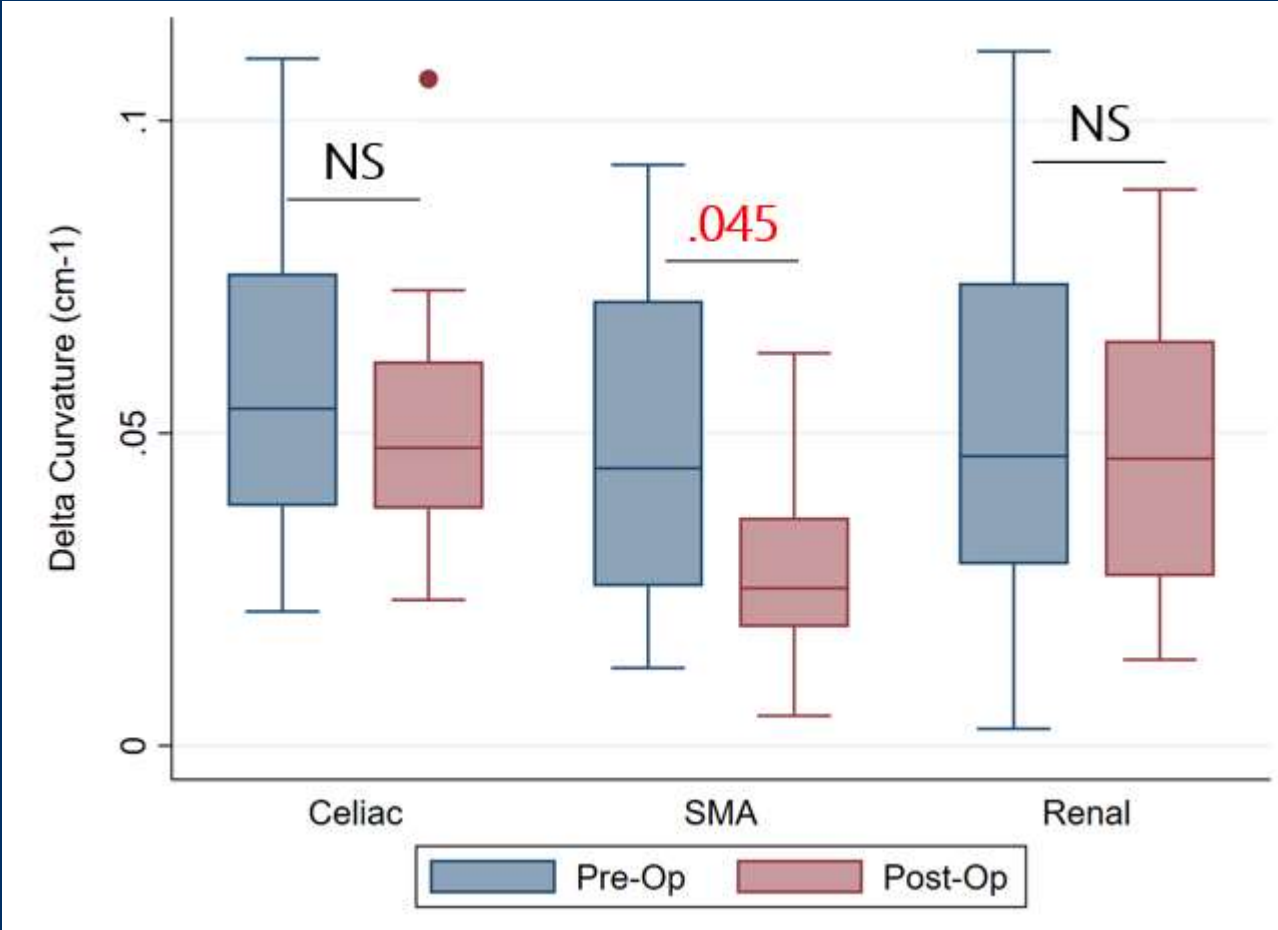
Branch Angle



End-Stent Angle



# Localized Max Vessel Curvature – Respiratory Change



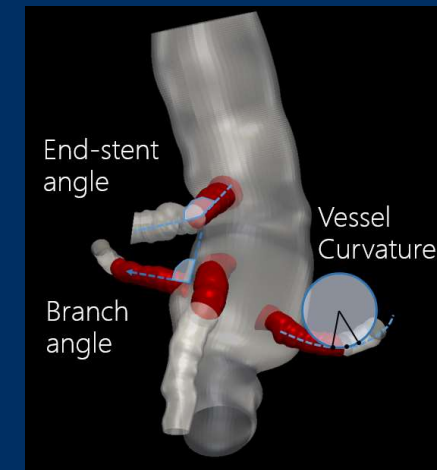


# Discussion

- ZFEN-BeGraft fEVAR → ~50% reduction in respiratory-induced  $\Delta$  branch angle

	fEVAR-induced $\Delta$ Branch Angle	Respiratory-induced $\Delta$ Branch Angle	Etiology
ZFEN-BeGraft	~10 deg	~5 deg	Thoracoabdominal
ZFEN-iCAST	~20 deg	~1 deg	Juxtarenal
iCAST/BeGraft	~2x	~0.2x	

- ZFEN-BeGraft fEVAR → minimal fEVAR-induced end-stent angle change; SMA is exception, perhaps because least perpendicular
- ZFEN-BeGraft fEVAR → minimal respiratory-induced end-stent angle and curvature change; SMA is exception
- Conforms to native anatomy and respiratory-induced motion
- Findings may influence device selection and branch-specific stent design





Thank you!

