

# Visceral Artery Mapping in Patients with Aortic Aneurysm Treated with Branched/Fenestrated Endografts

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## Background

- The process of planning for branched/fenestrated endovascular aortic (B/FEVAR) procedures for patients with abdominal aortic aneurysms (AAAs) is technically demanding and time-consuming
- Successful planning of B/FEVAR depends on accurate localization of the celiac and renal arteries relative to the superior mesenteric artery (SMA)
- In emergent scenarios, such as AAA rupture, understanding population-level patterns in visceral artery position may help expedite graft planning
- We hypothesize that visceral artery positions demonstrate recognizable anatomic patterns with measurable patient-level variability

## Methods

- Retrospective review was performed on an institutional data set of 346 patients who underwent B/FEVAR at Northwestern Memorial Hospital
- The longitudinal and arc distance of the celiac and renal arteries was measured relative to the SMA
- Descriptive statistics were utilized to summarize visceral vessel position measurements
- Histograms were then generated to visualize recognizable anatomic patterns

Figure 1. Fenestration Template

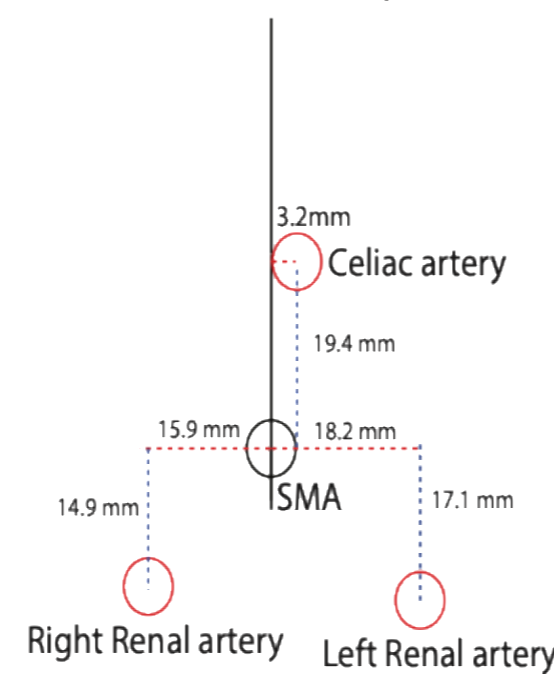


Figure 2. Spatial Distribution of Abdominal Visceral Arteries

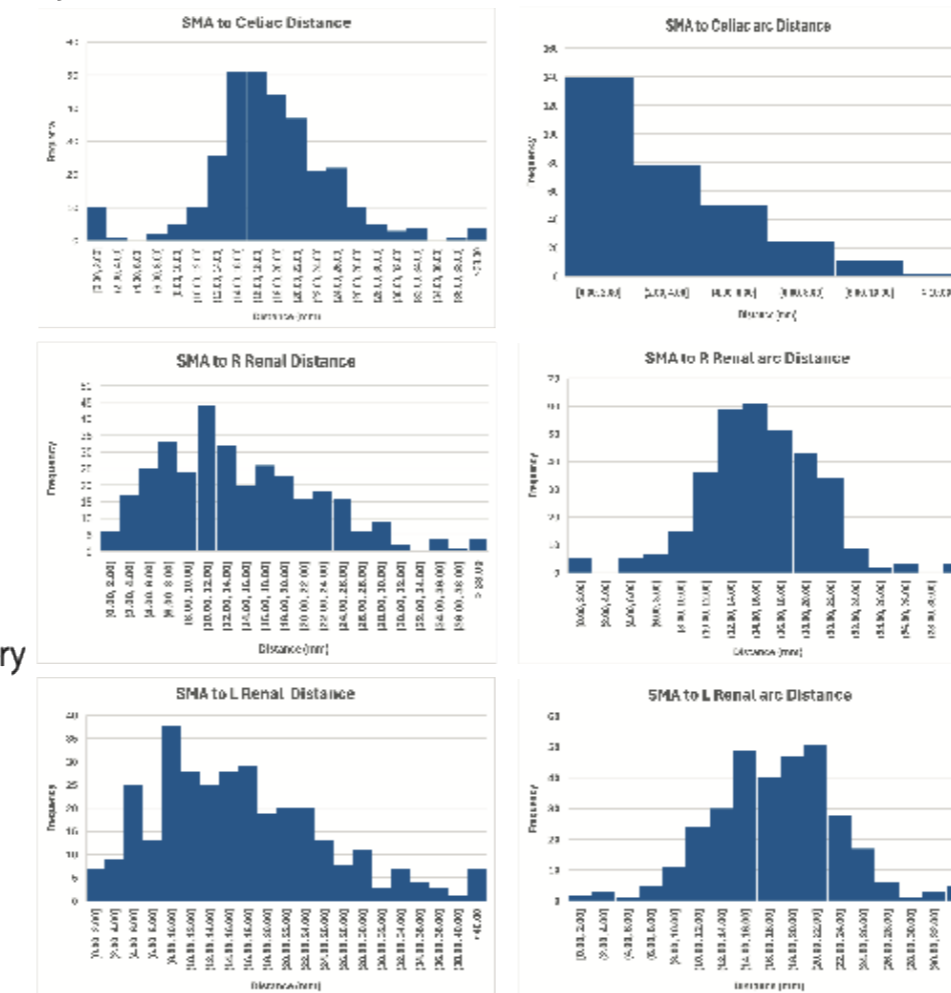


Figure 3.

Relative Vessel Positions				
Measurement (mm)	N	Median	Mean ± SD	95% CI
SMA to Celiac Artery	298	19.0	19.4 ± 5.8	18.8 - 20.1
SMA to Celiac Artery Arc Length	301	3.0	3.2 ± 2.5	3.0 - 3.5
SMA to Left Renal Artery	315	16.0	17.1 ± 10.0	16.0 - 18.2
SMA to Left Renal Artery Arc Length	321	18.0	18.2 ± 5.4	17.6 - 18.7
SMA to Right Renal Artery	326	14.0	14.9 ± 8.1	14.0 - 15.7
SMA to Right Renal Artery Arc Length	331	16.0	15.9 ± 4.6	15.4 - 16.4

## Results

- Analysis revealed limited variability of the positioning of the relevant visceral and renal arteries
- Unimodal distributions observed in relative visceral vessel positions (Figure 2)
- Celiac artery positioning and left renal arc positioning relative to the SMA was shown to be relatively consistent across patients.

## Conclusions

- Visceral artery positions relative to the SMA demonstrate a predictable anatomic pattern in patients treated with B/FEVAR
- Population-level vessel mapping provides a useful framework for procedure planning, particularly in emergent settings
- These findings support further development of anatomically informed planning tools for B/FEVAR.

## References

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