

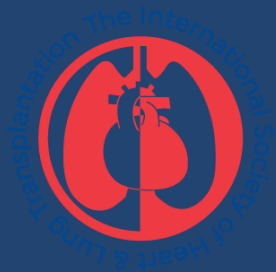
# Association of Use of Angiotensin- Converting Enzyme Inhibitors or Angiotensin II Receptor Blockers on LVAD Support and Risk of Gastrointestinal Bleeding: A Multicenter Analysis

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# Relevant Financial Relationship Disclosure Statement

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*Jessica Schultz, MD*

I will not discuss off label use and/or investigational use of any drugs/devices.

The following relevant financial relationships exist related to this presentation:

Jessica Schultz, MD: No relationships to disclose

Barry Trachtenberg, MD: Abbott: consultant

Rachel Araujo, MD: No relationships to disclose

Kevin Goodwin, MD: No relationships to disclose

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Jerry Estep, MD: \*\*\*

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Rebecca Cogswell, MD: Abbott: Speakers bureau and consultant. Medtronic: Advisory board, consultant, and husband's employer

# Background

- We previously published about an association between ACEI or ARB use and reduced rates of GIB after LVAD at our center<sup>1</sup>
- Thought was mechanism of action for ACEI/ARB is a reduction in angiogenesis that plays a role in development of AVMs while on LVAD support
- Purpose was to test this association in a large, multi-center database inclusive of HeartMate 3 devices

<sup>1</sup>Schultz, J. et al. "Association Between Angiotensin II Antagonism and Gastrointestinal Bleeding on Left Ventricular Assist Device Support." *JHLT*. Apr 2019. 38.5. 469-71.

# Methods

- Two centers with a 1st time cf-LVAD implant with complete medication and GIB data were included
  - Total n=648
- ACEI/ARB utilization: ACEI or ARB use at discharge or within the 1st 3 months after LVAD

# Methods

- GIB events were recorded for the 1<sup>st</sup> 2 years on LVAD support
- Negative binomial regression analyses were performed to determine the association between ACEI/ARB use and the number of GIB events on LVAD support

# Baseline Characteristics

Variables	UMN (n=411)	Houston Methodist (n=237)	p-value
Age	58 +/- 14	57 +/- 12	0.906
Male	331 (80.5%)	187 (78.9%)	0.617
Caucasian	326 (79.3%)	109 (46.0%)	<0.0001
Ischemic Cardiomyopathy	216 (52.6%)	139 (58.7%)	0.133
Bridge to Transplant (BTT)	240 (58.4%)	49 (20.7%)	<0.0001
Device Type	-	-	<0.0001
HM2	291 (70.8%)	219 (92.4%)	-
HVAD	44 (10.7%)	12 (5.1%)	-
HM3	76 (18.5%)	6 (2.5%)	-
INTERMACS	-	-	<0.0001
1	38 (9.2%)	53 (22.4%)	-
2-3	185 (45.1%)	144 (60.7%)	-
4-7	188 (45.7%)	40 (16.9%)	-
Diabetes Mellitus	147 (35.8%)	123 (51.9%)	<0.0001
Body Mass Index (BMI)	28.7 +/- 6.0	28.6 +/- 6.0	0.836
Creatinine	1.3 +/- 0.5	1.4 +/- 0.8	0.812
Albumin	3.4 +/- 0.6	3.3 +/- 0.7	0.042
Total Bilirubin	1.3 +/- 2.4	1.4 +/- 1.2	0.825
Right Atrial Pressure	12 +/- 6	14 +/- 7	0.0002
ACE-Inhibitor/ARB	287 (67.5%)	138 (32.5%)	0.003

# Breakdown by ACE-I/ARB or Not

Variables	No ACE-I/ARB (n=223)	ACE-I/ARB (n=425)	p-value
Age	59 +/- 12	57 +/- 14	0.0242
Male	185 (83.0%)	333 (78.4%)	0.164
Caucasian	139 (62.3%)	296 (70.0%)	0.060
Ischemic Cardiomyopathy	132 (59.2%)	223 (52.5%)	0.102
Bridge to Transplant (BTT)	92 (41.3%)	197 (46.4%)	0.215
Device Type	-	-	0.119
HM2	182 (81.6%)	328 (77.2%)	-
HVAD	21 (9.4%)	35 (8.2%)	-
HM3	20 (9.0%)	62 (14.6%)	-
INTERMACS	-	-	0.137
1	33 (14.8%)	58 (13.7%)	-
2-3	123 (55.2%)	206 (48.5%)	-
4-7	67 (30.0%)	161 (37.9%)	-
Diabetes Mellitus	104 (46.6%)	166 (39.1%)	0.063
Body Mass Index (BMI)	28.8 +/- 6.0	28.5 +/- 6.0	0.5995
Creatinine	1.5 +/- 0.6	1.3 +/- 0.6	0.0001
Albumin	3.4 +/- 0.7	3.4 +/- 0.6	0.948
Total Bilirubin	1.5 +/- 3.2	1.3 +/- 1.2	0.3617
Right Atrial Pressure	13 +/- 7	13 +/- 6	0.4854

# Results

- Use of either an ACEI or ARB was associated with a reduction in the incidence rate of GIB on LVAD support
  - Unadjusted 51% reduction in incidence rate ratio (IRR), 95% CI 30-66% reduction,  $p < 0.00001$
  - Adjusted 54% reduction in IRR, 95% CI 32-69% reduction,  $p = 0.0001$
  - The final model was adjusted for age, sex, INTERMACS profile, BTT status, serum creatinine, albumin, body mass index, and index right atrial pressure



# Conclusion

- Patients on ACEI or ARB while on LVAD support had a reduced incidence rate of GIB in this large, multi-center contemporary CF LVAD dataset
- There is a plausible mechanism of action for these medications in regards to the reduction in developing AVMs
- Whether or not this therapy is protective or is a marker of healthier LVAD patients - not clear
- Prospective data required

# Thank You



## Special thanks to our Entire LVAD Team!