

**ELECTRICAL REVERSE REMODELING WITH SACUBITRIL-VALSARTAN FOR HEART FAILURE: REDUCTION IN QRS 3D VOLTAGE TIME INTERVAL (3D QRS AREA)**



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**Background**

- The instantaneous absolute 3D ECG voltage integrated over the duration of QRS (VTI<sub>QRS-3D</sub>), also measured as 3D QRS area, is a novel marker of left ventricular electrical remodeling

**Research Question**

- To investigate the effect of sacubitril-valsartan on VTI<sub>QRS-3D</sub>

**Methods and Materials**

- Retrospectively evaluated 360 patients treated with sacubitril-valsartan for ≥3 months between January 2014 - June 2019
- Pre- and post-treatment 12-lead ECGs were converted to orthogonal X, Y, Z leads using Kors matrix
- VTI<sub>QRS-3D</sub> was obtained from root-mean-squared 3D ECG
- Pairwise t-test was used to assess Δ VTI<sub>QRS-3D</sub>

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**Results**

- Though Δ QRS duration was no different (pre 112 ± 26 ms, post 114 ± 25 ms, p=0.1), VTI<sub>QRS-3D</sub> significantly decreased with sacubitril-valsartan treatment (pre 59.2 ± 32.0 uVs, post 53.6 ± 26.2 uVs, p<0.0001).
- Reduction in VTI<sub>QRS-3D</sub> was more pronounced in patients with left bundle branch block, non-ischemic cardiomyopathy, and severely reduced ejection fraction

Variable	Baseline distributions Mean ± SD or %	VTI <sub>QRS-3D</sub> - μVs		p-value	Δ VTI <sub>QRS-3D</sub> - β-coefficient
		Pre sacubitril-valsartan	Post sacubitril-valsartan		
<b>OVERALL (N=360)</b>		59.2 ± 32.0	53.6 ± 26.2	<b>&lt;0.0001</b>	
Age, years	60.4 ± 13.4			0.71	0.36/10-yr
Female	32.2%			0.97	-0.05
<b>Baseline LBBB</b>	15.3%			<b>&lt;0.0001</b>	-9.99
LBBB (n=55)		104.9 ± 44.4	82.4 ± 30.3	<b>0.0007</b>	
No LBBB (n=305)		51.0 ± 20.2	48.5 ± 21.7	<b>0.008</b>	
<b>Baseline QRS duration, ms</b>	112 ± 26			<b>&lt;0.0001</b>	-2.93/10-ms
<b>Non-ischemic cardiomyopathy</b>	61.1%			<b>0.02</b>	-3.11
Non-ischemic (n=220)		62.7 ± 33.3	54.7 ± 26.4	<b>&lt;0.0001</b>	
Ischemic (n=140)		53.8 ± 29.0	52.1 ± 25.9	0.32	
<b>LVEF, %</b>	28.0 ± 10.2			<b>0.03</b>	2.80/10%
>25% (n=168)		63.5 ± 36.0	56.8 ± 28.2	<b>0.04</b>	
≤25% (n=167)		53.3 ± 23.7	50.4 ± 23.6	<b>0.002</b>	
<b>Months of treatment</b>	28.1 ± 7.9			0.11	-0.41/month

**Conclusion**

- Treatment with sacubitril-valsartan results in electrical reverse remodeling as assessed with QRS 3D voltage time integral.

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