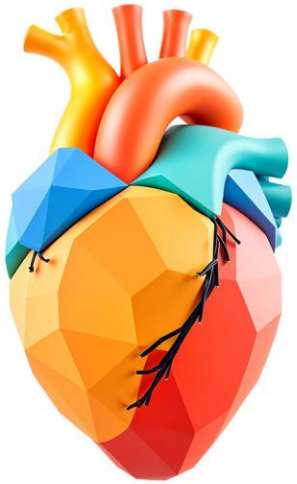

12th Annual Tehran Heart Center Congress
7th CRITICAL CARDIOVASCULAR CARE
دوازدهمین کنگره سالیانه مرکز قلب تهران
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2025
۲۵ و ۲۶ بهمن ماه ۱۴۰۳
13 & 14 February
Tehran Heart Center
Tehran, Iran

The Effect of Sacubitril/Valsartan on Supraventricular and Ventricular Arrhythmias in Patients with Heart Failure

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Disclosure

Conflict of interest:

None

Funding:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Background

- **Heart failure with reduced ejection fraction (HFrEF)** is linked to a high burden of **ventricular and supraventricular arrhythmias**
- **Sacubitril/Valsartan (SV) therapy** has been linked to lower rates of:
  - **Mortality**
  - **Ventricular tachycardia (VT) and ventricular fibrillation (VF),**
  - Usage of **implantable cardioverter-defibrillator (ICD) therapy.**

Background

- Frequent ICD interventions, including **anti-tachycardia pacing (ATP) and shocks**, are **distressing** for patients and **increase healthcare costs**; **optimizing patient care**.

- **Gaps in current research:** Limited data on the **antiarrhythmic effects of SV in ICD/CRT-D patients**

- **Aim:** Evaluate the impact of **SV therapy** on:
    - **Arrhythmic event reduction**
    - **ICD/CRT-D therapy interventions**
    - **Echocardiographic changes**

Materials and Methods

Study Design:

- **Single-center, retrospective, longitudinal observational study** at a heart failure outpatient clinic

Inclusion Criteria:

- **HFrEF patients with left ventricular ejection fraction (LVEF) ≤40%**
- **ICD/CRT-D implantation** with device interrogation every **3 months** for **12 months before and after SV therapy**
- **On guideline-directed medical therapy (GDMT)** including beta-blockers, MRAs, SGLT2 inhibitors before adding SV as the final component

Exclusion Criteria:

- **Simultaneous ICD/CRT-D implantation & SV initiation**
- **New device implantation or modification during study**
- **NYHA class IV with unstable condition**
- **Refractory ventricular arrhythmias requiring ablation**

Materials and Methods

Outcomes:

- **Primary: VT, VF, VT/VF** -which was stated for cumulative VT and VF incidences-, **non-sustained VT (NsVT), supraventricular tachycardia (SVT)**, and related interventions such as **ATP** and **defibrillation shocks**.
- **Secondary: Changes in echocardiographic parameters**, including **left ventricular end-diastolic diameter (LVEDD) and LVEF**.

Statistical Analysis

- **Wilcoxon Signed-Rank Test** for pre- vs. post-SV comparisons
- **Univariate & Multivariate Regression Analysis** to evaluate variable relationships

Results

Population Characteristics:

- **181 HFrEF patients completed ≥12-month follow-up:**
  - **Mean age:** 63.4 ± 12 years
  - **36.5% male**

Key Outcomes (Pre- vs Post-SV Therapy):

- **Ventricular Arrhythmia Reduction:**
  - **VF: ↓ 53%** (15 vs. 7, p=0.025)
  - **VT + VF (VT/VF): ↓ 29%** (24 vs. 17, p=0.047)
- **ICD Therapy Reduction:**
  - **ATP interventions: ↓ 28%** (14 vs. 10, p=0.043)
  - **Shocks delivered: ↓ 57%** (14 vs. 6, p=0.041)
  - **ATP + Shocks: ↓ 57%** (24 vs. 10, p=0.012)
- **Echocardiographic Improvements:**
  - **LVEF: ↑ (29.95% → 31.66%,** p=0.033)
  - **LVEDD: ↓ (61.39 mm → 59.51 mm,** p=0.047)

Results

Variable	
Age (mean ± SD)	63.39 ± 12
Male (%)	36.5
NYHA (%)	
1	47
2	25.4
3	21.5
4	5.5
Smoking (%)	27.6
HTN (%)	39.8
DM (%)	30.9
Dyslipidemia (%)	38.1
CKD (%)	13.3
SBP (mean ± SD)	116.79 ± 21.74
HR (mean ± SD)	74.5 ± 14.28
HF (%)	
NICMP	30.4
ICMP	69.6
Duration of HF (mean ± SD) (years)	8.96 ± 6.79
Device (%)	
ICD	60.8
CRT-D	39.2
Previous MI (%)	68
Previous stroke (%)	6.1
CABG (%)	26.5
Atrial fibrillation (%)	2.8
Digoxin (%)	27.1
LVEF	29.95 ± 9.61
LVEDD	61.39 ± 9.56

Table 1. Baseline characteristics before initiation of Sacubitril/Valsartan

(CABG = coronary artery bypass grafting, CKD = chronic kidney disease, CRT-D = cardiac resynchronization therapy-device, DM = diabetes mellitus, HF = heart failure, HR = heart rate, HTN = hypertension, ICD = implantable cardioverter defibrillator, ICMP = ischemic cardiomyopathy, LVEDD = left ventricular end-diastolic diameter, LVEF = left ventricular ejection fraction, MI = myocardial infarction, NICMP = non-ischemic cardiomyopathy, NYHA = New York Heart Association, SBP = systolic blood pressure, SD = standardized deviation)

Results

Regression Analysis:

- **Diabetes Mellitus (DM) → Lower VT incidence** (p=0.047)
- **ICD presence → Higher VT incidence** (p=0.034)
- **NYHA Class IV → Higher VF incidence** (p=0.014)
- **VT/VF:**
  - **ICD presence → Increased risk (**p=0.023)
  - **NYHA Class IV → Lower incidence (**p=0.030)
- **Male gender → Lower LVEDD & shock treatment requirement** (p=0.033 & p=0.044, respectively)

Results

Outcome	Gender	Age	NHYA4	HTN	DM	ICD	Duration of HF disease (year)
SVT							
Standardized Coefficient beta	-0.063	0.032	0.005	0.065	-0.112	0.009	0.035
P-value	0.439	0.686	0.947	0.430	0.161	0.910	0.659
VF							
Standardized Coefficient beta	-0.040	0.083	-0.194	-0.003	-0.026	0.101	-0.030
P-value	0.617	0.285	0.014	0.972	0.734	0.184	0.697
VT							
Standardized Coefficient beta	-0.027	0.057	-0.111	-0.007	-0.153	0.161	0.084
P-value	0.732	0.456	0.152	0.930	0.047	0.034	0.270
VT/VF							
Standardized Coefficient beta	-0.037	0.079	-0.167	-0.007	-0.135	0.170	0.056
P-value	0.631	0.296	0.030	0.932	0.077	0.023	0.456
NSVT							
Standardized Coefficient beta	-0.088	-0.032	-0.063	0.069	-0.084	-0.050	0.091
P-value	0.272	0.684	0.431	0.394	0.285	0.516	0.246
ATP							
Standardized Coefficient beta	0.079	0.111	-0.012	0.096	-0.079	0.134	-0.036
P-value	0.317	0.152	0.879	0.233	0.313	0.082	0.647
Shock							
Standardized Coefficient beta	-0.162	0.116	-0.004	0.012	-0.057	0.115	0.030
P-value	0.044	0.139	0.958	0.879	0.472	0.137	0.702
LVEF							
Standardized Coefficient beta	-0.009	-0.036	0.102	-0.048	-0.010	0.022	-0.116
p-value	0.913	0.649	0.203	0.557	0.902	0.777	0.141

Table 2. Regression analysis

(DM = diabetes mellitus,, HTN = hypertension, ICD = implantable cardioverter defibrillator, NYHA = New York Heart Association, HTN = hypertension, ATP = anti-tachycardia pacing, VT = ventricular tachycardia, VF = ventricular fibrillation, NsVT = non-sustained VT, SVT = sustained VT, LVEF = left ventricular ejection fraction,)

Conclusion

- **SV therapy significantly reduces ventricular arrhythmias (VT & VF)** in HFrEF patients.
- **Decreases the need for ICD interventions (ATP & shocks)**, indicating **potential antiarrhythmic benefits**
- **Optimizes heart failure management** by reducing both **arrhythmic burden & device dependency**
- **Strengths:**
  - Comprehensive analysis of multiple outcomes
  - Moderately long follow-up period
  - Adresses the gap in recent studies by evaluating HFrEF patients previously treated with ICT or CRT-D

Conclusion

- **Limitations:**
  - Observational and retrospective design:
  - Lack of a control group
  - Limited study populations
- **Future research needed** to:
  - Confirm findings in larger, diverse patient populations in RCT settings
  - Assess various clinical outcomes in longer follow-up periods
  - Determine ideal timing & patient selection for SV therapy in arrhythmia prevention

Take home message

- **Sacubitril/Valsartan: More than just heart failure therapy—reducing arrhythmias, improving outcomes,** and **enhancing patient care.**

Summary Graph

Aim

- To investigate the add-on impact of Sacubitril/ Valsartan (SV) therapy on the burden of Supraventricular and Ventricular Arrhythmias in Patients with Heart failure with reduced ejection fraction (HFrEF)

Design and Population

- Single cener, retrospective, longitudinal observational study, Between January 2020 to December 2023
- Adult HFrEF patients with ICD or CRT-D who were prescribed SV as an addition to their existing treatment
- 181 patients, Mean Age: 63.39±12, Male: 36.5%
- ICD: 60.8%, CRT-D: 39.2%

Primary outcomes

- Change in the cumulative incidence of Ventricular tachycardia (VT) and Ventricular fibrillation (VF), total VT/VF events, non-sustained VT, supraventricular tachycardia, anti-tachycardi pacing and defibrillation shocks in 12 months follow-up after starting SV

Findings

Outcome	Pre-SV therapy Episodes	Post-SV therapy Episodes	P-Value
Sustained ventricular tachycardia	6	11	0.185
Non-sustained ventricular tachycardia	29	32	0.480
Ventricular tachycardia	12	14	0.400
Ventricular fibrillation	15	7	**0.025**
Ventricular tachycardia + Ventricular fibrillation	24	17	**0.047**
Anti-tachycardia pacing	14	10	**0.043**
Shock	14	6	**0.041**
Anti-tachycardia pacing + Shock	24	10	**0.012**

Conclusion

SV therapy significantly reduces VTVF events and associated clinical interventions, indicating its potential to reduce the likelihood of lethal arrhythmic events and probable sudden cardiac death.

Acknowledgement

None

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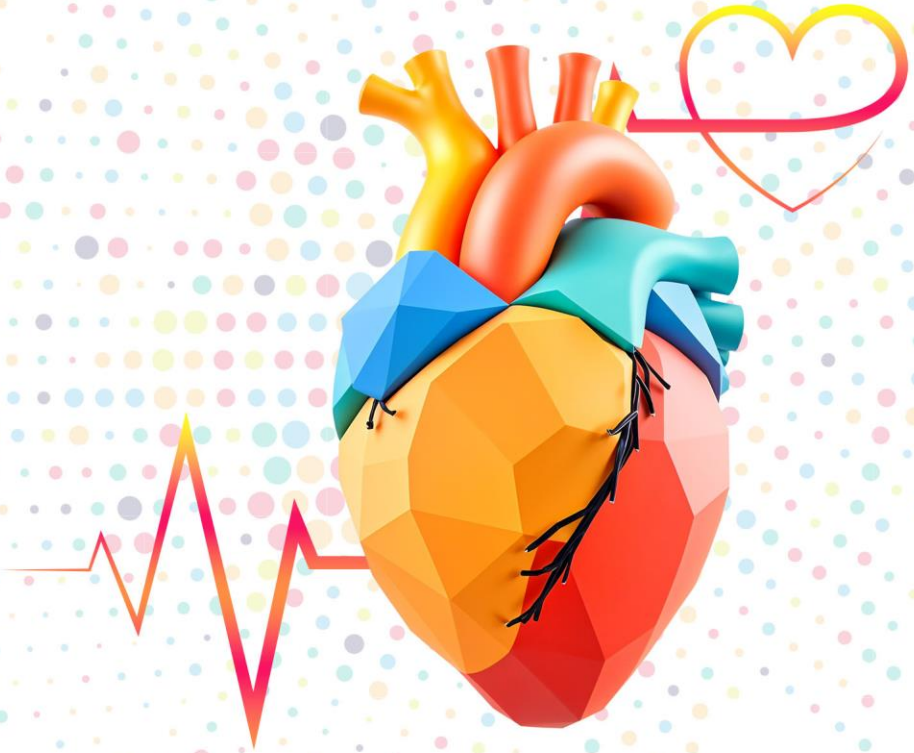

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