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ISRAEL HEART SOCIETY

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Improvement in diastolic function in patients undergoing TAVI- an echocardiographic study

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Disclosures

I have nothing to disclose

Introduction

Diastolic dysfunction in patients with aortic stenosis

- Aortic Stenosis (AS) causes adaption of the left ventricle (LV) to the systolic pressure overload with progressive concentric hypertrophy or concentric remodeling

- This process contributes to increase in left ventricular stiffness causing an impaired myocardial relaxation resulting in LV diastolic dysfunction

- The development of diastolic dysfunction in AS is the main cause for patients to become symptomatic

TAVI procedure and diastolic function

- Transcatheter aortic-valve implantation (TAVI) has revolutionized the management of aortic stenosis by providing a safe and efficacious alternative to surgical valve replacement

- Little is known about the effect of TAVI on diastolic dysfunction

Objectives

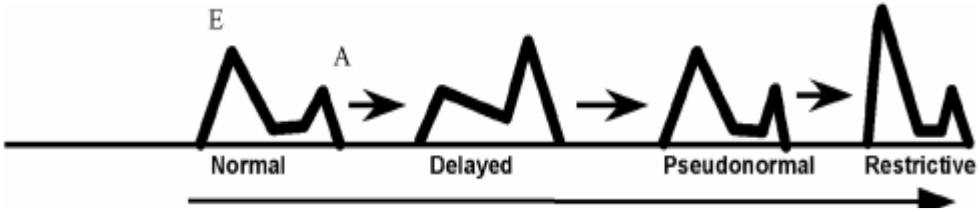
- Evaluate the effect of TAVI on diastolic function

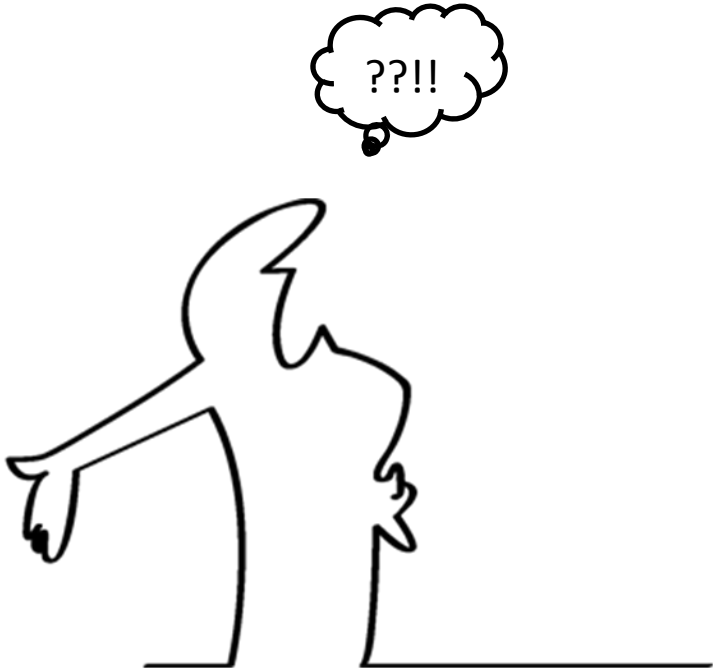
- Identify possible predictors associated with improved diastolic function post TAVI

Materials and methods

- 70 TAVI patients assessed with comprehensive echo evaluation at baseline and six months after TAVI

- Exclusion criteria: any degree of mitral stenosis or more than mild left sided valvular regurgitation, atrial fibrillation


E
A
Normal
Delayed
Pseudonormal
Restrictive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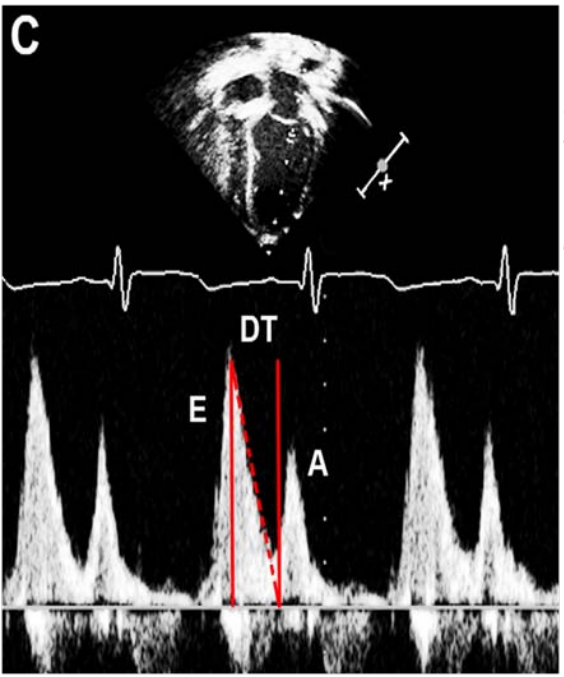
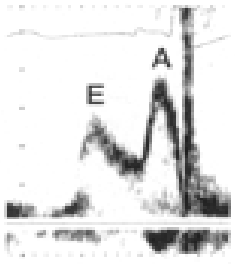
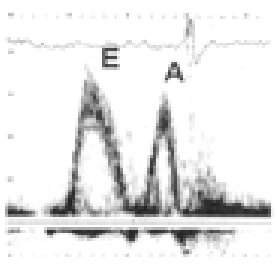
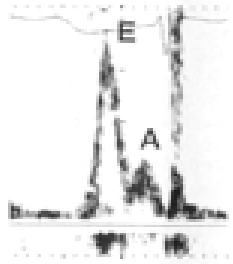
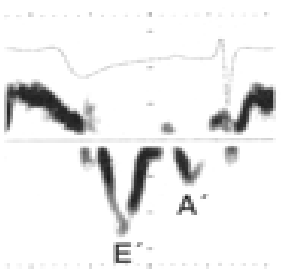
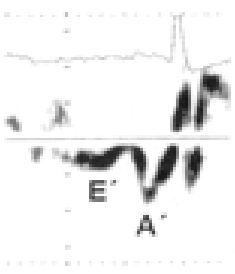
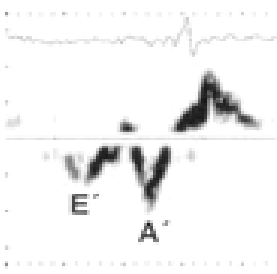
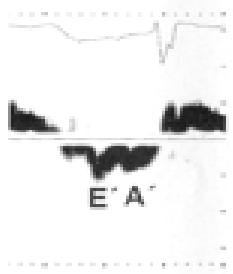
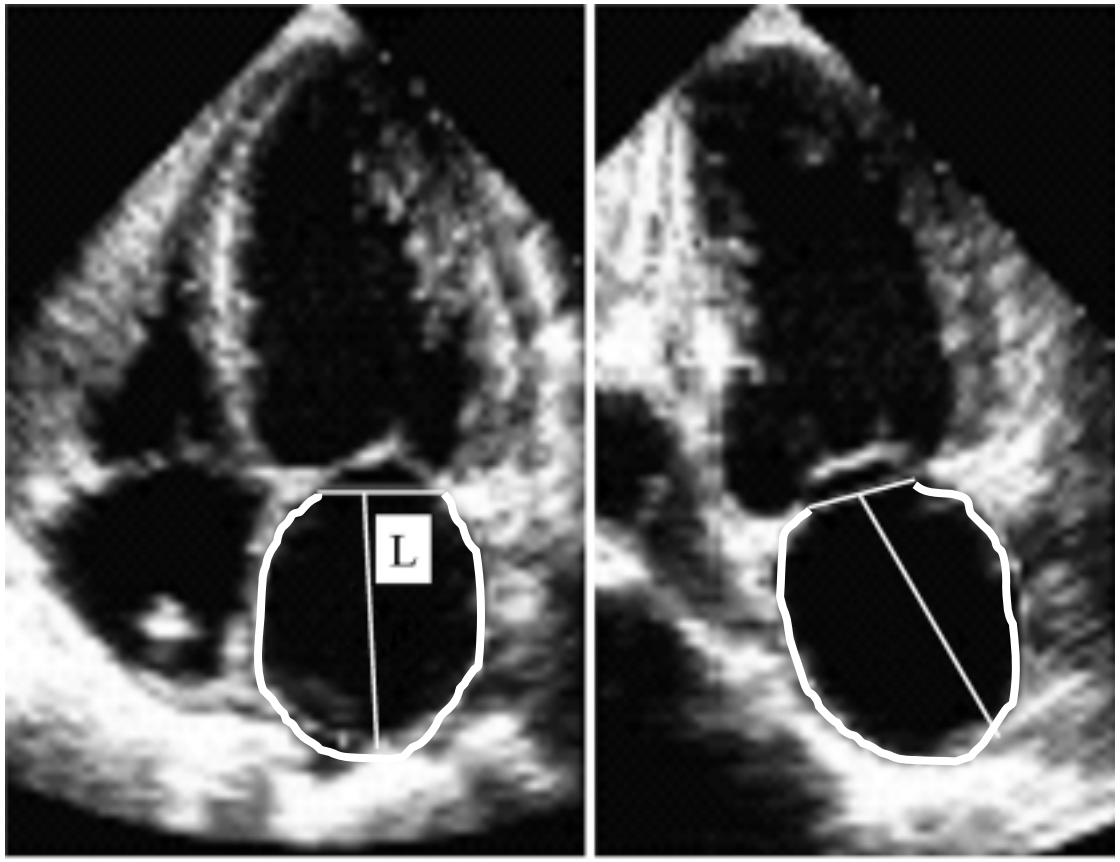
Mitral inflow parameters and mitral annulus velocity



E – early diastolic filling velocity
A –late diastolic filling velocity
DT- Deceleration Time

	Normal	Relaxation abnormality	Pseudo-normalization	Restrictive physiology
Mitral inflow				
Mitral annulus velocity				
	E/A ≥ 1.5	E/A< 1	1≤ E/A ≤1.5	E/A > 2
	e‘ >10	e ‘< 7	e ‘ < 7	e ‘ < 7
	E/e’ < 8	E/e‘≤ 8	E/e‘ ≥ 8	E/e’ > 15
	DT ≈	DT↑	DT ≈	DT ↓

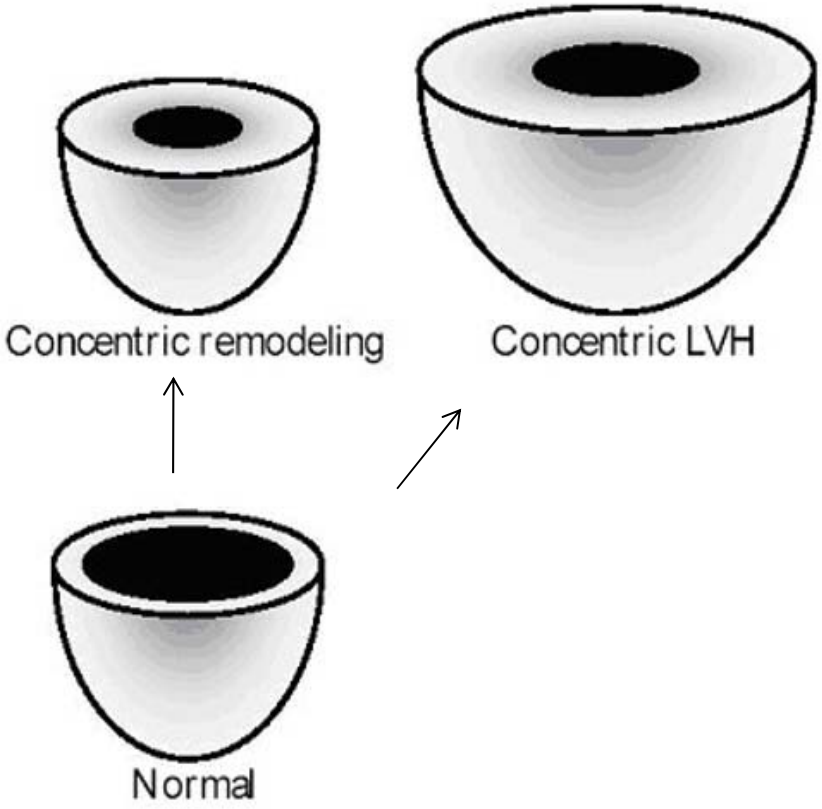
LA Volume



4 chamber view

2 chamber view

LV geometry parameters: concentric hypertrophy versus concentric remodeling



- IVS (inter ventriculr septum)
- PWT (posterior wall thickness)
- LVIDd (LV internal diastolic diameter)

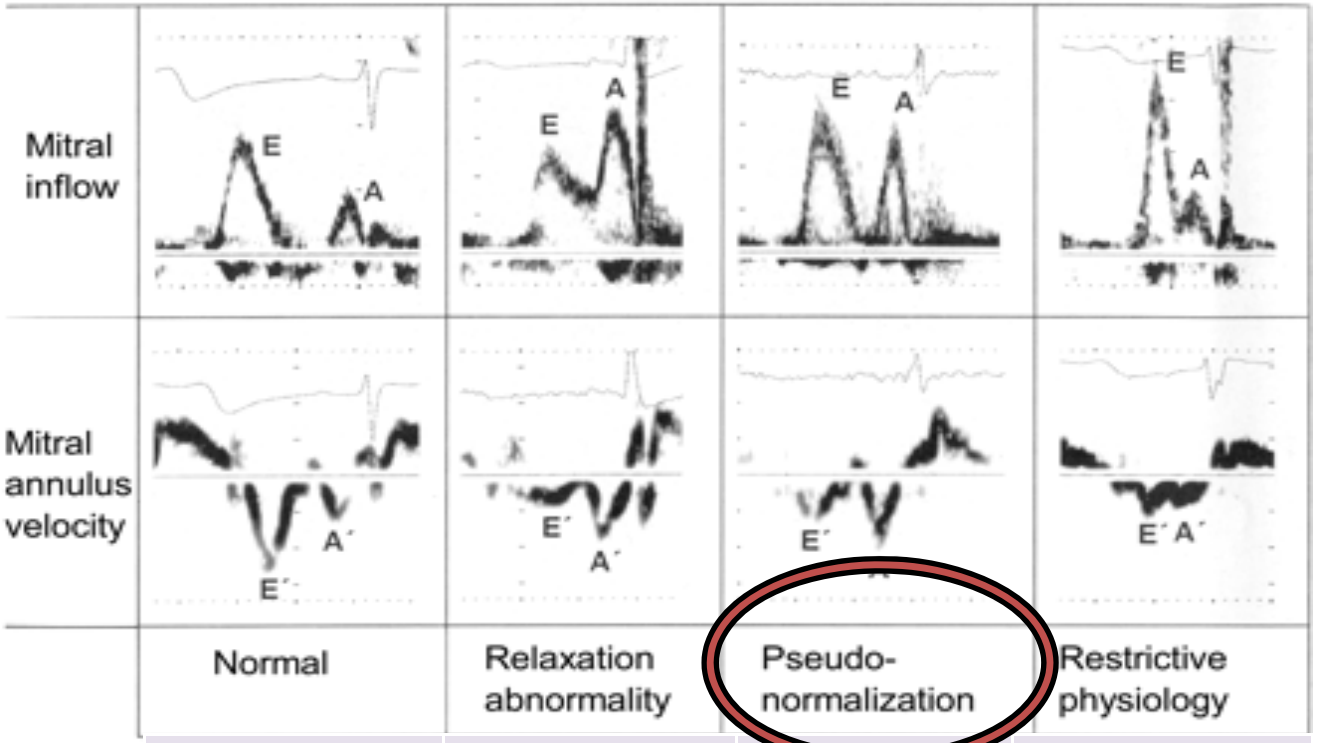
- **LV mass**
- **RWT relative wall thickness**

- Concentric remodeling: RWT ↑
  LV mass ≈
- Concentric hypertrophy: LV mass↑↑
  RWT ≈↑

Results

- Age of 82±5.6 years, 42% males, mean AVA 0.7 cm^2 with preserved EF%
- Baseline increased IVS PWT and LV mass
- Baseline- Increased LA volume and PAP (Pulmonary Artery Pressure) indicating high left sided filling pressure
- Baseline – **mostly pseudo-normal diastolic pattern**

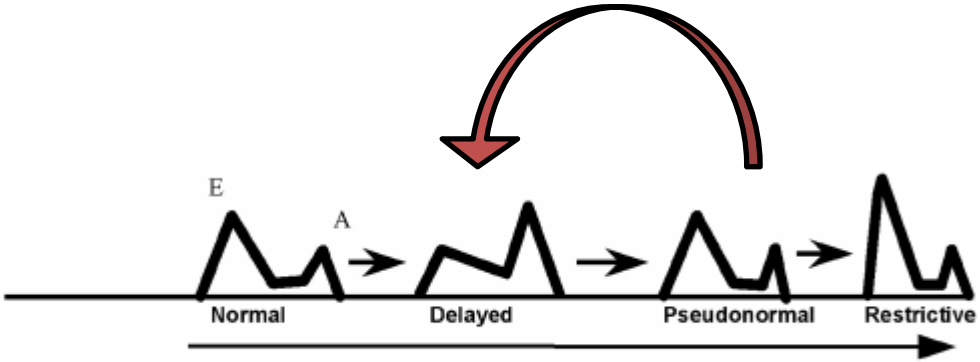
Diastolic function of the study population at baseline



E/A ≥ 1.5	E/A< 1	1≤ E/A ≤1.5	E/A > 2
e‘ >10	e ‘< 7	e ‘ < 7	e ‘ < 7
E/e’ < 8	E/e‘≤ 8	E/e‘ ≥ 8	E/e’ > 15
DT ≈	DT↑	DT ≈	DT ↓

Diastolic parameters at baseline and six months post TAVI

variable (mean ± SD)	*pre*	*Post*	*P value*
IVS (cm)	1.4±0.24	1.27±0.21	<0.0001
PWT (cm)	1.15±0.22	1±0.19	<0.0001
LVED (cm)	4.41±0.67	4.5±0.63	0.02
RWT	0.53±0.15	0.46±0.1	<0.0001
LV mass (gr)	270.1±76.4	245.1±75.8	<0.0001
E (cm/s)	96.9±30.2	98.8±30.7	0.6
DT (ms)	221.17±75.3	244±68.8	0.01
A (cm/s)	102.8±32.5	116.9±32.15	0.001
e' lateral (cm/s)	5.8±2.1	6.58±2.71	0.03
e' septal (cm/s)	4.61±1.69	4.5±1.23	0.62
E/A ratio	1.05±0.62	0.89±0.4	0.09
E/e' ratio	18.05±7.8	16.33±5.5	0.03
LA volume (mm^3)	88.1±30	80±28.9	<0.002
PAP (mmHg)	42.7±14.9	38.7±12.1	0.016


E
A
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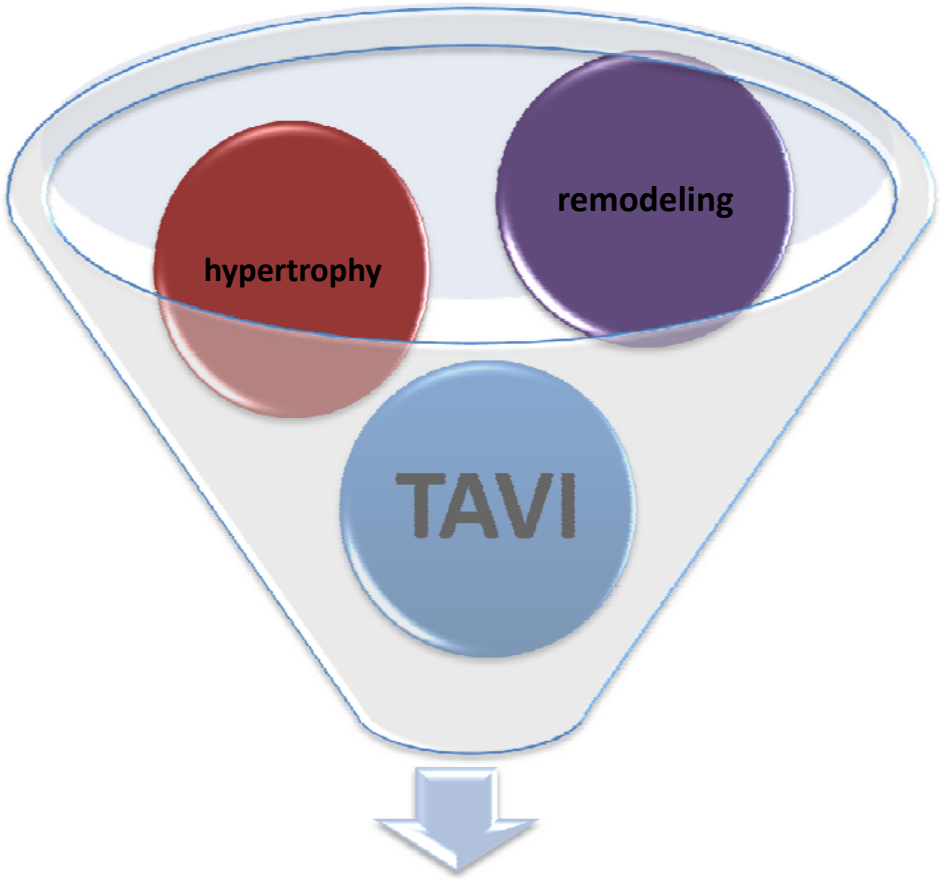
...but do all TAVI patients improve??

Diastolic parameters at baseline and 6 months post TAVI – concentric hypertrophy vs. concentric remodeling

variable	Concentric hypertrophy (54)		P value	Concentric remodeling (16)		P value
	pre	post		pre	Post	
E (cm/s)	100.2±30	101.2±32	0.8	87.8±25	90.3±21	0.6
DT (ms)	212.6±70	238±58	**0.04**	249.3±85	281.5±81	0.12
A (cm/s)	100.8±34	119.3±31	**0.0008**	110.1±27	114.1±30	0.5
e' lateral (cm/s)	5.8±2.1	6.5±2.8	**0.06**	6.2±2	6.7±2.1	0.6
e' septal (cm/s)	4.5±1.7	4.5±1.3	0.8	5.1±1.6	4.7±0.8	0.3
E/A ratio	1.14±0.6	0.88±0.3	**0.02**	0.78±0.23	0.79±0.17	0.8
E/e' ratio	19±8.3	16.6±5	**0.01**	14.3±3.6	15.8±5	0.6
LA volume (mm^3)	92.3±31	79.8±28	**0.0001**	71.7±24	78±28.2	0.2
PAP (mmHg)	43.8±15	38.5±10	**0.02**	39.8±14	34±5	0.2



TAVI might be more beneficial and effective for patients with concentric hypertrophy at baseline !

Conclusions

- Patients with severe aortic stenosis develop diastolic dysfunction with concentric hypertrophy or remodeling
- 6 month post TAVI, patient's diastolic function improves significantly
- Improvement in diastolic function parameters is almost exclusive to patients with concentric hypertrophy

Thank you