ACC.14
TCT@ACC-i2 | innovation in intervention

A1191
JACC April 1, 2014
Volume 63, Issue 12

Non Invasive Imaging

DISTINGUISHING PSEUDONORMALIZED FROM NORMAL FILLING BY FRACTIONATING E-WAVE DECELERATION TIME INTO ITS STIFFNESS AND RELAXATION COMPONENTS

Poster Contributions
Hall C
Sunday, March 30, 2014, 3:45 p.m.-4:30 p.m.

Session Title: Non Invasive Imaging: Myocardial Strain, Cardiac Mechanics and Diastolic Function
Abstract Category: 15. Non Invasive Imaging: Echo
Presentation Number: 1210-46

Authors: *Sina Mossahebi, Sandor Kovacs, Washington University in St. Louis, St. Louis, MO, USA*

Background: Pseudonormalized (PN) filling patterns indicate diastolic dysfunction. In PN filling transmitral E-and A-waves may be indistinguishable from normal (NL), requiring classification according peak E'. E-wave analysis via the parametrized diastolic filling (PDF) formalism allows fractionation of DT into stiffness (DTs) and relaxation (DTr) components such that DT = DTs + DTr. Simultaneous echo-cath has previously validated the fractionation method with DTs and DTr correlating with cath derived (MILLAR) stiffness (dP/dV) and relaxation (tau) with r=0.82 and r=0.94, respectively. We hypothesize that PDF analysis and DT fractionation can distinguish between normal and PN groups having indistinguishable, normal LVEF and E-wave patterns.

Method: We compared 10 age matched PN (elevated E/E') subjects to 10 NLs, by analyzing simultaneous echo-cath data (510 beats). Conventional DF parameters (DT, Epeak, Edur, E-VTI, and E/A), and PDF relaxation (cPDF) and stiffness (kPDF) parameters, DTs, DTr were compared.

Results: Conventional parameters (DT, Epeak, Edur, E-VTI, E/A) did not differentiate between groups. kPDF , cPDF ($p<0.001$), and DTs , DTr ($p<0.005$) differentiated between groups. Shorter DTs and higher kPDF in PN than in NLs indicate that PN chambers are stiffer than NL.

Conclusion: PDF parameters, relaxation and stiffness components of DT can differentiate normal and PN filling without requiring knowledge of E', and show that PN has increased stiffness compared to normal filling.

	Normal	Pseudonormal	Significance
Number of Subjects	10	10	NA
Age (y)	60±9	60±11	0.93 (NS)
Heart Rate (bpm)	66±8	65±8	0.68 (NS)
Ejection Fraction (EF) (%)	71±8	71±9	0.99 (NS)
LVEDP (mmHg)	14±3	19±4	<0.005
Peak E-wave (Epeak) (cm/s)	81±6	83±11	0.69 (NS)
Peak A-wave (Apeak) (cm/s)	72±10	76±12	0.46 (NS)
E/A (dimensionless)	1.2±0.2	1.1±0.1	0.42 (NS)
Peak E'-wave (E'peak) (cm/s)	15±4	9±2	<0.001
E/E' (dimensionless)	4.8±0.8	9.0±1.5	<0.001
E-wave deceleration time (DT) (ms)	180±10	185±14	0.37 (NS)
E-wave duration (Edur) (ms)	262±10	257±21	0.58 (NS)
E-VTI (cm)	9.9±1.9	10.7±1.0	0.33 (NS)
c PDF (1/s)	16.0±1.8	21.0±1.7	<0.001
k PDF (1/s2)	211±14	257±28	<0.001
DTr (msec)	43±8	61±14	<0.005
DTs (msec)	137±7	124±8	<0.005
NA not applicable, NS not significant			