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Transcatheter Closure of Atrial Septal Defect and the Effects on Right Ventricular Function; Strain and Strain Rate Echocardiography

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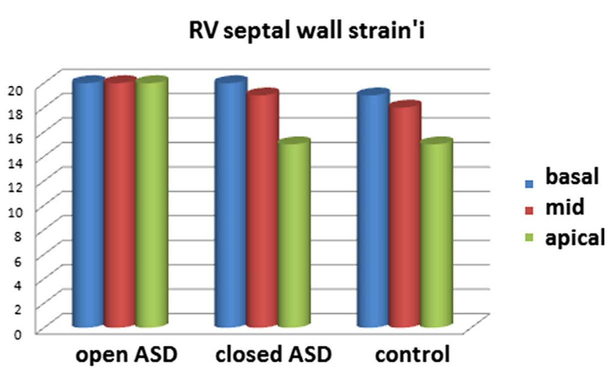
Aim: In this study, we investigated the effect of percutaneous closure of ASD on the right ventricular global and segmental strain (S)strain rate (SR) values.
Method and Results: Our study consisted of 22 patients with secundum ASD and 22 healthy subjects of similar age distribution and characteristics as control group. Patient and control groups were evaluated with conventional echocardiographic methods,in addition peak systolic S/SR was performed for the RV free wall and interventricular septum basal, mid and apical segments. In the patient group before closure with device and after at 3rd and 6th months, RV conventional echocardiographic variables and S/SR changes were evaluated. RA diameter and area, RV diameter, systolic and diastolic volume and area, Qp/Qs, TAPSE,SPAP was significantly higher in the patient group. RV FAC in the patient group was lower. After closure of ASD the RV diameter, RA area, RV systolic and diastolic volumes and area were significantly decreased. Also, before and at 3rd month after closing TAPSE was significantly reduced. After closure RVFAC significantly increased comparing to before closure. In the patient group Color Tissue Doppler parameters and derivatives (MPI,IVA)IVA significantly increased after closure. Patient and control groups GS and GSR were similar. When comparing PSS/SR there was no significant differences between the two groups concerning RV lateral basal,mid and apical S/SR and basal and apical septal S/SR and mid septal SR. Only mid septal S was significantly higher in the patient group. Even though the difference was not significant, the RV free wall S were higher in the control group, for the septum S it was opposite, higher in the patient group. There was no significant difference between GS/GSR before closure and at 3rd and 6th month after closure. But before and after closure at 3rd month basal and mid lateral S significantly increased. When comparing SR before closure and at 3rd month after closure septal basal, mid and apical segments is markedly reduced, apical and mid segments has reached the level of statistical significance, but the basal septal segment did not. When comparing the septum and RV free wall S before closure, basal, mid and apical segment S were not significantly different from each other, after closure there was a decline in septal S and an increase in RV free wall S. When comparing the septum and RV free wall SR before closure basal, mid and apical segment SR were not significantly different from each other, after closure with device septal S were decreased. Lateral SR to be significantly higher than the septal SR after closure of ASD.
Conclusıon: We have the idea that because of the ability of good volume discharge of RV free wall S (particularly in the basal and mid segments) it will reflect the RV deformation variability. Because the septal function decreased after transcatheter ASD closure, the implantation of the device to the İAS thought to contribute to deformation of the interventricular septum.



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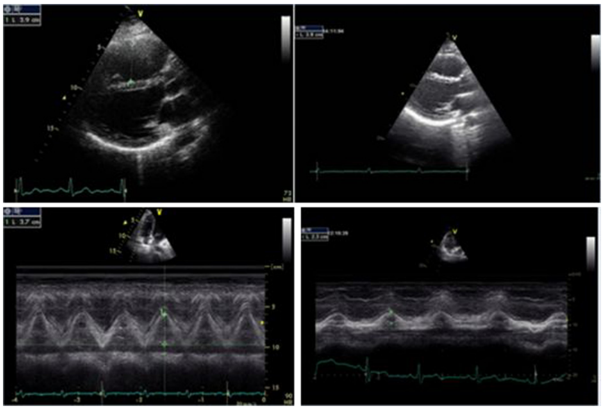
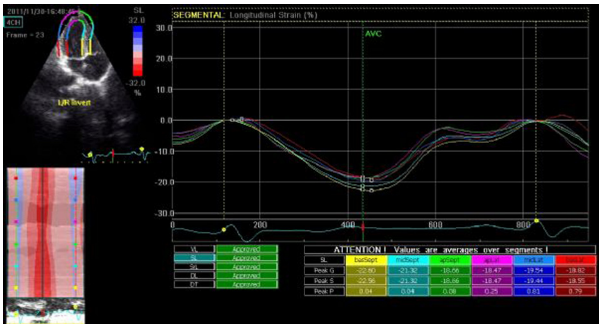
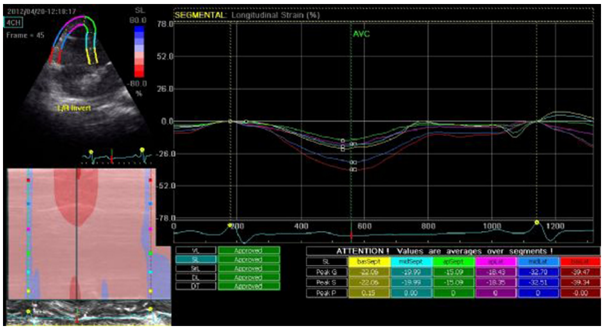


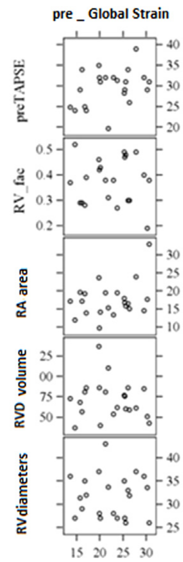




POSTERS

Correlation with right ventricular global strain and other parametres of right ventricul

Pearson Correlation Coefficients, N = 22 Prob > |r| under H0: Rho=0	
RV basic parameters	Pre GS
preTAPSE	0.36863 p = 0.0914
RV fac	-0.03302 p = 0.8840
RA area	0.33851 p = 0.1233
RVD volume	-0.12174 p = 0.5894
RVdiameters	-0.01615 p = 0.9431
RV diastolic area	-0.26769 p = 0.2284
RV sistolic area	-0.24901 p = 0.2638
RVS volume	-0.31048 p = 0.1596
RA diameters	-0.02990 p = 0.8949

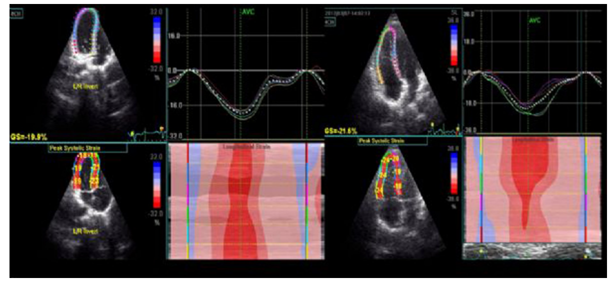


Baseline echocardiographic characteristics of the groups

	group of patients (n=22)	control group (n=22)	P
LV diastolic diameter (mm)	42.15 ± 4.07	40.76 ± 3.17	0.2136
LV sistolic diameter (mm)	23.69±4.57	20.20±4.03	0.0027
LA diameter (mm)	33.17±4.38	30.63±3.45	0.049
RV sistolic volume mm³)	32.75±10.31	15.05±2.92	< 0.001
RV diastolic volüme(mm³)	71.37±23.16	31.72±3.46	< 0.001
RV sistolic area (mm²)	14.80 ± 3.49	8.8 ± 1.22	< 0.001
RV diastolic area (mm²)	23.93 ± 5.14	17.83 ± 1.96	< 0.001
RA area (mm²)	17.53 ± 4.84	11.22 ± 1.406	< 0.001
RA diameters (d1/d2 mm)	48.96 ± 5.57/40.56 ± 6.24	40.81 ± 3.2/37.18 ± 3.51	0.0393 /< 0.001
RV fac (%)	37 ± 8.8	49 ± 8.9	0.0005
TAPSE (mm)	29.68 ± 4.4	23.09 ± 1.71	< 0.001
SPAP (mmHg)	34.27 ± 5.6	22.05 ± 2.96	< 0.001

Comparison RV parameters of the patients before and after of the closure

	Pre	Post		P1	P2
		3 month	6 month		
LV diastolic diameter (mm)	42.15 ± 4.07	45.11 ± 4.77	44.57 ± 3.61	< 0.0002	0.5689
LV sistolic diameter(mm)	23.69 ± 4.57	22.86 ± 4.02	22.71 ± 3.84	0.4477	0.7061
LA diameters (mm)	33.17 ± 4.38	33.72 ± 3.13	33.42 ± 3.15	0.2622	0.6605
RV diameter (PLAX, mm)	31.8 ± 4.57	24.14 ± 3.32	23.61 ± 2.67	<0.0001	0.3518
RV sistolic volume (mm³)	32.75 ± 10.31	17.50 ± 5.4	13.95 ± 3.87	<0.0001	0.0006
RV diastolic volume (mm³)	71.37 ± 23.16	41.12 ± 13.43	35.98 ± 8.48	<0.0001	0.0125
RV sistolic area (mm²)	14.8 ± 3.4	9.91 ± 1.56	8.6 ± 1.5	<0.0001	0.0158
RV diastolic area (mm²)	23.93 ± 5.14	18.54 ± 2.79	16.6 ± 3.10	<0.0001	< 0.0047
RA area (mm²)	17.53 ± 4.84	12.45 ± 2.75	12.11 ±2.81	0.0002	0.4112
RA diameters (mm)	40.56 ± 6.24/ 48.96 ± 5.57	35.47 ± 4.5/ 44.36 ± 4.99	33.66 ± 4.36/ 43.61 ± 5.33	0.0001/ <0.001	0.1255/ 0.3485
RV fac (%)	37.6 ± 8.8	45.8 ± 7.4	48.6 ± 7.3	0.0028	0.1762
TAPSE (mm)	29.68 ± 4.41	25.97 ± 2.97	23. 58 ± 2.97	0.0004	0.0017
SPAP (mmHg)	34.27 ± 5.6	24.41 ± 4.71	23.20 ± 3.92	< 0.001	0.2436
TRV (m/sn)	2.59 ± 0.31	2.14 ± 0.34	2.01 ± 0.23	< 0.0001	0.0235
RVSP (mmHg)	34.04 ± 5.9	23.55 ± 5.7	21.91 ± 4.3	< 0.001	0.3467



Comparison tissue-Doppler parameters of the patients before and after of the closure

	Pre	Post		p1	p2
		3 ay	6 ay		
TDI S (cm/s)	11.56 ± 1.65	10.94 ± 1.64	10.88 ± 2.52	0.3232	0.9523
TDI E (cm/s)	11.14 ± 1.9	9.50 ± 2.4	9.41 ± 1.47	0.0007	0.9984
TDI A (cm/s)	10.80 ± 2.39	9.91 ± 2.77	10.14 ± 3.90	0.4612	0.9854
E'/A'	1.03	0.95	0.92	0.4565	0.3954
IVRT (msn)	80.45 ± 21.84	77.57 ± 19.70	70.52 ± 18.46	0.2954	0.4343
MPİ	0.49 ± 0.13	0.44 ± 0.10	0.42 ± 0.11	0.1197	0.7258
IVA (m/s²)	2.76 ± 1.14	3.70 ± 1.45	3.94 ± 1.86	0.0018	0.1868

Global, regional peak right ventricular strain (%) and global right ventricular strain rate (1/s) in atrial septal defect patients before and 3 and 6 months after percutaneous closure.

	Pre	Post	Post		
		3. month	6. month		
Global strain (s -1)	-22.35 ± 5.19	-21.75 ± 3.2	-21. 74 ± 2.92	0.9143	0.1133
Lateral basal (s -1)	-24.05 ± 6.8	-29.63 ± 5.13	-26.78 ± 7.1	0.0039	0.1760
Lateral mid (s -1)	-24.19 ± 6.24	-27.55 ± 4.25	-25.69 ± 5.90	0.0151	0.2600
Lateral apical (s -1)	-22.97 ± 6.65	-20.30 ± 8.67	-19.93 ± 5.73	0.3141	0.9543
Septal apical (s -1)	-20.12 ± 6.9	-15.90 ± 8.42	-16.05 ± 6.48	0.0950	0.9551
Septal mid (s -1)	-20.89 ± 6.79	-19.56 ± 4.49	-19.39 ±4.77	0.5128	0.7700
Septal basal (s -1)	-20.92 ± 6.2	-20.72 ± 3.79	-19.37 ± 4.14	0.9732	0.1550
Global strain rate(s -1)	-1.25 ± 0.20	-1.30 ± 0.23	-1.28 ± 0.28	0.5667	0.5549
Lateral basal SR (s -1)	-1.71 ± 0.63	-2.05 ± 0.47	-2.01 ± 0.59	0.0783	0.7465
Lateral mid SR(s -1)	-1.58 ± 0.51	-1.68 ± 0.40	-1.73 ± 0.46	0.2725	0.9462
Lateral apical SR(s -1)	-1.61 ± 0.42	-1.43 ± 0.61	-1.27 ± 0.38	0.2854	0.2790
Septal apical SR(s -1)	-1.58 ± 0.34	-1.18 ± 0.54	-1.105 ± 0.51	0.0033	0.4519
Septal mid SR(s -1)	-1.48 ± 0.38	-1.29 ± 0.45	-1.19 ± 0.42	0.0090	0.1693
Septal bazal SR(s -1)	-1.62 ± 0.42	-1.42 ± 0.69	-1.01 ± 0.38	0.9143	0.7465

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Two-Dimensional Speckle Tracking Echocardiography for Assessment of Early Cardiac Function after Treatment of Patients with Overt Hypothyroidism

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Objectıve: Our aim was to evaluate cardiac function and myocardial contractility in patients with overt hypothyroidism using two-dimensional speckle tracking echocardiography (2D-STE) strain imaging and real-time three-dimensional echocardiography (RT3DE) and compare the changes at one month after starting the treatment.
Methods: Fourty-one patients with overt hypothyroidism and fourty age and body mass index matched healthy subjects underwent conventional echocardiography,