

## Right Ventricular Functions in Patients with Type 2 Diabetes Below 50 Years

Sir,

Left ventricular functions have been evaluated frequently in diabetes. There is, however, no literature on evaluation of right ventricular function in patients with diabetes. We performed detailed echocardiographic evaluation of right ventricular systolic and diastolic functions in patients of type-2 diabetes mellitus.

Twenty five patients with type-2 diabetes were evaluated after strict exclusion of conditions that could independently affect ventricular function. These included patients with systemic hypertension or history of antihypertensive drug therapy, autonomic neuropathy, microangiopathy, patients aged more than 50 years, smokers, history of chronic lung disease and those with a heart rate of < 60/min or > 100/min. Patients with history of angina or angina equivalents, abnormal resting electrocardiogram, positive stress test, inadequate echocardiographic evaluation, presence of any regional wall motion abnormality or even mild valvular lesions on echocardiography were also excluded. Mean age of onset of diabetes in these cases was  $42 \pm 2.6$  years. None of the patients had positive family history of premature coronary artery disease. Twenty five non-diabetic asymptomatic persons matched for age, sex, systolic and diastolic blood pressure without any abnormality on clinical examination, electrocardiogram, stress testing and echocardiography formed the control group. Statistical analysis was done using chi-square test.

There was no statistically significant difference in demographic and hemodynamic variables in the two groups. There was no statistically significant difference ( $P > 0.05$ ) between the two groups with regards to thickness of interventricular septum ( $9.2 \pm 2.0$  V/s  $8.8 \pm 1.8$ ) thickness of left ventricular posterior wall ( $7.9 \pm 1.6$  V/s  $7.4 \pm 1.6$ ), left ventricular ejection fraction ( $66.3 \pm 9.3$  V/s  $69.2 \pm 8.6$ ), fractional shortening ( $36.7 \pm 6.8$  V/s  $38.9 \pm 6.9$ ) and transmitral Doppler flow velocities (E/A ratio  $1.4 \pm 0.3$  V/s  $1.3 \pm 0.3$ , PHT- $55.8 \pm 10.8$  V/s  $49.8 \pm 12.3$ ).

Right ventricular echocardiographic findings are shown in Table 1. Right ventricular long axis fractional shortening and systolic excursion of tricuspid annulus were significantly lower in diabetics suggesting relative impairment of right ventricular systolic function. Pulmonary valve flow peak and mean velocities were also significantly lower in diabetics. This could be secondary to relative impairment of right ventricular systolic functions. Trans Tricuspid E-wave/A-wave velocity ratio were similar in the two groups and pressure half time was lower in diabetics suggesting that there was no impairment of right ventricular diastolic functions.

**Table 1 : Right sided echocardiographic findings in patients of type-2 diabetes**

Echocardiographic Parameter	Control	Diabetic	P value
Apical four chamber view RV long axis dimensions			
Fractional shortening FS (%)	31.6 + 7.7	26.8 + 7.5	< 0.05
Systolic excursion of Tricuspid annulus (mm)	23.7 + 3.3	20.9 + 2.9	< 0.01
Tricuspid Doppler flow velocities			
E wave/A wave velocity	1.20 + 0.32	1.12 + 0.40	> 0.05
Pressure half-time (m.sec.)	52.3 + 10.2	46.2 + 11.2	< 0.05
Doppler Pulmonary Flow velocity			
Peak velocity (cm/sec.)	94.3 + 16.8	82.1 + 12.6	< 0.05
Mean velocity (cm/sec)	59.7 + 11.8	50.2 + 7.3	< 0.01
Acceleration time (sec)	0.11 + 0.04	0.10 + 0.02	> 0.05

Increased collagen levels, increased cardiac sorbitol levels and impairment of calcium handling have been implicated in explaining systolic dysfunctions in diabetics.

Reason for early impairment of right ventricular systolic functions inspite of normal left ventricular functions in diabetics is not clear. Pulmonary flow acceleration time were similar in the two groups indirectly suggesting that there was no significant difference in pulmonary vascular resistance in the two groups. Left ventricular systolic and diastolic functions were also not different in the two groups. Diabetes is known to be associated with significant increase in the incidence of congestive heart failure even when patients with coronary artery disease are excluded.<sup>1</sup>

One histopathological study in hypertensive diabetic rat has shown predominance of right ventricular damage.<sup>2</sup> Reason for predominant involvement of right ventricle was, however, not clear.

We could not find any other reference in this regard. Predominant right sided failure has been described in other systemic diseases e.g. Beriberi<sup>3</sup>, amyloidosis<sup>3</sup> and thyrotoxicosis.

Our observations need further confirmation by histopathological and hemodynamic studies. We only wish to submit that while doing echocardiographic evaluation of diabetic patients, due attention should be paid to evaluation of right ventricular functions.

Treatment modalities for early right ventricular function abnormality are similar to those for early left ventricular function abnormality and include use of ACE inhibitors.

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New Office Bearers of API Tamil Nadu State Chapter (API TNSC) for the period 2007 to 2009

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Jt. Secretary	:	R Sehgal
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Department of Gastroenterology, SGPGI, Lucknow will organize **Mid-term Conference of Indian Society of Gastroenterology** on *Dilemmas in Clinical Practice and Preventive Gastroenterology: Stepping outside the Clinics* from **1<sup>st</sup> to 2<sup>nd</sup> September 2007**.

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