

LETTER TO THE EDITOR

**DETERIORATION OF LUNG FUNCTIONS IN TYPE II
DIABETIC SUBJECTS FROM NORTHERN INDIA**

Sir,

(Received on July 15, 2008)

Diabetes mellitus (DM) is one of the most common metabolic disorders affecting the functions of majority of body systems. Approximately 20% of world's diabetic population resides in South East Asia region. Many workers have reported either no change or lower pulmonary functions in diabetics than normal subjects ascribing different reasons (1–5). In a Japanese study, the incidence of pulmonary pathology was found to be 50% on autopsy (6). It has been suggested that pulmonary dysfunction may be one of the earliest measurable non-metabolic alteration in diabetes (7). Therefore, the present study was aimed to observe the status of pulmonary functions in diabetic subjects having no complications and to compare them with age and sex matched non-diabetic controls and find any gender variation.

The present study was conducted on 147 subjects including 95 diabetics (51 males and 44 females) and 52 age and sex matched controls (37 males and 15 females) taken from accompanying healthy subjects attending the Endocrine OPD of LLRM Medical College and associated Sardar Vallabh Bhai Patel Hospital, Meerut (UP). All the subjects were fully explained about the procedures to be carried out and written consent was obtained from them after getting approval from Institutional Ethical

Committee. Only those subjects having no history of smoking, known respiratory disease, congestive cardiac failure or volume overload and chronic complications of diabetes like neuropathy and retinopathy (confirmed by an Endocrinologist using bioesthesiometer and ophthalmoscope), were selected for the present work. The detailed history regarding the onset, duration and family history of DM was taken from all patients. Blood samples were collected from antecubital vein in all subjects and measurement of fasting blood sugar was done by glucose-oxidase method (8). The respiratory parameters were measured by computerized spirometer Spirolab II (MIR) with subject in sitting posture wearing a nose clip and breathing through the mouth piece as per recommendations of American Thoracic Society. Each subject was asked to take 3–4 normal breaths through the mouth piece of spirometer and then the subject was asked to take a slow and deep inspiration followed by blowing the air forcefully and rapidly. After one or two practice trials, highest of the three test readings taken from each subject was recorded as the final reading. Statistical analysis of all parameters was done by using unpaired Student's t test.

The mean values of all respiratory parameters were lower in diabetic subjects

Table I: Mean±SD of various physical and pulmonary parameters in study groups.

| SNo. | Parameters | Males | | Females | |
|------|-----------------------------|--------------|----------------|-------------|-----------------|
| | | Controls | Diabetics | Controls | Diabetics |
| 1. | n | 37 | 51 | 15 | 44 |
| 2. | Age (Year) | 47.89±12.50 | 49.76±8.57 | 48.13±14.47 | 45.59±11.10 |
| 3. | Height (cm) | 166.02±6.03 | 162.93±9.68 | 155.24±2.73 | 153.85±4.80 |
| 4. | Weight (Kg) | 64.51±8.29 | 63.80±9.51 | 62.20±4.22 | 60.25±11.01 |
| 5. | BMI (m/Kg ²) | 23.70±2.85 | 24.67±8.0 | 25.74±1.82 | 25.40±4.25 |
| 6. | Fasting Blood Sugar (mg/dl) | 98.05±8.99 | 214.63±48.52** | 100.00±9.40 | 153.84±72.53*** |
| 7. | FVC (l/min) | 2.05±0.42 | 1.75±0.39** | 1.56±0.30 | 1.54±0.34 |
| 8. | FEV ₁ (l) | 2.90±0.69 | 2.32±0.56** | 1.90±0.34 | 1.85±0.43 |
| 9. | FEV ₁ /FVC | 82.89±8.60 | 81.94±5.69 | 81.73±8.46 | 80.66±9.00 |
| 10. | PEFR(1/sec) | 7.63±1.97 | 4.96±1.64** | 4.25±1.35 | 3.44±1.05* |
| 11. | MVV(1/min) | 117.91±29.49 | 86.67±26.78** | 87.25±18.96 | 67.92±17.84* |

*P<0.05, **P<0.01, ***P<0.001 in comparison to respective controls.

of both sexes than non diabetic controls with greater reduction in male diabetics than females (Table I). The values of all lung functions were significantly (P<0.01) reduced in males diabetics but in females diabetics significant reduction (P<0.05) was observed only in PEFR and MVV.

Hyperglycemia in DM is known to have its effects on almost all body systems through alterations in structural and biochemical changes in tissues. The major cause is protein glycosylation which is responsible for thickening of basement membrane of various tissues leading to diffuse microangiopathy, demyelination and

chromatolysis of axons and Schwann cells. As the subjects suffering from neuropathy were excluded from the study, it may be postulated that such changes in pulmonary functions might be the earliest sign of diabetic neuropathy leading to differential activation of inspiratory muscles (9). Other reasons which may be ascribed are diminished elastic recoil of lungs (7), some genetic factor involved for abnormal collagen structure linked to genetic predisposition of DM or age related changes in lung functions which might appear early in diabetic males than females due to some yet unexplained mechanisms.

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