

COMPARATIVE ANALYSIS OF DYNAMIC PULMONARY FUNCTION TEST IN DIABETICS AND NON DIABETICS

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Abstracts:

BACKGROUND - Diabetes, a modern pandemic being a chronic progressive debilitating disease affects every organ of the human body in one or another manner. Lungs are one of major target organs in diabetes mellitus, mechanism of injury to lungs in diabetes mellitus includes non enzymatic glycosylation of proteins, microangiopathy, diabetic neuropathy of nerves supplying the muscles of chest wall, oxidative stress, polyol pathway, Nf-kb pathway and protein kinase c pathway. Exactly how and in what manner diabetes affects the lung function remains a subject of active research. This study shows the pattern of injury diabetes cause to the lungs, which will further indicate the possible mechanisms involved in lung injury in diabetics. **AIMS AND OBJECTIVES** – To find out the pattern of injury diabetes causes to lungs whether it is primarily restrictive, obstructive or combination of the both. **MATERIALS AND METHODS** – This study was a randomized controlled trial involving 30 diabetics and 30 healthy volunteers as control. Study was retrospective in nature and the instrument used was spiro excel digital spirometer by Medicaid systems at physiology department BJ MEDICAL COLLEGE AHMEDABAD **RESULTS**- The impairment of pulmonary function in diabetics was found to be primarily restrictive in nature with FVC % age in diabetics and non diabetics showing P value of 7.02726E suggesting statistically significant difference. No statistically significant difference was seen in FEV1/FVC % age of diabetics and non diabetics with a P value of 0.853593, suggesting no significant obstructive impairment of the airways in diabetes.

Key Words: Diabetes, FEV1, FVC%, FEV1/FVC, PEFR.

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Introduction:

Diabetes being a pandemic of our era is chronic progressive debilitating disease that affects every organ of our body. Considering how common diabetes has become now a days monitoring tool for assessing its progress and clinical complications is evolving at a rapid rate. Diabetes now a days in most tertiary care centres is being monitored in a holistic manner, which includes assessing for diabetic retinopathy, diabetic nephropathy, diabetic cardiomyopathy, peripheral neuropathy, autonomic neuropathy, certain newer modalities are being explored into like endothelial function, pulse wave velocity and spirometry. In this study we tried to find out the pattern of lung injury in diabetics, whether it is primarily restrictive or obstructive or a combination of both. Consistently high level of blood glucose leads to non enzymatic glycosylation of proteins in the lungs and the chest wall and make it less susceptible to proteolysis and leads to its accumulation in the lung connective tissue, which can explain the increased

stiffness of the lung parenchyma and the chest wall. Diabetes can do to the lungs what it does to the rest of the body, i.e. microangiopathy, in lungs microangiopathy can lead to reduction in diffusing capacity, which can further lead to loss of muscle endurance. The reduction in total lung capacity, vital capacity and lung compliance have also been observed in diabetics and loss of elastic recoil leads to dynamic collapse of the small airways in the lungs during expiration and diabetes even alters the level of surfactants thus altering pulmonary function.

Myopathic and neuropathic changes associated with diabetes can alter the efficiency of respiratory pump. Abnormal regulation of inflammatory mechanisms could cause exaggerated inflammatory responses in the lungs resulting in abnormal pulmonary function. Diabetic patients with impaired inflammatory control have higher level of markers - TNF alpha, ferritin, fibrinogen and C – reactive protein.

Thickening of alveolar epithelial and pulmonary capillary basal lamina has also been observed in diabetic patients which leads to reduction in DLCO in diabetic patients. Autonomic neuropathy can cause functional impairment of the respiratory system, through damage to bronchial neuro adrenergic innervation, thus altering ventilatory response to central and peripheral stimuli

Material and Methods:

- A This study was a randomized controlled trial involving 30 diabetics and 30 healthy volunteers as control.
 - Study was retrospective in nature and the instrument used was spiroexcel digital spirometer by Medicaid systems at physiology department BJ MEDICAL AHMEDABAD.
- The study was conducted on patients at sample collection center OPD no.69 at CIVIL HOSPITAL ASARWA, AHMEDABAD.

INCLUSION CRITERIA –

- Previously diagnosed diabetic patients having diabetes of at least 5 years duration, with in the age group of 30 to 60 years
- No history of smoking
- No history of tuberculosis asthma or any other respiratory disease.

EXCLUSION CRITERIA –

- Patient with known history of acute or chronic respiratory infections.
 - Patient with gross abnormalities of vertebral column or thoracic cage.
 - Patient with any neuromuscular disease or malignancy.
 - Subjects who have gone major abdominal or chest surgeries.
 - Patients with tobacco and drug addictions.
- The diabetic and controls were selected as per the inclusion and exclusion criteria.

- Procedure was explained to them in detail and written consent was obtained from them.

The basic parameters of the subject like age sex weight and height were recorded to obtain the predicted values in spirometry.

Result

PARAMETER MEASURED	DIABETICS MEAN+_SD	CONTROLS MEAN+_SD	P VALUE
FVC %age	43.01+_15.75	64.82+_23	7.02726E
FEV1%age	34.4+_16.8	45.2+_17	0.01961
FEV1/FVC %age	77.81+_26	76.6+_23	0.853593
FEF(25-75%)	32.92+_22.4	38.96+_16	0.23797

p value at 0.23797.

Discussion:

When FVC%age of 30 diabetics was compared to 30 controls, a strong statistical difference was found amongs them, with p value of 7.02726E-05, which indicates towards a restrictive damage done by diabetes to lungs reducing lung volumes like vital capacity.

When FEV1 amongst the 30 diabetics was compared to the 30 controls, a statistically significant difference was found with p value of 0.019162, but the strength of association was not as strong as in case of restriction.

When FEV1/FVC %age was compared among 30 diabetics and 30 controls, the mean was found to be slightly higher amongst diabetics, but the data was not statistically significant with a p value of 0.853593.

When FEF(25-75%age) was compared amongst diabetics and non diabetics mean was found to be slightly higher amongst non diabetic controls but the data was not statistically significant with

Conclusion:

- A strong correlation of restrictive lung damage with diabetes has been found in our study.
 - There is evidence of mild obstructive damage but the strength of correlation is not that strong.
 - No conclusive evidence of damage to small airways due to diabetes could be found in our study.

Acknowledgment:

I acknowledge the able guidance of Dr Geeta B. Nair madam under whom this study was conducted, I also want to thank Dr Kanu B. patel sir for giving me permission to conduct pulmonary function tests on diabetics at sample collection center OPD no. 69 at civil hospital Ahmedabad, I also want to than Mr Shailesh thakur head lab technician at sample collection center for arranging diabetic patients for my study.

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Disclosure: There was no conflict of interest.