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Research Article

Immunological Link in Type 2 Diabetes through Electro Photonic Imaging

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ABSTRACT

Introduction: Diabetes is getting into an epidemic form and significant effort is being put to check its spread. The present treatment consists of anti-diabetes medicines and some life style changes. Immunological link is associated with diabetes type 2 but it lacks conviction. In this study we wish to study whether we can reinforce the link through Electro Photonic Imaging (EPI).

Aim and objective: To find out link between immune organs and diabetes type2 through the study of EPI parameters and Bio chemical parameters, with the help of various statistical tools.

Material & Methods: Four hundred participants were scrutinized out which 199 participants were selected for the study. Four experiments were carried out **a)** Comparison of EPI parameters among normal, pre diabetes and diabetes **b)** Correlation of EPI parameters with Bio chemical parameters **c)** Comparison of EPI parameters in controlled and uncontrolled diabetes, **d)** Comparison of EPI parameters in pre and post Yoga intervention study.

Results: In all the 04 experiments, immune organ figured predominantly. There was significant difference in EPI values of immune organ between normal, pre diabetes and diabetes. Highly significant correlation was found between immune organ and diabetes. By comparing controlled and uncontrolled diabetes, highly significant difference was seen in the immune organ. In pre post study immune organ did not show significant change after intervention of Stop Diabetes Movement (SDM) Yoga module.

Conclusion: In all the four experiments conclusive association was seen between immunology and the diabetes type2. This reinforces earlier findings through modern medical research and suggests for introducing immune therapy alongside the conventional medicine for treatment of diabetes type 2. It also strengthens the justification for integrating Electro Photonic Imaging technique into modern medical research.

Keywords: Immunology; Electro Photonic Imaging; Diabetes Type2; Fasting Blood Sugar

INTRODUCTION

Diabetes type 2 is assuming an epidemic proportion throughout the world among the non-communicable diseases. Though developed and developing countries are most affected, the phenomenon is spreading across the globe [1]. Modern lifestyle, food habits, genetics and stress are believed to be responsible for the spread. The management of diabetes type 2 consists of diabetic medicines and changes in the lifestyle. Yoga is reported to be effective against stress and helps in adopting a healthy life style [2,3]. There are number of studies done to indicate the effect of yoga on immune system viz, immune response to stress [4], psycho–neuro immunological approach of yoga [5], effect of mind body therapies on immune system [6], effect of yoga on immunological markers in rheumatoid arthritis [7], to quote a few. While there is a definite etiology attributed to diabetes type 1, there is not a definite reason attributed to the occurrence of diabetes type 2 [8]. The former is an auto immune disorder and immunology comes into focus for the cause of this disease. Till now the modern medicine community is not able to conclusively attribute immunology to diabetes type 2. A few research papers mention regarding contribution of obesity to development of diabetes type2 but the mechanism is poorly understood [9]. There is a link of immunology in the development of obesity and diabetes type 2 [10]. Modern medicine has established biomarkers for detection of diabetes type 2. The most prominent at the moment are Fasting Blood Sugar (FBS) and Glycated Haemoglobin (HbA1c). Electro Photonic Imaging (EPI) is emerging as the indicator of energy levels in the body and in turn the health status [11,12]. The instrument is integrated into medical system in Russia [13]. There are many studies where changes have been seen in the pre post intervention stages through EPI [14]. Prominent among them are on cancer [15], asthma [16], hypertension [17], diabetes and cardiovascular diseases [18]. The principle of operation is based on electronic flow in the body. A high voltage pulse (10 KV, 1024 Hz) is applied for 0.5 seconds. An intense field is created around the object which produces gaseous discharge of light around the object. In the case of humans, electrons are extracted from the ten fingers and these high powered electrons bombard atmospheric molecules around the fingers and this causes gaseous discharge which is captured by a CCD camera. The image is transferred to computer and analyzed by the software [19].

AIM

The aim of this study is to explore the immunological link in diabetes type 2 through Electro Photonic Imaging.

MATERIALS AND METHODS

Four hundred participants from various 'yoga for diabetes' camps, were scrutinized. One hundred ninety nine participants were selected for various experiments. From these 102 participants were allotted to find the difference in values of selected EPI parameters and to find correlation between EPI and Bio chemical parameters. These participants were categorized into the normal, pre diabetes and diabetes on the basis of FBS score. Out of these 102 participants (mean age 51 ± 11 years) there were 52 males (mean age 54 ± 11 years) and 50 females (mean age 47 ± 10 years). They were categorized as: a) normal (29 participants, mean age 44 ± 11years), b) pre diabetes (13 participants, mean age 51 ± 11 years) and diabetes (60 participants, mean age 54 ± 9.6 years). The second experiment was to find difference between controlled and uncontrolled diabetes. Sixty participants (mean age 53.8 ± 9.62 years) were selected for this study. Out of these 35 were males (mean age 56.83 ± 8.72 years) and 25 females (mean age 49.56 ± 9.38 years). The third experiment was to find effect of Yoga on diabetes as measured through EPI parameters. Thirty seven diabetes participants (mean age 54.46 ± 7.21 years) were selected for this study. There were 24 males (mean age 57.46 ± 7.35 years) and 13 females (mean age 54.62 ± 6.83 years). EPI measurements were taken in the pre and post stages of SDM (Stop diabetes movement) Yoga intervention. The EPI parameters analyzed in these studies were Total area, Average intensity, Entropy, Fractality, Form coefficient, Integral area of Pancreas, Liver, Immune organs, Coronary vessels, Cerebral vessels, Left kidney and Right kidney [20]. The subjects were assessed on the inaugural day of the camp utilizing Electro Photonic Imaging (EPI) technique and the blood tests were taken. The data was taken over a period of 06 months from various diabetes related yoga camps and Arogyadham, a residential health center of Bengaluru based Yoga University, India.

Exclusion criteria

Participants with co morbidity; normal and pre diabetic participants on any medicines ; diabetic participants taking medicines apart from diabetes medications; participants suffering from any infectious or contagious diseases; persons with neurological disorder, drug abuse and psychological illness; physically handicapped persons with missing fingers; and females having menstruation or pregnancy on the day of measurement.

Sampling time

The data were taken in the morning hours with a gap of at least 3 hours after the last meal. The data in the camps were taken on the inaugural day of the camp. Data at Arogyadham was taken in the morning as well in the evening but ensuring a gap of 3 hours after the last meal. EPI was calibrated each time the place of taking measurement changed or as required. Informed consent was taken from all the participants before conducting the study. The study was approved by the institutional ethics committee of the S-VYASA Yoga University, Bengaluru.

Instrument

Kirlionics Technologies International (St Petersburg, Russia; GDV camera Pro with analog video camera, model number: FTDI. 13.6001.110310) was used for the assessment purpose. Along with the EPI software, it provided various features such as EPI screening, EPI scientific laboratory and EPI diagram.

Parameters analyzed

From the EPI scientific laboratory the following parameters were analyzed: Total area is an absolute value and is measured as the number of pixels in the image having brightness above the threshold; intensity is the evaluation of light intensity averaged on the area of the image; form coefficient and fractality are measures of irregularity in the image external contour; entropy reflects the level of non-uniformity of image, in other words, the level of stability of the energy field. EPI diagram/EPI screening grams give the integral area parameter, which is an index of the particular sector of image related to the organ in accordance with the principles of traditional Chinese medicine. This parameter, corresponding to liver, pancreas, immune organs, coronary vessels, cerebral vessels, left kidney, and right kidney, were analyzed. Integral area is a relative value and shows the extent to which the EPI gram deviates from an ideal model. It is an indicator of general health.

Data analysis

Data analysis was with the help of Microsoft Office Excel 2007 and R studio along with R Cmdr. Statistical tools used were independent 't' test, paired 't' test and correlation analysis [21].

RESULTS

For the purpose of this paper, we have concentrated on the immune organ parameter only. The results of first experiment are given in (Table 1 and Table 2). Statistical independent 't' test shows the difference between normal vs pre diabetes (-6.171; p = 7.362e-10), pre diabetes vs diabetes (5.890; p = 1.479 e-09) and normal vs diabetes (-0.281; p = 4.41e-08), all highly significant. The only other parameter which has significant difference between normal and pre diabetes is pancreas (-0.357; p = 0.027). The correlation analysis shows significant correlation between immune organs and diabetes (Table 2). Independent 't' test applied on the controlled and uncontrolled diabetes groups shows the difference only in immune organ parameter (0.201; p = 0.032), there is no significant difference in any other EPI parameter (Table 3). In the Yoga intervention group, after application of paired 't' test, the results are; immune organ (0.0517; p = 0.359), Intensity (0.3887; p = 0.5002) and Fractality (-0.0020; P = 0.6854). These three are the only EPI parameters which do not have significant difference in the pre-post stage (Table 4). This is very important and will be elaborated upon in the discussion. After examining table 1 we find significant difference between normal vs pre diabetes, only in immune organ *($p < 0.01$)* and pancreas ($p < 0.03$). There is no significant difference between normal and pre diabetes in rest of the parameters (Table 2). Shows significant correlation of FBS with immune organs (p = 0.05) in diabetes subjects. (Table3) show that there is no significant difference between controlled and uncontrolled diabetes, except in the immune organ parameter (p = 0.03).

Table1: Independent Sample 't' test between normal, pre diabetes and diabetes (Noteworthy).

EPI Parameter	Inter groups	t	df	*P* - value	Mean of differences
Immune organs	DIM,NIM	3.699	66.439	4.41e - 08	0.281
	DIM ,PDIM	-15.681	12.421	1.479e - 09	- 5.890
	NIM ,PDIM	-16.375	12.585	7.362e - 10	- 6.171
Pancreas	DPA, NPA	3.691	50.377	0.001	0.481
	NPA, PDPA	- 2.315	34.320	0.027	- 0.357

df- Degree of Freedom; p - level of significance, < 0.5 considered significant; t-student 't' test; D - Diabetes; PD - Pre Diabetes; N-normal; IM-immunity; PA-pancreas.

Table 2: Correlation of FBS with EPI parameters in normal, pre diabetes and diabetes (Noteworthy).

Group	FBS/with	t	df	p	r
Normal	Form Coefficient	1.943	27	0.062	0.350
Pre diabetes	Right Kidney	-2.459	11	0.031	-0.596
Diabetes	Immune organs	-1.956	58	0.055	-0.248
	Coronary vessels	-1.752	58	0.085	-0.224
	Entropy	-1.772	58	0.081	0.208

t-student 't' test, df-Degree of Freedom, p - level of significance < 0.05 considered significant
r- correlation coefficient varies between -1 to +1.

Table 3: Independent sample 't' test between controlled –uncontrolled diabetes.

Parameter	Controlled	Uncontrolled	t	df	p	Difference of means
Immune organs	0.196	-0.006	2.2044	52.786	0.03188	0.201

df- degree of freedom; p - level of significance, < 0.5considered significant; t-student 't' test
In pre post analysis the difference between pre and post condition is not significant in respect of immune organ, average intensity and fractality *($p > 0.1$)*, whereas it is so in other parameters (Table 4).

Table 4: Pre –post results of intervention group by paired 't' test.

EPI Parameter	t	df	P	Mean of differences
Av. Intensity	-0.6810	36	0.5002	-0.3887
Fractality	-0.4084	36	0.6854	-0.0020
Immune organs	0.9274	36	0.3599	0.0517

DISCUSSION

Diabetes is deriving world attention for it is growing rapidly. Modern medicine attributes many reasons for global reach on modern life style, food habits and stress [22]. Type 1 diabetes is attributed to immune disorder whereas genetic factors are risk factor for type 2 diabetes, apart from the factors stated above. There are few studies where type 2diabetes is also linked to immune system but the studies are inconclusive. It is recognized that a chronic low grade inflammation and an activation of the immune system are involved in the pathogenesis of obesity related insulin resistance and type2 diabetes. Systematic inflammatory markers are risk factors for the development of type 2 diabetes and macrovascular complications. Adipose tissue, liver, muscle and pancreas are themselves sites of inflammation in presence of obesity [23]. We have looked at diabetes from many aspects, carried various studies and analyzed through Electro Photonic Imaging. Our results clearly show that there is significant difference in the values of immune organ EPI parameter between normal and pre diabetes [24]. Out of all the parameters selected for analysis, we find this difference in immune organs and pancreas. This is indicative of the role of immunity in diabetes type 2. So the factors like life style, food habits, stress etc., weaken the immune system and that paves the way for diabetes type 2 to manifest. Immune organ parameter is the only parameter that appears significantly in all the studies. When we compare controlled and uncontrolled diabetes, there is no significant change in the parameters mainly because the changes /effects in the organs/systems have already set in, whether the diabetes is controlled or uncontrolled. However, only the immune organ shows significant change indicating its role and importance in diabetes type 2. We find a high correlation between immune organ EPI parameter and FBS [25]. Apart from the immune organ there is kidney. The most important observation is in the study related to pre post intervention. Seven days of yoga produces small changes in most of the parameters except the ***immune organ, intensity and fractality***. All these three parameters indicate that the duration of the Yoga program needs to be longer so that benefits can percolate down to immune system for sound health. Immune organs are the first to be affected and could be the last to show signs of complete recovery or reversal. Similarly intensity and factuality are parameters of general health and when these show a significant change, it indicates good health.

It is to the credit of this sound technology (which is not yet integrated into modern science) that we find such observations which will pave the way for complete change in the management of Type 2 Diabetes (T2D). The management may involve combination of conventional medicine along with the immune therapy. In fact Electro Photonic Imaging integrated into modern medical research may throw light on many not yet known/understood human body phenomenon. Modern research shows link between obesity, inflammation and diabetes type 2 but the mechanism is not established. That is why immunological tests are not the routine tests in the clinical practice. *Donath & Shoelson,* have mentioned in their paper that components of the immune system are altered in obesity and type2 disease. These immunological changes include altered levels of specific cytokines and chemokines, changes in the number and activation state of various leukocyte populations and increased adoptosis and tissue fibrosis. Together, these changes suggest that inflammation participates in the pathogenesis of T2D. Preliminary results from clinical trials with salicylates and interleukin-1antagonists support this notion and have opened the door for immune modulatory strategies for the treatment of T2D [26]. Such management would lower blood glucose levels and potentially reduce the severity and prevalence of the associated complications of this disease. EPI results have also shown a link between immune organ and the diabetes type 2. Thus EPI has the potential to serve as an extremely powerful and comprehensive medical diagnostic tool, capable of showing malfunctions of the body long before any physical symptoms become evident. EPI provides clues which the modern science can take forward and thus EPI can be an integrated part of the modern research.

LIMITATIONS OF THE STUDY

There was no funding for this research work. Immunological tests available in the modern medicine could not be carried out on the subjects to corroborate with the results. More work needs to be carried on larger sample sizes to integrate EPI as a holistic diagnostic tool.

STRENGTH OF STUDY

Immunological link to diabetes type 2 is established through this study, irrespective whether the diabetes is obesity induced. Earlier studies have mentioned the link between obesity inflammation and diabetes type 2.

IMPLICATIONS OF THE STUDY

Though earlier studies have tried to establish the immunological link to diabetes but it still lacks conviction. As a result immune therapy does not form the part of management/ treatment of diabetes type 2. With definite link established through Electro Photonic Imaging, immune therapy can be considered a supplementary treatment along with the conventional medicines for the treatment /management of diabetes type 2.

CONCLUSION

Electro photonic imaging technique is extremely useful in revealing the biological state or the state of functioning of organs/ systems. Changes in the energy level in organs can be read from the parameters of EPI images much before a disease is manifested. It may actually provide leads like in the current study. EPI when integrated with modern research and medicine develops into strong holistic approach [27]. The initial lead can come from EPI, the modern medical research can take it forward to form explanation at the cellular or genetic level. We have confirmed the immunology link with diabetes type 2 through EPI. It is time that immune modulators form part of the treatment regimen along with conventional medicine for diabetes type 2. Yoga has proved to be an immune modulator and besides there are immune therapies in the conventional medicine also. Yoga needs to be longer for the effects to percolate to the immune organs.

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