

Palestine Health Research Results

Diabetes mellitus



المقدمة:

يعتبر البحث العلمي من أهم الأنشطة الإنسانية التي يمارسها الإنسان فوق سطح كوكب الأرض في هذا العصر وفي العصور السابقة، وقد كان البحث العلمي على مر الأزمنة أساس النهضات والتقدم والتطور، وما ننعم به اليوم من رقي وحضارة هو نتاج البحث العلمي المستمر بمختلف مجالاته.

ويعرف البحث الصحي بأنه كل جهد علمي منظم يهدف إلى تنمية المعرفة و المهارات في المجالات الصحية المختلفة و إيجاد الطرق الأفضل للوقاية والعلاج من الأمراض وكذلك تطوير نظام صحي قادر على الاستجابة بفعالية ونجاعة لاحتياجات السكان في ظل بيئة صحية ديناميكية.

وأيضا فإن البحوث الصحية يمكن أن توفر معلومات هامة حول اتجاهات الأمراض وعوامل الخطر، ونتائج البرامج أو التدخلات الصحية العامة، وأنماط الرعاية المختلفة وتكاليف الرعاية الصحية واستخدامها، وكذلك يمكن أن توفر معلومات هامة حول فعالية التدخلات الطبية والجراحية، وتحسين استخدام الأدوية واللقاحات، أو تطوير الأجهزة الطبية، وطرق التشخيص.

كما أنها حيوية لتسجيل وتقييم الخبرة في الممارسة السريرية من أجل وضع مبادئ توجيهية لأفضل الممارسات وضمان الرعاية العالية الجودة للمرضى.

ونحن في وزارة الصحة وإدراكا منا للدور الهام للبحث العلمي وكذلك للمسئولية والدور المناط بنا في قيادة مسار التطوير والتدريب أتحنا الفرصة للباحثين وطلبة كليات الطب والصيدلة والعلوم الطبية الأخرى لعمل الأبحاث والتدريب في مرافق وزارة الصحة المختلفة ضمن الضوابط والقوانين المنظمة والمعمول بها من أجل تحقيق الهدف والنهوض بالقطاع الصحي من خلال دعم التعليم الطبي والبحث الصحي.

ونحن في الإدارة العامة لتنمية القوى البشرية نقوم بتنظيم ومتابعة هذا النشاط البحثي من خلال دائرة البحث الصحي التي تقوم في هذا المجال بـ:

- الإشراف علي هذا النشاط البحثي داخل مرافق الوزارة
- توجيه الباحثين للأماكن التي سيقومون بتنفيذ الأبحاث بها
- التأكد من الإجراءات التي تحفظ حقوق المبحوثين
- تدقيق الجانب الأخلاقي من الأبحاث
- الحفاظ على ممتلكات الوزارة.
- توثيق الأبحاث التي يتم انجازها
- توصيل نتائج البحوث لذوي العلاقة والمهتمين وصناع القرار في الوزارة.
- عمل الإحصائيات والتقارير المتعلقة بالأبحاث

لكن يبقى السؤال الملح وهو كيف يمكن الاستفادة من هذه الأبحاث ونتائجها في تطوير وتحسين الخدمات الصحية؟ لذلك قمنا بإنشاء صفحة على شبكة الانترنت (ضمن موقع الوزارة) خاصة بعرض ملخصات البحوث التي تجرى في الوزارة، كما قمنا بتصنيف رسائل الماجستير (التي حصلنا عليها من الجامعات و الباحثين) إلى عدة موضوعات وقد بدأنا بإعداد مجلة تشمل ملخصات الرسائل العلمية ونتائجها وتوصياتها من أجل توصيلها لذوي العلاقة والمهتمين وصناع القرار في المستويين الطبي والإداري.

Table of Contents

No.	Title	page
1	The Role of Helicobacter Pylori Infection, Malnutrition and Insulin Resistance among Type 2 Diabetic Medical Services Patients in the Gaza Strip: A Cross-Sectional Study	4
2	Islet Amyloid and Selected Trace Elements among Type 2 Diabetes Mellitus Patients in Gaza City	7
3	Biochemical Parameters among Type 2 Diabetic Patients with Erectile Dysfunction in Gaza City	10
4	Cystatin C and Other Markers of Nephropathy Among Type 2 Diabetic Patients in Gaza Strip	12
5	Association of serum Zinc, Magnesium, Iron and Copper among Type 2 Diabetic Patients in Gaza City	15
6	Polycystic ovary syndrome in women with type1 diabetes in Gaza Governorate	18
7	The Effect of Vitamin C Alone or in Combination with Vitamin E on Fasting Blood Sugar, Glycosylated Hemoglobin and Lipid Profile among Type 2 Diabetic Patients (Gaza Strip)	20
8	Assessment of Apolipoprotein C- III as A predictor of Cardiovascular Diseases among Type 2 Diabetic Men in Gaza Strip	23
9	Renoprotective Effect of Aliskiren Monotherapy and Aliskiren-Pentoxifylline Combination vs Other Renin-Angiotensin System Inhibitors in Hypertensive-Diabetic Type 2 Patients with Diabetic Nephropathy (Gaza Strip)	26
10	Assessment of Helicobacter pylori infection as risk factor for type 2 diabetes mellitus in Gaza strip	29
11	Adequacy of Glycemic Control and Serum Lipid Profile in Hemodialysis of Palestinian Patients with Diabetes Mellitus	32
12	Assessment of Dietary Habits on Risk Profiles and Complications among Type 2 Diabetic Patients at Al-Remal Clinic in Gaza Strip	35
13	Leptin Status and some Biochemical Parameters among type 2 Diabetic Females in the Gaza Governorate, Gaza Strip.	39
14	Resistin hormone level among Type 2 Diabetic Patients in Gaza Governorate	42
15	Homocysteine and Some Biochemical Parameters in Type 2 Diabetic Patients from Gaza Governorate	44
16	Obestatin level and some biochemical parameters in type 2 diabetic women attending Medical Relief Center in Gaza Governorate	47
17	Detection of Some Enzymes and Transferrin as Early Diagnostic Markers for Diabetic Nephropathy among Type-2 Diabetic Patients in Gaza	49
18	فاعلية برنامج إرشادي تدريبي لخفض الضغوط النفسية وتحسين التوافق النفسي لدى مرضى السكري بمحافظة غزة	51

The Role of *Helicobacter Pylori* Infection, Malnutrition and Insulin Resistance among Type 2 Diabetic Medical Services Patients in the Gaza Strip: A Cross-Sectional Study

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Abstract

Background: Diabetes mellitus means the increase in blood glucose above the normal range. With T2DM, the more common type, and the body does not make or use insulin well. In patients with DM, chronic infections are frequent and severe, due to the impairment of their immune status, *helicobacter pylori* are one of the most common infections worldwide. Available data on the possible association between *H.pylori* infection and DM are contradictory.

There are only a few studies in the Middle East, and the present study is the pioneer study, first conducted in the Medical services Clinics in the Gaza Strip.

Objectives: This study was conducted to reveal the prevalence of *H. Pylori* infection, malnutrition, and insulin resistance among T2DM patients, to describe the dietary requirements of T2DM patients, to highlight the need for better education in clinical nutrition of medical staff in Clinics, finally to evaluate the current information about diet, and lifestyle in the prevention of *H. Pylori*, and malnutrition.

Methodology: Across-sectional study was conducted in the Medical Services Clinics in the Gaza Strip, were 129 patients included in this study. Data was collected through direct methods that included hematological information and indirect methods through a structured interview questionnaire.

Results: The results of this study showed a highly significant percentage of *H. Pylori* (70.5%) among the diabetic patients including in the study, But not indicate any significant association between gender and *H. Pylori* status.

Conclusion: The study contributes in highlighting the relationship between DM patients, malnutrition and *H. Pylori*. Patients should update their sugar level values in the record, and should get exercise and diet plan for every meal.

Recommendation: Encourage patient's education as it imparts knowledge and thus modify dietary habits and quality of food consumed, and provides possible intervention strategies to diabetic patients, that could improve the understanding of DM& *H. Pylori* etiology in our country, especially in the new discover cases of T2DM. And further research are needed in consideration the impact of *H. Pylori* upon patients with chronic diseases.

Key words: Type2 diabetes mellitus, *Helicobacter Pylori*, Insulin Resistance, Malnutrition.

Conclusion

In the present study *H. pylori* infection, insulin resistance and malnutrition in type 2 DM patients was assessed using 129 patients from Gaza Strip, both male & female aged between 35 and 70 years old. A structured interviewed questionnaire about socio-demographic, *H. pylori* infection, drugs history and lifestyle were used anthropometric measurements and some biochemical analyses such as plasma glucose, c-peptide, HbA1c, *H. pylori* IgG ,were done for all subjects.

The collected information were analyzed statistically to identified and evaluate the possible relationship between *H. pylori* infection, malnutrition and the insulin resistance, among patients with type 2 DM by using with SPSS for Windows (version18), and chi-square and logistic regression analyses.

1. The results show that there are significant differences between the means of the C- peptide and HbA1c categories, where there is a significant difference between the means of the FBS categories at 0.1 level of significant.
2. This study demonstrate the strong relationship between *H. pylori* infection as a risk factor for insulin resistance, more than 70.5% of the samples found to have positive *H. pylori*.
3. We can conclude that there is insignificant association between the *H. pylori* and diabetes mellitus history (the duration of diabetes). *H. pylori* infection is not associated with duration of diabetes,
4. The study exhibited a positive significant difference between the means of weight for persons with positive and negative *H. pylori* status. Consequently, the mean of BMI of positive groups is significantly higher than the mean BMI for the negative group.
5. The study results show that there is a significant association between the *H.pylori* and smoking status of the participants. the study results show that the mean of C- peptide for smokers is significantly less than non smokers.
6. The results suggest that data seem to indicate a potential association between *H. pylori* infection ,malnutrition and IR, further studies are needed to strengthen this association and to clarify whether there is a causative link between them.

Therefore, we may hypothesize that *H. pylori* infection ,malnutrition acts in the pathways of the resistance of insulin .

Recommendation

We can resume our recommendations on 3 main targets: for healthy professionals, for patients and for policy makers as follow:

For Healthy professionals

- 1- Serum *H. pylori* should be integrated into routinely paraclinical investigations in all patients with type 2 D.M.
- 2- Establishment of nutritional status through eating a healthy balanced diet containing different macro and micronutrients, eating breakfast daily, eating saj and brown breads with bran, and other grains, drinking at least three cups of milk or yogurt daily, increasing eating of vegetables and fruits, to take adequate amounts of fibers, and to control the sugar blood level.
- 3- Nutritional states also should be integrated into clinical routine in all patients with type 2 D.M. especially in the new discover cases of type 2 DM.
- 4- Greater attention of the eradication of *H. pylori* has been shown to play important roles in the etiology of other chronic diseases.

- 5- Encourage patient's education as it imparts knowledge and thus modify dietary habits and quality of food consumed.
- 6- Documentation through different media is very important. to increase the awareness on the importance of nutritional status of type 2 DM patients life, and rise medical informations regarding *H. pylori* to health stuff.

For Patients

- 1- Patients should update their sugar level values in the record, and should get the exercise and diet plan for every meal.
- 2- An adequate lifestyle, socioeconomic factors, and some biochemical alterations could play an important role in the etiology of type 2 DM patients.
- 3- To improve the sugar level in patient's blood that can have a powerful effect on a series of pathologic conditions that represent a major source of morbidity and mortality in our society.
- 4- Patients with *H. pylori* positive should avoid that foods in their diet:
 1. Spicy foods and powders which include black or red pepper, chili powder, mustard seeds, nutmeg or cloves should be avoided on an *H. pylori* dietas they will promote the growth of bacteria.
 2. Foods and drinks which are tomato based should be avoided.
 3. Replace your regular vinegar needs with apple cider vinegar.
 4. Foods with high fat content as well as fried foods should be eliminated on an *H. pylori* diet.
 5. Refined foods such as sugar, artificial sweeteners, chocolates, and pastries should also be avoided when *H. pylori* is active.
 6. Steer clear of coffee, whether regular or decaffeinated, soda, tea and alcohol.
 7. Pasta and bread made with white flour should be limited.
 8. Although healthy oils such as olive or canola are suggested, pass up on foods made with hydrogenated oils.
 9. Limit foods which enhance acid production such as cabbage

For Policy makers

- 1- Further studies are needed to study the relationship between different nutritional problems, with *H. pylori* ,and type 2 DM, in other hospitals than medical services or several hospitalsas (Al-Shefa, Kamal Odwan, and others).
 - 2- Further research are needed in consederation the impact of *H. pylori* upon patients with chronic diseases.
- Finally this study could help in developing policy and determine an essential requirement for comprehensive care, and nutritional intervention which, could lead to development of better therapeutic and preventive strategies for dealing with this disease.

Islet Amyloid and Selected Trace Elements among Type 2 Diabetes Mellitus Patients in Gaza City

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Abstract

Background: Diabetes mellitus is one of the most worldwide spread chronic diseases, and its complications are very serious if it is untreated. Amyloid deposits derived from a peptide called amylin are found in the pancreas in the vast majority of cases of type 2 diabetes mellitus (T2DM). Free Fe and Cu ions are the most redox-active metals in mammalian tissues, where they may contribute to tissue damage by generation of reactive oxygen species (ROS) such as hydroxyl radicals. It has not been established if altered transition metal metabolism, play a role in the forms of heart disease that complicate the major classes of diabetes or if altered transition metal ion metabolism plays a role in islet amyloid or β -cell toxicity. The hypothesis that T2DM individuals have high levels of islet amyloid polypeptide (amylin) and impaired levels of trace elements which may be involved in the toxicity of the amylin peptide among T2DM patients have been investigated.

Objectives: To investigate the concentration of selected trace elements and islet amyloid level among T2DM in comparison with control.

Materials and methods: For this project, ELISA (Enzyme Linked Immunosorbent Assay) technique was used to detect amylin level. Blood sugar and metal ion level such as Copper, Zinc, Iron, and Magnesium were detected by colorimetric methods in the serum of T2DM patients and control. Variations in the concentration of trace elements and amylin levels in T2DM and non-diabetic control were statistically analyzed and evaluated. SPSS software was used to analyze obtained data.

Results: There was statistically significant difference between patients and controls in the blood sugar level, Zn, Mg and amylin ($p < 0.05$) with negative correlation for Zn and Mg and positive correlation for amylin. There was statistically significant differences for patients who suffer from diabetic coma for blood sugar, and Zn ($p < 0.05$). Patients with neuropathy have statistical significant value with the level of Zn ($p < 0.05$), While, Copper and iron didn't show any difference ($p > 0.05$). There was significant negative correlation between blood sugar and Zn ($p = 0.006$) also there iv were significant positive correlation between Cu and both of Zn ($p = 0.026$) and Mg ($p = 0.014$).

Conclusion: There were significant differences between healthy group and diabetic group with regard to the level of trace elements (Zn, Mg) and amylin hormone. Diet and food restriction was a helpful tool in managing and controlling of diabetes and then minimizing the risk of diabetes

complications. Blood sugar level, amylin hormone and Fe were influenced with age while, Fe was only influenced with sex. Mg level was influenced with smoking in patient's group. Blood sugar and Zn levels were altered in diabetic patients with diabetic coma. In diabetic neuropathy patient's Zn level was significantly low compared with patients who don't have neuropathy.

Keywords: Type 2 diabetes mellitus, Trace elements, Copper, Zinc, Amylin, Iron, Magnesium.

Conclusions

The findings suggested that amyloid formation and trace elements disturbance may have an important role in the pathogenesis of T2DM, and ultimately in the degeneration and death of pancreatic islet cells. These findings provided a new rationale and opening up additional avenues of research into the aetiology, pathogenesis and in the treatment of T2DM. The findings of this investigation may prove significant in future research, especially if they are implemented in further research *in vivo*. Understanding the potential involvement of copper ions in amylin-induced β -cell toxicity is identified as an important area for further research.

However, several conclusions could be drawn from our study:

1. T2DM patients have impairment in trace elements especially Cu, Zn, Mg and amylin hormone.
2. There were significant differences between healthy group and diabetic group with regard to the level of trace elements (Zn, Mg) and amylin hormone.
3. Diet and food restriction was a helpful tool in managing and controlling of diabetes and then minimizing the risk of diabetes complications.
4. Diabetic retinopathy and neuropathy were the most frequent complications of diabetes among diabetic patients in this study.
5. Amylin hormone and Fe were influenced with age while, Fe was influenced with sex.
6. Smoking as a bad behavior has an effect of Mg level in patients group.
7. Blood sugar, and Zn levels were altered in diabetic patients with diabetic coma
8. In diabetic neuropathy patients Zn level was significantly lower than healthy individuals.

Nevertheless T2DM is a serious problem that is now reaching epidemic proportions; further understanding of the factors involved in the aetiology and pathogenesis of this disease may aid in the identification of novel therapeutic targets and strategies.

Recommendations

In the light of these findings the following recommendations may considered to improve the management of diabetic patients and to minimize the risks diabetes complications :

1. Increase the awareness of the importance of physical exercise and food restriction among diabetic patients to avoid unnecessary medication or complications.
2. Physicians could take in their considerations the importance of monitoring trace elements level in the blood of diabetic patients which could be helpful in improving the diabetic patient's general health conditions, controlling blood sugar level and reduce the risk of diabetic complications.

3. This study needs to be expanded in term of data which should be collected, additional tests should be done, and more precise techniques could be used.

Limitations

In this study one or more obstacle was faced in carrying out assays.

1. Atomic absorption was supposed to be used in measuring the level of trace elements in both patients and control groups but the instrument was not working during the whole period in all universities and research centers in Gaza Strip. Usage of such instrument could give more sensitivity in measuring trace elements. However, all precautions and quality control roles were carried out through all assays done in our study and approved and well established techniques were chosen according to other studies.

Biochemical Parameters among Type 2 Diabetic Patients with Erectile Dysfunction in Gaza City

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Abstract

Background: Patients with type 2 diabetes mellitus (DM2) are more often have disturbances of sexual and reproductive functions. There is increasing recognition that hypotestosteronaemia is associated with DM2, cardiovascular disease (CVD), visceral obesity, insulin resistance (IR) and dyslipidemia.

Objectives: The main objective of this study is to investigate biochemical parameters in DM2 patients with erectile dysfunction (ED) in Gaza city.

Materials and Methods: This study is a case control study, and was carried out in Gaza city during the period (April to October, 2013). A total of 160 males aged 35 – 60 years were recruited; 80 DM2 patients and 80 as controls. Anthropometric, demographic, sexual and clinical data were obtained by questionnaire. Ten ml of blood were obtained for determination of fasting blood glucose (FBG), cholesterol, triglycerides and high density lipoprotein-cholesterol (HDL-C). Glycated hemoglobin (HbA1c) was determined.

Testosterone and insulin levels were analyzed by enzyme immunoassay. Low density lipoprotein-cholesterol (LDL-C) and homeostasis model assessment for insulin resistance (HOMA-IR) were calculated. Ethical approval was obtained. Data were analyzed using statistical package for social sciences (SPSS) software version 18 to find association, correlation and relationships.

Results: Increased prevalence of high BMI and HOMA-IR was observed among DM2 patients, in addition to high prevalence of low testosterone level ($p < 0.05$). Testosterone was correlated negatively and significantly with BMI and duration of DM2 ($p < 0.05$). ED was correlated significantly and directionally with duration of DM2, and complications of diabetes ($p < 0.05$). While, nocturnal/early morning erection (NEME) was correlated significantly but inversely with duration of DM2 ($p < 0.05$). In addition, duration of DM2 and low level of testosterone could be used as predictor factors associated with ED ($p < 0.05$), while increased BMI was a predictor factor associated with low testosterone level ($p < 0.05$).

Conclusion: In the present study, high incidence of low testosterone and increased prevalence of ED among DM2 patients could be attributed to uncontrolled DM2, obesity, IR, dyslipidemia, complications and long duration of DM2.

Keywords: *Type 2 diabetes mellitus, erectile dysfunction, insulin resistance, obesity, dyslipidemia, Gaza.*

Conclusions

1. Testosterone plays a critical role in male reproductive and metabolic function and incidence of low testosterone in the present study was higher in DM2 patients than controls. As a result ED is common among DM2 patients and diabetic men were affected earlier than non-diabetic men.
2. Prevalence of high BMI was higher in DM2 patients than controls and low testosterone may be a result of increased obesity of DM2 patients.
3. Prevalence of IR among DM2 patients was higher than controls, this could lead to decreased glucose uptake by the pituitary and gonads leading to hypogonadism and low testosterone level.
4. High incidence of dyslipidemia among DM2 patients may be attributed mainly to abnormal cholesterol, triglycerides, and HDL-C levels, which is considered as one of the important risk factors that increases incidence of ED.
5. Long duration of DM2 and prolonged elevation of glucose lead to IR, dyslipidemia, and low testosterone level.
6. Increased BMI and long duration of DM2 were independent predicting risk factors associated with low testosterone level.
7. High level of blood glucose and long duration of DM2, in addition to low testosterone level were determined to be of the leading independent predicting risk factors associated with ED.

Recommendations

1. Inform DM2 patients with its complications including ED.
2. Sexual health education including psychological support of patients suffers ED, provide relevant information, and increase clinician awareness of the need to address men's sexual health and implement appropriate strategies.
3. Continuous monitoring of FBG, HbA1c, testosterone, and lipid profile for DM2 patients to predict risk factors and early detection of ED.
4. Factors that can improve FBG, HbA1c, cholesterol, triglycerides, HDL-C, and decrease BMI and IR such as diet and exercise may be beneficial for DM2 patients.
5. More researches to be executed concerning other factors, (other hormones, enzymes, substrates, and effect of drugs), which contribute to ED.
6. Defining optimal cut off of HOMA-IR for the diagnosis of IR in Palestinian population.
7. Measuring the degree of ED among Palestinian population using IIEF-5 scoring system questionnaire to predict the association between ED and MS.

Cystatin C and Other Markers of Nephropathy Among Type 2 Diabetic Patients in Gaza Strip

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Abstract

Background: Nephropathy is a significant cause of morbidity and mortality in patients with diabetes mellitus (DM). The condition is characterized by persistent albuminuria and may be decline in the glomerular filtration rate (GFR). Serum cystatin C has been proposed as a simple, accurate, and rapid endogenous marker of GFR.

Objectives: To assess serum levels of cystatin C and some biochemical parameters among type 2 diabetes mellitus (T2DM) patients in Gaza Strip and whether these levels vary with stages of diabetic nephropathy (DNP).

Methods: In this study, 95 patients and 95 controls were enrolled. Body mass index (BMI) and blood pressure were measured after conducting face to face interview for each participant. Morning fasting blood and urine samples were obtained for measurement of serum cystatin C, creatinine, urea, glucose, lipid profile, and urine albumin and creatinine. The albumin to creatinine ratio (ACR) was calculated. Serum cystatin C and urine albumin were measured by particle enhanced immunoturbidimetric assay.

Serum and urinary creatinine, serum urea, glucose and lipid profile were measured using a specific enzymatic assay. The patients were divided into those with normo-, micro-, and macroalbuminuria.

Results: About 51.6 % of diabetic patients had at least one diabetes complications.

Frequencies of diabetes complications were increased with increase the duration of diabetes. Diabetes was found to be associated with family history and BMI (all $P < 0.05$).

About half of patients were diabetics since 5 years or less. Serum cystatin C levels were non-significantly changed in diabetic patients compared to controls ($P > 0.05$). Serum urea and creatinine were lower in diabetics (all $P < 0.05$). Cholesterol, triglycerides and low-density lipoprotein (LDL) were significantly higher in diabetics than controls (all $P < 0.05$). In contrast, high-density lipoprotein (HDL) was significantly lower in diabetics ($P < 0.05$). Diabetic patients showed higher levels of ACR ($P < 0.05$). In contrast, urine creatinine level was lower in patients ($P < 0.05$). The results of the study showed that 28.4% of the diabetic patients had microalbuminuria and 16.8% had macroalbuminuria. The mean levels of serum cystatin C in macroalbuminuria were significantly higher than those in normoalbuminuria or microalbuminuria (all $P < 0.05$).

The mean levels of serum urea in microalbuminuria and macroalbuminuria were significantly higher than those in normoalbuminuria (all $P < 0.05$). However, the mean levels of serum creatinine

in macroalbuminuria were significantly higher than those in normoalbuminuria or microalbuminuria (all $P < 0.05$). The mean levels of ACR in macroalbuminuria were significantly higher than those in normoalbuminuria or microalbuminuria (all $P < 0.05$).

In addition, the mean levels of ACR in microalbuminuria were significantly higher than in normoalbuminuria ($P < 0.05$).

For diabetic patients there were positive significant correlation between serum cystatin C and age ($r = 0.440$, $P = 0.000$), duration ($r = 0.372$, $P = 0.042$), serum urea ($r = 0.873$, $P = 0.000$), serum creatinine ($r = 0.892$, $P = 0.000$), cholesterol ($r = 0.283$, $P = 0.005$), LDL ($r = 0.416$, $P = 0.000$) and urinary albumin ($r = 0.579$, $P = 0.000$). In contrast, cystatin C was negatively correlated with HDL ($r = -0.645$, $P = 0.000$) and urinary creatinine ($r = -0.656$, $P = 0.000$). Receiver operating characteristic (ROC) plots demonstrated that with a cutoff value of 30 mg/g, the area under the curve (AUC) was 0.719 for cystatin C and 0.624 for creatinine. With a cutoff value of 300 mg/g, the AUC was 0.907 for cystatin C and 0.882 for creatinine.

Conclusion: The results of this study suggest that cystatin C measurement in serum is a useful, practical tool for the evaluation of renal involvement in the course of diabetes, especially in patients with DNP.

Key words: Type 2 diabetes mellitus, diabetic nephropathy, cystatin C, Gaza Strip.

Conclusions

1. There was significant association between DM and complications. The main self-reported complications among diabetic patients were retinopathy, neuropathy and CVD. The longer the duration of diabetes, the higher the percentage of complications.
2. Family history, obesity and overweight are risk factor for DM.
3. More than half of patients had diabetes since 5 years or less.
4. The majority of patients used OHA to manage diabetes and most of patients check blood glucose regularly.
5. Serum urea and creatinine was found to be lower in diabetic patients than in their non-diabetic counterparts.
6. People who have T2DM tend to have high levels of cholesterol, triglycerides, LDL and low HDL levels.
7. Serum cystatin C and creatinine were significantly higher in macroalbuminuric patients compared to norm- or microalbuminuric patients.
8. Lipid profile including, total cholesterol, triglyceride, HDL and LDL did not affected by the presence of microalbuminuria or macroalbuminuria.
9. The serum level of cystatin C was positively correlated with age and diabetes duration whereas sex and body mass index did not affect cystatin C level.
10. Serum cystatin C had significantly higher diagnostic accuracy in distinguishing patients with nephropathy than serum creatinine.

Recommendations

1. As many diabetes complications start before the diagnosis of disease, it is recommended to screening for diabetes in adults of any age who have risk factors like obesity, dyslipidemia and first degree family history.
2. There is a need to improve the diabetic patients' and general populations' awareness of diabetic complications, risk factors and the importance of lifestyle modifications in order to early protect themselves from the complications of this disease. As a result, they will not face future adverse consequences.
3. Screening for diabetic nephropathy must be initiated at the time of diagnosis in patients with T2DM and yearly thereafter.
4. Frequent monitoring of microalbuminuria and urinary ACR to avoid the future development of diabetic nephropathy.
5. Serum cystatin C and other biochemical parameters should be measured annually in patients with diabetes to help for detect the early stages of diabetic nephropathy patient.
6. Notification of health authorities on the results of this study, to investigate the introduction of new laboratory tests for early diagnosis of DNP.
7. further research is required to investigate other factors affecting cystatin C across a broader range of populations and to define the use of both creatinine and cystatin C in GFR estimation.

Limitation of the study

1. The study included only outpatients diabetics registered in MOH diabetes clinics, diabetic patients treated in private sector or in UNRWA are not included, so the results may not be generalizable to the overall diabetic patients.
2. Part of the questionnaire was based on self-report, so there was the potential of recall bias.
3. Cases and controls may not free from other undiagnosed diseases.
4. Not probability sample

Association of serum Zinc, Magnesium, Iron and Copper among Type 2 Diabetic Patients in Gaza City

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(MD, 2006)

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(2014)

Abstract

Objectives: To assess the association of serum zinc, magnesium, iron, copper and dietary habit among Type 2 diabetes mellitus (T2DM) patients and correlation with diabetes control.

Methods & Subjects: A case-control study conducted in UNRWA operated Sabra & Beach primary health centers, Gaza City. The cases represented by 60 T2DM patients while the controls were 60 healthy subjects. Semi-quantitative food frequency questionnaire was used to assess the intake of zinc, magnesium, iron and copper rich food. Serum zinc, magnesium, iron and copper were analyzed using a calometric absorbance method.

Results: The study revealed that normal controls were significantly more educated (38.8%) than T2DM patients (21.9%); T2DM patients were poorer (61.7%) than normal controls (36.7%) with statistical significance. T2DM patients were significantly heavier (average weight, 88.95 kg \pm 18.68) than normal controls (average weight, 83.62 kg \pm 17.11). There are significant differences in diet behavior; 76.7% of T2DM patients used to eat trimmed meat compared to 96.7% of normal controls and 93.3% of T2DM patients used to eat skinless chicken compared to 100% of normal controls ; 21.7% of T2DM patients used to eat whole grain bread compared to 8.3% of normal controls. Also, 40%, 13.3% of T2DM patients used to eat watermelon seeds and almonds respectively compared to 65% and 21.7% of normal controls. Significant physical activity differences showed that 4.8% of T2DM patients are physically active on daily basis compared to 14.8% of normal controls. The average dietary intake of zinc, magnesium, iron and copper rich food showed no significant differences between T2DM patients and normal controls. There are significant differences of average serum zinc between T2DM patients and normal controls ; the average serum of zinc is lower in T2DM patients (82.1ug/dl \pm 8.58) than normal controls (85.3 ug/dl \pm 7.85). Regarding serum magnesium level, T2DM patients have average serum level of magnesium (2.0 mg/dl \pm 0.11) lower than in normal controls (2.04 mg \pm 0.11). However, the average serum iron was higher among T2DM (89.53 ug/dl \pm 11.74) than normal controls (87.83ug/dl \pm 12.14). Also, the average serum copper level was lower in T2DM patients (92.32 ug/dl \pm 12.69) than normal controls (94.20 ug/dl

±17.11). Control of diabetes measured by FBS show that 58.3% was poor controlled. According to HbA1c; the poor control was 71.7%. Poor controlled T2DM patients have lower average serum of magnesium(1.98 mg±0.11) than acceptable normal controls (2.03 mg±0.11) .

Conclusion: The study concluded that average of serum zinc, magnesium and copper were lower in T2DM patients than normal controls. T2DM patients are less physically active, more obese, more than two thirds of them are uncontrolled, less frequently removing fat from meat and chicken, consume nuts less frequently. Poor controlled T2DM patients consume magnesium and copper rich food more than the acceptable diabetic control. The average magnesium level is lower in poorly controlled T2DM patients than in the acceptable controlled T2DM patients. Also the average iron level is higher in poorly controlled T2DM patients than in the acceptable controlled T2DM patients.

Key Words: *Type 2 diabetes mellitus, FBS, HbA1c, zinc, magnesium, copper, iron*

Conclusion

This current study is a case-control one which was conducted in UNRWA primary health care centers in Gaza City (Sabra & Beach primary health centers) in order to investigate the association of serum levels and dietary intake of copper, iron, magnesium and zinc on type 2 diabetic patients. This study concluded that:

1. Diabetic patients sound to be less educated than non-diabetics.
2. Diabetic patients seem to be poorer than non-diabetics.
3. Diabetic patients are two-fold smokers than non-diabetics.
4. Diabetic patients are less physically active than the non-diabetics.
5. Diabetic patients are heavier and more obese than non-diabetics.
6. In short term diabetic control, more than half of diabetic patients are poorly controlled.
7. In long term diabetic control, more than two thirds of diabetic patients are poorly controlled.
8. Diabetic patients are less frequently removing fat from meat than non-diabetics.
9. Diabetic patients are less frequently eating skinless chicken than non-diabetics.
10. Diabetic patients don't drink whole fat milk at all while non-diabetics rarely do.
11. Diabetic patients drink skimmed milk more frequently than non-diabetics.
12. Diabetic patients are more frequently eating whole grain bread than non-diabetics. And also they are less frequently eating refined bread than non-diabetics.
13. Diabetic patients consume almonds, cashew, hazelnuts and pistachio less frequently than non-diabetics.
14. Diabetic patients with poor glycemic control consume magnesium rich food more than the acceptable diabetic control.
15. Diabetic patients with poor glycemic control consume copper rich food more than the acceptable diabetic control.
16. The average of serum zinc level is lower in diabetic patients than non-diabetics.
17. The average of serum magnesium level is lower in diabetic patients than non-diabetics.

Recommendations

Type 2 diabetes can be prevented in non-diabetic individuals by lifestyle changes that reduce calorie intake and increase physical activity. On the other hand control of dietary intake is one of the key elements of any diabetic treatment regimen aimed at normalizing blood glucose. Dietary zinc, magnesium, copper, and iron have a significant role in glucose homeostasis. So, the following recommendations are suggested:

Recommendations at the National Level

1. It is necessary to obtain more accurate information regarding the micronutrients intake and the control of diabetes mellitus.
2. Suggestions to conduct more advanced research to determine the role of micronutrients in patients with diabetes mellitus.
3. Concentrate resources on improving the dietary guidelines in management of diabetes mellitus.
4. Establishment of nutrition clinics in different hospitals in the Gaza Strip.

Recommendations at Community Level

1. It is highly recommended that educational programs through different media to increase the awareness of the community especially diabetic patients to:
2. Provide scientific information on the healthy diet and importance of physical activity.
3. Increase the Palestinian awareness to the importance of periodic examination especially for those with family history of diabetes..
4. Increase the diabetic patients' awareness to health hazards of not controlling diabetes.

Recommendations for Diabetic Patients' Nutrition

1. Encourage a well-balanced diet consisting of nutrient rich foods with more calories, protein, vitamins, and minerals.
2. Encourage diabetic patients to keep their blood glucose on acceptable level.
3. Encourage intake of zinc and magnesium rich diet.
4. Encourage intake of seafood.

Polycystic ovary syndrome in women with type1 diabetes in Gaza Governorate

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Abstract

Background: Women with type 1 diabetes depend on insulin injections throughout their life. However, recommendation for strict metabolic control of diabetes requires the administration of supra-physiological doses of insulin, which might result in insulin-mediated stimulation of androgen synthesis. Hyperandrogenism in women with type 1 diabetes may be associated with polycystic ovary syndrome (PCOS).

Objective: To determine PCOS and associated clinical symptoms and biochemical alterations in women with type1 diabetes in Gaza Governorate.

Materials and Methods: This case-control study comprised 50 type 1 diabetic women selected from Medical Relief Center in Gaza Governorate and 50 apparently healthy non diabetic controls. Questionnaire interviews were applied. Anthropometric measurements were performed. Serum total testosterone, follicle stimulating hormone (FSH), luteinizing hormone (LH), and insulin were measured by ELSA. Data were analyzed using SPSS version 18.0.

Results: The mean ages of controls and cases were 23.8 ± 5.2 and 23.3 ± 5.7 years. The mean period of first delivery after marriage was significantly longer in cases compared to controls. Type 1 diabetes was more prevalent among less educated and unemployed women as well as among women with family history of diabetes. The mean of waist to hip ratio was higher in diabetic women compared to controls. The mean age of menarche was significantly higher in diabetic women compared to controls (13.9 ± 1.6 vs 13.2 ± 1.2 years, $P=0.020$). The presenting symptoms including acanthosis nigricans, seborrhea and hirsutism were more prevalent in cases compared to controls. The levels of total testosterone and insulin were significantly higher in cases compared to controls (0.58 ± 0.11 and 15.8 ± 12.4 vs 0.44 ± 0.11 and 10.8 ± 4.5 , % difference=26.3 and 37.6%, $P=0.000$ and 0.010 , respectively). Polycystic ovary syndrome was present in 11 (22.0%) out of 50 cases compared with 3 (6.0%) in controls ($\chi^2(\text{corrected})=4.070$, $P=0.044$). There was significant increase in PCOS frequency in cases with intensive insulin treatment 9 out of 22 (40.9%) compared to 2 out of 28 (7.1%) with non intensive insulin treatment. The Mean of waist to hip ratio was higher in PCOS than non PCOS cases. The mean insulin dose received by PCOS was significantly higher than non PCOS cases (72.7 ± 23.9 vs 55 ± 19.8 U.I cc/ml, $P=0.023$). Oligomenorrhea was reported in 11 cases with PCOS compare to 6 cases without PCOS ($\chi^2(\text{corrected})=23.735$,

P=0.000). In addition, the mean age of menarche was higher in PCOS than non PCOS cases. The mean levels of testosterone and insulin were significantly higher in cases with PCOS compared to cases without PCOS (0.64 ± 0.09 and 23.1 ± 13.0 vs 0.53 ± 0.11 and 14.1 ± 11.8 , $P=0.023$ and 0.041 , respectively).

Conclusion: Intensive insulin treatment was more frequently received by PCOS cases. Oligomenorrhea and increased levels of testosterone and insulin were the main features of PCOS.

Key words: Polycystic ovary syndrome, type1 diabetes, Gaza Governorate.

Conclusions

1. The mean ages of controls and cases were 23.8 ± 5.2 and 23.3 ± 5.7 years old
2. The mean period of first delivery after marriage was significantly longer in cases compared to controls.
3. Type 1 diabetes was more prevalent among less educated and unemployed women as well as among women with family history of the disease.
4. Waist to hip ratio was significantly higher in cases compared to controls.
5. The mean age of menarche was significantly higher in cases compared to controls.
6. The presenting symptoms among the study population including acanthosis nigricans, seborrhea and hirsutism were more prevalent in cases compared to controls.
7. The levels of total testosterone and insulin were significantly higher in cases compared to controls
8. Polycystic ovary syndrome was present in 11 (22.0%) out of 50 cases compared with 3 (6.0%) in controls ($\chi^2(\text{corrected}) = 4.070$, $P = 0.044$).
9. There was significant increase in PCOS frequency in cases with intensive insulin treatment 9 out of 22 (40.9%) compared to 2 out of 28 (7.1%) with non intensive insulin treatment.
10. The average of waist to hip ratio was higher in PCOS than non PCOS cases.
11. The mean insulin dose received by PCOS was significantly higher than non PCOS cases.
12. Oligomenorrhea was significantly higher in cases with PCOS compared to cases without PCOS. In addition, the mean age of menarche was higher in PCOS than non PCOS cases.
13. The mean levels of testosterone and insulin were significantly higher in cases with PCOS compared to cases without PCOS.

Recommendations

1. Insulin administration at appropriate dose under the supervision of a physician is recommended.
2. Frequent monitoring of serum testosterone and insulin particularly in women with history of diabetes.
3. Further research on PCOS in type 2 diabetes is needed.

The Effect of Vitamin C Alone or in Combination with Vitamin E on Fasting Blood Sugar, Glycosylated Hemoglobin and Lipid Profile among Type 2 Diabetic Patients (Gaza Strip)

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Abstract

Background: Persistent hyperglycemia causes increases in the production of free radicals especially reactive oxygen species (ROS) which promote the development of many complications of diabetes mellitus.

Objectives: of this study was to evaluate the effect of vitamin C alone or in combination with vitamin E as adjunctive therapy in reducing the serum level of glucose, glycosylated hemoglobin and lipid profile in type 2 diabetic patients in Gaza strip.

Materials and Methods: To achieve this purpose sixty type 2 diabetic patients were selected from Palestine Medical Relief Society and some UNRWA health centers in Gaza Strip. All patients were treated with metformin and divided into three groups, but two patients withdrawn due to incompliance. The first group (n=20) continued on metformin therapy only (control group). The second group (n=19) was treated with vitamin C along with metformin, whereas the third group (n=19) was treated with vitamins C and E combination together with metformin. All patients were followed up for three months. A number of biochemical tests were carried out for each patient on the start and at the end of the experimental protocol; including fasting blood sugar (FBS), glycosylated hemoglobin (HbA1c) and lipid profile (TG,TC,LDL,HDL).

Results: The results showed significant reduction in FBS, HbA1c and lipid profile among patients who used vitamin C (G2) and combinations of vitamin C and E (G3) compared to the control group after three months of treatment. the reductions in FBS , HbA1c and TG were more significant in G3 than G2, while the reduction in total cholesterol (TC) was similar in both groups. The reduction in LDL was more significant in G2 than G3.

Intake of vitamin C alone or vitamins C and E combination caused a small increases in HDL-cholesterol; however, these increases were not significant.

Conclusion: The study revealed that the use of antioxidants like vitamin C alone or the combination of vitamin C and E can provide a good glycemic control and reduce TG, TC, and LDL-cholesterol levels significantly and improve HDL-cholesterol level.

Key words: *Reactive Oxygen Species (ROS); Vitamin C; Vitamin E; Fasting Blood Sugar (FBS); Glycosylated hemoglobin (HbA1c); Triglyceride (TG); Total cholesterol (TC); Low Density Lipoprotein (LDL); High Density Lipoprotein (HDL).*

Conclusions

Vitamin C and vitamin E are among the most widely studied dietary antioxidants, which can play an important role as adjunctive therapy of diabetes mellitus; to produce better glycemic control and improve the lipid profile of diabetic patients , in order to delay or prevent future chronic diabetic complications.

This study was carried out on fifty eight (three groups) type2 diabetic patients (Gaza Strip) to evaluate the effect of vitamin C alone or in combination with vitamin E on fasting blood sugar (FBS),glycosylated hemoglobin(HbA1c) and lipid profile among those patients. Furthermore; the study was also conducted to compare the effect of vitamin C alone or vitamin C in combination with vitamin E intake on the same parameters and the same population. At the end of the study and following data analysis, we concluded:

1. Both vitamin C (500 mg twice aday) alone and vitamin C in combination with vitamin E (400 mg twice aday) had excellent antioxidant effect and gave a clear positive effect on FBS, HbA1c, TC, TG and LDL among type 2 diabetic patients. They both reduced these parameters significantly after three months of treatment.
2. Both vitamin C (500 mg twice aday) alone and vitamin C in combination with vitamin E (400 mg twice aday) increased the level of HDL slightly but statistically non-significant.
3. The reduction in FBS, HbA1c and TG caused by vitamin C (500 mg twice aday) in combination with vitamin E (400 mg twice aday) was more than the reduction caused by vitamin C (500 mg twice aday) alone, while the reduction in TC caused by both was closely similar (**Table 6.1**).
4. The reduction in the serum level of LDL was more significant in vitamin C (500 mg twice aday) treated group than in the group treated by vitamin C (500 mg twice aday) in combination with vitamin E (400 mg twice aday) (**Table 1**).
5. The improvement in lipid profile seen in this study could lead to reduction of the future type 2 diabetes mellitus complications.

Table 1:The effect of vitamin C (500mg twice aday) alone or in combination with vitamin E (400 mg twice aday) on the study parameters

Parameter	Vitamin C alone	Vitamin C in combination with vitamin E
FBS	7.00%↓	22.75%↓
HbA1c	11.50%↓	16.30%↓
TG	19.20%↓	23.60%↓
TC	14.10%↓	14.40%↓
LDL	23.10%↓	16.60%↓

Parameter	Vitamin C alone	Vitamin C in combination with vitamin E
FBS	7.00%↓	22.75%↓
HbA1c	11.50%↓	16.30%↓
TG	19.20%↓	23.60%↓
TC	14.10%↓	14.40%↓
LDL	23.10%↓	16.60%↓

Recommendations

1. Increase awareness of diabetic patients to the consequences and complications of diabetes mellitus.
2. Patients compliance to their oral hypoglycemic drugs in order to delay or avoid chronic diabetic complication.
3. Increase awareness about the relationship between chronic diabetic disease and oxidative stress.
4. Recommend the use of antioxidants as adjunctive therapy for type 2 diabetic patients as they give good glycemic control and improve the lipid profile in order to delay or ovoid chronic complications of diabetes mellitus.
5. Further studies on a larger number of patients and for a longer follow-up periods are recommended to assess the long effect of antioxidants on glycemic control and lipid profile in type 2 diabetic patients.

Assessment of Apolipoprotein C- III as A predictor of Cardiovascular Diseases among Type 2 Diabetic Men in Gaza Strip

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Abstract

Background: Diabetes mellitus is one of the most important risk factors for cardiovascular diseases. Apolipoprotein C-III (apo C-III) is a multifunctional protein that not only regulates the metabolism of triacylglycerols but also an important regulator of endothelial function. In the presence of hyperlipidemia, apo C-III exerts proinflammatory effects on both monocytes and endothelial cells that are important for transendothelial migration of monocytes into the vessels' intima and development of atherosclerosis.

Objectives: To investigate the prognostic value of plasma apo C-III concentrations for cardiovascular complication among Type 2 Diabetes mellitus (T2DM) patients in Gaza strip.

Subjects and methods: This study is a case-control study; a total of 89 male of T2DM were evaluated and classified into two groups according to heart disease [52 of T2DM patients without heart disease and 37 with heart disease] and equal number of normal subjects (n=89) were run in parallel with each group as a control. Apo C-III and apoA1 were measured using immunoturbidimetric methods. Glucose, creatine kinase (CPK), creatine kinase MB (CK-MB), aspartate aminotransferase (AST), Lactate aminotransferase (LDH), cholesterol, triacylglycerols (T.G) and, HDL-C were measured using colorimetric and kinetic method and low density lipoprotein (LDL-C) was calculated using the empirical relationship of Friedewald.

Results: The concentration of apo C-III, glucose, LDL, cholesterol, triacylglycerols, apoA1, LDH, AST, CPK and, CK-MB were significantly increased among T2DM patients ($P < 0.05$). There was positive correlation between apo C-III and plasma triacylglycerols in T2DM patients compared with control ($r = 0.755$, $p < 0.001$ and $r = 0.426$, $p = 0.001$ respectively). Also, there were positive correlation between apo C-III and glucose, cholesterol, AST and apoA1 among T2DM patients ($r = 0.238$, $p = 0.012$, $r = 0.340$, $p = 0.001$, $r = 0.237$, $p = 0.013$, $r = 0.242$, $p = 0.011$ respectively). There was statistically significant difference between apo C-III ($p < 0.05$) in the two cases groups of T2DM (with/without heart disease) and between the obese and non-obese T2DM patients. There was significant difference between apo C-III and insulin treatment ($p < 0.05$), while no significant difference was found between lipid-lowering drug and apo C-III.

Conclusion: High level of Apo C-III and low level of apoA1 concentration in plasma, independently of fasting triacylglycerols and other traditional risk factors, predicts cardiovascular mortality among T2DM patients.

Keywords: *apolipoprotein C-III, cardiovascular disease, type 2 Diabetes mellitus, triacylglycerol-rich lipoproteins, dyslipoproteinemia, Gaza strip.*

Conclusions

The findings of this study reflect the importance of apolipoprotein C-III as non-invasive tests to find T2DM patients who are at risk to develop CVD. The current study showed that concentration of apo C-III level in 89 T2DM patients were significantly elevated, and may play a role in prognosis of CVD complication. So estimation of this marker is of interest for management and follow-up of such patients.

1. Significant difference was found in the means of biochemical parameters between the patients and control groups.
2. Obesity and overweight were found to be significantly associated with diabetes, as they considered as risk factors for T2DM.
3. Significant correlation was found between apo C-III and glucose, cholesterol, triacylglycerol, apoA1 and AST.
4. The mean of apo C-III in T2DM and T2DM+HD patients were higher than controls, and the mean of apo C-III in T2DM patients is higher than in T2DM+HD, which consider risk factor for CVD.
5. Hypertension is one of the risk factor for CVD, which play a role for accelerating CAD.
6. The mean of triacylglycerols in T2DM patients is higher than T2DM+HD, which may increase the risk of CVD complication among those patients.
7. Higher concentration of apo C-III was found among T2DM patients who suffered from diabetes for less than 5 years than T2DM patients who suffered from diabetes for more than 5 years.
8. The mean of apo C-III in obese diabetes was higher than non-obese diabetes.
9. Apo AI is significantly decreased among T2DM patients more than controls.

Recommendations

1. There is a need to improve the diabetic patients' and general populations' awareness of diabetic complications, cardiovascular risk factors and the importance of lifestyle modifications. This could be achieved by improving patients' counselling by health care, or through campaigns and media to aware general populations.
2. In the MOH and UNRWA diabetes clinics, only glucose, triacylglycerols and, cholesterol are used to evaluate diabetic patients. Other important measures as apo C-III and apo A1 are recommended to be measured.
3. Measurement of LDL and HDL are not applied to screening T2DM in the MOH and UNRWA diabetes clinics, thus those test should be used as routine for screening all patients under risk of CVD.
4. Sustainable availability of expensive dyslipidemia medications are rarely achieved in MOH and never in UNRWA. So we recommend more attention from the decision makers about the problem of dyslipidemia in diabetic patients and the availability of medications.

Recommendations for future research

1. Further research is needed to investigate the changes in the different variables and apo C-III among T1DM patients.
2. Further research is needed to investigate the changes in the different variables and apo C-III among female T2DM patients.
3. Investigate the effect of apo C-III on the gestational DM for pregnant women and influencing factors during pregnancy.
4. Study the effect of lower hypoglycemic, lowering lipid agent and insulin on apo C-III levels.

Renoprotective Effect of Aliskiren Monotherapy and Aliskiren-Pentoxifylline Combination vs Other Renin-Angiotensin System Inhibitors in Hypertensive-Diabetic Type 2 Patients with Diabetic Nephropathy (Gaza Strip)

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Abstract

Background: Diabetic nephropathy (DN) is one of the most serious complications of diabetes mellitus (DM) and is the leading cause of end-stage renal disease (ESRD). Excessive activity of the renin-angiotensin system (RAS) plays a vital role in initiation and progression of DN.

Objectives: of this study was to evaluate the renoprotective effect of aliskiren (direct renin inhibitor) monotherapy and combination of aliskiren plus pentoxifylline (xanthine derivative), and compare it with enalapril and valsartan (RAS inhibitors) in hypertensive-diabetic type 2 patients with DN among patients in Gaza Strip.

Materials and Methods: To achieve this purpose, eighty hypertensive-diabetic type 2 patients with microalbuminuria (20-200 µg/min or 30-300 mg/24h) were selected from UNRWA and private clinics in Gaza Strip and divided into four groups. The first group (n=20) was treated with enalapril (10-20 mg/day), the second one (n=20) was treated with valsartan (160 mg/day), the third group (n=20) was treated with aliskiren (150 mg/day), whereas the fourth one (n=20) was treated with aliskiren-pentoxifylline combination (150, 400 mg/day), then all patients were followed-up for nine months by measuring serum creatinine level and urinary albumin excretion (UAE) rate before and at 3, 6 and 9 months of treatment.

Results: The results showed a significant reduction in UAE rate among patients who used aliskiren and aliskiren-pentoxifylline combination after 6 and 9 months of treatment, where the reduction in both groups was more pronounced at 9 months of treatment. In the valsartan treated group, the reduction in UAE rate was significant after 9 months of treatment, while in the enalapril treated group, no significant reduction in UAE rate was seen throughout the study period (9 months). In addition, the results also showed a significant reduction in serum creatinine level after 6 and 9 months of aliskiren-pentoxifylline combination treatment, whereas the decrease became significant after 9 months of aliskiren treatment. On the other hand, no significant reduction in serum creatinine level among patients who used enalapril or valsartan during the study period (9 months). The study revealed that aliskiren monotherapy and aliskiren-pentoxifylline combination had more pronounced renoprotective effect than enalapril and valsartan among hypertensive-diabetic type 2 patients with DN.

Keywords: *Diabetic Nephropathy, Aliskiren, Aliskiren-Pentoxifylline Combination, Valsartan, Enalapril, Urinary Albumin Excretion (UAE) Rate, Serum Creatinine Level, Renoprotective Effect.*

Conclusion

Diabetic nephropathy (DN) is considered one of the major DM complications, where more than 40% of diabetic patients may develop it (Atkins, 2005; Balakumar et al., 2009). Diabetic nephropathy is a progressive kidney disease characterized by changes in renal glomerular and tubular structure and function, where microalbuminuria (20-200 µg/min or 30-300 mg/24 h) is its first clinical sign (Araki et al., 2008). Several studies have confirmed the active participation of RAS in the pathogenesis of DN (Carey & Siragy, 2003; Cravedi et al., 2005; Yoo et al., 2007). Although it is initiated by chronic hyperglycemia, many biochemical mechanisms can modulate and enhance its progression including activation of PKC pathway, activation of polyol pathway, increased accumulation of AGEs, and oxidative stress (Kikkawa et al., 2003; Jerums et al., 2008). This study was carried out on eighty (four groups) hypertensive-diabetic type 2 patients with DN (Gaza Strip) to evaluate the renoprotective effect of aliskiren and aliskiren-pentoxifylline among those patients. Furthermore, the study was also conducted to compare the effect of aliskiren and aliskiren-pentoxifylline combination with other renin-angiotensin system inhibitors on renal functions in the same population. At the end of the study and after results analysis, we concluded the followings:

1. Both aliskiren (150 mg/day) monotherapy and aliskiren-pentoxifylline (150, 400 mg/day) combination had renoprotective effect among hypertensive-diabetic type 2 patients with DN. They significantly reduced UAE rate after 6 and 9 months of treatment and the reduction produced by both regimens after 9 months was more distinct.
2. Aliskiren (150 mg/day) monotherapy had positive effect on serum creatinine level, where it decreased significantly after 9 months of treatment.
3. Patients treated with aliskiren-pentoxifylline combination had a reduction in their serum creatinine level throughout the study period (9 months), but the significance appeared after 6 and 9 months of treatment.
4. In the valsartan (160 mg/day) treated group, there was a significant reduction in UAE rate after 9 months of treatment only.
5. In the enalapril (10-20mg/day) treated group, the results pointed to a clear increase in UAE rate at the end of the study period.
6. The study indicated that neither enalapril nor valsartan treatment had efficient effect on serum creatinine level among patients in this study because they increased it at the end of the study.

Recommendations

1. Increase awareness of diabetic patients to the dangerous complications concomitant with the uncontrolled hyperglycemia such as diabetic nephropathy which leads to ESRD.
2. Diabetic patients should comply with medications that control their blood glucose levels within normal range to delay or avoid the initiation of chronic diabetic complications.
3. Urinary albumin excretion (UAE) rate should be measured manually every year in diabetic patients to ensure the integrity of the kidneys.
4. Chronic diabetic type II patients (more than 10 years) with normal kidney functions should avoid ACEIs monotherapy and they should use a combination of ACEIs and ARBs.

5. Diabetic patients with diabetic nephropathy should be advised to use aliskiren (DRI) or aliskiren-pentoxifylline combination because it can reduce both UAE rate and serum creatinine level more significantly than other RAS inhibitors such as enalapril and valsartan.
6. Recommend to change the protocol used for treatment of hypertensive-diabetic patients in the hospitals and clinic centers in Gaza Strip.
7. Recommend further studies to assess the long-term effects of aliskiren monotherapy and aliskiren-pentoxifylline combination on renal functions in diabetic patients with diabetic nephropathy.
8. Further studies are recommended to evaluate the renoprotective effects of aliskiren monotherapy and aliskiren-pentoxifylline combination among diabetic patients with macroalbuminuria stage.

Assessment of *Helicobacter pylori* infection as risk factor for type 2 diabetes mellitus in Gaza strip

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Abstract

Background: Diabetes mellitus is a multifactorial disorder characterized by disturbance in carbohydrates, lipids and proteins metabolism. It constitutes one of the tenth leading causes of death in Gaza strip with mortality rate of 8.5 per 100,000 population in the year 2010. *Helicobacter pylori* (*H. pylori*) infection is believed to be associated with Type 2 diabetes mellitus.

Objective: To assess the *H. pylori* infection as a risk factor for type 2 diabetes mellitus in Gaza strip.

Materials and methods: This case-control study comprised 90 type 2 diabetic patients (Cases: 45 males and 45 females) and 90 healthy controls (45 males and 45 females). Questionnaire interview was applied. Blood samples were collected, processed and analyzed. Serum *H. pylori* IgG, glucose, insulin, cholesterol, triglycerides, low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), aspartate aminotransferase (AST), alanine aminotransferase (ALT), urea and creatinine were determined. Blood glycated hemoglobin (HbA1c) was measured. White blood cell (WBC), red blood cell (RBC), hemoglobin (Hb) and platelet (PLT) were determined. Data were analyzed using SPSS version 18.0.

Results: Type 2 diabetes was more prevalent among families with low income as well as among individuals with family history of the disease. More than half of the cases had diabetes since less than 5 years and most of them followed diet. The main self-reported complications were retinopathy, neuropathy and cardiovascular diseases. In addition, the prevalence of gastritis and peptic ulcer was significantly higher among cases compared to controls.

Blood HbA1c and serum glucose and insulin levels was significantly higher in cases compared to controls ($8.2 \pm 1.7\%$, 153.7 ± 53.0 mg/dl and 11.6 ± 9.6 μ U/ml vs $5.2 \pm 0.7\%$, 87.0 ± 12.3 mg/dl and 6.8 ± 5.1 μ U/ml, respectively, $P=0.000$). Serum cholesterol and triglycerides were significantly higher in cases (201.4 ± 43.3 and 203.8 ± 97.7 mg/dl) than controls (189.0 ± 37.9 and 153.1 ± 45.7 mg/dl, $P=0.042$ and $P=0.000$, respectively). Serum AST and ALT activities were significantly higher in cases compared to controls (36.3 ± 4.7 and 42.4 ± 5.0 U/L vs 16.9 ± 6.0 and 17.8 ± 8.7 U/L, respectively, $P=0.000$).

Serum urea and creatinine were also found to be significantly higher in cases (47.0 ± 5.3 and 1.06 ± 0.21 mg/dl vs 31.5 ± 11.8 and 0.88 ± 0.22 , mg/dl, respectively, $P=0.000$). White blood cell and

PLT counts were significantly increased in cases compared to controls (8.0 ± 1.9 and $262.3 \pm 61.3 \times 10^9/L$ vs 7.0 ± 1.4 and $224.8 \pm 43.4 \times 10^9/L$, respectively, $P=0.000$) whereas RBC count and Hb content did not show significant differences between cases and controls. The prevalence of *H. pylori* among diabetic patients 65 (72.2%) was significantly higher than controls 33 (36.7%) with $P=0.000$. Infection with *H. pylori* was significantly higher in diabetic males than diabetic females ($P=0.034$). When related to *H. pylori*, blood HbA1c levels were significantly higher in positive than in negative cases (8.4 ± 1.8 vs 7.6 ± 1.5 , $P=0.042$).

Serum cholesterol, triglycerides and LDL-C levels were significantly increased in *H. pylori* positive cases than in negative cases (216.4 ± 42.5 , 190.1 ± 91.9 and 139.8 ± 42.6 mg/dl, vs 195.6 ± 42.6 , 164.5 ± 61.2 and 115.4 ± 40.2 mg/dl, $P=0.041$, $P=0.033$ and $P=0.013$, respectively), whereas HDL-C level was significantly lower in positive cases (37.5 ± 6.9 vs 41.1 ± 8.8 mg/dl, $P=0.040$).

The activity of serum ALT and the concentration of urea were significantly increased in *H. pylori* positive cases compared to negative cases (43.1 ± 4.9 U/L and 41.1 ± 10.9 mg/dl vs 40.8 ± 4.8 U/L and 37.0 ± 12.8 mg/dl, $P=0.049$ and $P=0.022$, respectively). The WBC count was also significantly elevated in *H. pylori* positive cases (8.1 ± 1.8 vs $7.2 \pm 1.5 \times 10^9/L$, $P=0.038$).

Conclusions: *H. pylori* infection was significantly higher in type 2 diabetic patients compared to controls. *H. pylori* infection was associated with blood HbA1c, serum cholesterol, triglycerides, LDL-C, HDL-C, ALT, urea and WBC count. Therefore, monitoring of *H. pylori* infection as a possible risk factor of type 2 diabetes may be of prognostic value.

Keywords: *Helicobacter pylori*, Type 2 diabetes, Gaza Strip.

Conclusions

1. Diabetes mellitus was more prevalent among families with low income as well as among individuals with family history of the disease.
2. More than half of patients had diabetes since less than 5 years and most of them followed diet.
3. The main self-reported complications among diabetic patients were retinopathy, neuropathy and cardiovascular disease. In addition, the prevalence of gastritis and peptic ulcer was significantly higher among cases compared to controls.
4. The BMI was significantly higher in cases than controls.
5. The levels of blood HbA1c and serum glucose and insulin were significantly increased in cases compared to controls.
6. Serum cholesterol and triglycerides were significantly increased in cases compared to controls.
7. The activities of serum AST and ALT, and the concentrations of serum urea and creatinine were significantly elevated in cases in comparison with controls.
8. The WBC and PLT counts were significantly higher in cases than controls.
9. The prevalence of *H. pylori* in diabetic patients was significantly higher than in controls. Infection with *H. pylori* was significantly higher in diabetic males than diabetic females.
10. When related to *H. pylori*, blood HbA1c levels were significantly higher in positive than in negative cases.
11. Serum cholesterol, triglycerides and LDL-C levels were significantly increased in *H. pylori* positive cases more than in negative cases, whereas HDL-C level was significantly lower in positive cases.

12. The activity of serum ALT and the concentration of urea were significantly increased in *H. pylori* positive cases compared to negative cases.
13. The WBC count was significantly elevated in *H. pylori* positive cases compared to negative cases.

Recommendations

1. Frequent monitoring of *H. pylori* infection as a risk factor of type 2 diabetes, is recommended.
2. Estimation of lipid profile is needed to avoid the deleterious effect of *H.pylori* infection associated with diabetes.
3. Regular visits to optical, neurological and cardiac clinics to take early steps to avoid and manage diabetic complications concerning diabetic retinopathy, neuropathy and cardiovascular disease.
4. Further research is highly recommended on *H. pylori* infection among type 1 diabetes and other chronic diseases.

Adequacy of Glycemic Control and Serum Lipid Profile in Hemodialysis of Palestinian Patients with Diabetes Mellitus

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ABSTRACT

Inadequate glycemic control and lipid abnormalities which are prevalent among diabetic patients on hemodialysis may act synergistically to place these patients at an augmented risk for morbidity and mortality of diabetic complications. At the time of starting this study (Nov 2007), diabetes mellitus was prevalent among the hemodialysis Palestinian patients in Gaza Strip by 23 %.

The purpose of this case - controlled study was to assess the glycemic control and prevalence of dyslipidemia among the diabetics who were on hemodialysis, by following them up for 9-12 months and carrying out the following measurements (every 3-4 months) glycated hemoglobin (A1C), LDL cholesterol, HDL cholesterol, total cholesterol, and triglycerides, over the time of study, from Nov 2007 to Aug 2008. To achieve this purpose, fifty diabetic patients on dialysis were selected from the four hemodialysis centers in Gaza Strip hospitals (Al-Shifa, Nasser, Al-Aqsa, & Al-Najar). Twenty five healthy individuals without any obvious disease were taken as control. High mortality among the dialysis patients was noticeable. Fifteen hemodialytic diabetic patients died during the study period. Ten of the dead patients had history of hypertension before reaching the end stage renal disease.

The results of this study showed a significant elevation in glycated hemoglobin (A1C%) among the hemodialytic diabetic patients in comparison to healthy controls along the study period. Using a cutoff value A1C 6.5 % for good glycemic control, the results showed a significant proportion of patients (>40 %) with inadequate glycemic control in each of three tests carried along the study period. More than half (55.6%) of patients who underwent insulin therapy were with inadequate glycemic control. This result is indicative of insulin resistance among these patients. Dyslipidemia was characteristic in hemodialytic diabetic patients where the levels of HDL cholesterol were found to be significantly lower in all patients compared to controls 32.5 ± 8.8 vs. 42.7 ± 9.1 mg/dl; respectively (P-value <0.05). The mean LDL/HDL ratio in patients was higher and significantly different from that in controls, 3.6 ± 1.3 vs. 2.7 ± 0.8 ; respectively (P-value < 0.05).

Conclusion : Inadequate glycemic control in diabetics on hemodialysis was prevalent, insulin resistance is suggested, dyslipidemia is predominate, and further follow up of these patients is recommended.

Keyword : Hemodialysis, Diabetes mellitus, Glycemic control, A1c, Dyslipidemia.

CONCLUSIONS