Incidence of Peripheral Neuropathy and Diabetic Foot Cases among Diabetic Patients in Nasiriyah City: A Survey Study

Afrah N. Faris
Pathological Analysis Department/ Science College/ Thi-Qar University

Abstract

The aim of the study was to determine the incidence of peripheral neuropathy **(PN)** and diabetic foot **(DF)** among patients with type I and type II diabetes between March, 2010, and December, 2012 in Nasiriyah city. The study included 574 diabetic peripheral neuropathy and diabetic foot patients (91 PN (53 male, 38 female), 483 DF (279 male, 204 female). Patients classified according to (type of diabetes, sex, age, smoking and occupation).The results showed that there were no significant variations in the incidence of peripheral neuropathy between males and females in both type I and type II diabetes, However, the incidence of PN and DF in males of both groups (type I and type II) was significantly higher than in females of the same group ($p<0.05$, $p<0.01$) respectively. The incidence of PN and DF was increased significantly with age. The results showed that they were highly increased above 50 years of age, in both types of diabetes ($p<0.005$). It appeared that smoking does not affected the incidence of peripheral neuropathy and diabetic foo, they have high incidence ($P<0.005$) among non-smokers in comparison with smokers. Our study showed that the incidence of peripheral neuropathy and diabetic foot were significantly increase among patients who performed physical works ($p<0.005$).

Introduction

Diabetes mellitus is an endocrine disease characterized by impairment of carbohydrates, fat, and protein metabolism as a result of partial or complete lack of insulin secretion or decreased sensitivity of the tissues to insulin. It is well known that there are two general types of diabetes mellitus: Type I diabetes (insulin-dependent diabetes mellitus) ,which is caused by complete lack of insulin secretion and Type II diabetes, (non- insulin-dependent diabetes mellitus), which is caused by partial deficiency of insulin secretion or decreased sensitivity of target tissues to the metabolic effect of insulin so it is called insulin resistance. In both types of diabetes mellitus, the efficient uptake and utilization of glucose by most cells of the body is deteriorated (Guyton and Hall, 2006). As a late sequel of untreated diabetes mellitus may ended with many complications. Some of these complications is Vascular disease (diabetic angiopathy), such as atherosclerosis, ischemic heart diseases and stroke, which are the leading cause of death in people with diabetes, Kidney disease (diabetes nephropathy), diabetes is the chief cause of end-stage renal disease, Eye diseases, these include diabetic retinopathy, glaucoma and cataracts. More over diabetes is a leading cause of visual impairment and blindness. Nerve damage (diabetic neuropathy); this includes peripheral neuropathy, which often causes pain or numbness in the limbs, and autonomic neuropathy, which can impede digestion (gastro paresis) and contribute to sexual dysfunction and incontinence. Neuropathy may also impair hearing and other senses. Many studies have linked diabetes to increased risk of memory

loss, dementia, Alzheimer's disease; some researchers suggested that Alzheimer's disease might be 'type 3 diabetes" involving insulin resistance in the brain. However, other symptoms may include weakness or feelings of burning, tickling, or pricking in the arms, hands, legs and feet. Ulceration of foot in diabetes is common and disabling and frequently leads to amputation of foot or leg (Riaz, 2009 ; Kathleen and Head, 2006 ; Kanade et al., 2008).

Patients and Methods

This study is a retrospective one , It was designed to determine the incidence of diabetic peripheral neuropathy (DPN) and diabetic foot among patients with type I and type II diabetes between March, 2010, and December, 2012 in Nasiriyah city . The study included 574 diabetic peripheral neuropathy and diabetic foot patients (91 PN (53 male, 38 female) , 483 DF (279 male, 204 female)) (332 male,242 female).The study depend on statistical records of the special Endocrine and Diabetes Center, Unit of Diabetic Foot. Patients classified according to (type of diabetes, sex, age, smoking status and occupation). Patients with type I and type II diabetes classified to age groups (less than 40, 40-49, 50-60, equal or more than 60).The significance among groups was determined by p-value of χ^2 test (Al-Rawi and Khalafallah, 1989).

Results and discussion

As showen in the table 1, there is no significant variations in the incidence of peripheral neuropathy between males and between females either complain type I or type II diabetes. However, the incidence of diabetic foot in males of both groups was significantly higher than in females of the same group ($p<0.05$, $p<0.01$) respectively. The incidence of peripheral neuropathy was increased proportionally with the age of the patients. The incidence was highly increased above 50 years old (Table2). Table 3 also showed that the incidence of diabetic foot followed the same style.

It was appeared that smoking does not affected the incidence of peripheral neuropathy and diabetic foot, so they have high incidence ($P<0.005$) among non-smokers in comparison with smokers (table 4).

Table 5 showed that the incidence of peripheral neuropathy was significantly increase [($p<0.005$) $\chi^2= 30.70$ / df = 4] among hose wives, labours, retired (people working after retirement) and employees, however, diabetic foot was also significantly increase [($p<0.005$) $\chi^2=195.27$ / df = 4] among house wives, retired, labours and employees.

Table (1): Diabetic complications in Type I & Type II diabetic patients according to sex (n=574)

Diabetic Complications / Diabetic Type		Peripheral Neuropathy (n=91)	Diabetic foot (n=483)	Significancy χ^2
Type I	Male	25	141	(χ^2= 4.4 / df = 1) p<0.05
	Female	20	107	
Type II	Male	28	138	(χ^2 = 7.1 / df = 1) p<0.01
	Female	18	97	

Table (2): Diabetic complications in Type I diabetic patients according to age group (n=293)

Diabetic Complications / Age Group (years)	Peripheral Neuropathy (n=45)	Diabetic foot (n=248)
< 40	2	23
40-49	7	37
50-60	20	90
≥ 60	16	98
Significance χ^2	p<0.005 (χ^2= 18.02 / df = 3)	p<0.005 (χ^2 = 61.37 / df = 3)

Table (3): Diabetic complications in Type II diabetic patients according to age group (n=281)

Diabetic Complications / Age Group (years)	Peripheral Neuropathy (n=46)	Diabetic foot (n=235)
< 40	1	10
40-49	4	42
50-60	15	82
≥ 60	26	101
Significance χ^2	p<0.005 χ^2 = 33.82 / df = 3	p<0.005 χ^2= 27.83 / df = 3

Table (4): Effect of smoking on the incidence of diabetic complications

Smoking Status / Diabetic Complications	Smokers	Non Smokers	Significance χ^2
Peripheral Neuropathy (n=91)	10	81	p<0.005 (χ^2 = 55.39/df=1)
Diabetic foot (n=483)	81	402	p<0.005 (χ^2 = 213.33/df=1)

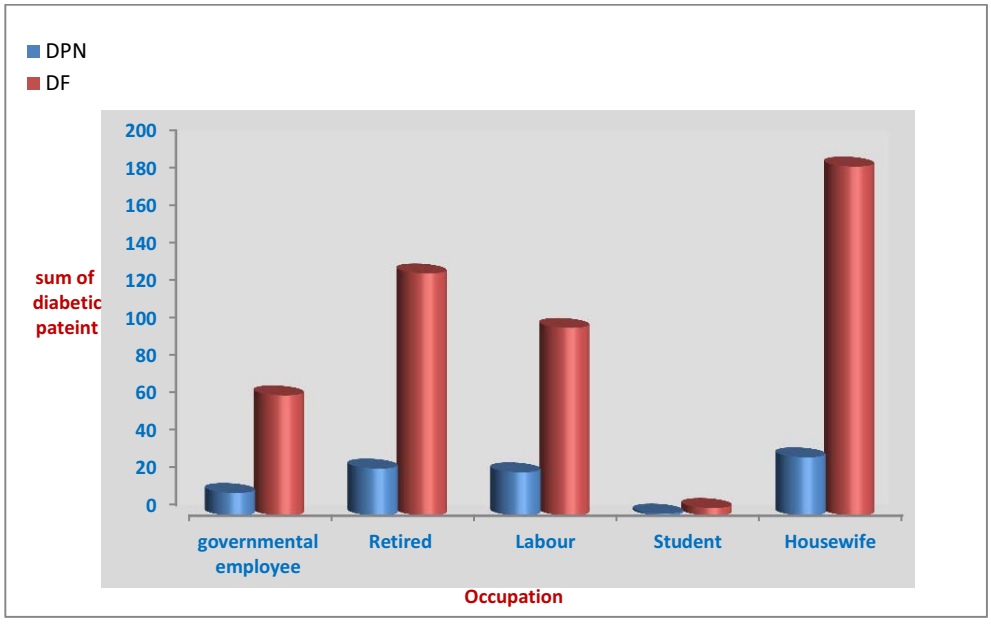

Figure (1): Distribution of PN and DF in diabetic patients numbers according to occupation

Although the present study was not deal with the incidence of diabetic neuropathy among total diabetic patients in the area of the study, but it clearly showed that the incidence of peripheral neuropathy and diabetic foot in males was significantly higher than in females in both types of the disease. In addition it verified that the incidence was highly increased above 50 years old which indicate that there was positive correlation of diabetic neuropathy and diabetic foot with the period of complain. Furthermore, it showed that when the job of the patient required physical work, it usually increase the incidence of diabetic neuropathy and diabetic foot.

Peripheral neuropathy (PN) is a well known common long-term complication of diabetes, and although a proportion of people with PN complain pain, but many are asymptomatic (Walters *et al.*, 1992). However, despite the lack of symptoms, people with PN are known to be at high risk of foot complications including foot ulceration, infection and amputation (Pecoraro*et al.*,1990 ; Adler *et al.*, 1999 ; Lehto *et al.,* 1996). Many studies are in agreement with our study in one or more parameters, Won *et al* found that the prevalence of neuropathy was 33.5% (n = 1338) in Korea (Won *et al.,* 2012). The overall prevalence of PN was 39%in the UAE **(**Al-Maskari and El-Sadig , 2007).An incidence of 32.2 % for PN was recorded by Barbosa*et al* in Portuguese primary health care population , with a significant positive association with age (69.0 +/- 9.1 vs 63.3 +/- 9.9 years, p=0.01), disease duration (15.7 +/- 13.5 vs 7.2 +/- 8.8 years, p=0.001), feet skin changes (38.8 vs 13.0%, p=0.04) and myocardial infarction/ischemia (14.8 vs 1.7%, p=0.03) (Barbosa *et al. ,* 2001). In patients of type 2 diabetes in Jordan, 45 % complain retinopathy, while impaired vibration, position and protective sense were found in 19%,13% respectively(Jbour *et al.,* 2003).

In the island nation of Mauritius, neuropathy was detected in 8.3% of the 847 diabetic subjects (12.7%) of those with known diabetes, and 3.6% of those with newly diagnosed diabetes. Diabetes duration, high fasting glucose and type I diabetes were positively correlated with neuropathy (Shaw *et al.,* 1998). Regarding the correlation of PN with patient's age, our results were similar to that recorded by Kathleen and Head who found that the incidence of PN was increased significantly with age. They found that 8.1 percent of the 40-49 year age group had PN, compared to 34.7 percent of individuals over age 80 (Kathleen and Head, 2006). This could be related to the period of complain, so the hyperglycemic status is the main cause of these complications, while, glycemic control is the key for prevention, and retarding progression of diabetic neuropathy of any type (Little *et al.,*2007). Early metabolic abnormalities in the nerves of diabetic patients are thought to be due to the direct exposure of nerve tissue or its vascular bed to high concentrations of glucose. Hyperglycemia may increase the activity of the polyol pathway, resulting in the accumulation of sorbitol and fructose and a decrease in Na/K–ATPase activity. There is also loss of myelinated fibers, and demyelination may occur.Our results suggest that axonal degeneration is the main cause of diabetic polyneuropathy, because reduction of the amplitudes of the sensory and motor responses, reflecting axonal damage, was a more prominent feature than slowing of nerve conduction velocities, an indicator of demyelination (Partanen *et al.*, 1995)

References

Adler AI. ; Boyko EJ. ; Ahroni JH. and Smith DG**.** Lower-extremity amputation in diabetes. The independent effects of peripheral vascular disease, sensory neuropathy, and foot ulcers. Diabetes Care 1999, 22(7) **:** 1029-1035**.**

Al-Maskari F. and El-Sadig M. Prevalence of risk factors for diabetic foot complications. BMC Family Practice 2007, 8 : 59.

Al-Rawi KM. and Khalafallah AM. Design and analysis of Agricultural Experiment. Al-Mousal University press. Iraq 1989.

Barbosa AP. ; Medina JL. ; Ramos EP. and Barros HP : Prevalence and risk factors of clinical diabetic polyneuropathy in a Portuguese primary health care population. Diabetes Metab. 2001, 27(4) : 496-502.

Guyton AC. and Hall JE. Medical physiology. 11th ed. Elsevier Inc. 2006, Pp : 972 .

Jbour AS. ; Jarrah NS. ; Radaideh AM. ; Shegem NS. ; Bader IM. ; Batieha AM. and Ajlouni KM. Prevalence and predictors of diabetic foot syndrome in type 2 diabetes mellitus in Jordan. Saudi Med. J. 2003, 24(7) : 761-764.

Kanade RV. ; Van Deursen RWM. ; Harding KG. and Price PE. Investigation of standing balance in patients with diabetic neuropathy at different stages of foot complications. Clinical Biomechanics 2008, 23(9) : 1183-1191.

Kathleen A. and Head ND. Peripheral Neuropathy:pathogenic mechanisms and Alternative therapies. Alternative Medicine Review 2006, 11(4) : 294-329.

Lehto S. ; Rönnemaa T. ; Pyörälä K. and Laakso M. Risk factors predicting lower extremity amputations in patients with NIDDM. Diabetes Care 1996, 19(6) : 607 -612.

Little, A.A ; Edwards, J.L. and Feldman, E.L. Diabetic neuropathies. Pract Neurol. 2007, 7: 82-92.

Partanen, J. ; Niskanen, L. ; Lehtinen, J. ; Mervaala, E. ; Siitonen, O. and Uusitupa, M. Natural history of peripheral neuropathy in patients with non-insulin depended diabetes mellitus. The new England J. of medicine. 1995, 333(2): 89-94.

Pecoraro RE. ; Reiber GE. and Burgess EM. Pathways to diabetic limb amputation. Basis for prevention. Diabetes Care 1990, 13(5) : 513-521.

Riaz S. Diabetes mellitus. Sci. Res. Essays 2009, 4(5) : 367-373.

Shaw JE. ; Hodge AM. ; De Courten M. ; Dowse GK. ; Gareeboo H. ; Tuomilehto J. ; Alberti KG. and Zimmet PZ. Diabetic neuropathy in Mauritius: prevalence and risk factors. Diabetes Res. Clin. Pract. 1998, 42(2) : 131-139.

Walters DP. ; Gatling W. ; Mullee MA. and Hill RD. The prevalence, detection, and epidemiological correlates of peripheral vascular disease: a comparison of diabetic and non-diabetic subjects in an English community. Diabet Med 1992, 9(8) : 710-715.

Won JC. ; Kwon HS. ; Kim CH. ; Lee JH. ; Park TS. ; Ko KS. and Cha BY. Prevalence and clinical characteristics of diabetic peripheral neuropathy in hospital patients with Type 2 diabetes in Korea. Diabet Med. 2012, 29(9) : 290-296.

نسبة حدوث حالات اعتلال الاعصاب المحيطية والقدم السكري بين مرضى السكري في مدينة الناصرية: دراسة مسحية

افراح نصرالله فارس
قسم التحليلات المرضية / كلية العلوم / جامعة ذي قار

الخلاصة

هدفت الدراسة الى تحديد نسبة انتشار حالات اعتلال الاعصاب المحيطية واصابات القدم (القدم السكري) بين مرضى السكري (للنوعين الاول والثاني) وللفترة ما بين شهر آذار 2010 وشهر كانون الاول 2012 في مدينة الناصرية. شملت الدراسة 574 مريضاً يعانون من اعتلال الاعصاب المحيطية واصابات القدم (91 اعتلال الاعصاب المحيطية (53 ذكور،38 اناث) و483 اصابات القدم (279 ذكور،204 اناث)) تم تقسيم المرضى حسب (نوع السكري، الجنس، العمر، التدخين والمهنة).

اظهرت النتائج عدم وجود فرق معنوي في حالات الاصابة باعتلال الاعصاب المحيطية (DPN) بين الذكور والاناث سواء في النوع الاول او النوع الثاني. لكن في حالة القدم السكري (DF) كان هناك ارتفاعاً معنوياً في معدل اصابة الذكور مقارنة الاناث في كلا النوعين الاول والثاني ($P<0.01$, $P<0.05$) على التوالي. ووجد ان معدل حدوث حالات اعتلال الاعصاب المحيطية والقدم السكري تزداد بشكل معنوي بتقدم العمر حيث اظهرت النتائج وجود زيادة كبيرة في معدل الاصابة فوق عمر (50 سنة) في كلا النوعين من السكري ($P<0.005$). وجدت الدراسة انه لا يوجد تأثير لعامل التدخين بالنسبة لحالات اعتلال الاعصاب المحيطية والقدم السكري. ووجد ان النسبة الاعلى من الاصابة باعتلال الاعصاب المحيطية والقدم السكري في المرضى غير المدخنين ($P<0.005$). اوضحت الدراسة ان معدل حدوث الاصابة باعتلال الاعصاب المحيطية والقدم السكري يزداد بشكل معنوي في المرضى الذين يقومون بجهد بدني ($P<0.005$).

نستنتج من هذه الدراسة ان نسبة أنتشار حالات اعتلال الاعصاب المحيطية والقدم السكري بين مرضى السكري من النوع الاول والثاني ترتبط بشكل معنوي مع عاملي الجنس والعمر، ووجد ان هناك علاقة طردية بين اعتلال الاعصاب المحيطية والقدم السكري وبين فترة الاصابة بالمرض. واشارت النتائج الى ان الجهد البدني يزيد من نسبة الاصابة باعتلال الاعصاب المحيطية والقدم السكري.