

The Prevalence and Risk Factors of Hypertension in Hospitalized Type II Diabetic Patients

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Abstract

Objective: To report on the prevalence and risk factors of hypertension in hospitalized type II diabetic patients.

Methods: Prospective study to all diabetic patients who might be admitted to Merjan hospital during the period between June to October 2004. Patients age , sex , body mass index ,hypertension ,serum cholesterol , protein in urine , fasting blood glucose , smoking and family history were analyzed as a probable risk factors.

Result: Total of 100 patients were studied, 55% of whom are hypertensive. Hypertensive patients tend to be older, obese, and hyperlipidemic with family history of hypertension and overt protein uria.

Conclusion: Hypertension is common in diabetic, weight reduction, treatment of hyperlipidemia and tight glycemic control are essential to minimize the occurrence of hypertension.

Key words: hypertension, diabetes mellitus, obesity, proteinuria, hyperlipidemia.

الخلاصة

الهدف: لتقرير مدى انتشار وعوامل الخطورة لارتفاع ضغط الدم الشرياني في مرضى السكري (النوع الثاني) والراقدين في المستشفى.
الطريقة: استقيت المعلومات من مرضى السكري (النوع الثاني) والذين ادخلوا إلى مستشفى مرجان التعليمي، فلقد أدخل مئة مريض إلى المستشفى للفترة المحصورة بين حزيران وتشرين الأول من عام 2004، ولقد تم تحليل المعطيات التالية: العمر، الجنس، معدل كتلة الوزن، ضغط الدم الشرياني، الكوليسترول في الدم، وجود زلال في الإدرار، السكر في الدم قبل الإفطار، التدخين ووجود تاريخ عائلي مرضي لارتفاع ضغط الدم الشرياني.

النتائج: تمت دراسة المرضى المذكورين وكان 55% منهم يعانون من ارتفاع ضغط الدم ومما يميز هؤلاء المرضى بأنهم الأكبر عمرا والأكثر وزنا والذين أظهروا زيادة في نسبة الكوليسترول في الدم ووجود الزلال في الإدرار كما إنهم من عوائل تعاني من ارتفاع الضغط الشرياني.
الاستنتاج: ارتفاع ضغط الدم الشرياني شائع في مرضى السكري (النوع الثاني). العلاج المبكر لارتفاع ضغط الدم والسكري ذو أهمية كبيرة لمنع حدوث المضاعفات التي تصيب القلب والأوعية الدموية، ولتقليل تسارع التدهور في مضاعفات الأوعية الدموية الدقيقة، ولتقليل معدل الوفيات

Introduction

Diabetes mellitus is a syndrome of chronic hyperglycemia due to relative insulin deficiency, resistance or both, it affect more than 120 million people world wide.

Diabetes is usually irreversible; furthermore, patients can have a reasonably normal life style, its late complication results reducing life expectancy and major health costs⁽⁵⁾.

Hypertension affects one billion people world wide⁽⁷⁾. Inadequate treatment of hypertension continues to be the major contributing factor in the development of and death from coronary artery diseases, stroke, heart failure and renal failure^(4, 7, 8).

Diabetes mellitus & hypertension commonly co-exist and may be considered as a part of the insulin resistance or metabolic syndrome^(4, 7).

Hypertension is an especially important cause of morbidity and mortality because the risk of diabetic macro vascular & micro vascular complications whic strongly related to the level of blood pressure^(2, 3, 5, 7).

Patients and methods

Hundred hospitalized patients were studied through a period of June to October 2004 at Merjan teaching hospital of both sexes, all of them diabetic (type II) and of normal blood pressure at time of diagnosis of diabetes mellitus. The following parameters were studied: age, sex, body mass index, family history hypertension, serum cholesterol, protein in urine and smoking. The duration of diabetes was not included because diabetes may be a symptomatic. Fifty five percent of the patients were hypertensive, 55% of the hypertensive were male and 45% were female.

We measured blood pressure in sitting position, the arms were supported at the level of heart, the width of the bladder cuff of sphygmomanometers were $> \frac{2}{3}$ of the circumference of the arm, we lowered the mercury slowly (2 mm per second), we took two measurements of 5 minutes apart for each patient, we defined patients as hypertensive when their blood pressure $> 140\text{mmHg}$.

Proteinuria was measured by dip sticks, fasting venous blood glucose & serum cholesterol we measured by enzymatic methods.

Any reading of cholesterol more than 5.2 mmol/L was considered hyperlipidemic. In this study we did not use HbA_{1c} and serum lipid profile due to it's unavailability in the laboratory of the hospital. The results were analyzed by chi square and it was considered significant when P value is < 0.05 .

Results

- 1- The mean age of the patient was 59.9 ± 17.7 (67.27%) of the Hypertensive group were > 60 years of age while of the normotensive groups were 58.7 % (P value < 0.05).
- 2- Thirty patients out of 55 of the hypertensive group were female i.e. female to male ratio was 1.2, while the female in normotensive group were 30 out of 45 patients. I.e. female to male ratio is 2: 1. The sex was found not significant.
- 3- Forty patients out of 55 were obese (i.e. body mass index $> 30 \text{ Kg/ m}^2$) while 18 patients of normotensive group were obese, so the body mass index is very significant (P < 0.01) as a risk factor.
- 4- Thirty five patients of hypertensive group (63.6%) had a family history of hypertension, while 11 patients of the normotensive group (24.4%) had family history (P value 0.01).
- 5- Thirty six patients of the hypertensive group(65.45%) showed ypercholesteremia , where as 8 patients(17.77%) of the ormotensive group were hyperchoestremic. i.e. (P < 0.05).
- 6- Forty nine (89.09%) of the hypertensive group had proteinuria compared with 11 patients (24.4%) the normotensive group (The P < 0.01) it was the most serious risk factor.

- 7- Forty patients (72.72%) of the hypertensive group were smoker compared with 28 patients (62.2%) of the normotensive group. The $P > 0.05$.

Discussion

Because hypertension & diabetes mellitus share many identical risk factors, it is not surprising for both to exist together. In addition to the development of diabetic nephropathy, at least two other factors have been proposed to contribute to hypertension in diabetes mellitus type II. Hyperinsulinemia and extra cellular fluid volume expansion⁽¹⁰⁾.

After menopause, prevalence of hypertension increases rapidly in women and exceeds that in men, due to low of the protective effect of estrogen. The age dependent hypertension can be explained by the replacement of elastin by collagen & fibrous tissue in the elastic lamina of the aorta. An age dependant process that is accelerated by atherosclerosis and hypertension. The linear increase in hypertension with body mass index may part of metabolic syndrome refer to frequent clustering ension with of hypertension with abdominal adiposity , hypertriglyceridemia and low high density lipoprotein cholesterol levels and insulin resistance^(4, 7, 9)

There is mounting evidence for an expanded plasma volume in addition to over activity of the sympathetic system which can be a reasonable explanation of hypertension in obese. The familial clustering of hypertension documents an important genetic component & points to the chance of exposure to same environmental hazard especially in our societies.

In a recent Danish study non diabetic, non obese, normotensive individuals with albuminuria had slightly higher systolic blood pressure and showed a smaller vasodilatory response to nitroglycerin⁽¹⁾. Hypertension is a common development and may itself damage the kidney still further⁽⁴⁾. Cigarette smoking account for the development of hypertension through hemodynamic stress (nicotin increase the heart

rate & transiently increased blood pressure) and endothelial injury and dysfunction (impaired nitric oxide release & result vasodilatation), In addition to development of an atherogenic lipid profile⁽⁷⁾.

Conclusion

As the parameters that were studied each of which can increase morbidity & mortality so the early intervention by tight blood glucose control, tight blood pressure control, normalization of dyslipidemia and weight with regular exercise can be a safe & solid step of prevention or delay progression of hypertension in diabetics?

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Table (1) Comparison between hypertensive and normotensive D.M type II according to some variables :-

Variables	Hypertensive D.M No. 55	Normotensive D.M No. 45	P value
Age \geq 60 years	67.27%	57.77%	< 0.05
Sex ratio F:M	1.2 : 1	2:1	> 0.05
B.M.I \geq 30Kg/m ²	72.72%	40%	< 0.01
Family hx.of hypertension	63%	24%	< 0.01
Serum cholesterol \geq 5.2 mmol/L	65.45%	17%	< 0.01
Protein in urine	88%	24%	< 0.001
Smoking	72.72%	62%	> 0.05