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Hypertension update: Reshaping of the Future

Zagazig Research In Hypertension

Session 3

Determinants and impact of masked hypertension in offspring of patients with diabetes: relation with coronary flow and cardiac function

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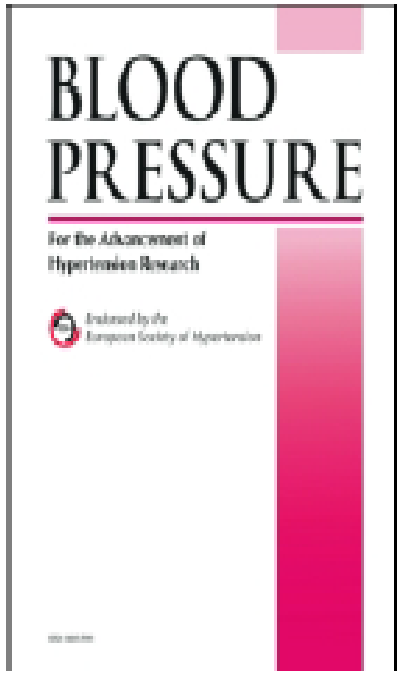

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Determinants and impact of masked hypertension in offspring of patients with diabetes: relation with coronary flow and cardiac function

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Determinants and impact of masked hypertension in offspring of patients with diabetes: relation with coronary flow and cardiac function

Ragab A. Mahfouz, Mohammad Gouda & Waleed Alawady

Introduction

Ambulatory BP monitoring may add important information beyond office BP measurement in patients with hypertension and diabetes.

But, scarce data are available as regard the prevalence of MH in offspring of patients with diabetes. Moreover, whether offspring of patients with diabetes with MH had impaired coronary circulation and cardiac function is not clearly studied.

Objective:

We aimed to evaluate the prevalence, determinants and clinical impact of masked hypertension in offspring of patients with diabetes.

Masked hypertension “MH” was defined according to guidelines as daytime ambulatory BP monitoring “ABPM” >135/85mmHg and clinic BP <140/90mmHg.

Methods

GI: 100 nondiabetic offspring of patients with diabetes

(49.6 ± 7.5 years old, 65% males)

GII: 60 offspring of healthy people

were enrolled

24-h ABPM was applied to evaluate mean 24-h systolic/diastolic BP, daytime, nighttime and night dipping readings.

Assess for microalbuminuria + Measuring High Sensitive CRP+ Fasting bl. Sugar

LV parameters and coronary flow reserve of LAD (induced by adenosine 0.14 mg/kg/min was calculated in all offspring.

Results

Results

GI: 100 nondiabetic offspring of patients with diabetes

GII: 60 offspring of healthy people

Only 3 had MH

29 cases proved to have MH

61 cases did not have MH

Table 1. Demographic characteristics of offspring of patients with diabetes versus offspring of non-diabetics (control).

	Offspring of patients with diabetes ($n = 100$)	Controls ($n = 60$)	p Value
Age (years)	49.6 ± 7.5	47.2 ± 6.8	0.62
Sex (male/female)	65/35	38/22	0.35
Body mass index (kg/m^2)	26.4 ± 4.2	24.2 ± 3.3	0.09
Smokers (%)	42%	23%	<0.05
Family history of hypertension	35 (35%)	5(8.3%)	<0.05
Systolic blood pressure (mmHg)	127 ± 11.5	119 ± 7.3	0.06
Diastolic blood pressure (mmHg)	82.1 ± 8.2	76 ± 8.1	0.07
Patients with masked hypertension (%)	29 (29%)	2 (3.3%)	<0.001

29% of offspring of patients with diabetes had MH compared to only 3.3% of offspring in healthy people (p<0.001).

All ABPM parameters were significantly higher in offspring of patients with diabetes than control offspring, whilst the systolic and diastolic dipping were significantly lower (p<0.001 and <0.05, respectively).

	Offspring of patients with diabetes (100)	Control (60)	*p* Value
Clinic blood pressure (mmHg)			
Systolic blood pressure	127 ± 11.5	119 ± 7.3	0.06
Diastolic blood pressure	82.1 ± 8.2	76 ± 8.1	0.07
Daytime blood pressure (mmHg)			
Systolic blood pressure	139 ± 9	123 ± 7	<0.001
Diastolic blood pressure	86 ± 7	74 ± 5	<0.01
Nighttime blood pressure (mmHg)			
systolic blood pressure	131 ± 8	103 ± 9	<0.001
Diastolic blood pressure	77 ± 6	64 ± 5	<0.001
24-h blood pressure (mmHg)			
Systolic blood pressure	139 ± 12	116 ± 7	<0.01
Diastolic blood pressure	81 ± 7	71 ± 7	<0.05
Nocturnal blood pressure (mmHg)			
Systolic dipping	7.9 ± 3	21 ± 4	<0.001
Diastolic dipping	8 ± 2	12 ± 4	<0.05

Table 3. Echocardiographic

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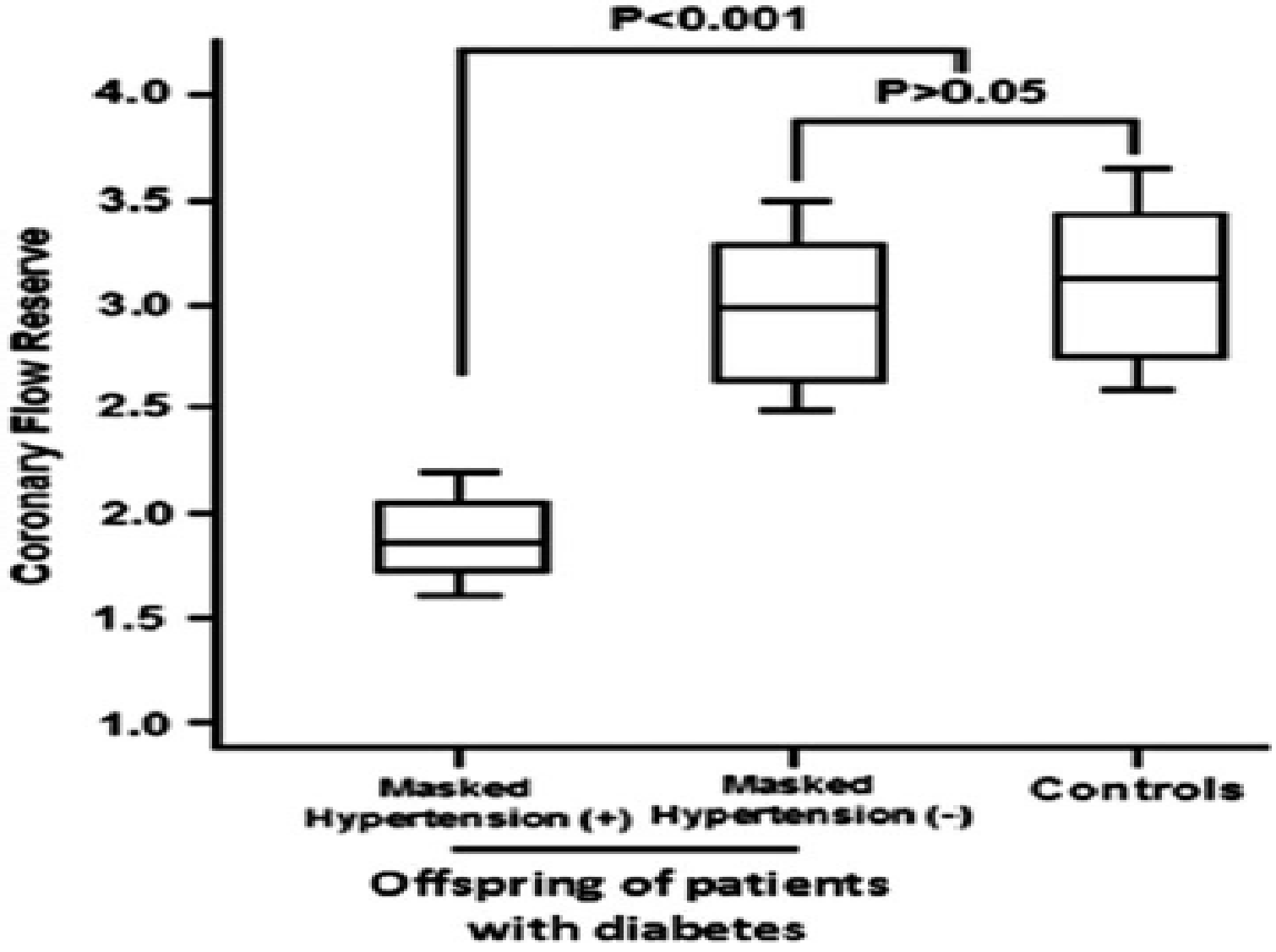


Left ventricular mass index (g/m²)
Left ventricular ejection fraction (%)
Early to late mitral flow (E/A)
Septal e′ (cm/sec)
E/e′
Mean diastolic velocity hyperemia

Coronary flow reserve	2.34± 0.28	3.2 ±0.23	<0.001

Table 4. Demographic characteristics of offspring of patients with diabetes with versus without masked hypertension.

	Offspring with masked hypertension (29)	Offspring without masked hypertension (71)	*p* Value
Age (Year)	45.7 ± 2.5	44.1 ± 2.1	0.42
Body mass index (kg/m^2)	24.5 ± 0.9	23.8 ± 0.7	0.16
Smokers (%)	15 (51.7%)	8(13%)	<0.03
Family history of hypertension	12(41.4%)	23 (37.7%)	0.08
Fasting blood glucose (mmol/L)	5.4 ± 0.1	4.8 ± 0.1	<0.05
Two-hour glucose level (mmol/L)	9.9 ± 0.02	5.3 ± 0.01	<0.001
Serum creatinine (µmol/L)	79 ± 6	76 ± 6	0.13
Cholesterol (mmol/L)	5.3 ± 0.1	4.4 ± 0.1	<0.05
Triglyceride (mmol/L)	2.1 ± 0.07	2.0 ± 0.04	0.36
High-Density lipoprotein (mmol/L)	1.18 ± 0.1	1.2 ± 0.1	0.33
Microalbuminuria %	12 (41%)	3 (4.9%)	<0.01
Estimated Glomerular Filtration Rate ml/min/1.73 m^2	76.5 ± 15.8	77.8 ± 14.5	0.57
High-Sensitive C-reactive protein (mg/L)	3.4 ± 0.5	1.5 ± 0.3	<0.001

Regression Analysis

FH of HTN (p<0.01),

High-sensitive CRP (p<0.001),

Smoking (p < 0.01),

Fasting blood sugar (p<0.01)

LVMI (p<0.01)

With univariate regression analysis in offspring of patients with diabetes, the odds of having MH independently increased with……..

E/e' ratio (p<0.01)

Daytime systolic BP (p<0.001)

Microalbuminuria (p<0.05),

Nocturnal systolic dipping (p<0.01)

Whilst with multivariate analysis the presence of MH was independently and strongly predicted by ↑daytime systolic BP& less nocturnal systolic dipping

To identify the determinants of CFR, and E/e’ ratio.

Logistic regression analysis revealed that MH was independently associated with reduced coronary flow reserve ($p<0.0001$) and diastolic dysfunction ($p<0.001$).

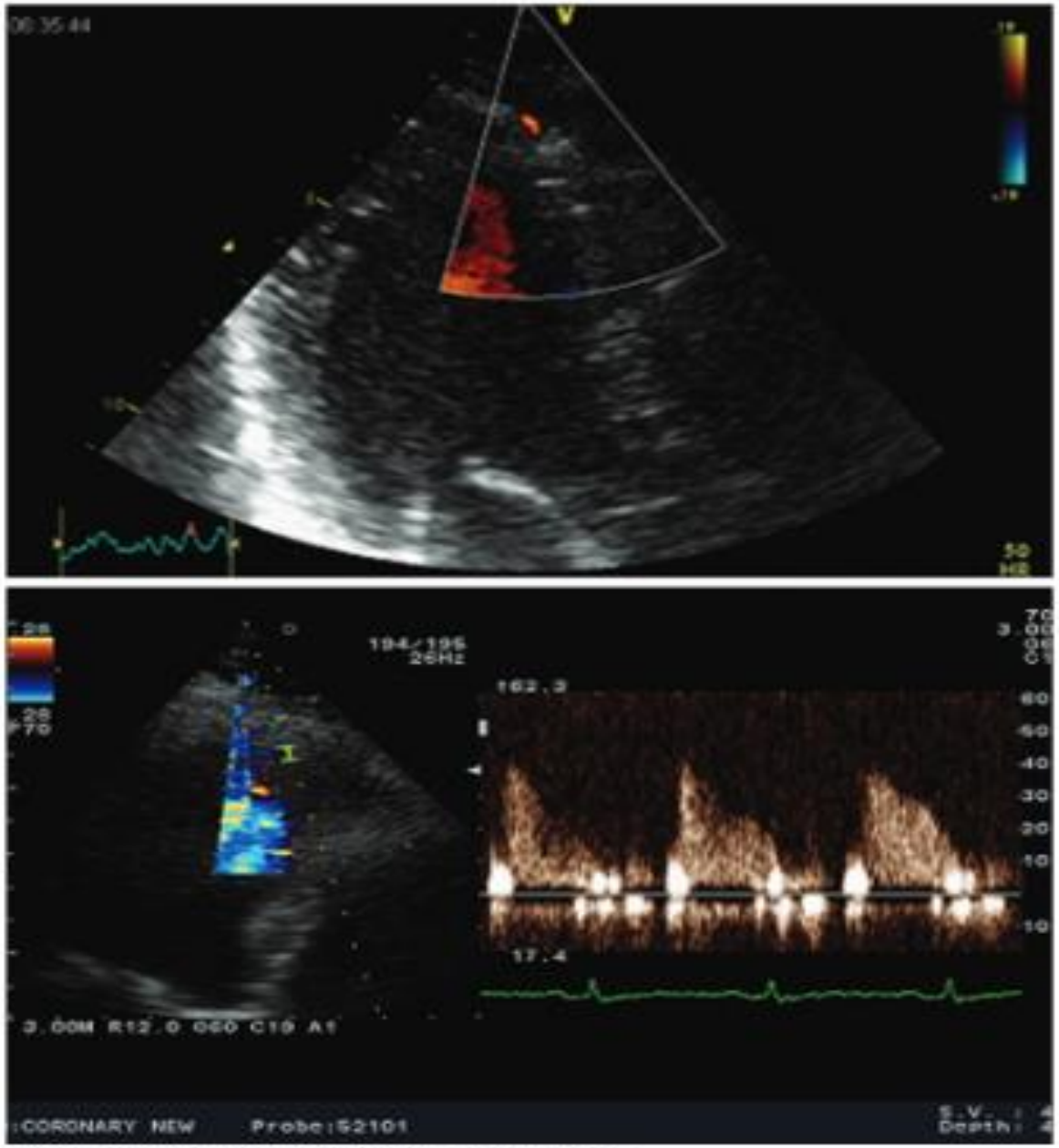
Conclusion

MH is prevalent in offspring of patients with diabetes and significantly associated with reduced coronary flow reserve and left ventricular diastolic dysfunction.

These findings suggest that offspring of patients with diabetes constitute a high risk group and deserve close follow up, mainly with the use of ABPM.

Determinants and impact of masked hypertension in offspring of patients with diabetes: relation with coronary flow and cardiac function https://doi.org/10.1080/08037051.2018.1524261

Figure 2: Evaluation of Coronary Flow in the Distal Part of LAD from Modified Apical View



Typical diastolic flow is seen with pulsed wave Doppler.

Coronary flow reserve assessment

Coronary flow in the distal part of LAD was recorded with a high resolution frequency transducer (5–7 MHz), guiding with color Doppler flow mapping, utilizing a sample volume (2.5-3.0mm wide) positioned on the color signal in LAD.

Baseline coronary flow was recorded first, followed by IV adenosine (0.14 mg/kg/min) to induce hyperemia and then spectral Doppler signals was recorded.

It appears to be bi-phasic, with a lower peak during systole and a higher peak during diastole. The average of 3 cardiac cycles Peak diastolic velocities were measured at baseline and peak hyperemic conditions.

Peak diastolic flow is the simplest parameter to measure, in addition to being the most reproducible and the one with the closest correlation with coronary perfusion reserve measured by PET.

Coronary flow reserve was defined as the ratio of hyperemic to basal mean diastolic velocities and a value <2 were considered pathological