

Gender Differences in the Management of Diabetic Patients with Hypertension and Chronic Ischemic Heart Disease

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Abstract: *Objective:* To determine gender differences in cardiovascular risk factors control and clinical management in hypertensive diabetics with chronic ischemic heart disease. *Research design and methods:* CINHTIA was a cross-sectional and multicenter survey aimed to evaluate the clinical profile and management of hypertensive outpatients with chronic ischemic heart disease attended by cardiologists in Spanish clinical practice setting. The aim of the present work was to examine the gender differences in the control and treatment of cardiovascular risk factors in the subgroup of patients with diabetes. Adequate blood pressure (BP), LDL-cholesterol and diabetes control rates were defined according to ESH-ESC 2003, NCEP-ATP III and ADA-2005 guidelines, respectively.

Results: A total of 654 patients (42.4% women) were included for the present analysis. Women were older. Smoking, sedentary lifestyle and peripheral arterial disease were more frequent in men; left ventricular hypertrophy and heart failure in women. The total number of lipid lowering and antihypertensive agents were similar between genders, but with a trend to use more antidiabetic drugs in women. There was a tendency to a better BP control in men (21.5% vs 17.0%, $p=0.09$). LDL-cholesterol and diabetes were better controlled in men (34.6% vs 26.6%, $p=0.04$ and 29.7% vs 22.3%, $p=0.025$, respectively).

Conclusions: Diabetic women with hypertension and chronic ischemic heart disease exhibit lower control rates of cardiovascular risk factors.

Keywords: Hypertension, cardiologist setting, chronic ischemic heart disease, men, women, diabetes, cardiovascular risk factors, control.

INTRODUCTION

Cardiovascular disease is the most important cause of death among women [1]. Despite that, it seems that many physicians and patients do not actually perceive the coronary risk in females [2]. This could be related with the fact that many physicians do not realize the magnitude of this epidemic in women, and could result in significant worse risk factors control rates [3].

Although in the last years there is a growing awareness about this matter, available information on gender differences is still scarce and mainly provided from US population [4, 5]. Recently, it has been published a study with data from Germany [6]; but., it would be interesting to determine potential gender disparities in populations with a different risk profile, hypothetical lower, such as Mediterranean countries [7].

CINHTIA (Cardiopatía Isquémica crónica e Hipertensión Arterial en la práctica clínica en España) was a

cross-sectional and multicenter survey aimed to evaluate the clinical profile and management of hypertensive outpatients with chronic ischemic heart disease attended by cardiologists in Spanish clinical practice setting. The main results of this survey have recently been published [8, 9]. The aim of the present work was to examine the gender differences in the control and treatment of cardiovascular risk factors in the subgroup of patients with diabetes.

RESEARCH DESIGN AND METHODS

The methods and design of the study have been previously described [8, 9]. Briefly, a total of 112 investigators, all of them cardiologists, participated in the study. Each investigator was asked to include consecutively patients ≥ 18 years, both genders, with an established diagnosis of hypertension and chronic ischemic heart disease. Patients with an acute coronary syndrome within the three previous months were excluded.

Chronic ischemic heart disease was defined as the presence of stable angina pectoris, evidence of myocardial ischemia assessed by stress tests, history of myocardial infarction for >3 months or previous revascularization (surgical or percutaneous). The presence of cardiovascular risk factors, organ damage or associated clinical conditions was

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Table 1. Clinical Characteristics of the Study Population (n=654)

	Male (n=377; 57.6%)	Female (n=277; 42.4%)	p
Age (years)	67.0±9.6	69.6±7.8	<0.0001 ²
BMI (kg/m ²)	28.9±3.6	29.4±4.5	0.092 ²
Atrial fibrillation (%)	16.2	31.5	<0.0001 ¹
LVEF (%)	54.5±12.8	56.3±11.7	0.118 ¹
Cardiovascular Risk Factors¹			
Dyslipidemia (%)	88.5	89.3	0.790
Current smoker (%)	13.6	4.2	<0.0001
Ex-smoker (>1 year quit smoking) (%)	40.9	5.7	<0.0001
Sedentary lifestyle (%)	71.9	55.4	<0.0001
Organ Damage¹			
Left ventricular hypertrophy (%)	49.9	62.4	0.001
Heart failure (%)	24.6	38.1	<0.0001
Peripheral artery disease (%)	27.4	14.2	<0.0001
Renal function insufficiency (%)	20.6	20.4	0.99
Stroke (%)	10.2	10.8	0.89
Physical Examination²			
SBP (mmHg)	143.6±17.6	146.9±17.3	0.018
DBP (mmHg)	81.9±10.8	84.5±12.3	0.006
HR (bpm)	68.5±11.0	71.5±10.6	<0.0001
Biochemical Parameters²			
Total cholesterol (mg/dl)	193.9±47.6	208.5±46.4	<0.0001
Triglycerides (mg/dl)	160.6±55.9	160.2±58.4	0.962
LDL-cholesterol (mg/dl)	112.1±38.3	120.4±36.7	0.009
HDL-cholesterol (mg/dl)	48.6±23.3	49.2±17.1	0.736
Serum fasting glucose (mg/dl)	151.4±44.9	157.9±44.1	0.076
Creatinine (mg/dl)	1.31±1.1	1.35±1.1	0.752
Uric acid (mg/dl)	6.8±5.5	6.6±5.8	0.787
Treatment¹			
≥4 drugs (%)	96.7	97.0	0.666
Antihypertensive drugs (≥ 2 agents) (%)	95.5	96.8	0.765
Beta blockers (%)	64.9	62.0	0.455
CCB (%)	45.7	53.9	0.045
ACEIs (%)	44.8	40.2	0.258
Diuretics (%)	38.9	53.9	<0.001
ARB (%)	38.0	44.3	0.122
Alpha blockers (%)	6.3	3.3	0.102
Lipid lowering drugs	77.7	77.5	1.000
Statins	75.0	73.1	0.585
Ezetimibe	10.1	17.0	0.012
Fibrates	4.9	5.2	1.000
Others	0.8	2.2	0.179
Antidiabetics	84.8	89.7	0.045
Oral antidiabetics	68.2	64.9	0.396
Insulin	21.7	33.2	0.01
Anticoagulants	13.6	27.3	<0.001
Antiplatelets	91.6	77.1	<0.001

(Table 1) contd.....

	Male (n=377; 57.6%)	Female (n=277; 42.4%)	p
Diagnostic Procedures¹			
Electrocardiogram (%)	100	99.6	0.425
Echocardiogram (%)	85.0	83.1	0.580
Exercise test (%)	57.2	44.1	0.001
Radio-isotopic exam (%)	23.2	31.7	0.025
Stress echocardiogram (%)	6.3	4.0	0.265
Cardiac catheterism (%)	69.4	49.6	<0.001

BMI: body mass index; LVEF: left ventricular ejection fraction; SBP: systolic blood pressure; DBP: diastolic blood pressure; HR: heart rate; CCB: calcium channel blockers; ACEIs: angiotensin converting enzyme inhibitors; ARB: angiotensin II receptor blockers.

¹Chi-square test.

² Student's t-test.

recorded from the patients' clinical history. All of them were defined according to the ESH-ESC 2003 guidelines [10]. Sedentary lifestyle was defined as the physical activity shorter than a 30 minute daily walk.

Since this study was performed in the second quarter of 2007, adequate blood pressure (BP), LDL-cholesterol and glycemic control rates were defined according to the current guidelines in 2007, what means the ESH-ESC 2003, NCEP-ATP III and ADA 2005 guidelines, respectively [10-12].

RESULTS

In the CINHTIA study a total of 2,024 hypertensive patients with chronic ischemic heart disease were included (31.7% female). Overall 654 patients (32.3%) were diabetics (377 men [57.6%], 277 women [42.4%]). Table 1 summarizes the clinical characteristics of the study population. Women were older and had an increased prevalence of atrial fibrillation. The presence of concomitant cardiovascular risk factors and organ damage was very common in both genders. Smoking, sedentary lifestyle and peripheral arterial disease were more frequent in men and left ventricular hypertrophy and heart failure rates were higher in women. Both systolic and diastolic BP, heart rate, total cholesterol, LDL- and HDL-cholesterol values were higher in women.

Concerning to treatment, almost all the patients were taking at least 4 drugs, and ≥ 2 antihypertensive agents, without significant differences between genders in the total number of drugs. The overall number of lipid lowering drugs was also similar in both sexes, but there was a trend to prescribe more antidiabetics in women. However, males were taking more antiplatelets and females more anticoagulants, likely to be related with a higher prevalence of atrial fibrillation. Interestingly, calcium channel blockers, diuretics and insulin were more frequently used in women (Table 1).

Focusing on risk factors control rates, there was a tendency to a better BP control in men (21.5% vs 17.0%, $p=0.09$). LDL-cholesterol and diabetes control rates were both higher in males (34.6% vs 26.6%, $p=0.04$; 29.7% vs 22.3%, $p=0.025$, respectively).

Finally, the diagnostic methods performed in this population according to gender were examined. Exercise test and cardiac catheterization were more commonly performed in male gender, and radio-isotopic exams in women (Table 1).

DISCUSSION

In this Spanish survey, the results showed that despite a similar number of antihypertensive and lipid lowering drugs, a lesser proportion of women attained BP, LDL-cholesterol and diabetes control rates. This fact may be related with the circumstance that females had more organ damage, and in this situation is more difficult to achieve cardiovascular risk factors goals [13]. Previous studies have reported worse control rates in women, including BP, LDL-cholesterol and HbA1c values [4-6]; although some of them found that women with diabetes received less treatment for modifiable coronary heart disease risk factors than diabetic men [5, 6], others have reported this poorer control with a similar intensity of medication management [4].

Although women have a similar or slightly higher prevalence of angina pectoris [14], this survey showed that men were more likely to undergo stress tests and coronary angiography. As a result, hypertensive diabetic women with coronary heart disease appeared to be under-diagnosed and this might have clinically relevant implications.

It has been reported that a multiple intensive intervention treating the associated risk factors markedly improves cardiovascular prognosis in at-risk patients with type 2 diabetes [15]. All these data suggest that despite the clinical management of women with diabetes has improved, it is necessary to increase the awareness of physicians for this population. Since women often exhibit a worse clinical profile, it is likely that women need a more aggressive approach than men to achieve cardiovascular risk factors targets.

The cross-sectional design of the study was chosen to best represent the "real world" of the clinical practice. Consequently, a large population of hypertensive patients achieved by consecutive sampling was included in the trial. But this methodology has its limitations, since it reduces the level of control that can be exercised to reduce variation and bias. As our study was carried out in a population attended by cardiologists in Spain, the data could be generalized probably only to those countries with the same health care delivery and cardiovascular risk profile.

In conclusion, diabetic women with hypertension and chronic ischemic heart disease have lower control rates of cardiovascular risk factors than men despite a similar intensity of treatment.

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