Scientific letters

Impact of the ACC/AHA AHT Guidelines on the Frequency of Hypertension and the Need for Treatment. The RICARTO Study

Impacto de la guía de HTA del ACC/AHA en la frecuencia y la necesidad de tratamiento de la hipertensión arterial. Estudio RICARTO

To the Editor,

The new hypertension (HTN) guidelines of the American College of Cardiology/American Heart Association (ACC/AHA)[1] use lower blood pressure (BP) values than in previous guidelines[2,3] (≥ 130/80 mmHg) to define HTN and therapeutic targets. In the United States population this means an increase of 13.7% in patients diagnosed with HTN and 1.9% in those requiring pharmacological treatment; in addition, 14.4% of hypertensive patients on treatment will require treatment intensification.[4] Our aim was to evaluate the potential impact of the new ACC/AHA guidelines in the general population of Toledo.

RICARTO is an observational epidemiological study of a cohort undergoing follow-up for a minimum of 5 years.[5] The target population consist of patients aged 18 years or older in the Toledo health care area (n = 424 172). Cardiovascular risk was calculated with the ASCVD Pooled Cohort Risk Equations Risk Calculator. The protocol was approved by the *Complejo Hospitalario de Toledo* Ethics Committee. BP was taken as the mean of 3 readings measured with an Omron HEM-907.

The study included 1694 patients (59.2% were women; mean age, 49.35 ± 15.73 years). The epidemiological data are shown in Table 1. Patients with systolic BP between 130 and 140 mmHg were younger and had less obesity than those with BP ≥ 140 mmHg ($P < .001$). A total of 21.4% of patients were receiving treatment with antihypertensives (10.9% angiotensin II receptor blockers;

Table 1
Characteristics of the Individuals Studied

	Not hypertensive (< 130/80 mmHg)		Hypertensive (≥ 140/90 mmHg)		"New" hypertensive (≥ 130/80 but < 140/90 mmHg)		Total	
Age								
18-44 y	494 (59.0)		76 (13.6)		115 (38.7)		685 (40.4)	
45-64 y	302 (36.1)		242 (43.2)		146 (49.2)		690 (40.7)	
65-79 y	37 (4.4)		192 (34.3)		33 (11.1)		262 (15.5)	
≥ 80 y	4 (0.5)		50 (8.9)		3 (1.0)		57 (3.4)	
Sex								
Female	563 (67.3)		257 (45.9)		131 (44.1)		951 (56.1)	
Male	274 (32.7)		303 (54.1)		166 (55.9)		743 (43.9)	
Setting								
Urban	316 (37.8)		139 (24.8)		84 (28.3)		539 (31.8)	
Rural	521 (62.2)		421 (75.2)		213 (71.7)		1155 (68.2)	
Age, y	837	42.2 ± 12.8	560	60.7 ± 14.1	297	48.1 ± 13.4	1694	49.3 ± 15.7
Weight, kg	837	69.3 ± 13.2	558	80.9 ± 16.7	297	79.47 ± 15.6	1692	74.93 ± 15.9
Height, cm	837	165.4 ± 8.97	558	163.9 ± 9.82	297	167.5 ± 10.1	1692	165.3 ± 9.54
Body mass index	837	25.3 ± 4.24	558	30.1 ± 5.38	297	28.2 ± 4.56	1692	27.4 ± 5.17
Waist circumference, cm	837	85.6 ± 11.4	560	101.0 ± 12.8	297	94.8 ± 12.4	1694	92.3 ± 13.9
SBP, mmHg	837	113.3 ± 9.39	559	140.8 ± 16.8	297	130.5 ± 9.35	1693	125.4 ± 17.5
DBP, mmHg	837	67.3 ± 6.88	559	81.0 ± 11.4	297	79.6 ± 6.21	1693	74.0 ± 10.8
Heart rate, bpm	837	72.9 ± 10.6	559	76.3 ± 12.7	297	74.1 ± 10.9	1.693	74.2 ± 11.4
Fasting blood glucose, mg/dL	834	82.0 ± 10.7	560	98.7 ± 24.1	296	87.9 ± 19.5	1.690	88.6 ± 19.2
Glycosylated hemoglobin, %	810	5.27 ± 0.42	545	5.8 ± 0.86	290	5.47 ± 0.62	1.645	5.48 ± 0.68
Total cholesterol, mg/dL	832	190.0 ± 34.6	559	194.0 ± 37.0	296	202.0 ± 34.9	1.687	194.0 ± 35.7
LDL-C, mg/dL	828	112. ± 31.7	557	115.0 ± 33.0	295	123.0 ± 31.6	1.680	115. ± 32.3
HDL-C, mg/dL	828	59.7 ± 15.3	559	53.7 ± 16.5	295	56.4 ± 15.4	1.682	57.1 ± 16.0
Triglycerides, mg/dL	832	93.1 ± 53.2	559	130.0 ± 81.1	295	118.0 ± 96.0	1.686	109. ± 74.0
Serum creatinine, mg/dL	833	0.78 ± 0.15	560	0.8 ± 0.25	296	0.85 ± 0.18	1.689	0.82 ± 0.20
Microalbumin/creatinine ratio	521	6.84 ± 16.1	351	29.6 ± 128.	194	7.15 ± 15.3	1.066	14.4 ± 75.8
CKD-EPI	837	101.0 ± 14.9	560	85.7 ± 18.1	297	94.7 ± 15.7	1.694	94.8 ± 17.5

CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration; DBP, diastolic blood pressure; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; SBP, systolic blood pressure.
Values are expressed as No. (%) or mean ± standard deviation.

Table 2
Frequency of Hypertension According to the 2 Criteria Used, in Different Ages and Types of Patients

	Diagnosis of hypertension with mean BP from 3 measurements of 130/80 mmHg			Diagnosis of hypertension with mean BP from 3 measurements of 140/90 mmHg		
	Not hypertensive	Hypertensive (treatment or BP ≥ 130/80 mmHg)		Not hypertensive	Hypertensive (treatment or BP ≥ 140/90 mmHg)	
	No. (%)	No. (%)	95%CI	No. (%)	No. (%)	95%CI
Age						
18-44 y	494 (72.1)	191 (27.9)	24.55-31.36	609 (88.9)	76 (11.1)	8.841-13.66
45-64 y	302 (43.8)	388 (56.2)	52.43-59.88	448 (64.9)	242 (35.1)	31.50-38.70
65-79 y	37 (14.1)	225 (85.9)	81.06-89.56	70 (26.7)	192 (73.3)	67.48-78.27
≥ 80 y	4 (7.0)	53 (93.0)	82.99-97.14	7 (12.3)	50 (87.7)	76.32-93.85
Total	837 (49.4)	857 (50.6)	48.18-52.96	1134 (66.9)	560 (33.1)	30.81-35.33
Sex						
Female	563 (59.2)	388 (40.8)	37.65-43.95	694 (73.0)	257 (27.0)	24.22-29.93
Male	274 (36.9)	469 (63.1)	59.53-66.51	440 (59.2)	303 (40.8)	37.22-44.35
BMI						
Normal (< 25)	438 (74.10)	153 (25.90)	22.40-29.57	509 (86.1)	82 (13.9)	11.18-16.89
Overweight (25-29.99)	299 (45.20)	363 (54.80)	50.95-58.58	435 (65.7)	227 (34.3)	30.67-37.98
Obese (≥ 30)	100 (22.80)	339 (77.20)	73.00-80.89	190 (43.3)	249 (56.7)	51.93-61.27
Abdominal obesity[*]						
No abdominal obesity	649 (63.60)	371 (36.40)	33.41-39.37	817 (80.1)	203 (19.9)	17.49-22.46
Abdominal obesity	188 (27.90)	486 (72.10)	68.55-75.35	317 (47.0)	357 (53.0)	49.11-56.70

95%CI, 95% confidence interval; BMI, body mass index; BP, blood pressure.
[*] Abdominal obesity: waist > 102 cm in men or > 88 cm in women.

9.1%, diuretics; 7.1%, angiotensin-converting enzyme inhibitors; 4.6%, calcium channel blockers; 3.9%, beta blockers; 1.2%, alpha blockers). The prevalence of HTN according to the 2 criteria is shown in Table 2. The overall frequency of HTN was 33.1% and 50.6% depending on the criteria used, a difference of 17.5% ($P < .001$), representing a 52.9% increase. The difference was 22.3% (54.6% increase) in men and 13.8% in women (51.1% increase) ($P < .001$).

In absolute terms, the impact was higher in obese patients: the frequency of HTN rose from 56.7% to 77.2% (a 20.5% difference; 36.1% increase) in obese patients and from 24.7% to 41.2% (16.5% difference; 66.8% increase) in nonobese patients ($P < .001$ for all differences). In overweight individuals, a similar effect to obese patients was observed, and the prevalence rose from 34.3% to 54.8% (20.5% difference; 59.8% increase). In patients with abdominal obesity, HTN rose from 53.0% to 72.1% (19.1% difference; 36% increase), similar to the findings for obese patients; in contrast, in those without abdominal obesity, the frequency of HTN rose from 19.9% to 36.4% (16.5% difference; 82.9% increase) ($P < .001$ for all differences).

The estimated cardiovascular risk was ≥ 10% in 30.8% of the population (46.8% in hypertensive individuals and 7.1% in nonhypertensive individuals). In normotensive patients who would be hypertensive according to the new guidelines, 3.9% (2.2% of women and 6.1% of men) had a risk ≥ 10%. Furthermore, 54.8% of the 464 hypertensive patients who were well-controlled (BP < 140/90 mmHg) would become poorly-controlled with BP < 130/80 mmHg ($P < .001$).

This study demonstrates that the use of the ACC/AHA guidelines on HTN in this sample of the Spanish population would result in a significant 17.5% increase in the frequency of HTN, with this increase being higher in male patients (22.3%), and those who are obese (20.5%), overweight (20.5%) or have abdominal obesity (19.1%). Due to a high cardiovascular risk, 3.9% of the "new" hypertensive patients would require pharmacological treatment. More than half (55%) of patients currently controlled on treatment would require intensification of their antihypertensive treatment to be controlled according to the new guidelines.

The lower BP levels recommended by the new 2017 ACC/AHA guidelines are based on randomized and observational studies. The observational data demonstrated a gradual increase in mortality as BP increased beyond levels of > 115/75 mmHg, and the studies carried out on treatment in hypertensive patients reported a reduction in morbidity and mortality at systolic BP levels < 130 mmHg. In the SPRINT study they demonstrated that in hypertensive patients with high risk, intensive treatment (BP 121/69 mmHg) reduced morbidity and mortality vs standard treatment (BP 136/76 mmHg).[6]

The ACC/AHA guidelines indicate a prevalence of BP between ≥ 130/80 and ≥ 140/90 mmHg of 14%,[1] very similar to the findings by Muntner et al.[4] (13.7%) and our findings (17.5%). In the United States population, the proportion of hypertensive patients requiring treatment intensification to reach the new targets was 14.4%, somewhat different to the 55% found in this study. We consider these figures to be relevant, at a time when, as some authors have pointed out, hypertension may need to be redefined and its treatment improved.

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Venoarterial Extracorporeal Membrane Oxygenation and Ventricular Assistance With Impella CP in an Amniotic Fluid Embolism

Oxigenador extracorpóreo de membrana venoarterial y asistencia ventricular con Impella CP en embolia de líquido amniótico

To the Editor,

Amniotic fluid embolism (AFE) is a rare obstetric complication. The clinical presentation varies from moderate organ dysfunction to cardiogenic shock, respiratory failure, disseminated intravascular coagulation, and death in 60% of patients. The treatment for AFE is based on cardiopulmonary support and correction of the coagulopathy.[1]

Venoarterial extracorporeal membrane oxygenation (VA-ECMO) has been used in patients with AFE who have developed cardiogenic shock and respiratory failure,[2] although this treatment is not always sufficient. We present the first published case of a patient with a clinical presentation compatible with AFE who required cardiopulmonary support with VA-ECMO and left ventricular assistance with Impella CP.

A 34-year-old woman, gravida 2 with 1 previous cesarean delivery, was admitted in week 38 of her pregnancy due to premature rupture of membranes. On blood tests, hemoglobin was 12.1 g/dL; platelets, 180 000/μL; prothrombin time, 96%; international normalized ratio, 1.02; activated partial thromboplastin time, 24.8 seconds; and fibrinogen, 334 mg/dL. Four hours after admission, urgent cesarean was performed due to fetal bradycardia. Toward the end of surgery, she had diffuse capillary bleeding and uterine atony with hemodynamic and respiratory compromise, for which she received fluid resuscitation, vasopressors, uterotonic drugs, mechanical ventilation, and transfusion of blood products. The patient then went into pulseless electrical activity, with recovery of circulation after 7 minutes of advanced life support.

She was subsequently moved to the intensive care unit on mechanical ventilation, still hemodynamically unstable, with noradrenaline at 0.8 μg/kg/min and blood results compatible with disseminated intravascular coagulation (platelets, 26 000/μL; international normalized ratio, 1.67; activated partial thromboplastin time, 75.2 seconds; fibrinogen, 81 mg/dL; and D-dimer, 88 332 ng/mL). The coagulopathy was corrected with thromboelastography guidance, the noradrenaline dose was reduced, and arteriography was performed that showed active bleeding from both uterine arteries, which were then embolized. At 12 hours postadmission, it was decided to proceed to urgent surgery because the patient had ongoing abdominal hemorrhage with significant hemodynamic and respiratory compromise, going into acute pulmonary edema. Transesophageal echocardiography showed severe biventricular dysfunction with a Simpson's left ventricular ejection fraction of 8%.

It was decided to implant a femoro-femoral VA-ECMO (Cardiohelp Maquet Cardiopulmonary; Hirrlingen, Germany) and intra-aortic balloon counterpulsation. Good gas exchange was maintained with VA-ECMO at 4.0-4.5 L/min, but transesophageal echocardiography showed a severely-dilated akinetic left ventricle, unable to open the aortic valve despite high-dose dobutamine and reduction of VA-ECMO flow. An Impella CP was inserted percutaneously via the left femoral artery, after withdrawal of the intra-aortic balloon counterpulsation, to unload the left ventricle. Surgical hemostasis was required to stop bleeding at the entry point.

The patient returned to the intensive care unit with VA-ECMO at 4.0-4.5 L/min and Impella CP at 2.4-2.4 L/min, which allowed gradual reduction of catecholamines. She became oligo-anuric and renal replacement therapy was started with regional calcium citrate anticoagulation.

On day 2 of admission, low-dose intravenous heparin was started to prevent complications associated with the VA-ECMO and Impella CP but, given the ongoing bleeding and life-threatening coagulopathy, it was decided to take a heparin-free approach.

On day 3, the patient was hemodynamically more stable, and transesophageal echocardiography showed improved ventricular function with aortic valve opening, so the Impella CP was removed (after 48 hours' use) and VA-ECMO was continued due to