

VIEWPOINTS

# Is it Time to Retire the Diagnosis “Hypertensive Emergency”?

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The recognition of the risks of high blood pressure (BP) in the last century was highlighted by observing the acute association between very high BP and medical catastrophes in emergency settings, including stroke, acute left ventricular failure, and myocardial infarction. Edward Freis was among the first authors to propose the concept of “hypertensive crisis,” which he characterized as a life-threatening disorder caused by acute or severe elevation of BP and clinical manifestations secondary to hypertension.<sup>1</sup> According to Freis, the clinical manifestations included encephalopathy, neuroretinitis, evidence of rapidly advancing renal impairment, and acute heart failure.

Hypertension guidelines incorporated the diagnosis of hypertensive crisis, and the 1984 Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure report proposed the classification of hypertensive emergencies and urgencies.<sup>2</sup> Hypertensive emergencies were characterized by hypertensive encephalopathy, intracranial hemorrhage, acute left ventricular failure, dissecting aortic aneurysm, severe hypertension, toxemia, head trauma, extensive burns, unstable angina pectoris, and acute myocardial infarction, in which BP should be lowered within 1 hour. Urgencies were defined as situations in which BP should be controlled within 24 hours, including accelerated or malignant hypertension, perioperative hypertension, and patients requiring emergency surgeries.

With slight variations in the criteria for the definition of urgencies and emergencies, these recommendations

have been repeatedly copied and pasted into the Joint National Committee guidelines and the guidelines from Europe and other countries. The 2017 American Heart Association/American College of Cardiology hypertension guidelines<sup>3</sup> defined hypertensive emergencies as severe BP elevations (>180/120 mm Hg) associated with evidence of hypertensive encephalopathy, intracerebral hemorrhage, acute ischemic stroke, acute myocardial infarction, acute left ventricular failure, unstable angina pectoris, dissecting aortic aneurysm, acute renal failure, and eclampsia. The guideline defined hypertensive urgencies as situations associated with severe BP elevation in patients without an acute or impending change in target organ damage or dysfunction. The 2018 European Society of Cardiology/European Society of Hypertension guidelines of hypertension<sup>4</sup> included the diagnosis of malignant hypertension (characterized by fundoscopic changes or disseminated intravascular coagulation), excluded any presentation of stroke from the criteria to characterize hypertensive emergencies, and proposed a similar definition for hypertensive urgencies.

Patients with high BP in emergency departments have worse long-term cardiovascular outcomes than those with lower BP.<sup>5</sup> This consequence is expected because these patients already have high BP levels and a longer duration of hypertension. The diagnoses of urgency and emergency would be justified if short-term outcomes were influenced by prompt therapy in emergency departments. Nevertheless, there is no clinical trial in patients diagnosed as having

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hypertensive urgencies and emergencies showing the short-term reduction in the incidence of cardiovascular events. The long-term benefits would depend of the management after the discharge of the emergency department.

The denomination of hypertensive urgency for the isolated elevation of BP in the emergency room has been questioned.<sup>6</sup> There is no evidence that lowering BP in a short period prevents major cardiovascular events and the prognosis was not different in patients referred to an emergency service.<sup>7</sup> The resumption of medication for the chronic management of hypertension in this context can be considered.

The utility of the diagnosis of hypertensive emergencies to guide the treatment of patients in emergency departments should also be questioned. There is a clear difference between the dangerous long-term elevation of BP, the major cause of cardiovascular diseases,<sup>8</sup> and the acute elevation of BP, even if accompanied by target organ damage or dysfunction. Delayed therapy for primary clinical conditions, and treating high BP instead, continues to occur in emergency settings. Here, we propose reasons to abandon the diagnosis of hypertensive emergency (Table), which had been useful to characterize the risks of high BP but now deserves an honorable retirement.

### MISGUIDED IMPORTANCE ATTRIBUTED TO HIGH BP IN EMERGENCY CARE

The concept that sustained high BP was associated with a higher incidence of cardiovascular events was consolidated. The idea that high BP was also the cause of immediate consequences was a corollary of this knowledge, creating the theoretical grounds to propose immediate intervention over BP in patients presenting with acute clinical conditions.

Most patients with stroke, acute pulmonary edema, aortic dissection, encephalopathy, and others present with high BP in emergency rooms. These clinical conditions were then recognized as a consequence of acute BP rising. The perception of reversal causality, for example, BP increasing as a response to the damage or dysfunction of organs, particularly the brain and heart, was missed because the diagnosis

**Table. Reasons to Discard the Diagnosis of Hypertensive Emergencies**

1. Misguided importance attributed to high blood pressure in emergency care.
2. Absence of clinical trials with cardiovascular outcomes in patients with hypertensive emergencies.
3. Broader coverage of diagnostic and therapeutic aspects by guidelines and protocols proposed for the primary clinical conditions.

of high BP and those clinical conditions was concurrent. This misguided interpretation also occurred with more trivial clinical conditions, such as headache and epistaxis.

The recommendation to treat high BP as a means to interrupt a worse clinical course of the clinical conditions that characterize hypertensive emergencies was included in medical textbooks and guidelines. This notion still prevails in emergency care worldwide and may eventually give primacy to measures to lower BP, delaying the treatment the primary clinical diagnosis.

### ABSENCE OF CLINICAL TRIALS WITH CARDIOVASCULAR OUTCOMES IN PATIENTS WITH HYPERTENSIVE EMERGENCIES

Patients presenting with the diagnosis of hypertensive emergency have already a diagnosis of an acute cardiovascular event on course. Therefore, treatments would aim to reduce complications of the clinical conditions that characterize the occurrence of hypertensive emergencies, particularly the evolution to fatal outcomes or more severe complications. The strategy to reach these goals should be tested in randomized clinical trials, which should depart from the definition of the disease to be treated. Hypertensive emergencies do not fill this criterion because various clinical conditions define it. The simple decision to treat or not treat is naturally different in patients with stroke, acute left ventricular failure, angina, and others. Moreover, there is no common denominator among the different clinical conditions to justify a similar BP-lowering strategy for all.

The use of BP-lowering drugs in the absence of such trials could be eventually justified because the hypertensive response worsens the clinical condition, such as acute pulmonary edema. In this case, however, the treatment should be tailored to the underlying diagnosis, which is better defined by guidelines and protocols specific to each clinical condition.

### BROADER COVERAGE OF DIAGNOSTIC AND THERAPEUTIC ASPECTS BY GUIDELINES AND PROTOCOLS PROPOSED FOR THE PRIMARY CLINICAL CONDITIONS

The natural diagnosis sequence in patients with hypertensive emergencies is usually from the typical manifestations of the primary clinical diagnosis and not from the detection of high BP. The management of BP is one among several steps of care in such conditions,

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and frequently the intervention over BP is secondary or even not considered in guidelines for the primary diagnoses.

## STROKE

The management of high BP in patients presenting with acute stroke in emergency departments is the more controversial among the diagnosis that characterizes a hypertensive emergency. The 2017 American Heart Association/American College of Cardiology hypertension guidelines divide the management by the diagnoses of acute ischemic stroke and intracerebral hemorrhage.<sup>3</sup> The 2018 European Society of Cardiology/European Society of Hypertension guidelines for hypertension do not include any presentation of stroke as a criterion for diagnosing hypertensive emergencies because the beneficial effects of BP reduction in these conditions are unclear.<sup>4</sup>

The management of high BP is among several steps proposed by the specific guidelines for acute cerebrovascular events.<sup>9,10</sup> The recommendations unfold in ischemic and hemorrhagic strokes, several BP levels, and by the possibility of carrying out thrombolysis or mechanical thrombectomy. The classes of recommendations and the corresponding level of evidence in all guidelines that address the management of BP during acute stroke are mostly low (or weak) (IIa or IIb and B and C, respectively). Nonetheless, there is high uncertainty over the benefits and risks of intensive BP lowering on functional outcomes.<sup>11,12</sup>

The various nuances of BP management during acute cerebrovascular events suggest that neurovascular specialists (or trained intensivists and emergency physicians) are needed to achieve better outcomes in these patients. The recommendations for nonspecialists should be restricted to the recognition of a cerebrovascular event in patients with acute elevation of BP and the immediate referral to a tertiary care hospital. If it is impossible to transfer a patient within the time window for thrombolysis or thrombectomy, a better alternative would be to avoid modulating BP. This option has been associated with better neurologic outcomes in patients who are not candidates for pharmacological or mechanical reperfusion.<sup>13</sup>

## ACUTE CORONARY SYNDROMES

According to hypertension guidelines, unstable angina and acute myocardial infarction are traditionally listed as criteria to diagnose a hypertensive emergency.<sup>3,4</sup> Unlike the detailed recommendations for managing high BP in patients with stroke, the hypertension guidelines superficially address BP management in patients with acute cardiac ischemia.

There are no clinical trials of major cardiovascular outcomes assessing the benefits of different strategies to reduce BP in the context of acute coronary syndromes. Differently from guidelines for hypertension, guidelines for acute coronary syndromes focus on revascularization therapies, which are firmly based on the results of randomized clinical trials and do not include BP in the flow charts and algorithms for the management.<sup>14,15</sup>

Physicians are more often concerned with low BP values in patients presenting with acute coronary syndromes, which can signal incipient cardiogenic shock. High BP is usually secondary to pain (reversal causality), particularly in patients with previous hypertension, and is evidence of preserved cardiac output. These patients are treated with nitrates, drugs that have a BP-lowering effect as one of their mechanisms to reduce myocardial ischemia, while the procedures to promote coronary reperfusion are prepared.

## ACUTE LEFT VENTRICULAR FAILURE

Acute cardiogenic pulmonary edema is a self-evident clinical condition with short-term resolution in most patients and is another clinical condition that does not have its management primarily oriented by BP values. The management is based on the pathophysiology of the syndrome and the clinical experience. BP is elevated in many patients, particularly those with hypertensive cardiomyopathy, because of the sympathetic discharge promoted by hypoxemia and the fear of imminent death. The rationale for treatment indicates drugs that reduce preload and afterload, such as nitrates.

Guidelines for managing heart failure superficially address on the management of acute cardiogenic pulmonary edema,<sup>16,17</sup> a condition that was specifically focused by a complementary statement from the European Society of Cardiology.<sup>18</sup> It recommends vasodilators, preferentially nitrates, and oxygen and loop diuretics as the first step for treatment. Pulmonary edema secondary to acute left ventricular failure is another clinical condition that does not have its management primarily oriented by BP values in most patients.

## AORTIC DISSECTION

The short-term risk of dying immediately after the onset of dissection (particularly the type A) characterizes an aortic dissection as a medical emergency. BP is frequently high at presentation in the emergency setting because of the intense pain and because most patients have chronic hypertension, the primary cause of aortic syndromes. The rationale to lower BP in this context aims to reduce the wall tension and the shear

stress, which promotes endothelial tearing and enhances the disruption of the media layer of the aorta.

Hypertension guidelines<sup>3,4</sup> and a recent review<sup>19</sup> recommend lowering systolic BP below 120 mmHg in patients with aortic dissection, accompanied by heart rate reduction. These strategies were not and will not be tested in randomized controlled trials with major cardiovascular outcomes. Specific guideline provides a broader coverage of diagnostic and therapeutic strategies, focusing primarily on the criteria to recommend medical, surgical, or percutaneous therapies.<sup>19</sup>

## PREECLAMPSIA AND ECLAMPSIA

Guidelines for hypertension<sup>3,4</sup> recommend lowering BP to values lower than 140/90 mmHg. Preeclampsia and eclampsia, however, are self-evident conditions usually managed in an obstetric department and not in emergency departments. There are many randomized clinical trials comparing the effect of different drugs over BP in patients with eclampsia, but none comparing the effect of different BP targets in maternal-fetal outcomes. The treatment of pregnant women with high BP should follow guidelines that cover BP and other conditions in patients with preeclampsia/eclampsia.<sup>20</sup>

## HYPERTENSIVE ENCEPHALOPATHY

Hypertensive encephalopathy is primarily a diagnosis of exclusion after other causes of central nervous system dysfunction are ruled out, particularly stroke. It was probably more frequent at the time when the BP of the whole population was higher than currently, and patients were not treated intensively. According to old reports, it characteristically responds dramatically to acute lowering of BP. Guidelines of hypertension cover superficially the diagnosis and conduct in patients with hypertensive encephalopathy,<sup>3,4</sup> a very rare condition nowadays.

## CONCLUSION

The recognition of high BP in patients in emergency settings requires the diagnosis of the causes of the elevation. The diversity of clinical conditions that lead to the diagnosis of hypertensive emergency does not have a common denominator to justify a similar BP-lowering strategy for all. The clinical conditions are usually self-evident and should be managed according to their specific guidelines, which include several aspects of diagnosis and treatment. Treating elevated BP rather than the primary clinical condition can be harmful. The diagnosis of hypertensive emergency provided good services to doctors and patients, but given the contemporary reality, it should have a well-deserved retirement.

## ARTICLE INFORMATION

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