REVIEW

A critical appraisal of the guidelines from France, the UK, Europe and the USA for the management of hypertension in adults

Lecture critique des recommandations pour la prise en charge de l’hypertension artérielle de l’adulte, françaises, anglaises, européennes et nord-américaines

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KEYWORDS

Hypertension; Guidelines; Target

Summary  Hypertension is the leading cause of death in developed countries; its management is the subject of guidelines that are regularly reviewed and updated. However, the guidelines from France, the UK, Europe and the USA differ. Some recommendations are graded, whereas others are not. All recommendations emphasize the role of alternative methods for clinical measurement of blood pressure, such as ambulatory blood pressure measurement (ABPM) or self-measurement. The UK guideline recommends that the diagnosis of hypertension should be established by ABPM. The USA guideline recommends a target of <150/90 mmHg for patients aged >60 years. The French guideline recommends that the target blood pressure remains at <140/90 mmHg, with <150 mmHg for patients aged >80 years. Systolic blood pressure between 130 and 139 mmHg and diastolic blood pressure >90 mmHg are recommended for diabetic patients and those with chronic kidney disease. The French Society of Hypertension (SFHTA) guideline is unique in recommending a dedicated consultation to announce the diagnosis

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Abbreviations: ABPM, ambulatory blood pressure monitoring; ACE, angiotensin-converting enzyme; ARB, angiotensin II type 1 receptor blocker; DBP, diastolic blood pressure; ESH, European Society of Hypertension; HAS, French National Authority for Health (Haute Autorité de Santé); JNC-8, Eighth Joint National Committee; NICE, National Institute for Health and Care Excellence; SBP, systolic blood pressure; SFHTA, French Society of Hypertension (Société française d’hypertension artérielle).

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to the patient. In the French and European guidelines, diuretics, beta-blockers, calcium antagonists, angiotensin-converting enzyme (ACE) inhibitors and angiotensin II type 1 receptor blockers (ARBs) remain indicated as first-line therapy for hypertension; if the target blood pressure is not achieved, they recommend combining two active substances. The UK guideline recommends ACE inhibitors or ARBs as first-line therapy for patients aged <55 years; calcium antagonists are advised for patients aged >55 years and for black patients. The USA guideline advises treating non-black patients, including those with diabetes, with thiazides, calcium antagonists, ACE inhibitors or ARBs; for black patients, including those with diabetes, it recommends thiazide and calcium antagonists.

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Background

According to the author Paul Valéry, ‘everything simple is false, everything complex is unusable’. This maxim sums up the difficulty facing any team tasked with developing a guideline: if they aim for simplicity, they will probably leave out many special cases; and if all cases are covered, the result becomes so complex that nobody can understand how it works. In other words, there are no miracle solutions or magic formulae. Guidelines on the management of hypertension are no exception. The 2-year period from 2013 to 2014 saw the publication of new hypertension guidelines in France by the French Society of Hypertension (Société Française d’Hypertension Artérielle [SFHTA]) [1], in Europe by the European Society of Hypertension (ESH) [2], and in the USA by the Eighth Joint National Committee (JNC-8) [3]. In the UK, the guidelines were updated in 2011 by the National Institute for Health and Care Excellence (NICE) [4]. These guidelines differ in both content and form. As the leading cause of death worldwide, the management of this condition is as important as ever, yet the advice differs between countries and continents. This critical appraisal summarizes the key recommendations of these guidelines, highlighting points on which they agree and disagree, as well as unique features.

A leaflet or a book?

The ideal length for a guideline is a thorny issue. A short document is easy to read and use, but inevitably simplistic, while an intentionally exhaustive document that exceeds 50 pages is difficult to use in routine practice. The French and European guidelines sit at opposite ends of this spectrum: the French guideline is just four pages long and contains 39 references, while the European document runs to 77
pages and contains 735 references. The USA and UK guidelines are 14 and 27 pages long, respectively. The SFHTA, JNC-8 and NICE had evidently taken the view that their guidelines should be short enough to ensure that they are read. The European guideline, on the other hand, is intended as a reference work, and addresses every situation encountered in the initial management, workup and treatment of hypertension, including techniques currently under evaluation, such as renal denervation. This detailed document nevertheless includes many tables summarizing the positions adopted. It is clearly intended for specialists. In contrast, the French guideline targets generalists and its simplicity is a stated aim; it is divided into short, deliberately didactic subsections. This guideline does not address specific situations, but proposes a general plan of action for managing hypertension in adults. Thus, for example, resistant hypertension is dealt with in a separate document that differs in form and length.

**Should recommendations be graded?**

As clinical practice is nowadays based on evidence and as little as possible on opinion, the selection of documents and articles on which to base recommendations is a crucial stage; it makes it possible to weigh up expert opinion and naturally results in a grading of recommendations.

For the USA guideline, a panel of methodologists selected the articles most relevant to the questions posed, and passed them on to the writing panel. The selection criteria were extremely restrictive, in that only publications referring to clinical trials in hypertension were retained.

The French guideline lists few references, including former guidelines (issued in 2005 by the French National Authority for Health [Haute Autorité de santé; HAS]) [5], guidelines from other countries or scientific societies (NICE, ESH) and meta-analyses. The USA and European recommendations are graded in the usual manner, ranging from strong recommendations, based on clinical trials of high methodological quality that included a large number of patients, down to more empirical expert opinions, with a series of intermediate levels in between. The French and UK recommendations are not graded, as the intention was to convey a straightforward message to clinicians.

Do levels of evidence matter to typical prescribers who are not hypertension specialists? It would be useful to answer this question by conducting a survey among the clinicians targeted by the guideline. The European guideline strongly recommends renin-angiotensin system blockers in unilateral renal artery stenosis (class I recommendation), but tempers it with a B grading for its level of evidence, signaling that it is supported by clinical trials of limited size. The possibility of adjusting recommendations through grading appears better suited to evidence-based rather than opinion-based medicine. The danger, however, is that the message can become overly complex and convoluted.

**Diagnosing hypertension: out-of-office measurements are best!**

A paradox highlighted by all of the guidelines is that office blood pressure measurement is undoubtedly the worst method for diagnosing and monitoring hypertensive patients. Alternative methods — ambulatory blood pressure monitoring (ABPM) or self-measurement — must now be considered to have an important if not essential role. The SFHTA recommends out-of-office measurements to confirm the diagnosis of hypertension, but does not specify whether this refers to self-measurement or ABPM. However, the SFHTA and the French Committee for the Prevention and Control of Hypertension (CFLHTA) have been promoting the use of self-measurement for several years. In fact, the French National Health Insurance Fund (CNAM) is going to offer home blood pressure monitors to primary care physicians as an aid to the diagnosis of hypertension. The aim of this initiative is to distinguish true hypertension from white coat syndrome, which leads to overdiagnosis, and to reduce the cost to society of unnecessary treatment. However, recent studies have revealed that the conditions under which self-measurement is performed, and therefore its reliability, can be far from satisfactory. Although patients generally master the technical aspects of self-measurement, the major advantages of this method are undermined by failure to take enough readings, to take them at the required frequency or to record and submit them, which ultimately means that the results are unusable and have little impact on blood pressure control. If self-measurement is to make a positive contribution to the management of hypertensive patients, physicians must therefore receive training and patients must be properly informed.

The UK guideline recommends that suspected hypertension should be confirmed by 24-hour ABPM. ABPM appears to be a more sensitive and specific method for diagnosing hypertension than multiple office blood pressure measurements at repeated appointments. NICE also claims that ABPM is more cost-effective than home self-measurement, and that self-measurement is more effective than office measurements, but less effective than ABPM. It is thought, however, that 5–10% of patients do not tolerate ABPM, and that no automated systems are suitable for patients with atrial fibrillation. According to NICE, the use of ABPM results in fewer visits to the physician and earlier initiation of treatment for patients who require therapy. Including the cost of buying the equipment, the NICE expert committee calculated that it would be cost neutral in 2 years and produce savings after 3 years.

According to the ESH, alternatives to office blood pressure measurement (self-measurement or ABPM) are a useful adjunct to conventional blood pressure measurement, which remains the gold standard for screening for, diagnosing and monitoring hypertension.

The USA guideline does not address the diagnosis of hypertension. This document focuses on a limited number of objectives: to define the blood pressure thresholds above which therapy should be initiated, treatment goals and treatment strategies. A recap of the conditions under which blood pressure is measured, particularly the standard sphygmomanometer method, is included in the supplemental content.

**Blood pressure goals**

The USA guideline revives the old debate about the blood pressure thresholds above which treatment is justified, and
the blood pressure targets to achieve through treatment, which in reality amount to the same thing. This guideline, drafted by a panel of experts led by a professor of family medicine, focuses on three questions: what are the blood pressure values above which treatment initiation leads to a reduction in cardiovascular events; what blood pressure targets should be achieved in order to reduce cardiovascular events; and what is the harm-benefit balance of the various antihypertensive drug classes in the treatment of hypertension? The rationale for developing this guideline is as follows: the optimal target blood pressure for antihypertensive treatment is unclear, including in subgroups (black patients, patients with diabetes or chronic kidney disease); setting blood pressure goals too low has led to overmedication of hypertensive patients and an increase in adverse effects; blood pressure goals should probably be raised, in order to limit treatment intensification. New treatment targets were defined, based on publications selected by a group of methodologists, using strict criteria, and then forwarded to the writing panel. Following the recent publication of two Japanese clinical trials showing that reducing systolic blood pressure (SBP) to 136–137 mmHg was no better than a goal of 142–145 mmHg in terms of reducing the incidence of the complications of hypertension, the USA guideline recommends a target of <150/90 mmHg for patients aged >60 years. The blood pressure goal for patients aged <60 years remains <140/90 mmHg. In patients with diabetes or chronic kidney disease, the blood pressure goal has been increased from <130/80 mmHg to <140/90 mmHg. A recent study estimated the proportion of hypertensive adults in the USA affected by the change in these recommendations [6]. The new blood pressure goals would reduce the number of persons eligible for antihypertensive therapy by 5.8 millions. The proportion of hypertensives meeting blood pressure goals would increase from 40.6% (based on the JNC-7 targets) to 56.5% (based on the newly determined targets) [6].

The French guideline gives more discretion to clinicians. The target blood pressure it recommends, including for patients with diabetes or chronic kidney disease, is an SBP between 130 and 139 mmHg and a diastolic blood pressure (DBP) <90 mmHg, but lower goals can be proposed for certain patients, after consulting a specialist.

The European guideline draws a distinction between ‘high normal’ blood pressure and three grades of hypertension. A two-way table is used to decide at which stage patients should be treated, where the columns correspond to blood pressure and the rows to the number of risk factors, the presence of target organ disease, chronic kidney disease or diabetes and the patient’s status (e.g. secondary prevention). The different colours indicate the overall cardiovascular risk level, where green corresponds to the lowest risk and red to the highest. This table may appear complicated and relatively unusable in practice. However, it highlights the value of taking into account the intensity of the risk factor considered — in this case hypertension severity — and of estimating overall cardiovascular risk when deciding whether to treat patients. This observation is based on the results of clinical trials conducted in patients at ‘high cardiovascular risk’, in whom it was shown that a statin or renin-angiotensin system blocker significantly reduced the incidence of cardiovascular complications. For patients categorized as having a high cardiovascular risk (e.g. a diabetic with a reduced glomerular filtration rate), it is only logical to prescribe treatment proven to reduce overall cardiovascular risk, specifically a renin-angiotensin system blocker, regardless of whether they are also hypertensive. It is worth mentioning that the HOPE study [7], which, among other things, lent support to the ESH’s paradigm of the benefit of treating patients with high cardiovascular risk, was rejected by the JNC-8 because the patients enrolled in this trial were not all hypertensive.

France’s 2005 HAS guideline also contained a two-way table, a similar (but less complicated) version of the ESH table, but it was omitted from the brief overview of the 2013 SFHTA recommendations. The concept was no doubt considered unhelpful for generalists.

Breaking the bad news

The French SFHTA guideline is unique in recommending a dedicated consultation to announce the diagnosis to the patient. Its purpose is to inform the patient about hypertension and its consequences, the available pharmacotherapy and the objectives of treatment, and then to ascertain the patient’s opinion and evaluate his or her decisional ‘balance sheet’ (the benefits and drawbacks of treatment from the patient’s perspective). The intention is commendable, although the concept of ‘breaking the bad news’ may seem odd for a condition that is a risk factor rather than a disease. Hypertension is defined by blood pressure values at which the increased incidence of cardiovascular complications becomes significant. Rather than following a bimodal distribution, with normotensives on one hand and hypertensives on the other, forming two distinct states of ‘wellness’ versus ‘sickness’, its distribution is unimodal, forming a continuum of increasing blood pressure and increasing risk. In severe hypertension (blood pressure >180/110 mmHg) the risk is sufficiently high to warrant a rapid decision concerning treatment, which may justify a dedicated consultation to disclose and discuss the diagnosis. This situation is not the norm, however. On the contrary, in grade 1 or 2 hypertension (initial SBP between 140 and 179 mmHg and/or DBP between 90 and 109 mmHg), the variability of blood pressure means that it cannot be assumed that the patient is usually hypertensive; the individual risk is not sufficiently high to justify immediate initiation of antihypertensive medication [5]. In these cases, the decision about whether or not to prescribe medical therapy is only taken after a 3–6-month observation period, to include at least three consultations and at least two blood pressure measurements per consultation. Non-pharmacological measures to lower blood pressure and reduce risk cofactors are put in place during this observation period. In these situations, which account for the majority of cases, at what point should the clinician break the bad news? As soon as high readings are recorded? As mentioned above, it cannot be assumed from one reading that the patient is usually hypertensive, because blood pressure is variable. During the observation period? This period, with its successive appointments, could well offer an ideal opportunity to inform and educate patients and, where appropriate, to help them understand the benefits of treatment, without a dramatic announcement as if hypertension were a
### Table 1  Comparison of the guidelines on the management of hypertension.

<table>
<thead>
<tr>
<th></th>
<th>France (SFHTA)</th>
<th>UK (NICE)</th>
<th>Europe (ESH)</th>
<th>USA (JNC-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of pages</strong></td>
<td>4</td>
<td>27</td>
<td>77</td>
<td>14</td>
</tr>
<tr>
<td><strong>Grading</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Blood pressure targets</strong></td>
<td>Limited</td>
<td>Limited</td>
<td>Broad</td>
<td>Limited</td>
</tr>
<tr>
<td>&lt; 60 years</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/90 mmHg</td>
</tr>
<tr>
<td>&gt; 60 years</td>
<td>&lt; 150 mmHg</td>
<td>&lt; 140–150 mmHg</td>
<td>&lt; 150/90 mmHg</td>
<td>Not specifically mentioned</td>
</tr>
<tr>
<td>Diabetes</td>
<td>130–139/ &lt; 90 mmHg</td>
<td>&lt; 140/90 mmHg complicate diabetes; &lt; 130/80 mmHg complicated diabetes</td>
<td>&lt; 140/85 mmHg</td>
<td>&lt; 140/90 mmHg</td>
</tr>
<tr>
<td><strong>Chronic kidney disease</strong></td>
<td>130–139/ &lt; 90 mmHg</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/90 mmHg</td>
</tr>
<tr>
<td><strong>Diagnostic methods</strong></td>
<td>Office, self-measurement or ABPM</td>
<td>ABPM</td>
<td>Office, self-measurement or ABPM</td>
<td>Not discussed in document</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>First-line therapy</strong></td>
<td>Thiazides, beta-blockers, CAs, RAS blockers</td>
<td>RAS blockers if &lt; 55 years; CAs if &gt; 55 years or black Combination as first-line therapy if high-risk or severe hypertension RAS blockers + CAs</td>
<td>Thiazides, beta-blockers, CAs, RAS blockers</td>
<td>Thiazides, CAs, RAS blockers; if black, thiazides or CAs alone or combined</td>
</tr>
<tr>
<td><strong>Second-line therapy</strong></td>
<td>Combine, but avoid combining different RAS blockers; precaution if beta-blockers and diuretics RAS blockers + thiazides + CAs RAS blockers if microalbuminuria</td>
<td>Increase monotherapy or switch to another class or combine; avoid combining different RAS blockers RAS blockers + thiazides + CAs All classes; RAS blockers if microalbuminuria RAS blockers if microalbuminuria or proteinuria</td>
<td>Increase monotherapy or switch to another class or combine; avoid combining different RAS blockers RAS blockers + thiazides + CAs Thiazides, CAs, RAS blockers</td>
<td>Increase monotherapy or switch to another class or combine; avoid combining different RAS blockers RAS blockers + thiazides + CAs Thiazides, CAs, RAS blockers</td>
</tr>
<tr>
<td><strong>Third-line therapy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chronic kidney disease</strong></td>
<td>Not mentioned</td>
<td>Outside the scope of the guideline</td>
<td>Outside the scope of the guideline</td>
<td>RAS blockers alone or combined</td>
</tr>
</tbody>
</table>

ABPM: ambulatory blood pressure monitoring; CA: long-acting dihydropyridine calcium antagonist; ESH: European Society of Hypertension; JNC-8: Eighth Joint National Committee; NICE: National Institute for Health and Care Excellence; SFHTA: French Society of Hypertension (Société Française d’Hypertension Artérielle); RAS: renin-angiotensin system.

a Beta-blockers appear less effective than other classes for stroke prevention.
b Specific guidelines for these indications.
terminal illness. It would, perhaps, be useful to conduct a clinical trial to see whether a dedicated consultation to announce and discuss the diagnosis of hypertension actually increases the proportion of patients who ultimately achieve blood pressure control. Finally, as the average general practice consultation in France lasts 16 minutes, and these consultations will necessarily take longer, it will be important to make the best possible use of the time.

Treatment

The guidelines also differ on the thorny question of the treatment of hypertension (Table 1). According to the SFHTA, five antihypertensive drug classes remain indicated as first-line therapy for hypertension: diuretics, beta-blockers, calcium antagonists, angiotensin-converting enzyme (ACE) inhibitors and angiotensin II type 1 receptor blockers (ARBs). If the target blood pressure is not achieved, it recommends combining two active substances, preferably in a single tablet (fixed-dose combination therapy). The French guideline no longer recommends particular combinations. The 2005 HAS guideline included a diagram showing which combinations were recommended (in the shape of a boat, with some drug classes in the hold and others on the deck), but it is absent from the 2013 document, apparently giving free rein to clinicians to use any combination of these drugs. The new guideline does state, however, that two renin-angiotensin system blockers should not be combined, and that the combination of a beta-blocker with a diuretic increases the risk of diabetes. However, if hypertension is uncontrolled after 6 months, the SFHTA guideline recommends checking that triple antihypertensive therapy has been prescribed at optimal doses, including a renin-angiotensin system blocker, a thiazide diuretic and a calcium antagonist. These three antihypertensive drug classes are the ones that most of the guidelines recommend combining in third-line therapy, but what happens when beta-blockers have already been prescribed as first-line therapy or as part of combined second-line therapy, as the SFHTA recommendations permit? The diagram in the SFHTA guideline implies that these drugs will have been replaced at some point. The question remains, why recommend them for first-line therapy if they will later have to be replaced?

The UK guideline takes a more linear approach, in that it recommends ACE inhibitors or ARBs as first-line therapy (treatment A) for patients aged < 55 years. Calcium antagonists (treatment C) are advised for patients aged > 55 years or black patients, unless they have edema or a risk of heart failure, in which case diuretics are recommended. At step 2, NICE recommends combining a renin-angiotensin system blocker with a calcium antagonist. At step 3, a thiazide diuretic (treatment D) should be combined with A and C. Regarding the choice of diuretic, the data on chlortalidone 12.5 or 25 mg (withdrawn from the market in France) and indapamide 1.25 or 2.5 mg seem more robust than for hydrochlorothiazide, probably due to underdosing of this drug in clinical trials. The USA guideline advises treating non-black patients, including those with diabetes, with thiazides, calcium antagonists, ACE inhibitors or ARBs. For black patients, including those with diabetes, it recommends thiazide and calcium antagonists. It also advises that patients aged > 18 years with chronic renal disease should receive a renin-angiotensin system blocker.

What about beta-blockers?

Neither NICE (UK) nor the JNC-8 (USA) recommends beta-blockers as first-line drugs. According to the JNC-8, this is based on the LIFE study, which, together with the ASCOT study, showed an excess of cardiovascular events, particularly stroke, in the beta-blocker group compared with the ARB group [8, 9]. Beta-blockers are allowed as first-line therapy, however, in the French and European guidelines. But the SFHTA tempers this recommendation by stating that beta-blockers appear to be less effective than the other classes in stroke prevention. According to the French and European guidelines, third-line therapy must use a renin-angiotensin system blocker with a calcium antagonist and a diuretic. This raises the question of what to do when the patient was previously taking a beta-blocker. Should it be withdrawn and replaced with a drug from one of the three recommended classes? Given that about 70% of hypertensives require a combination of at least two agents, the question remains as to why beta-blockers are still recommended for first-line therapy if they have no place in third-line therapy. According to the UK guideline, beta-blockers can be used in the fourth step of treatment adjustment. According to JNC-8, the additional properties of alpha-blocking and vasodilating beta-blockers are irrelevant for the treatment of hypertension.

What to do in practice

Although different in presentation, content and expected use, each of these four guidelines aims to become a useful tool for the practitioner, whether generalist or specialist, confronted with hypertensive patients, and to respond to unanswered questions. After focusing on their different approaches, one could highlight their resemblances. Indeed, there is a global tendency to generalize the target goal of a BP < 140/90 mmHg, alleviating previous more severe restrictions concerning chronic kidney disease and diabetes mellitus patients. Moreover, for elderly patients, goals are even less restrictive, targeting an SBP < 150 mmHg depending on their general health state. The decision to treat takes into account the severity of hypertension and the global cardiovascular risk. Furthermore, the priority is given to renin-angiotensin system blockers, calcium blockers and thiazides. Renovascular disease largely benefits from the prescription of renin-angiotensin system blockers. No difference is made between conversion enzyme inhibitors and angiotensin blockers and their combination finds no indication.

Conclusion

The guidelines from France, the UK, Europe and the USA on the management of hypertension in adults, published in 2013 and 2014, arrived at different recommendations on blood pressure goals and treatment strategies. The respective expert panels had clearly set themselves different

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objectives. The stated aim of the French panel was to meet the need for a short, convenient document that would be easy to use. Taking a more radical approach, particularly regarding treatment, remained the driving force behind the UK guideline. In the USA, the big issue was to define new blood pressure goals, with the added bonus of reducing health expenditure by treating fewer patients. The European guideline is exhaustive and addresses every situation, incorporating the economic differences of the various countries within and beyond Europe’s borders. These differences may create confusion among practitioners as well as patients. They also affect quality indicators for target goals and may interfere with reimbursement policy, depending on the health system. The relevance of these various guidelines could be assessed by studying the following outcomes: how many clinicians read them; are the recommendations applied; and how effective have they been in reducing the incidence of the complications of hypertension and adverse drug effects?

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References


