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CORRESPONDENCE

Long-lasting, resistant hypertension should be a part of the aortic dissection risk score

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To the Editor:

Aortic dissection (AoD) is not often easy to recognize in the emergency department (ED).

Arterial hypertension (HTN) is crucial factor affecting AoD pathogenesis. Between 65% and 75% of AoD patients have HTN [1–3]. HTN is both a predisposing factor for (HTN induces chronic damage to the aortic wall) and a trigger of AoD (acute BP elevation can initiate the onset of dissection). The majority of patients with AoD are expected to have resistant, poorly controlled HTN [3, 4].

HTN has not been included in the AoD detection risk score (AoD-DRS). It is surprising that HTN is not listed among the five high-risk conditions affecting the development of AoD in the AoD detection risk score (DRS) in contemporary papers and guidelines [3]. Omitting the most important risk factor (without a clear explanation) from the list of five conditions is unexpected and clinically relevant. The AoD-DRS has substantially improved our approach to patients suspected of having AoD. The AoD-DRS has been validated together with D-dimer levels [5, 6] and both are recommended for the risk stratification of patients [3]. Such scores are very useful in the management of numerous diseases by providing evidence-based rationale for either proceeding to imaging techniques or safely avoiding unnecessary procedures.

Why has HTN not been included in the AoD-DRS? HTN had been omitted from the list of high-risk conditions affecting the development of AoD in the AoD-DRS, but this omission was not due to a lack of the importance of HTN. It stems probably from our current inability to properly incorporate HTN into the AoD-DRS. This is presumably the result of the lack of refinement of the risk stratification for AoD among patients with high BP. The need for better risk stratification of patients with HTN with regard to AoD has been recognized for years [7]. It has not been possible to stratify the risk in over a billion HTN patients globally with regard to the pathogenesis of AoD using the description "unregulated." Our real knowledge of the features of HTN that represent high-risk markers for AoD is very scarce. This is surprising, as it contrasts with the importance of HTN as one of the key causes of AoD.

Moreover, it seems that Marfan syndrome (although several times less prevalent than HTN as a cause of AoD) has attracted more scientific attention with regard to risk profiling [7]. Some advances have been made toward better risk stratification for the development of AoD in the HTN population, e.g., a study in Oxfordshire. That study showed that >50% of BP readings were over 140/90 mmHg in the years prior to AoD, reaching 180 mmHg for systolic BP in almost half of the patients [8].

Should we act as if HTN is not important for the development of AoD? All our diagnoses are the estimations of probability. The presence of high-grade and long-lasting independent risk factors increase the likelihood of any disease. For example, unregulated HTN that lasts for decades increases the risks of stroke, acute myocardial infarction, heart failure, and AoD. For that reason, physicians obtain detailed information about BP over the recent decades in a patient suspected of having AoD. The need for such a history is currently not highlighted in the guidelines. The AoD-DRS has been a focus for good, evidence-based reasons, but it lacks the inclusion of HTN. Therefore, we are expected to look for "other connective tissue diseases" in addition to Marfan syndrome, in a crowded ED but not for HTN (recognized for half of a century as the most important cause of AoD in the vast majority of publications). The

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cumulative prevalence of all five "high-risk conditions" listed in the AoD-DRS is probably not higher than that of HTN alone. In practice, experienced physicians have been using the AoD-DRS, but some or perhaps even most of us have also continued to evaluate the BP status independently ("at the discretion of the physician").

Can we improve the score? We should not accept the absence of a crucial risk factor (i.e., HTN) from the score as a definitely lost opportunity but rather should try to identify markers of a high level of risk of the development of AoD in the hypertensive population and then incorporate those markers into the AoD-DRS. In this way, a modified risk score will be developed that will then need validation. Therefore, studies should provide as much precise information as possible about the HTN type, duration, grade, maximal and average values, variability, dipping status, prior treatment, and antihypertensive drug persistence. The benefits of such research will be at least twofold: an advance in the prevention of AoD (by intensifying and adjusting the treatment of patients at high risk of developing AoD) and an improved rate of correct AoD diagnosis together with a decrease in the time from symptom onset to proper diagnosis.

What are the messages for the ED? The AoD-DRS has been recommended in the current guidelines, and we should continue to use it. The AoD-DRS is a relatively new validated tool that supplements the preexisting ones. Meanwhile, no study or registry has questioned the role of HTN as a risk factor for AoD [9]. On the contrary, recent publications about AoD (including a systematic review) underline the etiopathogenic importance of HTN [2]. Therefore, HTN has not lost its place of primary importance as the most common risk factor for AoD [10]. Accordingly, the evaluation of the severity of HTN, which was performed before the AoD-DRS was introduced, should not be abandoned. As the role of HTN has not been denied, it makes sense to consider multislice computed tomography (MSCT) of the aorta in a patient even if he or she has a low AoD-DRS if he or she has long-standing and treatment-resistant HTN. Consequently, the evaluation of the severity of HTN is not lost from our diagnostic armamentarium in the ED. Prospective trials are needed to elucidate the risk/benefit ratio of including severe HTN in the AoD-DRS.

Why is this topic relevant? HTN is responsible for half of cardiovascular diseases [11]. It is estimated that HTN will result in the deaths of approximately 10 million patients worldwide this year [11]. The prevalence of HTN is expected to increase due to the higher prevalence of obesity and the aging of the global population [12]. Among patients who were diagnosed with AoD during follow-up, HTN was diagnosed at the baseline in 86%. Furthermore, HTN represents a population-attributable risk factor for 54% of AoD patients [13]. Therefore, adequate antihypertensive treatment may prevent approximately half of AoDs [13]. In addition to HTN, the incidence of AoD is projected to increase [14]. The case fatality rate from AoD is still very high, with approximately half of all patients dying prior to hospital admission. Furthermore, almost half of hospitalized AoD patients die within 30 days [14].

Final remarks: Currently, concerning AoD, we are in the better position in the ED than before because we have two ways to analyze the risk of AoD: one relatively new method (AoD-DRS), which has been validated and recommended, and another traditional method, which stems from the patient's personal history of BP abnormalities. There is no reason to neglect the pivotal role of unregulated HTN in the development of AoD, and consequently, we should continue the traditional HTN analysis in addition to using the AoD-DRS. The presence of long-term resistant HTN increases the probability of AoD. In contrast, the absence of HTN decreases the likelihood of AoD. Therefore, both extremes are useful: high BP (particularly for long time) increases and low BP decreases the probability of AoD. The third variant (borderline HTN or well-controlled HTN of short duration) does not seem at the moment to be useful for the prediction of AoD. More precise characterization of HTN as a risk factor for AoD is needed.

Conclusion: The AoD-DRS has been validated and is recommended by international guidelines to improve the clinical assessment of the probability of AoD. No publication has disputed the importance of HTN as a risk factor for AoD. Moreover, HTN is considered to be a crucial factor in the development of AoD in the majority of patients, and it is surprising that it has not been incorporated into the AoD-DRS. This is the result of the absence of the refinement of risk stratification for AoD among patients with high BP. Detailed characteristics of HTN at the baseline should be compared between patients who later experience AoD (during the follow-up) versus patients who do not. The first prospective community study to investigate this was the recent Oxford Vascular Study. It is worth incorporating long-term resistant HTN into the AoD-DRS. Moreover, this score is expected to be used more frequently in the future because the prevalence of HTN and incidence of AoD are expected to increase, as is the number of patients with suspected AoD in the ED.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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