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How to identify which patients should not have a systolic blood pressure target of <120 >mmHg

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How to identify which patients should not have a systolic blood pressure target of <120 mmHg

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This commentary refers to 'On cerebrotoxicity of antihypertensive therapy and risk factor cosmetics', by F.H. Messerli *et al.*, https://doi.org/10.1093/eurheartj/ehaa971. and the discussion piece 'Importance of pulse pressure at low systolic blood pressure', by F.H. Messerli *et al.*, https://doi.org/10.1093/eurheartj/ehab553.

In their recent editorial about a UK Biobank study,[1] Messerli *et al.*[2] were right to warn that not all patients should have their systolic blood pressure lowered to <120 mmHg. However, they did not mention a subgroup of patients, who can be readily identified, in whom such low systolic targets should be avoided.

Patients with stiff arteries have a wide pulse pressure, aggravated by bradycardia, and are more likely to have a large cuff artefact, with the true (intra-arterial) diastolic pressure being lower than the cuff pressure.[3] Such patients are at risk from low diastolic pressure; treating patients with a pulse pressure of >60 mmHg to a systolic target of 120 mmHg would push the diastolic to < 60 mmHg. Among patients with a diastolic pressure of <60 mmHg and a pulse pressure of >60 mmHg (diastolic blood pressure (DBP) < 60/pulse pressure (PP) > 60), there were a doubling of subclinical myocardial ischaemia and a 5.85-fold increase in the risk of stroke.[4]

A large cuff artefact is commoner than many physicians would suppose. Spence *et al.* reported in 1978 that, among patients aged ≥60 years with DBP ≥100 mmHg but no hypertensive end-organ disease, half had an intra-arterial pressure that was ≥30 mmHg lower than the cuff pressure.

Virtually all of myocardial perfusion, and more than half of cerebral perfusion, occur during diastole. What is little understood is that there is a large pressure gradient in the brain: based on computer simulations using an anatomically detailed cerebrovascular architecture, we estimated that 'when the blood pressure in the brachial artery is 117/75 mmHg, it is 113/73 mmHg in the lenticulostriate artery but only 59/39 mmHg in small branches in the posterior parietal subcortex'[5] (*Figure 1*).

Patients with cuff DBP <60/PP >60, and in many cases an even lower intra-arterial diastolic pressure, can be expected to have diastolic pressures in the cerebral cortex that are below critical perfusion thresholds at least some of the time. This very likely accounts for the excess of white matter lesions in patients with 'well-controlled hypertension' reported by Messerli *et al.*; they were probably too well controlled. Patients with a pulse pressure of >60 mmHg should not have a systolic pressure target below 120 mmHg.

Conflict of interest: none declared.

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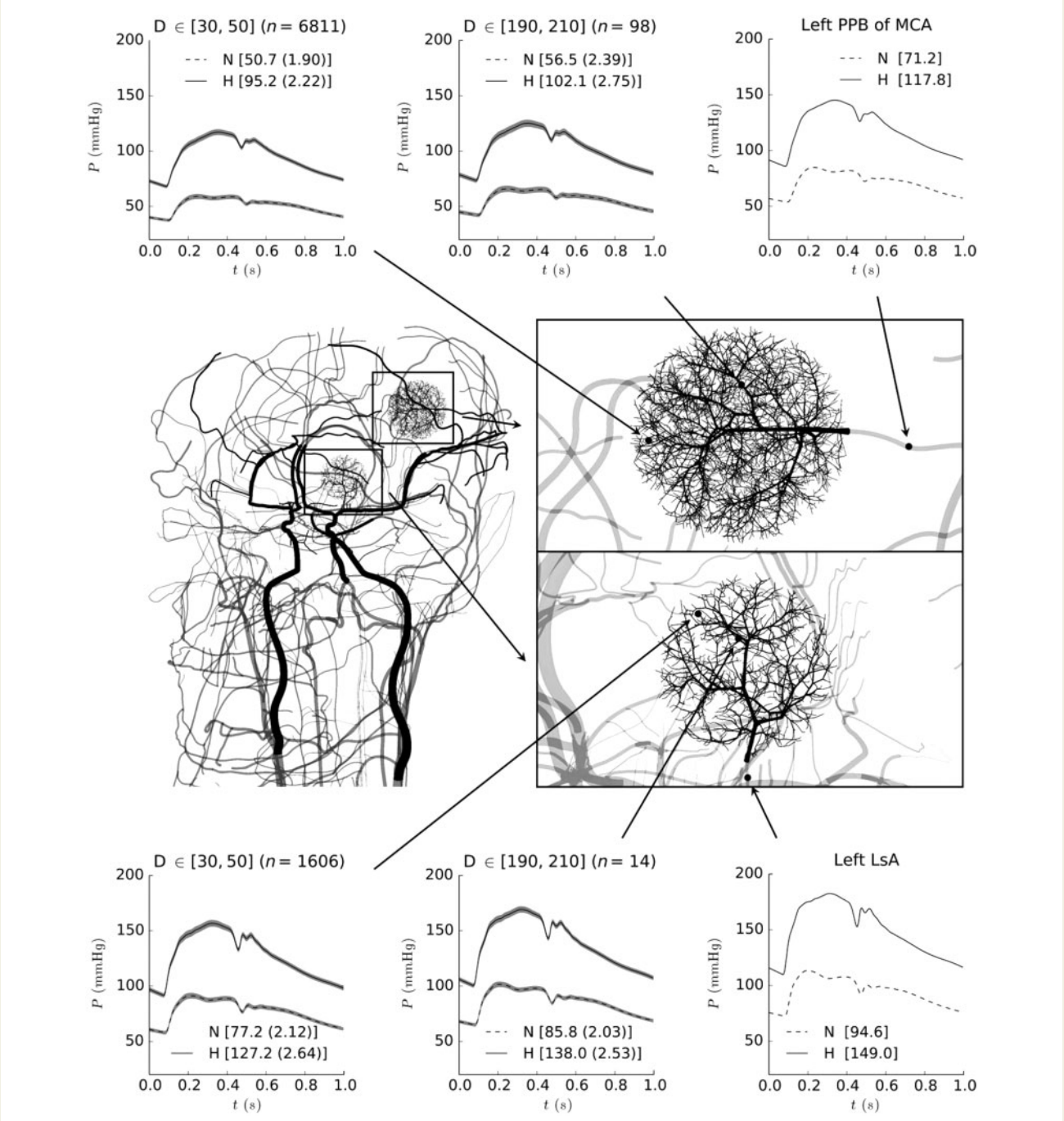

Figure 1 Detail of the peripheral beds corresponding to the lenticulostriate artery and to the posterior parietal branch of the middle cerebral artery. Pressure waveforms are shown for the normotensive (N, dashed line) and hypertensive (H, solid line) cases. Right panels (top and bottom) display the pressure waveform in the feeding artery to the corresponding arteriolar networks. Middle and left panels show the pressure level in arterioles with diameter ranges between $D \in (190\ \mu m, 210\ \mu m)$ and $D \in (30\ \mu m, 50\ \mu m)$, respectively; *n* indicates the number of vessels taken to calculate the average and standard deviation (SD) pressure waveforms (grey-shaded area). In brackets, the mean arterial pressure is reported. LsA, lenticulostriate artery; MCA, middle cerebral artery; PPB, posterior parietal branch. Reproduced by the permission of Oxford University Press from Blanco *et al.*[5]