

## SHOULD BLOOD PRESSURE BE LOWERED IMMEDIATELY AFTER STROKE? YES

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The longstanding fear of lowering blood pressure during acute stroke has its origins in concerns over aggravating cerebral ischemia in the penumbra by reducing the blood pressure too quickly, below perfusion pressure. As shown in the figure, in the ischemic region, cerebral blood flow is no longer regulated; it is pressure-passive. For this reason it is indeed very important to avoid reducing the blood pressure too far; treatments that cannot be controlled, such as sublingual nifedipine, must be avoided<sup>1</sup>.

However, the other side of the coin is that if the blood pressure is left too high, this will increase the risk of

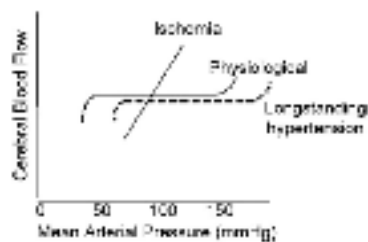


Figure. Loss of CBF regulation during acute ischemic stroke. In physiological conditions, CBF is autoregulated over a wide range of perfusion pressures, from ~50- to 150-mm Hg mean arterial pressure. This is shifted to the right in longstanding hypertension because of cerebral hypertrophy. During acute ischemia, CBF becomes pressure passive, resulting in a marked reduction of CBF if pressure drops too low. The threshold at which this becomes a problem will be higher for patients with long-standing hypertension whose CBF autoregulation is shifted to the right.

hemorrhage, and will worsen edema and accelerate the strangulation of the penumbra by the increased tissue pressure that in turn will reduce perfusion. The brain is contained externally by a rigid skull, and compartmentalized by tough fibrous structures such as the falx and tentorium, and stiff white matter tracts such as the corpus callosum. Swelling within a compartment reduces perfusion. This is why hemicraniectomy is so important for the malignant middle cerebral infarction<sup>2</sup>.

Furthermore, there are circumstances in which the blood pressure must be lowered during acute stroke: patients with severe hypertension and such complicating features as acute pulmonary edema or aortic dissection must have their blood pressure treated<sup>3</sup>, and candidates for thrombolysis must also have their blood pressure reduced into a safe range. The AHA guidelines<sup>4</sup> recommend

reducing blood pressure to below 185/110 before giving tPA, and recommend intravenous drugs (labetolol or calcium channel antagonists), or nitroglycerine patches<sup>5</sup>. Intravenous drugs can be controlled, and a nitrate patch can be removed, if the blood pressure is trending too low. For most patients – both those with longstanding hypertension and a shift of the autoregulation curve to the right, as shown in the figure, and for those without previous hypertension - a mean arterial pressure of ~120 mmHg (e.g. 180/90, 160/100) will be adequate to maintain perfusion. The question, therefore should not be whether to lower blood pressure in acute stroke, but when, to what level, and with what treatments<sup>6</sup>.

### References

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