Management of hypertension in a patient with Acute stroke
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Conflict of interest: None
Acute stroke management

- Pathophysiology
- Review of Literature
- What guidelines recommend

Global Burden of Stroke
Valery L. Feigin, Bo Norrving, George A. Mensah

Circ Res. 2017;120:439-448
Cerebral autoregulation

Autoregulatory system in the brain can maintain essentially constant CBF between a MAP of 50 to 60 mm Hg to 150 to 160 mmHg.


Cerebral autoregulation

Chronic Hypertension = Vascular hypertrophy
Cerebral autoregulation

Acute stroke: relation between CBF and MAP becomes linear

Impaired Cerebral autoregulation

↓ BP
- Increased cerebral infarction or Perihaematomal ischaemia

↑ BP
- Inc. cerebral oedema, haematoma expansion
- Haemorrhagic transformation
Aim of BP management in acute stroke

The primary goal of stroke care is to preserve as much of the penumbra as possible, which means optimizing BP and CBF.

J. of Human Hypertension (2009) 23, 559–569

The International Stroke Trial (IST)

There is a small range of BP that is optimal for the penumbra.

Jo -Bee et al. Stroke. 2002;33:1315-1320
Controversies in Acute Stroke management

Questions to be Answered

• To treat or not to treat?
• Who we should treat? ICH vs AIS
• When to initiate treatment?
• What is the BP goal?
• Which drug class should be used?

I. Acute Ischemic Stroke
I. Acute Ischemic Stroke

- Management of blood pressure in the setting of AIS remains largely empiric.
- Treatment of elevated BP in patients who is candidates for thrombolytic differs from that who are not thrombolytic candidate.
- In a majority of patients, a decline in BP occurs within the first hours after stroke even without any specific medical treatment.
- Aggressive treatment of initial high BP may lead to neurological worsening by reducing perfusion pressure to ischemic areas of the brain.

Cerebrovascular disease

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
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<tbody>
<tr>
<td>It is not recommended to intervene with BP-lowering therapy during the first week after acute stroke irrespective of BP level, although clinical judgement should be used in the face of very high SBP values.</td>
<td>III</td>
<td>B</td>
</tr>
<tr>
<td>Antihypertensive treatment is recommended in hypertensive patients with a history of stroke or TIA, even when initial SBP is in the 140-159 mmHg range.</td>
<td>I</td>
<td>B</td>
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<tr>
<td>In hypertensive patients with a history of stroke or TIA, a SBP goal of &lt;140 mmHg should be considered.</td>
<td>IIa</td>
<td>B</td>
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<tr>
<td>In elderly hypertensives with stroke or TIA, SBP values for intervention and goal may be considered to be somewhat higher.</td>
<td>IIb</td>
<td>B</td>
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<tr>
<td>All drug regimens are recommended for stroke prevention, provided that BP is effectively reduced.</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>
Acute Ischemic Stroke: who to treat early

<table>
<thead>
<tr>
<th>4.3. Blood Pressure</th>
<th>COR</th>
<th>LOE</th>
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<tbody>
<tr>
<td>1. In patients with AIS, early treatment of hypertension is indicated when required by comorbid conditions (e.g., concomitant acute coronary event, acute heart failure, aortic dissection, postthrombolysis sICH, or preeclampsia/eclampsia). Lowering BP initially by 15% is probably safe.</td>
<td>I</td>
<td>C-EO</td>
</tr>
</tbody>
</table>

3. In patients with BP ≥220/120 mm Hg who did not receive IV alteplase or EVT and have no comorbid conditions requiring acute antihypertensive treatment, the benefit of initiating or reinitiating treatment of hypertension within the first 48 to 72 hours is uncertain. It might be reasonable to lower BP by 15% during the first 24 hours after onset of stroke. | IIb | C-EO |
Acute Ischemic Stroke: who to treat early

2. In patients with BP <220/120 mm Hg who did not receive IV alteplase or EVT and do not have a comorbid condition requiring acute antihypertensive treatment, initiating or reinitiating treatment of hypertension within the first 48 to 72 hours after an AIS is not effective to prevent death or dependency.

Stroke. 2018; March

22 Randomized studies, ttt group (5672) and control group (5416)

No benefit with respect to short- and long-term dependency and mortality rate

Rong Zhao. Medicine, 94, (23), 20
Effects of antihypertensive treatment after acute stroke in the Continue Or Stop post-Stroke Antihypertensives Collaborative Study (COSSACS)

Pt were taking antihypertensive drugs were randomly assigned (48 hours of stroke) to either continue or stop pre-existing antiHTN drugs for 2 weeks

Continuation of antihypertensive drugs did not reduce 2-week death or dependency, cardiovascular event rate, or mortality at 6 months


Pts (n = 2038), randomized to receive antiHTN to lowering SBP by 10% to 25% within the first 24 hours, achieving BP less than 140/90 mm Hg within 7 days, or to discontinue all antiHTN medications (control) during hospitalization

JAMA. 2014;311:479–489
Acute Ischemic Stroke Candidate for thrombolysis
To avoid bleeding complication

There is a strong association of high systolic BP after thrombolysis with poor outcome, increase symptomatic ICH and mortality.

Stroke. 2009;40:2442-2449
Options to Treat Arterial Hypertension in Patients With AIS who are Candidates for Acute Reperfusion Therapy

Short and rapidly acting IV agent

Acute Ischemic Stroke: When to start?
II. Acute Intracerebral Hemorrhage

- Spontaneous, nontraumatic ICH is a significant global cause of morbidity
- Elevated BP is highly prevalent in the setting of acute ICH and is linked to greater hematoma expansion, neurological worsening, and death and dependency after ICH
- but... how low we can go..
European Stroke Organisation (ESO) guidelines for the management of spontaneous intracerebral hemorrhage

- **Recommendation**
  In acute ICH within 6h of onset, intensive blood pressure reduction (systolic target < 140 mmHg in < 1h) is safe and may be superior to a systolic target <180 mmHg. No specific agent can be recommended.

- **Quality of evidence:** Moderate
- **Strength of recommendation:** Weak


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**Intracerebral hemorrhage**

SBP >200 mmHg consider aggressive reduction of BP with continuous IV infusion (labetalol, nicardipine and esmolol)

**Signs of increased ICP**

- **YES**
  - SBP < 180 mmHg for the first 24 hs

- **NO**
  - SBP < 160 mmHg for the first 24 hr

EHS, M. Ibrahim, 2014
Randomly assigned 2839 pts who had a spontaneous intracerebral hemorrhage within the previous 6 hours and who had elevated SBP

Primary and Secondary Outcomes at 90 Days (INTERACT2 Investigators)

<table>
<thead>
<tr>
<th></th>
<th>Intensive Blood-Pressure Lowering (N = 1399)</th>
<th>Guideline-Recommended Blood-Pressure Lowering (N = 1430)</th>
<th>Odds Ratio (95% CI)</th>
<th>P Value</th>
</tr>
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<tbody>
<tr>
<td><strong>Primary outcome:</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Death or major disability</td>
<td>719/1382 (52.0)</td>
<td>785/1412 (55.6)</td>
<td>0.87 (0.75–1.01)</td>
<td>0.06</td>
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<tr>
<td><strong>Secondary outcomes:</strong></td>
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<td></td>
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<tr>
<td>Score on the modified Rankin scale</td>
<td>Ordinal analysis of mRankin scale</td>
<td>0.87 (0.77–1.00)</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>166/1394 (11.9)</td>
<td>170/1421 (12.0)</td>
<td>0.99 (0.79–1.25)</td>
<td>0.96</td>
</tr>
</tbody>
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ATACH-2 Trial

1000 participants with a mean SBP of 200.6±27.0 mm Hg at baseline

Conclusion

**Acute ischemic stroke**

- If receiving thrombolysis
  - Prior: reduction of BP ≤ 185/110 mmHg
  - Maintain: BP ≤ 180/105 mmHg at least 24hr
  - No evidence that one class of antihypertensive drug is superior to another

- Not receiving thrombolysis
  - No BP reduction in the first 24hr **EXCEPT**
  - High BP > 220/120 mmHg or severe acute comorbidities
  - Initial BP reduction by 15% is a reasonable goal

**Acute hemorrhagic stroke**

- High SBP > 220 mmHg, it is reasonable to use continuous intravenous drug infusion to reduce BP to lower level
- Uncertain effect of BP lowering (<140 mmHg) in hemorrhagic stroke, but most studies have shown that such BP values are safe (always < 180 mmHg, but may be not too low < 125-130 mmHg)
Thank You