Blood Pressure Management after Aneurysmal Subarachnoid Hemorrhage (aSAH)

- Blood Pressure Targets After Aneurysmal Subarachnoid Hemorrhage: Is Lower Better?
- Continuous Intra-arterial Infusion of Verapamil for Severe Vasospasm Treatment After Subarachnoid Hemorrhage: A Case Report
- A rare case of Fahr's disease with posterior circulation (basilar tip) aneurysm- pathophysiology, management, and complications
- Identification of Risk Factors Influencing Hemorrhage Volume in Aneurysmal Subarachnoid Hemorrhage: A Multicenter Retrospective Study
- Subarachnoid Hemorrhage Following Cervical Medial Branch Radiofrequency Ablation: A Case Report
- Current Management of Aneurysmal Subarachnoid Hemorrhage
- The relationship between blood pressure and mortality after subarachnoid haemorrhage
- Results of an Online Survey on Intensive Care Management of Patients with Aneurysmal Subarachnoid Hemorrhage in German-Speaking Countries

Objective: To minimize the risk of aneurysmal rebleeding and delayed cerebral ischemia (DCI) while ensuring adequate cerebral perfusion.

Pathophysiological Considerations

- **Early phase (first 72 hours)**:
  - Risk: **Rebleeding** due to unstable clot or unsecured aneurysm.
  - Strategy: **Strict BP control** to reduce transmural pressure.
- **Intermediate phase (Days 3–14)**:
  - Risk: **Delayed cerebral ischemia (DCI)** from vasospasm.
  - Strategy: Maintain **adequate cerebral perfusion pressure (CPP)**, possibly with **permissive hypertension**.

Timing-Based Targets

Phase	Aneurysm Secured?	SBP Target	Rationale
Hyperacute (0–24 h)	No	< 140 mmHg	Prevent rebleeding
Acute (24–72 h)	No	120–140 mmHg	Maintain low-normal BP
Post-securing phase	Yes	> 160 mmHg	If DCI suspected, for CPP support
DCI with vasospasm	Yes	160–200 mmHg	Individualized hypertensive therapy

Antihypertensive Agents (Pre-securing)

- **Labetalol** (IV): α/β-blocker, rapid onset.
- **Nicardipine** (IV): CCB with favorable CNS profile.
- **Hydralazine**: Use with caution due to variable response.

- **Avoid**: Nitroprusside and nitroglycerin (may raise ICP).

⚠ Monitoring

- Continuous **arterial line** recommended.
- Avoid **hypotension (MAP < 65 mmHg)**.
- Frequent **neurological examinations** to detect early DCI.

After Securing the Aneurysm

- Consider **induced hypertension** for symptomatic vasospasm or DCI.
- Use **vasopressors** (e.g. norepinephrine) to reach target SBP.
- Monitor with:
  - Transcranial Doppler (TCD)
  - Perfusion imaging
  - Clinical status

Key Guidelines

- **AHA/ASA 2023**: Recommend SBP < 160 mmHg before securing the aneurysm.
- **ESICM & Neurocritical Care Society**: Advocate for **individualized targets** post-securing.

Post hoc observational cohort study

In a Post hoc observational cohort study Eagles et al. [1] boldly asserts that systolic blood pressure (sBP) lower than 118 mmHg before aneurysm treatment in aSAH patients may improve outcomes. But this conclusion, drawn from a post hoc analysis of outdated trial data (CONSCIOUS-1, originally designed for evaluating clazosentan), is as fragile as a ruptured aneurysm.

1. Fatal Flaw: Post Hoc Analysis Used as Clinical Guidance The authors base their claims on a post hoc exploration of a dataset never intended to address this question. CONSCIOUS-1 focused on vasospasm, not on early BP management. This kind of retrospective data mining is fertile ground for spurious correlations and type I errors. The conclusion (“lower is better”) is not hypothesis-driven—it is data-dredged.

 Verdict: Retrospective opportunism disguised as prospective insight.

2. Statistical Gymnastics and the 118 mmHg Myth The most eyebrow-raising claim is the “optimal cut point” of 118 mmHg identified via the Youden index—a tool best reserved for binary classifiers, not continuous hemodynamic variables in critically ill humans. The fact that this cut point, when used dichotomously, yields an odds ratio of 0.28 is more a reflection of statistical overfitting than clinical truth.

 Verdict: The Youden index should not be a replacement for clinical reasoning or robust RCTs.

3. Biological Implausibility and Clinical Recklessness Suggesting an sBP of <118 mmHg as “safe” borders on clinical negligence. In aSAH, hypoperfusion, particularly in the penumbra of vasospastic vessels or already ischemic territories, is a clear and present danger. Prior literature consistently warns against overzealous BP lowering before securing the aneurysm. Ignoring this, the authors suggest a threshold that would make most neurointensivists squirm.

 Verdict: If followed, this “target” risks precipitating infarction in the name of hypothesis testing.

4. Confounder Handling: Too Little, Too Late Although the authors claim to have adjusted for confounders, the paper provides minimal details on how key covariates were selected or weighted. Factors like aneurysm size, location, timing of treatment, baseline neurological grade, or intracranial pressure—all critical—are largely glossed over.

 Verdict: Adjustments feel more like statistical decoration than meaningful correction.

5. Misleading Implications for Practice The final conclusion—“lower sBP may be associated with improved outcomes”—is a dangerous oversimplification. The authors don't just fail to demonstrate causality—they actively mislead by promoting a precise but clinically hazardous target. Worse yet, the message could influence junior clinicians or protocol committees inappropriately.

 Verdict: The study flirts with harm under the pretense of nuance.

Conclusion This paper exemplifies the worst kind of retrospective analysis: methodologically weak, clinically misleading, and dangerously simplistic. By anchoring its entire thesis on post hoc thresholds and shaky statistics, it generates far more noise than signal. The field of neurocritical care deserves better than seductive but unfounded numbers like “118 mmHg.”

Final Score: 2/10 Scientific Rigor: ★☆☆☆☆ Clinical Relevance: ☆☆☆☆☆ Statistical Integrity: ★☆☆☆☆ Potential Harm: ★★★★★

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Eagles ME, Veilleux C, Riva-Cambrin J, Macdonald RL. Blood Pressure Targets After Aneurysmal Subarachnoid Hemorrhage: Is Lower Better? Neurosurgery. 2025 Jun 9. doi: 10.1227/neu.0000000000003556. Epub ahead of print. PMID: 40488458.