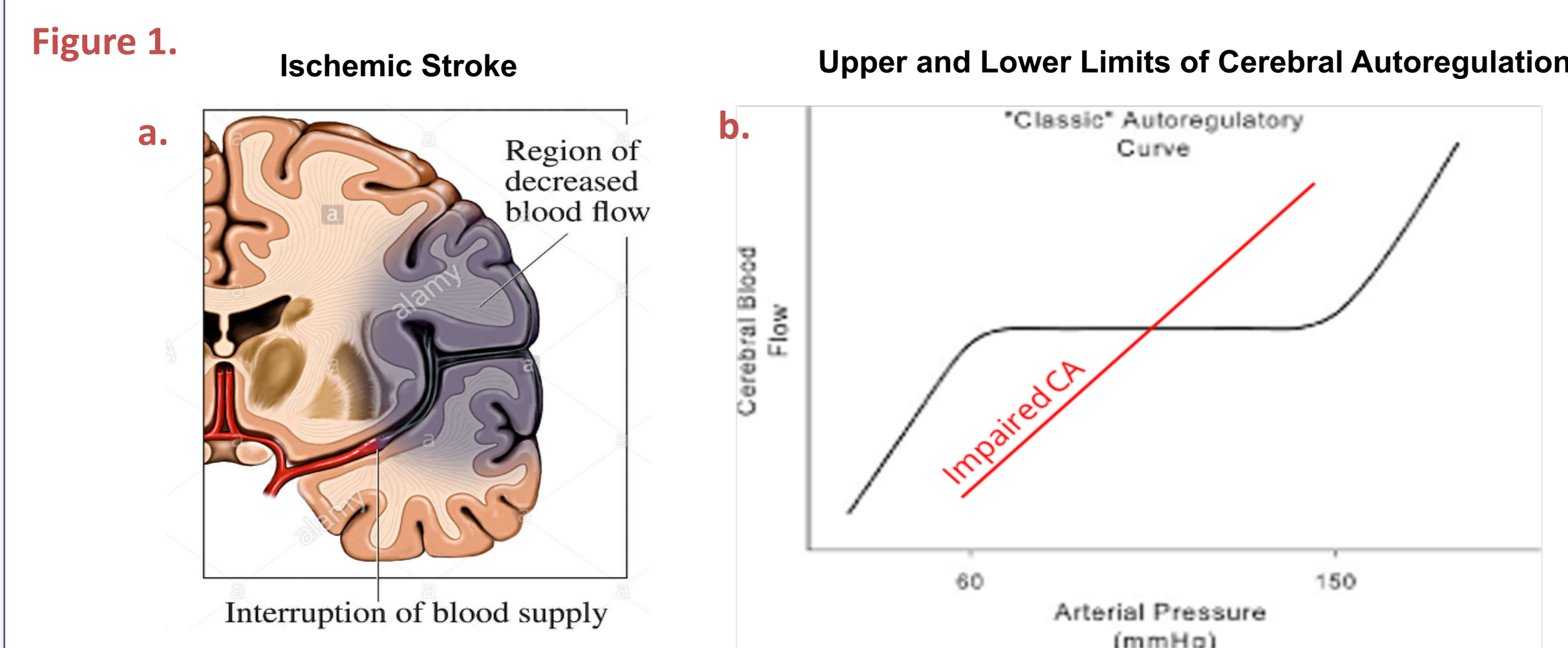


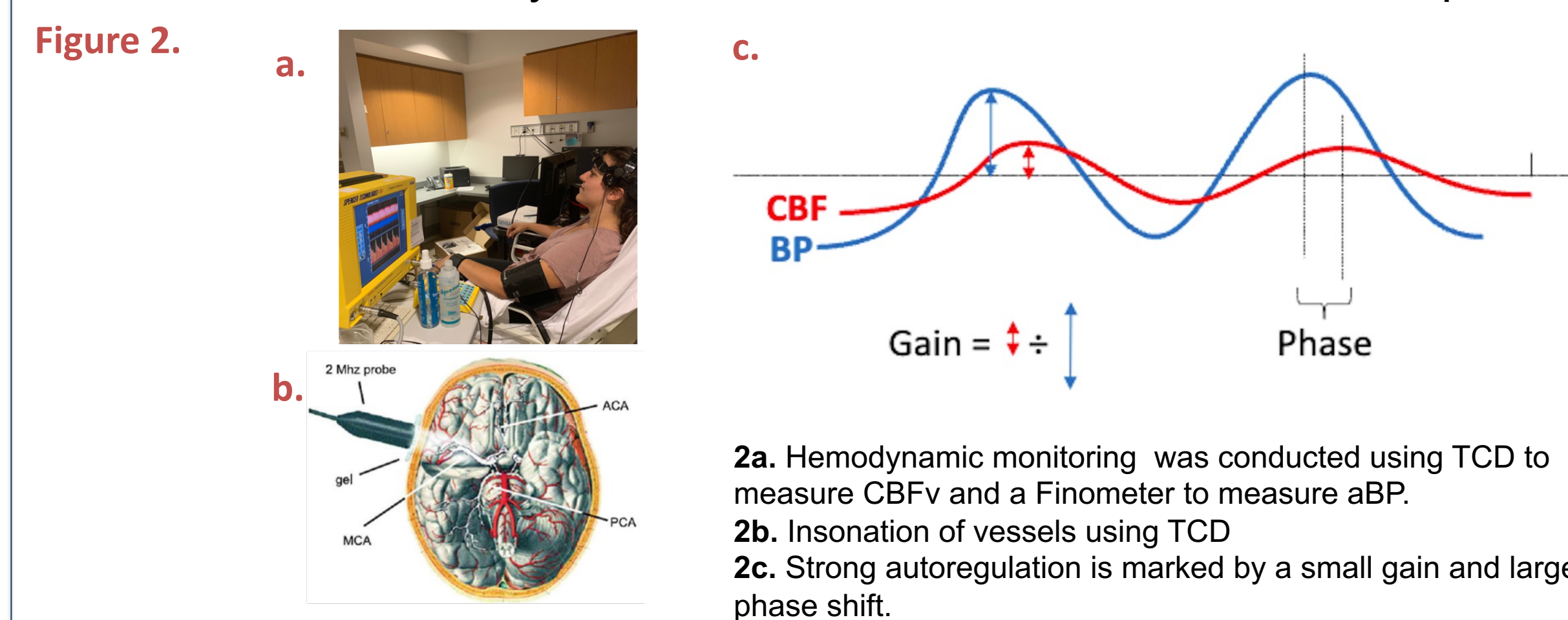
## Background

- Ischemic stroke is the leading cause of significant disability and death in the U.S.
- Damage caused by acute stroke impairs cerebral autoregulation (CA), which leads to secondary brain injury.
- Topographic differences in CA are unknown.
- Investigating CA is critical to personalizing blood pressure and improving patient outcomes.



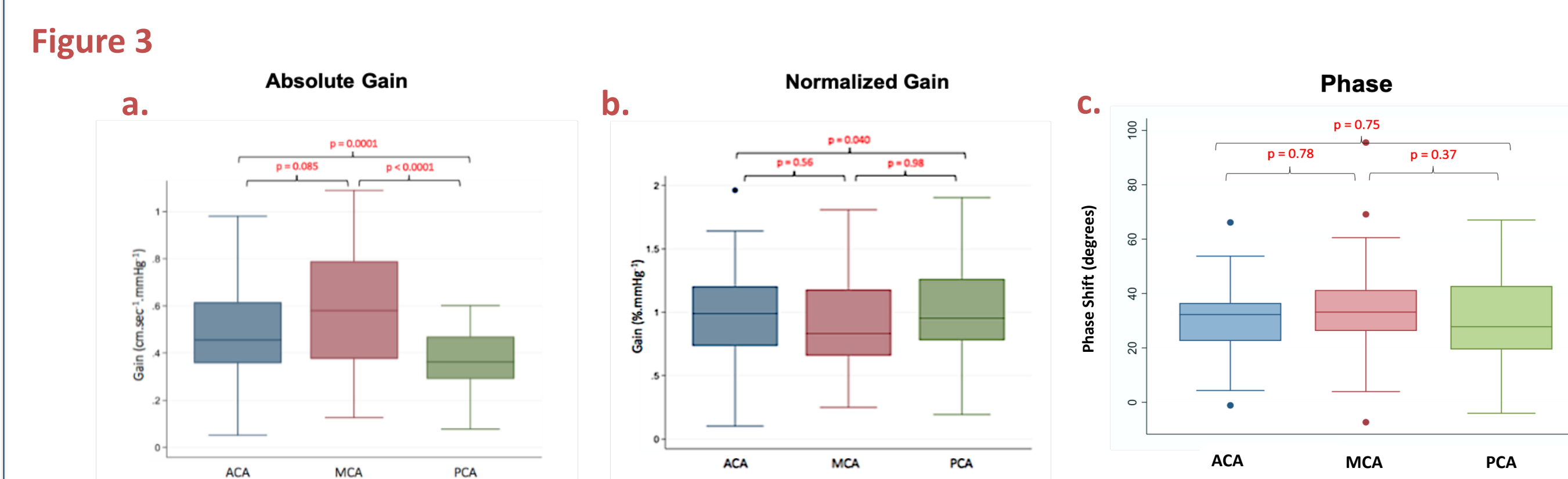
## Methods

- Utilized hemodynamic monitoring technique to assess CA.
- Monitored cerebral blood flow (CBFv) and arterial blood pressure (aBP) in the middle cerebral artery (MCA), anterior cerebral artery (ACA), and posterior cerebral artery (PCA).
- Quantified and assessed CA based on gain, normalized gain, phase, and coherence, which are outputs from a transfer function analysis (TFA).
- Enrolled 40 healthy volunteers and 32 acute ischemic stroke patients.



## Results (Healthy Cohort)

- Absolute gain is lowest in the PCA.
- Normalized gain and phase are similar across all three vessels.

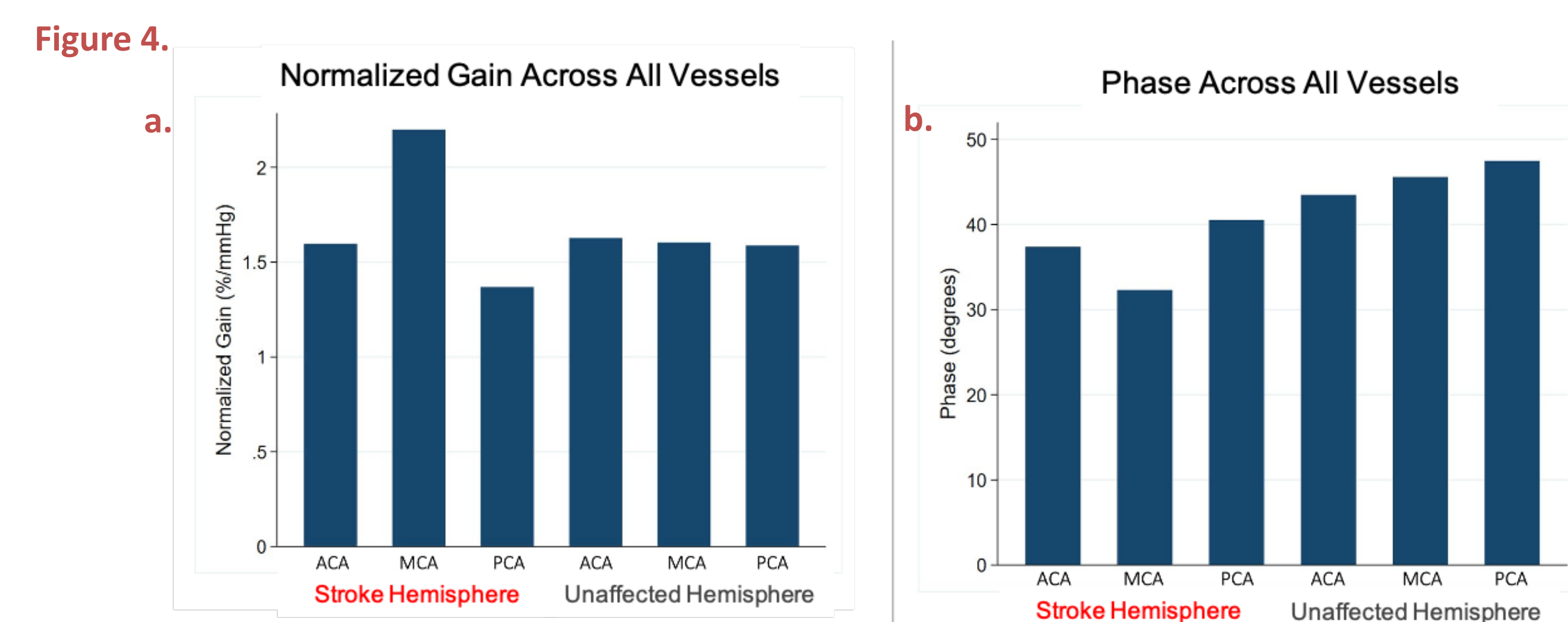


## Results (Stroke Cohort)

**Table 1. Demographics of Stroke Cohort**

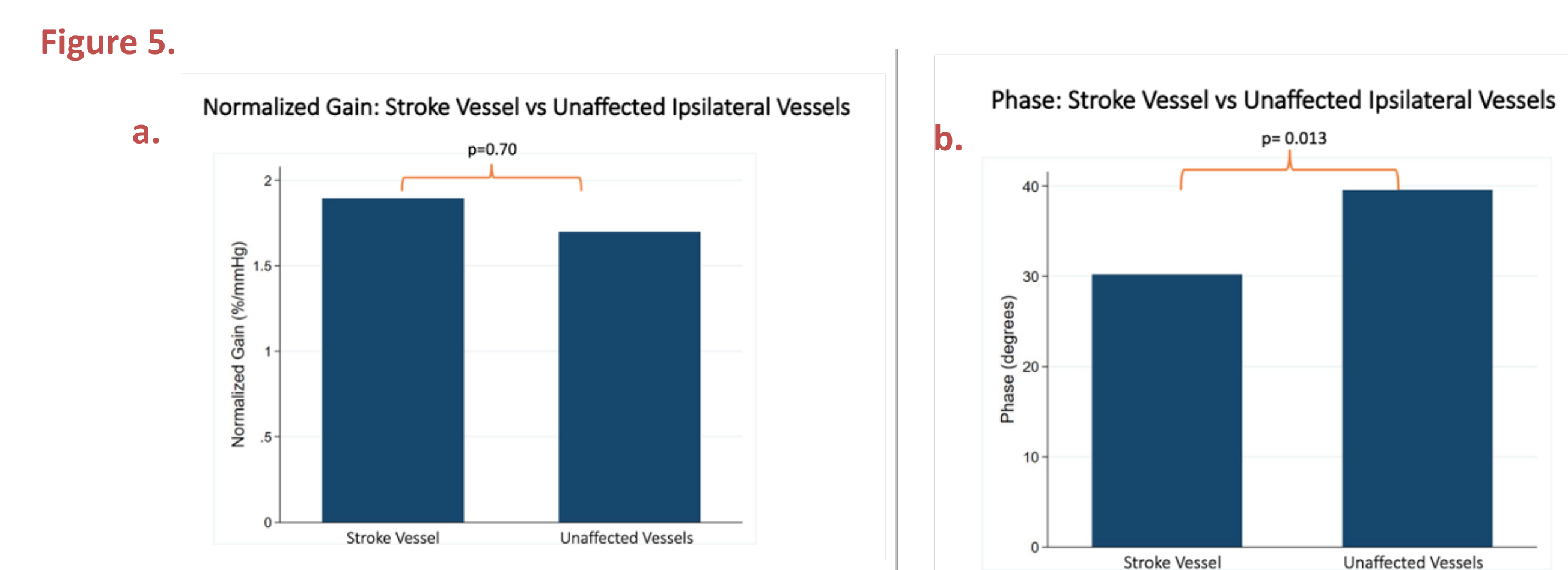
|                            | Cohort (n=32) |
|----------------------------|---------------|
| Age                        | 62 (15.7)     |
| Sex, % female              | 28%           |
| Race, % white              | 53%           |
| Medical History            |               |
| Hypertension               | 68.8%         |
| Diabetes                   | 25%           |
| Hyperlipidemia             | 62.5%         |
| CHF                        | 22%           |
| Prior Stroke               | 9.4%          |
| CAD/MI                     | 21.9%         |
| Smoking (current + former) | 68.8%         |
| Time to Study, hours       | 40.7 (14.7)   |
| Initial NIHSS              | 10.4 (8.7)    |
| NIHSS at Monitoring        | 7.2 (8.1)     |
| Stroke Laterality, % Left  | 43.80%        |
| Stroke Vessel              |               |
| ACA                        | 9.4%          |
| MCA                        | 78.1%         |
| PCA                        | 12.5%         |

## Does single-vessel ischemic stroke cause global autoregulatory impairment?



- Autoregulation is not globally impaired.

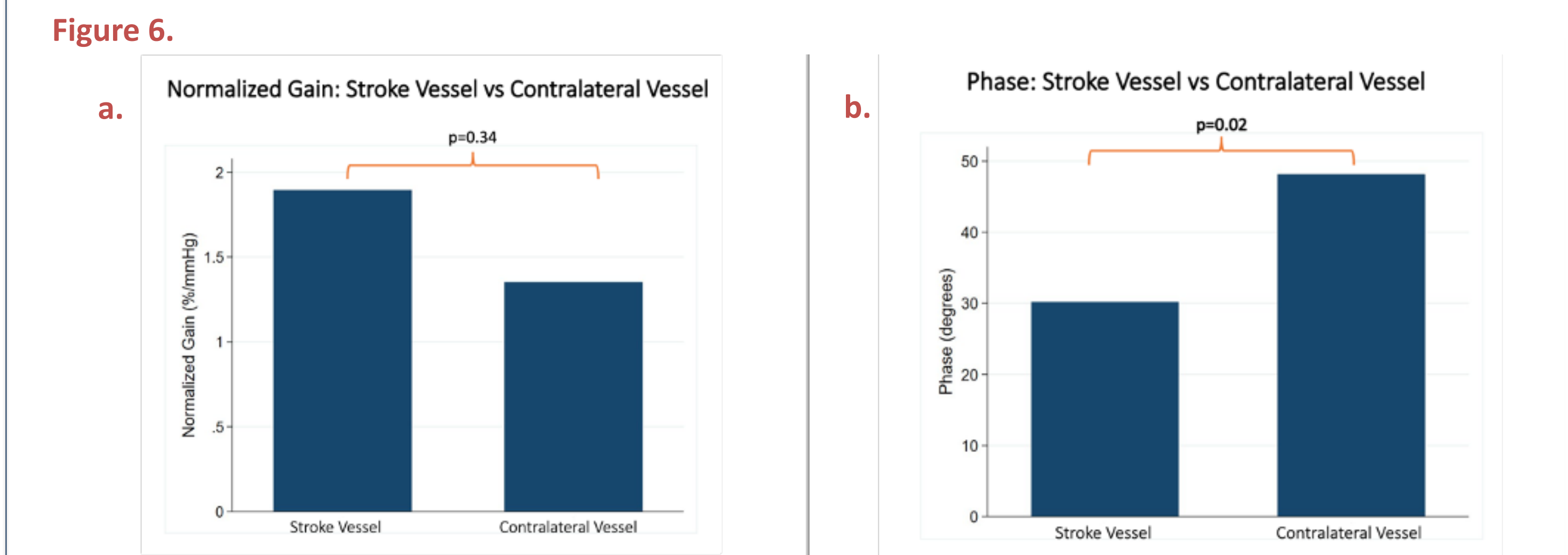
## Is autoregulatory impairment after single-vessel ischemic stroke limited to the affected vessel?



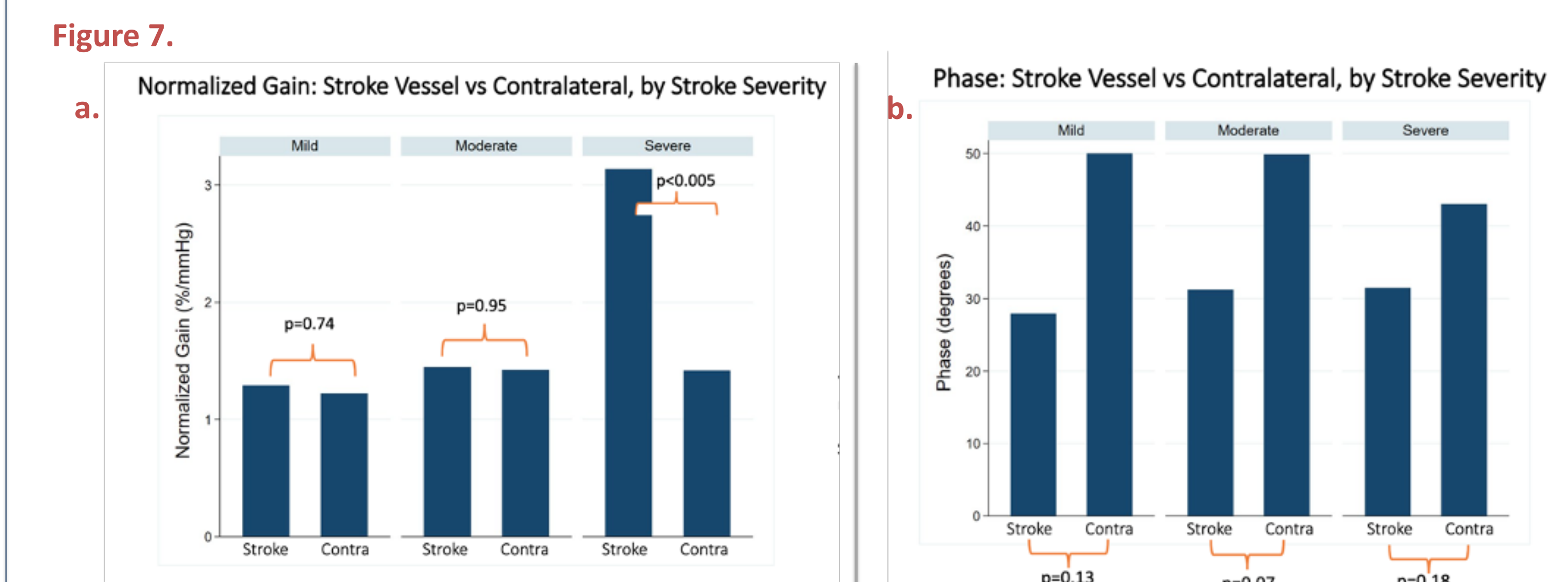
- Autoregulation is impaired in the stroke vessel and not in the unaffected, ipsilateral vessels.

## Results (Stroke Cohort)

### Is autoregulatory impairment after single-vessel ischemic stroke limited to the affected vessel?



- Autoregulation is impaired in the stroke hemisphere.
- Autoregulation is impaired in the stroke vessel but not the contralateral vessel.



- Phase impairment, not gain impairment depends on stroke severity.
- Focal autoregulatory impairment is most noticeable in severe strokes.

## Conclusions

### Healthy Cohort

- Absolute flow is tightly regulated in the back of the brain.
- When adjusting for territorial differences in absolute flow, CA is consistent across all vessels.

### Stroke Cohort

- CA is focally, not globally impaired in stroke patients.
- CA impairments are most pronounced in the affected vessel of the stroke patients, sparing ipsilateral and contralateral vessels.
- CA impairment is dependent upon stroke severity.

## References

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