

Joy He BA; Michael Zhang MD; Michael Iv; Gordon Li MD; Melanie Hayden Gephart MD, MAS

Department of Neurosurgery, Stanford University, Stanford, CA 94305

Department of Radiology/Neuroimaging and Neurointervention, Stanford University, Stanford, CA 94305

## Introduction

- Gadolinium-based contrast agents (GBCA) are necessary to enhance MRI studies
- GBCA deposits in the brain[1-4] and dechelated gadolinium is toxic[5,6]
- Patients with meningiomas require regular MRIs over decades

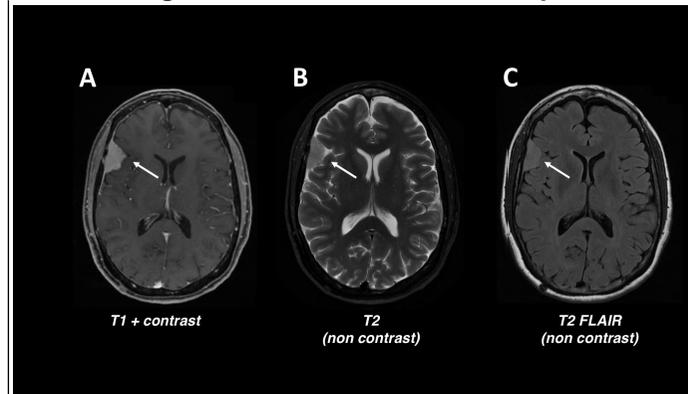
## Objective

- Can we *eliminate* gadolinium contrast agents from the surveillance monitoring of asymptomatic convexity meningiomas?
- Chose a tumor type for which surgical resection is not immediately indicated

## Methods

- IRB-approved retrospective chart review: 106 MR sequences from 18 patients
- Inclusion criteria: 1) adult patients 2) asymptomatic convexity meningiomas 3) baseline contrast-enhanced and non-contrast axial MRI imaging of the brain
- Exclusion criteria: 1) baseline or follow-up axial images not available 2) baseline scan obtained without contrast 3) diagnosis of meningioma was later disputed.
- Percent tumor growth measured by comparing cross-sectional area measured from earliest vs most recent scan.
- Change in tumor size was compared using T1+contrast, T2, and T2 FLAIR sequences.

### Meningioma across different MR sequences



The same tumor can be visualized with equal acuity on T1 with contrast (A), noncontrast T2 (B), and noncontrast T2 FLAIR (C).

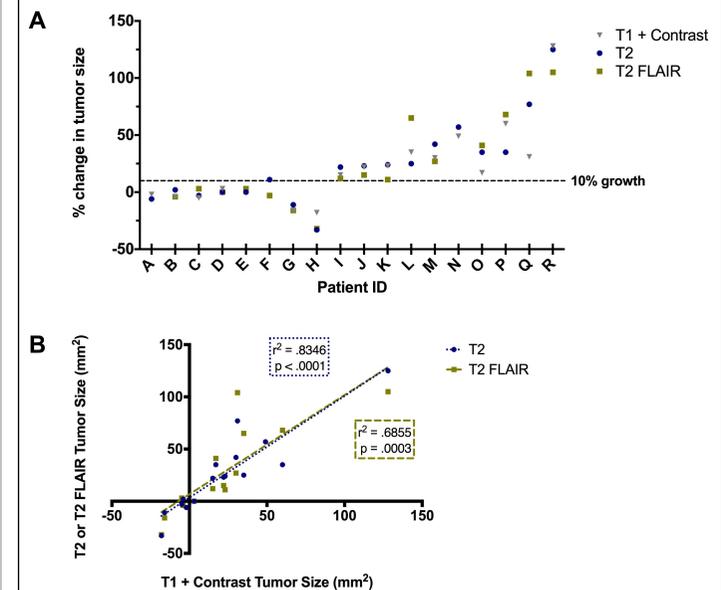
## Results

- Tumor growth <10% was taken to represent stability, consistent with similar studies [7]
- In 17 out of 18 patients, noncontrast studies (T2, T2 FLAIR) accurately assessed tumor growth compared to consensus.
- For one patient, noncontrast studies indicated 12% growth while consensus was stability.

## Conclusions

- Non-contrast MRI images may be **equivalent** to contrast weighted MRI images for surveillance monitoring of asymptomatic convexity meningiomas

### Meningioma size on noncontrast T2 and T2 FLAIR is consistent with T1 + Contrast



Correlation of T2 and T2 FLAIR data compared to corresponding values on T1+Contrast. T2  $r^2=.8346$ ,  $p<.0001$ , T2 FLAIR  $r^2=.6855$   $p=.0003$ , Pearson correlation.

## References

1. McDonald, R.J., et al., Radiology, 2015.
2. Kanda, T., et al., Radiology, 2015.
3. Kanda, T., et al., Radiology, 2014.
4. McDonald, R.J., et al., Radiology, 2017:
5. Sherry, A.D., et al., J Magn Reson Imaging, 2009.
6. Sanyal, S., et al., Nephrol Dial Transplant, 2011.
7. Salvetti DJ, et al., J Neurosurg, 2013