

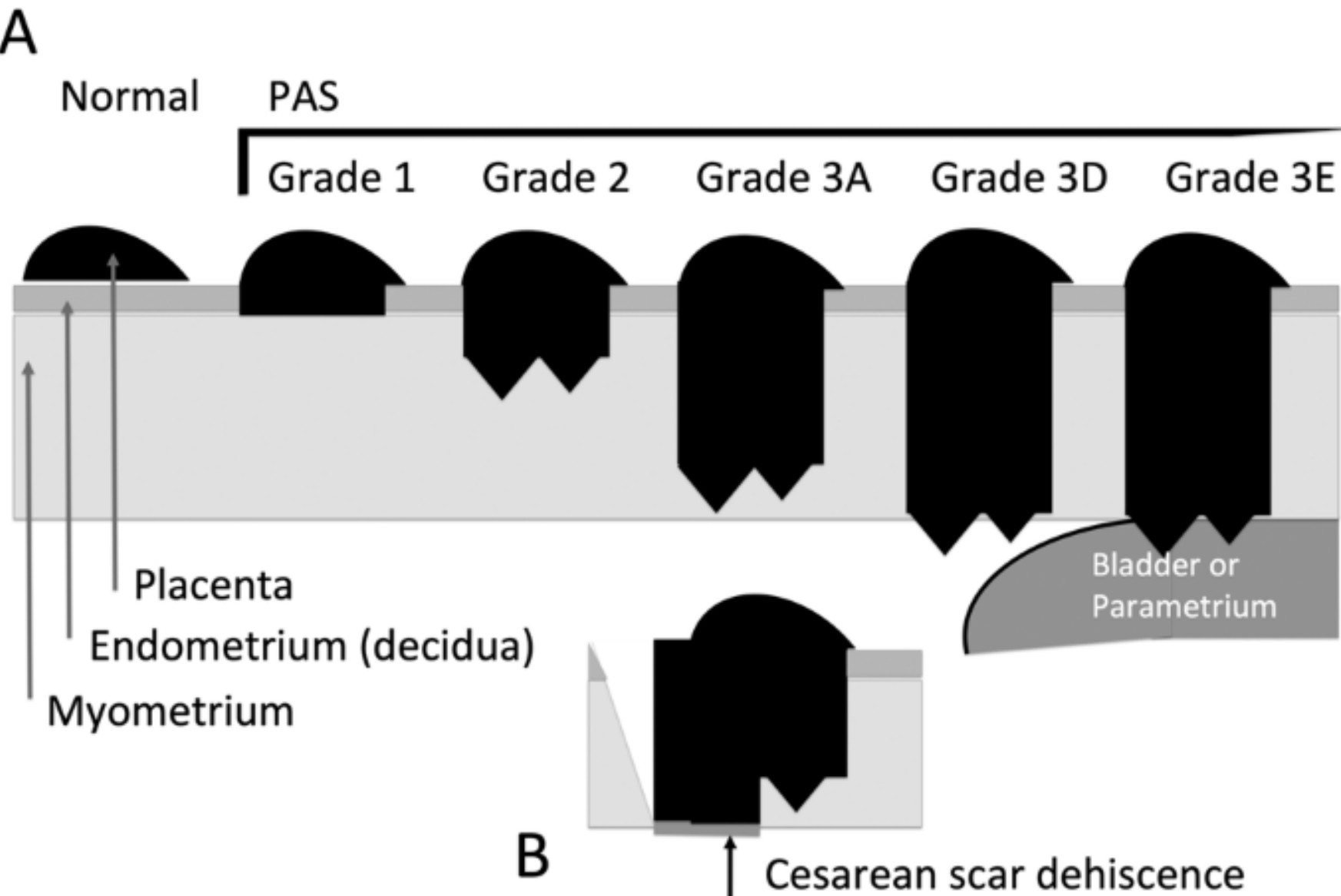
IVIM MRI Finds Markers of Increased Perfusion in Abnormally Adherent Regions of the Placenta in Placenta Accreta Spectrum Disorder

Neal Chandnani; Caroline Walsh; Alex Barker; David Michael Mirsky, MD; Miriam Post, MD; Erin K. Englund, PhD; Mariana L. Meyers, MD



Background

Placenta accreta spectrum disorder is abnormal placental invasion into the uterine wall that results in retention of the placenta during delivery



Introduction

Intravoxel incoherent motion (IVIM) MRI acquires data at multiple diffusion encoding strengths (b-values) to distinguish between intracellular motion and intravascular motion

Methods

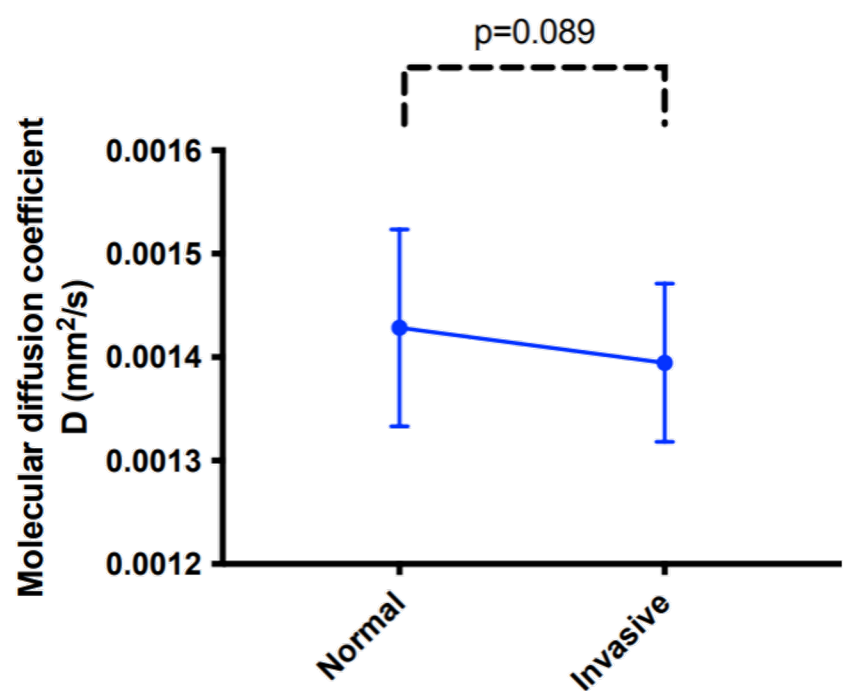
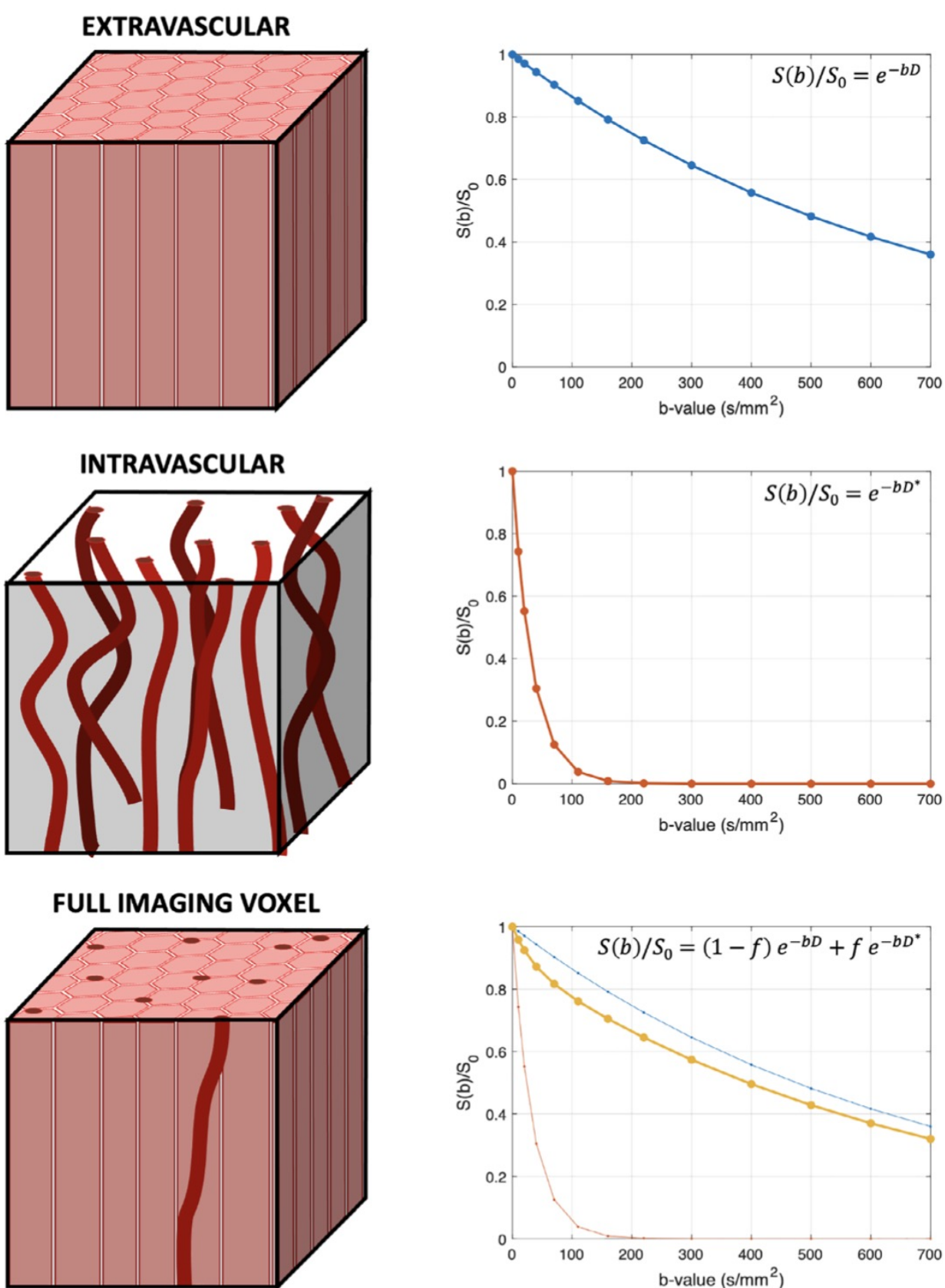
A retrospective analysis was performed on 25 pregnant patients with a diagnosis of PAS, imaged between 2/21-5/23

ROIs were defined by an expert radiologist and IVIM parameters f , D , and D^* were computed on a voxelwise basis via paired t-tests and one-way ANOVAs

f : volume fraction of blood

D : intracellular diffusion coefficient of water

D^* : intravascular diffusion coefficient of water

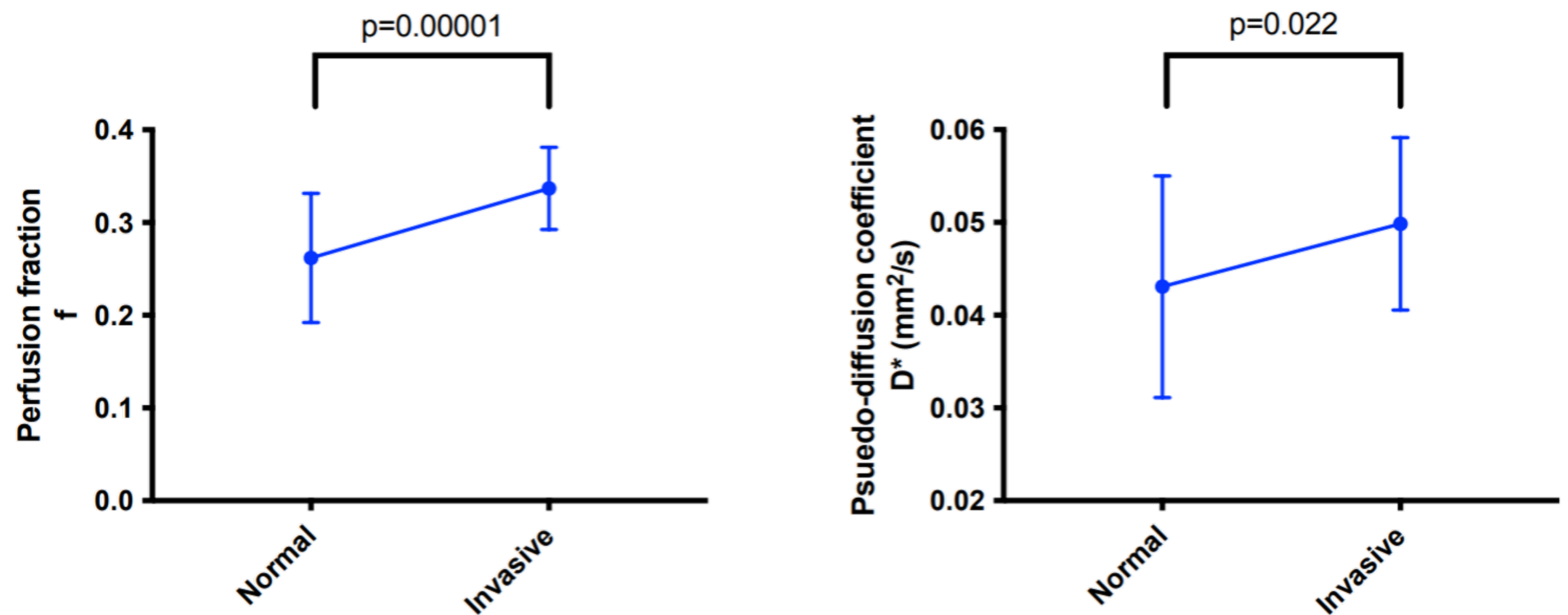


Citations

Hecht, J.L., Baergen, R., Ernst, L.M. *et al.* Classification and reporting guidelines for the pathology diagnosis of placenta accreta spectrum (PAS) disorders: recommendations from an expert panel. *Mod Pathol* **33**, 2382–2396 (2020). <https://doi.org/10.1038/s41379-020-0569-1>
Englund EK, Reiter DA, Shahidi B, Sigmund EE. Intravoxel Incoherent Motion Magnetic Resonance Imaging in Skeletal Muscle: Review and Future Directions. *J Magn Reson Imaging*. 2022;55(4):988-1012. doi:10.1002/jmri.27875

Results

Areas of concern for abnormal placental adherence had a higher perfusion fraction and increased D^* compared to the normal regions ($p=0.00001$, $p=0.022$, respectively), suggesting increased local blood flow



There was no observed difference of D ($p=0.089$) nor of any IVIM parameter between groups defined by PASD grade.

Conclusion

Increased f and D^* in the areas of concern for abnormal invasion suggest increased local microvascular blood flow.