

Diabetic Complications Consortium

Application Title: MRI-Urodynamic Evaluation of Early Changes in Diabetic Cystopathy.

Principal Investigator: Alejandro Roldán-Alzate

1. Project Accomplishments:

- The original start date for the project was delayed due to some issues with the IRB and it started in November 2021.
- A total of six (6) healthy volunteers have been recruited for the study including four (4) BPH/LUTS patients and five (5) men and one woman. Additionally, two patients with diabetes are scheduled to be scanned in July. Data analysis is currently being conducted as more subjects are recruited. Recruitment of diabetic patients has been slower than anticipated due to the coronavirus pandemic, however it has been improving in recent weeks.
- The MRI technology that we have implemented has allowed us to obtain quantitative and qualitative data about the lower urinary tract providing specific and varied information about anatomy and biomechanics during the voiding process in a safe, accurate and reproducible way (Figure 1).

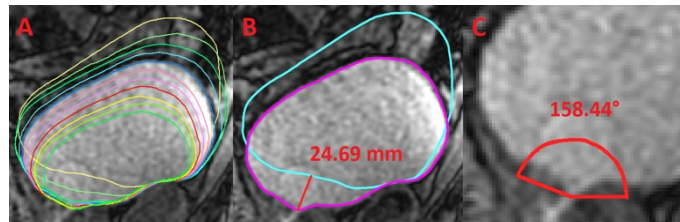


Figure 1: a) Contour lines of bladder lumen segmentations through the voiding event. b) Bladder emptying prolapse distance and c) EBNA at maximum flow rate for a healthy volunteer.

2. Specific Aims:

Specific Aim 1. Perform dynamic MR imaging of voiding in young men with type 1 diabetes and age-matched healthy controls.

Five healthy control men have been recruited for the study.

Specific Aim 2. Perform dynamic MR imaging of voiding in young women with type 1 diabetes and age-matched healthy controls.

One healthy control woman has been recruited for the study.

3. Publications:

Four (4) conference abstracts were published and presented.

1. Shahid, L. A., Gonzalez-Pereira, J. P., Johnson, C. J., Li, Y., Rowinski, D., Roldán-Alzate, A., Predictive Urodynamics Of Bladder Voiding Using MRI-Based CFD: A Pilot Study. Summer Biomechanics, Bioengineering, and Biotransport Conference (SB³C2022) June 20-23, Cambridge, MD, USA.
2. Shahid, L. A., Gonzalez-Pereira, J. P., Johnson, C. J., Roldán-Alzate, A., Real-Time MRI-Based Computational Modeling Of Urinary Flow In Urethra. Summer Biomechanics, Bioengineering, and Biotransport Conference (SB³C2022) June 20-23, Cambridge, MD, USA.
3. Gonzalez-Pereira, J.P., Johnson, C., Wells, S., Bushman W., & Roldán-Alzate, A. Assessment Of Bladder Biomechanics Using MRI [abstract]. In: Proceedings of the 2022 Summer Biomechanics, Bioengineering, and Bio transport Conference. 2022 20-23 June; Cambridge, MD, USA
4. Kouna, M., Johnson, C., Gonzalez-Pereira, J., Wells, S., Bushman W., & Roldán-Alzate, A. The Analysis of Urethral Biomechanics During Voiding Using MRI. In: Proceedings of the 2022 Summer Biomechanics, Bioengineering, and Bio transport Conference. 2022 20-23 June; Cambridge, MD, USA