



SYSTEM AND METHOD FOR FUNCTIONAL ASSESSMENT OF URINARY TRACT USING MAGNETIC RESONANCE IMAGING

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The Invention

UW researchers have developed a magnetic resonance imaging (MRI) urodynamics method, as well as a patient specific MRI-based computational fluid dynamics (CFD) simulation of bladder voiding. Before the imaging session starts, the subject is equipped with a voiding device that allows him/her to void supine in the scanner. The voiding device is connected to a container through a flexible plastic tube. 3D sagittal DISCO Flex images (volumetric dynamic MR images) are acquired over the voiding period capturing the bladder neck and urethra as well as other regions of the bladder. The bladder and lower urinary tract is segmented from the dynamic volumetric MRI images and STL files are exported. The patient-specific bladder anatomies (STL files at different time frames during the voiding cycle) are imported into the computational fluid dynamics (CFD) software. Bladder wall motion is estimated from the time resolved volumes segmented from the MR images and imposed with a user-defined function to virtually drive voiding. Velocity, flow, vorticity, pressure drop and kinetic energy are some of the quantitative parameters extracted from the image based CFD simulations. Parameters such as bladder contractility index (BCI) and bladder outlet obstructions index (BOOI) normally obtained from multichannel urodynamics are derived non-invasively from the calculated parameters.

Additional Information

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Tech Fields

- [Medical Imaging : MRI](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846