

Lower urinary tract symptoms

Lower urinary tract symptoms (LUTS) refer to a group of clinical **symptoms** involving the **bladder**, urinary sphincter, **urethra**, and, in men, the **prostate**. Although LUTS is a preferred term for prostatism, and it is more common for the term to be applied to men; lower urinary tract symptoms also affect women. LUTS affect approximately 40% of older men.

Dysfunction of the lower urinary tract (LUT) is prevalent in neurological disorders, including **multiple sclerosis**, **stroke**, **spinal cord injury** and neurodegenerative conditions. Common symptoms include **urinary urgency**, **urinary incontinence**, and **urinary retention**.

Lower urinary tract symptoms (LUTS) are the most common nonmotor symptoms usually occurring mid-stage of **Parkinson's disease** (PD); however, its underlying mechanisms are unknown. Roh et al. aimed to assess whether **corticometry** or volumetry can identify a pattern of cerebral cortical changes in PD patients with LUTS.

They recruited 85 idiopathic PD patients and performed corticometry and volumetry on various cortical regions using each patient's **magnetic resonance imaging**. To identify a correlation between the cortical thickness/volume and nonmotor symptoms scale domain 7 scores, which represent the severity of LUTS, they performed a general linear model and region of interest analyses.

Significant regional thinning of the left **precuneus** left **temporal pole**, left precentral, right precuneus, and right **pars opercularis** was correlated with nonmotor symptoms scale domain 7 scores. They also found that cortical volumes of the left precuneus and left **frontal pole** were inversely correlated with the severity of urinary symptoms.

This study showed that the thicknesses and volumes of several cortical regions were significantly correlated with the severity of LUTS in PD patients. The findings of regional atrophy and thinning of specific cortical regions in this study provide additional evidence that multiple cortical regions, especially the precuneus cortex, not only may be involved in urinary dysfunctions of PD patients but also may help to elucidate the exact underlying mechanisms for LUTS in PD patients ¹⁾

Treatment

Recent advances in **neuromodulation** have resulted in improved treatments for overactive **bladder** symptoms of urgency, frequency, and nocturia. However, there are presently no treatments available for the induction of voiding to overcome urinary retention.

Havton et al. demonstrated that transcutaneous **spinal cord stimulation** (TSCS), a non-invasive intervention, applied over the thoracolumbar spine in neurologically intact rhesus macaques can activate the LUT, including activation of the bladder detrusor muscle, the urethral sphincter and pelvic floor muscles. Urodynamic studies show improved voiding efficiency and decreased post-voiding residual volumes in the bladder while maintaining coordinated activity in the **detrusor** and **sphincter** with physiologic detrusor peak pressure, contraction duration, and urine flow rate remaining

unchanged.

They concluded that TSCS may represent a novel approach to activate the LUT and enable voiding in select neurological conditions ²⁾.

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Roh H, Kang J, Hwang SY, Koh SB, Kim JH. Regional Cerebral Cortical Atrophy is Related to Urinary Tract Symptoms in Parkinson's Disease. J Neuroimaging. 2021 Feb 3. doi: 10.1111/jon.12829. Epub ahead of print. PMID: 33534966.

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Havton LA, Christe KL, Edgerton VR, Gad PN. Noninvasive spinal neuromodulation to map and augment lower urinary tract function in rhesus macaques. Exp Neurol. 2019 Aug 7;113033. doi: 10.1016/j.expneurol.2019.113033. [Epub ahead of print] PubMed PMID: 31400304.

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