

Pattern identification of urinary bladder pre-voiding activity in humans

Background It is estimated that 17% of individuals aged >40 in the United States and Europe suffers from overactive bladder syndrome which is a bothersome urological condition associated with frequent urination and urge incontinence. Due to the aging population, the prevalence will still increase with consequent effects on quality of life and healthcare resources. In clinical practice, the diagnosis of overactive bladder is based on qualitative data provided by patients, being a symptom based syndrome and, because of its complexity, a definitive solution does not exist yet. Therefore more quantitative data and techniques to assess overactive bladder would be highly desirable. From previous experiments in unconscious rats in normal and pathologic conditions (conducted at Erasmus MC, Rotterdam) a recurrent pre-voiding pattern was identified^[1].

Aims Following the encouraging results in animals and available observations in humans (from scientific literature) the hypothesis to be tested is that, in patients, urge incontinence is preceded by a recurrent pattern of bladder pressure changes. The identification of this repetitive pre-voiding activity will be investigated analyzing the pattern of conventional urodynamic signals (i.e. bladder pressure and flow during filling and voiding) in a database of urodynamic recordings available at the department of Urology of Inselspital (Bern) and Erasmus MC (Rotterdam).

Tasks

- Familiarize with pressure and flow urodynamic signals
- Identification of recurrent pattern in normal and pathological conditions
- Classification of patients in group of similar patterns
- Statistical quantification (sensitivity, specificity etc.) & optimization

Nature of the Thesis

Analysis of pressure and flow urodynamic signals: 30%
 Pattern recognition: 60%
 Statistical assessment: 10%

Requirements

Interest in signal processing & pattern recognition
 Programming knowledge (MATLAB)

Supervisors

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Institutes

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References

1. Clavica F, Choudhary MS, van Asselt E, van Mastrigt R (2013) Can an algorithm predict a voiding contraction in unconscious rats? Conf Proc IEEE Eng Med Biol Soc 2013: 1334-1337.

Contact

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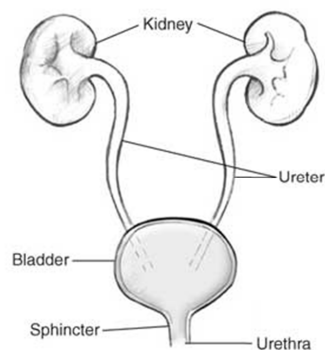


Figure: Schematic diagram of the urinary tract.