

Abstract for the general public

What are the most stressful situations for a child at school age? It was noted that children consider wetting in school the third-worst stress, following the death of a parent and going blind. Wetting is a frequent problem in pediatric population with an increasing epidemiological evidence that this is the second commonest chronic condition of childhood after the atopy/allergy complex. In Poland it is estimated that around 300 thousands of children have urinary incontinence. The main functional bladder disorder causing urinary incontinence is overactive bladder. It is defined as urinary urgency, usually accompanied by urinary incontinence. Untreated overactive bladder leads not only to the health consequences but also is the source of psychosocial disturbances such as shame, low self-esteem, the child's frustration.

Scientists try to explore unclear pathomechanism of overactive bladder. In recent studies the role of disturbed brain – bladder connection is highlighted. Urination also called micturition is a complex process with numerous brain centres and neurotransmitters involved. Many researchers presented the role of neurotrophins in pathomechanism of overactive bladder. Neurotrophins are small proteins which regulate plasticity of neuronal pathways related to controlling urination. They may be detected in urine. It was proved that concentrations of excreted neurotrophins in patients with overactive bladder are higher compared to individuals without urinary problems and correlate with the severity of symptoms.

The aim of my project is the evaluation of changes in urinary concentrations of neurotrophins in patients with overactive bladder during transcutaneous electrical nerve stimulation therapy (TENS). It is a method used in pediatric nephrology for several years. TENS is non – invasive, painless, simple to use and well-tolerated by children and has no side effects in contrast to pharmacotherapy. Stimulation of nerves innervating the bladder neuromodulates them to regain physiological reflexes. However, the exact mechanism of action is unknown.

In our project we would like to find the relationship between neurotrophins and TENS therapy, which may help to explore the role of nervous system in overactive bladder. For this purpose patients with overactive bladder refractory to standard treatment will use TENS during 12 weeks according to given instruction in a home setting with a control visit every 4 weeks. The measurement of neurotrophins concentration will be performed in the study group at the beginning and at the end of the TENS therapy and in the control group comprising children without urinary problems. The urinary excretion of different neurotrophins such as nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), neurotrophin 3(NT3), neurotrophin 4 (NT4) will be measured. Additionally, we will monitor the severity of symptoms using validated questionnaires, bladder diaries and uroflowmetry. It is a simple, non-invasive diagnostic screening procedure used to calculate the flow rate of urine over time.

Collected data may contribute substantially to explaining the role of nervous system in the pathomechanism of overactive bladder and broaden significantly our knowledge about interactions between selected neurotrophins and TENS therapy. The results of the project will give the information about TENS mechanism of action and may indicate the new innovative trends in the therapy of overactive bladder in pediatrics.