

NAME: FASIPE OLUBUNMI ASHLEY

MATRIC NO:18/MHS02/084

DEPARTMENT: NURSING SCIENCE

PHYSIOLOGY 212

MICTURITION

Micturition (urination) is the process of urine excretion from the urinary bladder

Most of the time, the bladder (detrusor muscle) is used to store urine. As it fills, the rugae distend and a constant pressure in the bladder (intra-vesicular pressure) is maintained. This is known as the stress-relaxation phenomenon. The ability to voluntarily control micturition develops from 2 years as the CNS develops.

Micturition is also known as the voiding phase of bladder control and it is typically a short-lasting event. Urinary flow rate in a full bladder is:

20-25ml/s in men

25-30ml/s in women

Whilst the capacity of the bladder varies from roughly 300-550ml, afferent nerves in the bladder wall signal the need to void the bladder at around 400ml of filling.

Regulation of Micturition

Passing of urine is under parasympathetic control. Bladder afferents signals ascend through the spinal cord and then project to the pontine micturition centre and cerebrum. Upon the voluntary decision to urinate, neurones of the pontine micturition centre fire to excite the sacral preganglionic neurones.

There is subsequent parasympathetic stimulation to the Pelvic Nerve (S2-4) causing a release of ACh, which works on M3 muscarinic ACh receptors on the detrusor muscle, causing it to contract and increase intra-vesicular pressure. The pontine micturition centre also inhibits Onuf's nucleus, with a resultant reduction in sympathetic stimulation to the internal urethral sphincter causing relaxation.

Finally, a conscious reduction in voluntary contraction of the external urethral sphincter

from the cerebral cortex allows for distention of the urethra and the passing of urine. In the female, urination is assisted by gravity, while in the male, bulbospongiosus contractions and squeezing along the length of the penis helps to expel all of the urine.

Clinical Relevance – Urinary Retention

Urinary retention has a variety of causes:

- Benign prostatic hyperplasia (BPH) – this is the most common cause
- Nerve dysfunction
- Infection
- Constipation
- Drugs – including anticholinergics, antidepressants and opioids.

Patients typically present with intermittent flow, straining, vesical tenesmus (the feeling of incomplete emptying of the bladder following urination) and hesitancy (a delay between trying to urinate and the flow beginning).

Complications include incontinence, nocturia (the need to urinate at night), pain, hypertension, high frequency, hydronephrosis (high vesical pressure can push urine back up ureters), kidney failure, sepsis. Retention leading to complete anuria (inability to pass urine) can cause the bladder to significantly stretch and possibly tear.

In an acute setting treatment includes urinary catheterisation, a prostatic stent or a suprapubic cystostomy can be used. Long-term patients' treatment is dependent on cause, with the most common cause, BPH, having pharmacological (alpha blocker, 5-alpha-reductase inhibitor) and surgical (prostatectomy, transurethral resection of the prostate) treatment options.