

UTILITY OF THE PENILO-CAVERNOSUS REFLEX TESTING

Hypothesis / aims of study

In clinical assessment of men with suspected neurogenic sacral dysfunction sacral reflex testing is commonly used. In addition, to improve clinical utility neurophysiological measurement of the sacral reflexes was suggested (1). However, contribution of the sacral reflex testing to diagnostic evaluation of patients with suspected sacral peripheral nervous system lesion has not been established, yet.

The aim of the present study was to assess the additional sensitivity provided by the clinical and neurophysiologic testing of the penilo-cavernosus reflex apart to the clinical neurologic examination of the sacral region.

Study design, materials and methods

A group of men with clinical, electrodiagnostic, and neuro-imaging findings supportive of the cauda equina or conus medullaris lesions were included. A history of the current disease was obtained, with particular emphasis on sacral (urinary, bowel and sexual) dysfunction. Clinical neurologic examination including anal sphincter squeeze, perianal touch and pinprick sensation, and penilo-cavernosus reflex testing were performed.

Neurophysiologic measurements of the penilo-cavernosus reflex were performed using a standard EMG system with recommended settings (1). Double rectangular electrical pulses of 0.1-0.5 ms duration, and with the inter-stimulus interval of 3 ms were applied to the dorsal penile nerves at a frequency of 1 Hz. All responses were recorded by a standard concentric EMG needle electrode inserted consecutively into the left and right bulbocavernosus muscles (2). The latency (ms) of the shortest, reproducible response was measured and compared to upper normative limit of 36.0 ms (3). On neurophysiological testing the more abnormal of two (left and right) responses was used for calculations of sensitivities.

Sensitivity (%) of the clinically and neurophysiologically tested penilo-cavernosus reflex testing was calculated on patients stratified according to anal sphincter squeeze, and perianal sensation. In addition, for neurophysiologic testing patients were also stratified according to results of the clinical penilo-cavernosus reflex testing.

Results

A group of 53 men, aged 17 to 82 years (median, 43 years) was included. Urinary incontinence was reported by 25, disturbed bladder emptying by 38, fecal incontinence by 25, constipation by 28, and erectile dysfunction by 46 patients. Data on sensitivity of clinical and neurophysiological elicitation of the penilo-cavernosus reflex in patients stratified according to

Table 1. Sensitivity of the clinical testing of the penilo-cavernosus reflex.

Clinical neurologic findings	Penilo-cavernosus reflex N (%)			Total N (%)
	∅	↓	Normal	
<i>Anal sphincter squeeze</i>				
Normal	8 (50)	5 (31)	3 (19)	16 (37)
Mildly to moderately reduced	7 (70)	0 (0)	3 (30)	10 (23)
Severely reduced or absent	16 (94)	0 (0)	1 (6)	17 (40)
<i>Perianal sensation</i>				
Normal	5 (56)	2 (22)	2 (22)	9 (17)
Mildly to moderately reduced	19 (66)	3 (10)	7 (24)	30 (57)
Severely reduced or absent	14 (93)	1 (7)	0 (0)	15 (28)
Total	38 (72)	6 (11)	9 (17)	53 (100)

∅ - non-elicitable response, ↓ – reduced response.

clinical findings are shown in Tables 1 and 2; the right columns also show findings of the clinical examination.

Table 2. Sensitivity of the neurophysiologic measurement of the penilo-cavernosus reflex.

Clinical neurologic findings	Double electrical stimulation N (%)			Total N (%)
	∅	↑ LT	Normal	
<i>Anal sphincter squeeze</i>				
Normal	1 (6)	9 (63)	6 (19)	16 (37)
Mildly to moderately reduced	5 (50)	4 (40)	1 (10)	10 (23)
Severely reduced or absent	13 (76)	3 (18)	1 (6)	17 (40)
<i>Perianal sensation</i>				
Normal	1 (11)	5 (56)	3 (33)	9 (17)
Mildly to moderately reduced	11 (38)	11 (38)	7 (24)	30 (57)
Severely reduced or absent	12 (80)	3 (20)	0 (0)	15 (28)
<i>Penilo-cavernosus reflex – clinical</i>				
Normal	1 (11)	5 (56)	3 (33)	9 (17)
Reduced	0 (0)	3 (50)	3 (50)	6 (11)
Non-elicitable	24 (63)	11 (29)	3 (8)	38 (72)
Total	25 (47)	19 (36)	9 (17)	53 (100)

Ø - no response, ↑ LT – prolonged latency.

Interpretation of results

The study demonstrated a high sensitivity of both clinical and neurophysiologically tested penilo-cavernosus reflex to diagnose neuropathic lesion (each was abnormal in 83% of patients). Furthermore, it demonstrated a reasonably high sensitivity even in patients with normal findings on clinical neurologic examination, a very important point not reported before.

Sacral reflex testing thus indeed demonstrated the potential to obtain additional diagnostic information not available by other approaches. This is probably due to central conduction within the sacral spinal cord that is very sensitive to desynchronisation of the afferent (sensory) input. Such desynchronisation might be caused by even a minimal nerve fibre damage, not detected by other approaches.

The study also found that neurophysiologic measurement of the penilo-cavernosus reflex provided additional information after clinical testing of the reflex; abnormal results in 67% of patients with normal, and detected reflex response in 53% with reflex non-elicitable clinically. These findings can be explained by higher ability to record responses, and ability to measure reflex unilaterally on neurophysiologic testing.

Concluding message

Both clinical and neurophysiologic testing of the penilo-cavernosus reflex seem to be clinically useful, and complementary to findings of the clinical neurologic examination. However, further studies aimed to assess specificity of the sacral reflex testing are needed to better estimate their utility.

References

1. Incontinence. Plymouth (UK); Health Publication Ltd, 2005 (675-706).
2. Neurourol Urodyn 2000; 19(5): 565-576.
3. Neurourol Urodyn 2007; in press.

FUNDING: The study was supported by the Republic of Slovenia Research Agency, Grant No. J3 7899.

HUMAN SUBJECTS: This study was approved by the The National Ethics Committee of Slovenia and followed the Declaration of Helsinki. Informed consent was obtained from the patients.