CZU:619:616.62-008.222/.223:636.7/.8 ELECTROSTIMULATION METHOD AS TREATMENT OF NEUROLOGICAL URINARY INCONTINENCE IN DOGS AND CATS

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ABSTRACT

Urinary incontinence is a consequence of many neurological diseases. Electrical impulses applied to the pelvic muscles have a dual role: to strengthen the muscles that are responsible of retaining the urine in the bladder and to inhibit the bladder contractility being effective in different types of urinary incontinence.

Electric stimulation effects on the urinary incontinence were evaluated in a comparative study performed in the Medical Clinic of the Faculty of Veterinary Medicine Iasi. The study was conducted on 20 pet carnivores, 15 dogs and 5 cats of different breeds, age and sex, all of them presented in our clinic with different neurological disorders and a history of urinary incontinence.

Electric stimulation techniques have been proved efficient in the treatment of urinary incontinence. The number of sessions of electric stimulation ranged from 7 to 50. Out of the 15 dogs, 9 dogs (60%) have shown a full recovery, 2 dogs (13.33%) have shown a mild improvement and 4 of them (26.66%) did not show any sign of recovery. Out of the 5 cats, 4 (80%) have shown a full recovery and 1 (20%) did not recover at all.

Keywords: Electrostimulation, urinary incontinence, dog, cat

INTRODUCTION

Micturition is a medullary reflex voluntarily controlled by cortical inhibition.

By increasing the bladder internal pressure, micturition contractions are triggered as a result of the stretching reflex. This reflex is caused by stimulating the sensitive stretching receptors located in the wall of the detrusor muscle. The stimulated receptors transmit impulses through the pelvic

nerves to the sacral centers S2-S3, then follow the afferent pathway (pelvic nerves), reaching again the bladder, determining the contraction of the bladder and the relaxation of the internal sphincter (2). If after the micturition reflex was triggered the urinary bladder has not emptied, the nervous elements of this reflex remain in an inhibition state until there is a new reflex triggered. If micturition is not possible, the impulses start from the cortex, through the medullary center, inhibit the detrusor tonus, simultaneously increasing the sphincter tonus, therefore increasing the urinary continence. Urinary incontinence is a complex syndrome, clinically expressed by involuntary micturition, with no efforts and without adopting the characteristic urinating attitude (9).

Types of urinary incontinence

- Effort incontinence (stress incontinence) is caused by weakening of the connecting tissue and of the perineal muscles, which cause a dysfunctionality of the sphincterian muscles.

- Emergency incontinence is manifested by involuntary leakage of urine (usually in large amounts), accompanied or immediately followed by persistent sensation to urinate again.

- Overflow incontinence is characterized by involuntary loss of urine due to exceeding the retention capacity of the bladder. The main cause of this form of incontinence is obstruction (blockage) of the urinary tract, causing the urethra tonarrow due to prostate enlargement in males or due to urolyths in both sexes.

- Neurogenic urinary incontinence (reflex incontinence) occurs in patients with serious neurological disorders and it is characterized by triggering a spontaneous and involuntary contraction of the bladder muscles, often without the patient being aware of the need to urinate. The voiding of the bladder is automatic, unconscious and uncontrolled. Neurogenic urinary incontinence occurs in neurological disorders or critical spinal injuries (3).

The aim of electric stimulation is to contract and strength enweakened muscle mass. Regarding theurinary incontinence, electric impulses transmited through electrodes in the pelvic region will determine contractions of the muscles situated arround the bladder, leading to a systematic strengthening (4). Electrostimulation is useful both for stress incontinence and reflex incontinence.

MATERIALS AND METHODS

Our study cases were represented by 20 animals with neurogenic urinary incontinence selected within the casuistry of the Small Animal Internal Medicine Clinic of the Faculty of Veterinary Medicine from Iaşi, from which 15 dogs and 5 feline patients, of different ages, breeds and genders. All these cases had various neurological affections due to trauma such as car accidents or falls from a high-rise building.

Following the general clinical and neurological examination, various clinical signs were observed, depending on the affected region, ranging from mild lameness to limb paresis and paralysis. Clinical signs vary from patient to patient, but all of them had urinating problems. In order to confirm the diagnosis, imaging methods were used, such as radiography and ultrasonography.

For **electrostimulation** and treating patients, the Intelect®Vet device was used, as well as massage, special balls for physiotherapy and balance platforms. Intelect®Vet is a revolutionary product for veterinarians who provide physical therapy to animals. The device is equipped with two independent channels of electrotherapy, containing four types of currents, Interferential, Premodulated, Russian, High Volt, and an ultrasound probe with a frequency of 1 and 3 Mhz used in the rehabilitation of patients with orthopedic or neurological problems. Therefore, the device offers four methods of therapy, namely: electrical stimulation, ultrasound stimulation and ultrasound combination and laser therapy.

The working method consisted of applying surface electrodes to the motor points, on the proximal and distal muscles from the pelvic region. Previously, the cutaneous area corresponding to the motor points was trimmed and disinfected, and for a better conductivity, electrode gel was applied.

In terms of time and frequency of sessions, they were gradually increased from 5 minutes of electrostimulation up to a maximum of 20 minutes once every 2 days (Table 1).

Table 1**Parameters of curent used for electrostimulation**

Therapeutic aim	Electric curent type
Reducing spasm	Current Type: Premod
	Emission mode: Continuous
	Low pulse: 1kHz
	Increased pulse: 10 Hz
	Intensity: Variable
Muscle strengthening	Current Type: VMS
	Emission mode: Continuous
	Phase duration: 200 µsec
	Ramp: 2 sec
	Fr: 50 pps
	Intensity: Variable

RESULTS AND DISCUSSIONS

The neuromuscular electrostimulation uses a low intensity electric current which, by stimulating the alfa motor nerves, allows recruiting and contracting muscles of patients that have lost the capacity of voluntarily contract muscles, following different conditions with clinical manifestations such as paresis or paralysis. (8).

In neurology, the use of neuromuscular electrostimulation has two major objectives, namely to support muscle recovery and endurance in flaccid paralysis associated with peripheral motoneuron damage, and to reduce muscle spasm in spastic paralysis associated with damage to the central motoneuron (4).

Regarding electrostimulation, in the first sessions, a program to reduce muscle spasms and pain relief was used, followed by stretching sessions for muscle toning.

There are two types of motor points: muscular motor point that corresponds to the skin projection area of the muscle region rich in motor plaques and motor nerve point corresponding to the area of skin where the nerve is located superficially.

After our study, we have seen major improvements when electric stimulation techniques have been applied in order to treat urinary incontinence. From 20 patients, both dogs and cats, 13 patients (65%) have shown a full recovery, 2 (10%) a mild improvement and 5 (25%) did not recover at all. The patients that have not recovered were either euthanised or died because of secondary complications of the primary illness. Out of the 15 dogs, 9 (60%) have shown a full recovery, 2 (13.33%) have shown a mild improvement and 4 of them (26.66%) did not show any sign of recovery. Out of the 5 cats, 4 (80%) have shown a full recovery and 1 (20%) did not recover at all.

The number of sessions of electric stimulation ranged from 7 to 50, based on monitoring the clinical evolution of the patient. One patient did not recover at all, even after 50 sessions of electric stimulation, whereas 1 patient made a full recovery after 7 sessions.

CONCLUSION

A medium range of 20 electric stimulation sessions of the pelvic floor have shown positive results when it comes to improving the status of patients suffering from urinary incontinence. We have not noticed breed, age or sex as factors influencing the outcome of urinary incontinence. More studies should be made in order to assess if these individual factors play a role in the individual outcome. Such promising results suggest that electric stimulation can become a replacement of medical and surgical management of urinary incontinence.

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