Surgical Management of Urinary Incontinence caused by Urethral sphincter Mechanism Incompetence Via Cystourethropexy in a Male Dog

Bir Erkek Köpekte Üretral Sfinkter Mekanizması Bozukluğunun Neden Olduğu Uriner Inkontinensin Sistouretropeksi ile Cerrahi Sağaltımları

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VETERINER CERRahi DERGISti (1998), (4) 3-4

SUMMARY

Urethral sphincter mechanism incompetence is a common cause of urinary incontinence in dogs. It is reported most commonly in bitches, particularly after ovariohysterectomy. Male dogs seem to be less predisposed to urinary incontinence than bitches. An 11 month-old, male Bassett hound dog was brought with a complaint of urinary incontinence particularly during sleep. After clinical, radiological and laboratory investigations, the case was evaluated as urethral sphincter mechanism incompetence. Ephedrin which is an alpha adrenergic drug was not successful in treating this problem at a dose of 1mg/kg of body weight in a day, orally. Cystourethropexy was performed to correct the problem. The dog returned to normal micturation via cystourethropexy plus ephedrin treatment after one week.

Keywords: Urinary incontinence, cystourethropexy, dog.

INTRODUCTION

Micturition is a two-stage process involving the passive storage and the active voiding of urine. The loss of voluntary control of micturition is defined as urinary incontinence (1,3,5,6,7,8,9,11).

Incontinence is unacceptable to most owners; if not adequately treated, this disorder may result in euthanasia of the pet (6).

Nervous control of the bladder and urethra is a combination of autonomic and somatic interactions. Sympathetic innervation is composed of preganglionic fibers exiting the lumbar spinal cord (L1-L2), via the hypogastric nerve. Sympathetic innervation is supplied to both the detrusor and smooth muscles and facilitates the storage phase of micturition. Alpha-adrenergic stimulation results in contraction of the trigone and urethra and forms a functional internal urethral sphincter. There are also alpha-adrenergic fibers that have a modulating effect like an external urethral sphincter (3,7,9,11).

Parasympathetic innervation is supplied to the detrusor by the pelvic nerve from spinal cord segments (S1-S3). Stimulation of the pelvic nerve result in detrusor muscle contraction (3,7,9,11).

The pudendal nerve, which arises from sacral spinal cord segments (S1-S3), provides somatic stimulation of the striated urethral musculature (3,7,9,11).

The cerebral cortex can initiate the micturition reflex as it does during territorial marking, or it can inhibit micturition as in house training (7,11).

The causes of urinary incontinence can be divided mainly into two groups. These are neurogenic and non-neurogenic causes. Neurological disorders are common causes of urinary incontinence in dogs. Pathophysiology of
neurogenic urinary incontinence varies with the location and with the severity of the lesion. In the neurological disorders of upper motor neuron segments, voiding is interrupted, involuntary and incomplete. Functional urinary obstruction and urinary retention are often present (2,3,5,7,9,11).

In the neurological disorders of motor neuron segments, urine flow is influenced by the tone of the urethral sphincters. When urethral tone is minimal, even small increments of intravesical pressure produce some discharge of urine (7,9,11).

Non-neurogenic disorders include a variety of anatomical abnormalities of lower urinary tract that may cause urinary incontinence. These abnormalities are ectopic ureters, extrophy of urinary bladder, female pseudohemorrhoidism, patent urachus, urethroccele, urethral diverticulum, urethral fistula and vestibulovaginal stenosis. Acquired anatomical abnormalities include inflammatory or infiltrative disorders of bladder or urethra that may impair the function of these organs (5,7,9,11).

Obtaining of history has great importance for the recognition of the condition. Indication of polyuria, polakiuria, stranguria, dysuria and nocturia may be mistaken for urinary incontinence (1,2,5,7,9,11).

For differential diagnosis in addition to physical examination, laboratory testings, radiography, ultrasonography, endoscopy, electromyography, urodynamic studies may be necessary (1,7,9,11).

Treatment is based on ethiology and can be divided into two categories, which are medical and operative therapies ((5,7,9,11).

Firstly, immediate care, such as fluid deficits, electrolyte disturbances, acid-base imbalances and azotemia must be neutralized. Then medication is chosen according to the cause (9,11).

Cholinergic agents such as Bethanechol are used to stimulate smooth muscle activity and detrusor contraction in the loss of bladder innervation (7,9,11).

Smooth muscle relaxing agents such as aminopromazine may be used in dogs with hypercontractility (7,9,11).

In urethral hyperreflexia associated with internal urethral sphincter alpha-adrenergic blocking agents such as phenoxybenzamine and nicergoline have been used to decrease smooth muscle activity of urethra (7,9,11).

To decrease striated muscle activity of the urethra, myorelaxing agents such as Dantrolen and baclofen or tranquillizing agents such as diazepam can be used (7,9,11).

In urethral incompetence or urethral hyporeflexia, to increase smooth muscle activity of the urethra, alpha-adrenergic agonists such as phenylpropanolamine and sympathomimetic agents such as imipramine have been recommended (4,5,7,9,11).

Estrogen and testosterone are used in hormone-responsive urinary incontinence (2,5,7,9,11).

As a surgical treatment congenital abnormalities must be corrected like ectopic ureter. To correct urethral sphincter mechanism incontinence several surgical techniques have been used such as prosthetic sphincter made of silastic, colposuspension, teflon injections to the urethral and periurethral tissues, fixation of the deferent ducts to the abdominal wall with a modified technique, bladder neck flap reconstruction technique, partial excision of bladder neck, urinary diversion by transplantation of both ureters into a reservoir constructed from 60 cm. of jejunum and cystourethreopexy (3,4,5,6,7,9,10,11).

CASE REPORT

An 11-month old, male Bassett hound was brought with a complaint of urinary incontinence particularly during sleep. Upon admission, case history was recorded including the age at onset and duration of incontinence, the ability to void normally, frequency of voiding, volume of urine passed at each episode of urination, water intake, abdominal and pelvic trauma. After physical examination complete blood counts and urinalysis were performed.

Our facilities were unable to carry out urodynamic studies.

Positive and double contrast radiographs were taken. In the history, it was found that the dog had incontinence congenitally, frequency of urination was 7-8 times in a day, the dog was able to void voluntarily, water intake was ad libitum and there was no abdominal or pelvic trauma anamnesis. The dog was an intact male and had the ability of copulation. Physical examination did not reveal any abnormality and complete blood counts and urinalysis were within the normal physiological range.

Positive and double contrast radiographs only revealed the presence of a caudally situated bladder (intrapelvic bladder), and a small and very dilated intrapelvic ureth-

Fig. 1. Preoperative positive contrast radiograph of the case. 
Şekil 1: Olgunun preoperatif olarak alınan pozitif kontrast radyografisi.
Initially, ephedrin was given at a dose of 1mg/kg of body weight in a day, orally. But no objective improvement was gained by this treatment after 15 days and surgical treatment by cystourethropexy was considered.

Food was withheld for 24 hours before surgery. Premedication was achieved with an injection of xylazine HCl 2mg/kg i.m. (Rompun 23.32 mg/ml-Bayer) and anesthesia was provided by ketamin HCl 20mg/kg i.m. (Ketalar fl. 50 mg/ml-Parke Davis). The dog was placed in dorsal recumbency and the abdomen was prepared for aseptic surgery using povidone-iodine scrub and 70% ethyl alcohol.

The bladder was visualised by caudoventral midline laparotomy. Perirethral fat was dissected from the ventral bladder neck and proximal urethra in the midline. Cranial traction was applied and maintained. Four horizontal mattress sutures of 2/0 silk were placed in the seromuscular layer of the bladder neck and urethra. The sutures were then placed on the midline closest to the incision on the ventral abdominal wall. These sutures were tied in a caudal to cranial order. Abdominal incision was then closed in a routine manner. Antibiotic therapy (Ampicilline plus sulbacatam- Duocid fl. 0.5 g.-Pfizer) and ephedrin therapy was continued for 7 days. The dog was catheterized to facilitate urination on the first day. The animal owner was contacted weekly by telephone for two months and the last situation of the animal was inquired. One week after surgery, the dog was accepted for physical and radiological examinations. Positive and double contrast radiographs revealed that the bladder was not intrapelvic and urethral length was approximately 4cm. longer in comparison with before (fig. 3).

**DISCUSSION**

Urethral sphincter mechanism incompetence is a common cause of urinary incontinence in dogs. It is reported most commonly in bitches particularly after ovariohys-terectomy. Urinary incontinence is a rare condition in males and is mostly seen after castration. Our case had not been castrated before and had an ability for copulation (2,3,4,5,7,9,11).

A predisposition for medium-sized and large-sized dogs, particularly Doberman Pinschers, Old English Sheepdogs and Springer Spaniels has been reported (7). Because medium-sized and large-sized dogs are kept out of doors in our country, urinary incontinence is not considered as a serious problem and no such case has been reported to date.

It is suggested that intrapelvic bladder and dilated proximal urethra are responsible for the urinary incontinence cause by urethral sphincter mechanism incompetence (1,3,5,7,9,11). This thought is supported by our radiographic findings.

Initially, ephedrin treatment, which is an alpha-adrenergic drug and has been used to improve tone in the hypoplastic urethra, was tried for 15 days. No positive result was obtained by this method of treatment. We preffered cystourethropexy because it is a simple technique and considered suitable for our case and also as it has previously been found effective in bitches (4).

The operative treatment was supported by ephedrin therapy as it has been recommended. After 7 days, the dog was able to void voluntarily and it was reconfirmed 45 days later. Also positive contrast bladder radiography revealed that the bladder was situated intraabdominally and the intrapelvic urethra was obviously narrowed.

**REFERENCES**

Tüm üyelerimizden ve meslektaşlarımızdan dergimizde yazılaryla ve önerileriyyle desteklemeleri rica ediyoruz.

YÖNETİM KURULU

ARAŞTIRMA ÖZETİ

Köpeklerde karpal artrodezis için Ilizarof tekniğinin kullanılması: 4 olgu

Use of Ilizarof Technique for Carpal Arthrodesis in the Dog: 4 cases

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ECVS Seventh Scientific Meeting, June 26-28, 1998
Poertschach, Austria, Abstracts 9.


İkinci olgu dört aydan beri trafik kazası sonrasında radial paralizis gösteriyordu. Olgu volunter direk eklemi fleksiyonu ve karpal eklemde serbest passif hareketleri sahipti. Olgulardakine benzer olarak sağ unilateral pancarpal artrodeze gerçekleştirdi.

Üçüncü olgu iki yıl boyunca karpal fleksiyon kontrak-türü gösteren radial paralizisli bir köpekti. Karpusun 20 derece ekstensiyonu gerçekleşti, eklem kartilajlari uzaklaştırıldı ve kompresyon kansellöz kemik grefti kullanılamadan gerçekleşti.