ALTERNATIVE METHOD OF SURGICAL TREATMENT OF URINARY INCONTINENCE IN THE SPAYED BITCH

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Abstract

The aim of this paper was the assessment of the useful alternative method of surgical treatment of urinary incontinence in the spayed bitch. The operation was performed on a bitch, which before had been inefficiently treated by available drugs. During a contrast X-ray examination (ascendent urethrography), executed before the operation, intrapelvic position of urinary bladder neck, as well as slight spondylisis L 1, 2, and 6 and spondylarthrosis of the section L 1-4 was found. During an ultrasound examination of the abdominal cavity, perceptible changes of bladder’s wall structure were not found. The vagina remained not adhered to the base of the bladder and it did not contain fluid content. The structure of either kidney did not differ from normal; inflammatory changes were not found. Before the operation, basic biochemical and morphological examination of peripheral blood, as well as general urine examinations, had been performed. The obtained results did not differ from the reference values. In the hormonal profile of peripheral blood, low concentration of oestradiol 19 pg/mL in comparison to the reference values for a bitch (≤ 20 pg/mL in anoestrus), as well as of progesterone 0.2 ng/mL (≤ 1 ng/mL in anoestrus), was found. The operation performed consisted of modification and simultaneous combination of three different techniques (colposuspension, bladder neck reconstruction, and bladder suspension) of surgical incontinence treatment. During the follow-up examination after surgery, an intra-abdominal position of the entire bladder was found, and during the period of 16 months after the operation, incidence of urine uncontrolled discharge/leakage were not observed.

Key words: bitch, urinary incontinence, surgical treatment.

Acquired urinary incontinence is the most frequent remote complication of surgical castration in bitches (1). It happens in over 20% of spayed bitches and, in the case of animals with an over 30 kg body weight, the percentage of individuals with this problem increases to over 30% (2). Mostly, post-spaying urinary incontinence is noted in German shepherds, Boxers, Dachshunds, Poodles, Bobtails, Dobermans, Collies, and Irish Setters (2, 5). The reasons for the occurrence of this disease remain still unclear. Apart from hormonal and pedigree factors, occurrence of acquired urinary incontinence is also predisposed by obesity and age of the animal. In case of elder bitches, a decrease in contractility of the bladder neck and urethra happens, as well as shortening of the urethra, and its widening, and sinuous curvature. Additionally, the bladder neck can undergo dislocation to the pelvic cavity. Possibly, occurring inflammation and neoplasia are additional risk factors (3, 8). At differential diagnosis of acquired urinary incontinence, ectopic ureters and nervous system diseases should be taken into consideration (especially these concerning spinal cord and spinal nerves at the lumbo-sacral segment) (3, 5, 8). In bitches with post-spaying urinary incontinence, the standard procedure is pharmacological treatment. In many cases it gives good results, enabling the controlling or removing of clinical symptoms of the disease. All the currently-used drugs show symptomatic activity only, which disappear after stopping administration of the drugs. Additional negative aspects of pharmacotherapy are the high costs of applicable preparations, the possibility of side-effects occurrence and the fact that some animals do not respond to administered drugs at all (3). In the case of pharmacotherapy failure, an alternative method of treatment remains a surgical procedure, which includes: cranial dislocation of the bladder neck (colposuspension, bladder neck reconstruction, and bladder suspension), elongation of the urethra (bladder neck reconstruction), and narrowing the urethra lumen by submucosal injections of collagen or teflon.

The aim of the casework was the assessment of effective surgical treatment of urinary incontinence in the spayed bitch by simultaneous application of
colposuspension and bladder-suspension, as well as elongation of the urethra.

Material and Methods

Clinical examination. The examinations were performed on the crossbred, 5-year-old bitch, weighing 45 kg, which 4 years earlier had been subjected to ovariohysterectomy due to an advanced form of EPC. At one year from the surgery, first symptoms of acquired urinary incontinence occurred. The patient – at the beginning by drops and then in a constant and uncontrolled way – urinated at different parts of day and night. In the course of the disease, the bitch was treated pharmacologically. At first, phenylpropanoloamine-HCl (Propalin, Biovet, Poland) was applied, then oestriol (Incurin, Intervet), afterwards Propalin with oestradiol benzoate (Mesalin, Intervet). The drugs were given in turns for one year and applied treatment produced an improvement for a period of 2-3 weeks only. During the patient’s first visit to the Small Animal Clinic, the animal was subjected to general clinical examination and a basic examination of blood and urine was performed, and also the hormonal profile of the animal was defined. Afterwards, a detailed examination of the urinary system was performed, completed by an ultrasound examination. In order to determine the position of the bladder and urethra, a contrast X-ray examination was performed after insertion of a catheter into the end part of the urethra and an injection of 6 ml of non-ionic iodinated contrast medium (Omnipaque; Amersham Health) into the lumen of the urinary tract (ascendent urethrography). In order to appraise the natural setting of the bladder and urethra, an X-ray was done with the animal in a standing position by a horizontal beam. Ascendent urethrography was repeated six months after the operation had been performed in order to check the setting of the bladder and to confirm the effectiveness of applied treatment.

Surgical technique. The operation was performed in general anaesthesia with endotracheal intubation. After placing the animal on its back and shaving the retroumbilical region, the operative area was prepared and covered in the routine manner. The operative access was performed by retroumbilical laparotomy with simultaneous exposure of part of the pubic symphysis. After finding the bladder and emptying it of urine, a single-stay suture (Amifil 1/0, Sinpo) was put on its apex. The suture enabled the safe pulling away of the bladder towards the cranial, facilitating access to its neck. After removal of intrapelvic fat covering the bladder neck and urethra, the vagina was exposed. A blind-ended catheter with large diameter was introduced into the vagina from the vestibule side and pushed out towards the cranial. The vagina, in its new position, was sutured to the periosteon of pubic symphysis and to rectal abdominal muscles by interrupted nylon sutures (Amifil 1/0, Sinpo). Then, after covering the bladder with moistened operating sponges, its lumen was exposed by a longitudinal incision running through the distal part of the body, the neck, and the proximal part of the urethra. After exposure, the lumen of the bladder, ureteral orifices were found intact, which excluded the presence of ureteral ectopy. Elongation of the urethra was effected by the excision of triangular flaps in the bladder wall. Continuity of urinay tracks was reconstructed by a continuous suture non-penetrating mucous membrane. The suture was performed by monofilament absorbable material (Biosyn 4/0; Syneture). The suture was additionally strengthened by several stitches of the same suture material. At the next stage of the operation, the mucous membrane of part of the bladder body was exposed by removal of adventitia and muscular layers. The bladder, prepared in this way, was sutured to the abdominal cavity wall by interrupted nylon sutures (Amifil 1/0, Sinpo). The abdominal cavity was closed routinely. During postoperative period, antibiotic was given three times at 2 d intervals (mixture of penicillin G and procaine penicillin) (Duplociline, Scanvet); besides, limitation of activity, protection of operative wound, and monitoring of miction were recommended. The operative wound healed by the first intention and 10 d after the operation skin sutures were removed.
Results

Biochemical and morphological examinations of peripheral blood, as well as general examination of urine, indicated no changes in comparison to the reference values (12). The hormonal profile of peripheral blood showed low concentration of oestradiol 19 pg/mL in comparison to the reference values for female dogs in anoestrus (≤ 20 pg/mL) (12) as well as of progesterone 0.2 ng/mL (≤ 1 ng/mL) (12). Ultrasound examination did not show perceptible changes in the bladder wall structure, the vagina remained not adhered to bladder’s basis and it did not contain liquid content. The structure of both the kidneys did not differ from normal, and inflammatory changes were not found. An X-ray examination, performed before the operation, showed the intrapelvic position of the bladder neck, as well as slight spondylosis at the level of L 1, 2, and 6, and spondylarthrosis of the section L 1-4 (Fig. 1). A follow-up examination performed six months after the operation showed the intra-abdominal position of the entire bladder (Fig. 2).

Fig. 1. Preoperative ascendent urethrogram: the caudal bladder position (bladder neck – red arrow).

Fig. 2. Postoperative ascendent urethrogram: the intra – abdominal bladder position (bladder neck – red arrow).
Discussion

Urinary incontinence is the phenomenon, which is characterised by an outflow of urine through the urethra while intracystic pressure is higher than intraurethral. It is not accompanied by the relaxation of the external urethral sphincter, so the whole process takes place without the animal’s awareness. In physiological conditions, while collecting the urine inside the bladder, its free outflow is blocked by the sphincter mechanism of the urethra. This multi-elemental system includes: the urethral muscles (smooth – internal sphincter, striated – external sphincter), and submucosal vascular plexuses, and is supported by the adequate elasticity, length, and diameter of the urethra.

An auxiliary function in urinary continence is fulfilled by intrapelvic muscles and ligaments, which suspend the bladder and urethra (3). So far several theories have arisen that try to explain the etiology of acquired urinary incontinence. The oldest, proposes that this disease is perceived in the development of adhesions between the uterine stump and the dorsal area of the bladder. Additionally, it was suspected that the uterine stump adhered to the bladder neck, hampering the function of the mechanism of the internal sphincter of the urethra. Subsequent researches did not confirm this theory, because urinary incontinence in female dogs after ovarioectomy happens with the same frequency as in case of animals subjected to ovariohysterectomy (1). In the event, the patient preoperative ultrasound examination, as well as an intraoperative inspection, did not confirm the presence of adhesions, which could be responsible for urinary incontinence. At present, there is a common conviction about a hormonal reason for this disease (3, 4). After spaying, lack of oestrogens reduces the number of α-adrenergic receptors in the bladder neck and in the urethra, it decreases blood flow in vascular plexuses in the wall of the urethra and increases the concentration of endogenic LH and FSH. Low concentration of both steroid hormones, in case of this patient, allowed the exclusion of the presence of functional ovary tissue and left ovary complex, as the reason for disturbances in micturition. At the same time, these indications suggested the necessity of substitute administration of oestradiol in order to prevent urinary incontinence. The period, in which castration is performed, has no substantial significance for the occurrence of acquired urinary incontinence. One can assume that this complication happens slightly more frequently in bitches spayed after first oestrus than in bitches spayed before reaching sexual maturity (4, 7).

Carrying out comprehensive investigation, aiming at determination of the period in which symptoms of urinary incontinence occurred, helps in making a diagnosis, because acquired urinary incontinence happens most often (depending on the cited source) in period of one to three years after castration (5, 11). In the presented case, the first symptoms of the disease also occurred one year after castration. Pharmacotherapy is “the golden standard” of acquired urinary incontinence treatment in female dogs. Most frequently phenylpropanolamine is administered orally in a dose of 0.001–0.0015/kg two-three times a day, which, owing to stimulation of α-adrenergic receptors, evokes an increase in the urethra’s tension. Apart from phenylpropanolamine, synthetic oestrogens are administered, which increase the number of α-adrenergic receptors in the urethra, increase blood flow in its vascular plexuses, and reduce endogenic LH and FSH concentrations. In some cases there is a possibility of combined administration of α-adrenergic drugs and oestrogens. Another group of given drugs are synthetic analogues of Gn-RH, which administration leads to the blockage of receptors of this hormone and consequently causes reduction of LH and FSH concentrations (1, 4).

The treatment of acquired urinary incontinence in bitches presents a serious therapeutic problem, as none of the methods of treatment so far applied guarantees 100% efficacy (especially in the long term perspective). Lack of the possibility of hygiene preservation by the affected animal is very often the reason for the increasing frustration of the owner, that makes him/her to take the decision about the animal’s euthanasia. Beneficial effects that are obtained thanks to administration of medicines, do not last too long. Surgical management also has limited effectiveness and is connected with a risk of the occurrence of serious complications. The combining of surgical treatment methods, in some cases supported by pharmacotherapy, gives hope for the sustained keeping of the disease under control. The most often performed surgical treatment is colposuspension (colpexio, colposuspensio). This intervention is aimed at changing the position of the bladder neck and rests on cranial translocation of part of the vagina and its fixation outside the pelvic cavity. The intra-abdominal position of the bladder neck facilitates urinary continence, owing to the uniform activity of intra-abdominal pressure on the bladder, its neck, and the proximal part of the urethra (6, 9). When the bladder neck is located outside the abdominal cavity, intra-abdominal pressure acting on the bladder wall (tending to its compression and expulsion of urine) is an additional element aggravating the sphincter mechanism of the urethra. After colposuspension, slight (approx. 3%) elongation of the urethra occurs (3), which can improve urinary continence, owing to an increase in mechanical resistances in the urethra. The most serious complication, concomitant with colposuspension, is urethral occlusion, which is caused by the squeeze of the urethra’s wall to the margin of pubic symphysis. In this respect, stitches fixing the vagina should be inserted in its edges, laterally from the urethra. After the correct putting in and fastening of the stitches, it should be possible to insert the ending of a needle holder between the urethra and the pubic symphysis (6). Early effectiveness of colposuspension is estimated for approx. 55% only and it considerably falls in the long term prognosis. In the Rawlings et al. (10) report, only 14% of operated-on bitches kept urination fully under control one year after the surgery. Bladder neck reconstruction is the next surgical method, which is applied in the case of urinary incontinence; however, it is usually reserved for congenital urethral hypoplasia cases. The reconstruction of the bladder neck can be...
performed on ureteral openings, because crossing its line results in the occurrence of iatrogenic ureteral ectopy. In the presented case, both the surgical methods were applied (colposuspension and bladder-neck reconstruction), supported by bladder suspension. The procedure of bladder suspension aimed at additional intensification of the effect induced by colposuspension.

The decision to use all available surgical treatment methods was caused by lack of positive results from pharmacological treatment and was connected with animal’s owner declaration about the necessity of euthanasia in the event of continuation of uncontrolled urination. Owing to limited effectiveness of colposuspension, application of this method only could not bring the expected results. An additional factor hampering the choice of the optimal treatment method is the fact that objective criteria of individual bitches’ qualification for definite methods of procedure have not been worked out so far (3, 10). Lack of postoperative complications and full continence that is still maintained (16 months after the operation) in the presented bitch, encourage the performing of the combined operation in other sick animals as well.

References