Clinical approach, diagnosis and therapeutic management in cystitis in dogs and cats

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Abstract
Cystitis as a primary suffering is found in an overwhelming percentage among females, as a consequence of favorable factors such as bladder topography and bladder size. This condition has a high degree of variability in terms of prognosis and therapeutic success. The purpose of this paper is to present the etiological and evolutionary features of cystitis and also the response to treatment at patients in different stages of cystitis. The studied cases were investigated in two private clinics in Bucharest according to the following protocol: anamnesis, clinical examination, urine examination (cytological, uroculture, summary and urinary sediment) and ultrasonographic examination. The paraclinical examinations included the biochemical analysis of the blood, the hemoleucogram (CBC) and the urine examinations in order to assess the specific parameters of the urinary tract disorders. Ultrasound was used, as a fast, non-invasive method by which it can be identified changes in bladder topography, bladder integrity, inflammation, accumulation of uroliths at different stages, as well as possible neoplastic formations. The established treatments aimed at calming the symptoms in order to prevent an irreversible decompensation of the general status of the patient, as well as healing and preventing any recurrences. In both species, there was a predominance of the prevalence of cystitis secondary to the processes of urinary lithiasis among males, as well as an increased predisposition of bacterial complications in the bladder among females. Among the methods used for examination, ultrasound proved to be indispensable for a correct diagnosis. In both species, it was observed that there is a direct correlation between the sex of the patient and the type of cystitis installed. There was no direct correlation between the patient's hormonal status and the risk coefficient for the development of urinary calculi and the appearance of cystitis. Therapeutic management of cystitis comprises a wide range of drugs that address both the etiology and symptomatology of cystitis, which is why treatments have most often led to the healing of patients even if sometimes there were relapses.

Keywords: cystitis, dog, cat, diagnosis, treatment

Introduction
Cystitis, defined as inflammation of the bladder, is a condition common to all mammal species. Invariably, cystitis as a primary disease represents a condition present in an overwhelming percentage among females, as a consequence of favorable factors such as the topography of the bladder and the dimensions of the urethra [3].

Due to the increased incidence of this disease among patients, the evolution, often insidious, which allows the inflammatory process to be chronicled thus prolonging the treatment period and also of the relapsing character, we aimed to emphasize the special importance of rapid detection and also the correct therapeutic management in relation to maintaining a satisfactory standard of quality of life among patients [1].

Within this paper will be presented the etiological, evolutionary features and also the response to treatment of patients in different stages of cystitis, acute or chronic, primary or secondary as a consequence of another pathological process.

Materials and methods
The cases studied were investigated in two private clinics in Bucharest according to the following protocol: anamnesis, clinical examination, biochemical examination, urine examination (cytological, uroculture, summary and urinary sediment) and ultrasonographic examination[2].
Anamnesis is the key to therapeutic success because extremely valuable information can be collected from the patient. In this respect, data should be obtained as objectively as possible related to the time of the appearance of the clinical signs, their intensity and frequency, possible causal or favorable factors, nutrition and other treatments in progress [4].

The complete blood count and the urine examinations are performed in order to assess the specific parameters of the urinary tract disorders. Further, any rigorous examination is always supplemented by various methods of imaging investigation and in the case of bladder pathologies, by far the easiest and most correct method is ultrasound. With this fast, non-invasive method, it can be appreciated in real time changes in the topography, the integrity of the bladder, inflammation, accumulation of uroliths at different stages, as well as the possible neoplastic formations [7].

The drugs used in cystitis therapy targeted curative treatment, symptomatic treatment to prevent irreversible decompensation of the patient's general status and also a prophylactic treatment to prevent any recurrence. Also, any therapeutic management of cystitis also includes the diet specific to each type of cystitis [5,6].

**Results and discussions**

The population studied was divided into two age categories, between 1-6 years, respectively 7-14 years. It was observed that in both cats and dogs, the prevalence was higher in the category 1-6 years: 4 of 7 cats and 3 of 4 dogs, as can be seen in figure 1.

![Fig. 1 Prevalence of cases according to age in dogs and cats](#)

In both species, there is a dominance in the prevalence of cystitis cases, secondary to the processes of urinary lithiasis among males, as well as an increased predisposition of bacterial complications in the bladder among females.
<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Species</th>
<th>Race</th>
<th>Sex</th>
<th>Age</th>
<th>Hormonal status</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tasha</td>
<td>Cat</td>
<td>Burmese</td>
<td>Female</td>
<td>12 years</td>
<td>Sterilized</td>
<td>Acute cystitis</td>
<td>- anti-hemorrhagic; - antispastic</td>
<td>Cured after 7 days</td>
</tr>
<tr>
<td>2</td>
<td>Mimi</td>
<td>Cat</td>
<td>Maine Coon</td>
<td>Female</td>
<td>6 years</td>
<td>Sterilized</td>
<td>Chronic cystitis</td>
<td>- anti-hemorrhagic; - antispastic; - anti-inflammatory; - antiseptics</td>
<td>Favorable evolution after 2 days, cured after 5 days</td>
</tr>
<tr>
<td>3</td>
<td>Calypso</td>
<td>Cat</td>
<td>European race</td>
<td>Female</td>
<td>1 year</td>
<td>Unsterilized</td>
<td>Chronic cystitis</td>
<td>- antispastic; protector of the bladder mucosa</td>
<td>Complete remission after 14 days</td>
</tr>
<tr>
<td>4</td>
<td>Felix</td>
<td>Cat</td>
<td>British Shorthair</td>
<td>Male</td>
<td>7 years</td>
<td>Sterilized</td>
<td>Urolithiasis Cystitis</td>
<td>- diet to dissolve the struvite; - urinary acidifier</td>
<td>Improvement over 2 weeks. After 30 days, struvite in small quantities.</td>
</tr>
<tr>
<td>5</td>
<td>Foiţă</td>
<td>Cat</td>
<td>European race</td>
<td>Male</td>
<td>2 years</td>
<td>Sterilized</td>
<td>Urethral blockage Cystitis</td>
<td>- applying a urethral catheter; - antibiotics; - anti-inflammatory; - urinary acidifier; - antiemetics</td>
<td>Favorable evolution from the first day. Monitoring for calcium oxalates.</td>
</tr>
<tr>
<td>6</td>
<td>Kasi</td>
<td>Cat</td>
<td>Persian</td>
<td>Female</td>
<td>9 years</td>
<td>Sterilized</td>
<td>Bacterial cystitis</td>
<td>- antibiotics; protector of the bladder mucosa – - antipyretics; - rehydration</td>
<td>Favorable evolution over 14 days</td>
</tr>
<tr>
<td>7</td>
<td>Ahile</td>
<td>Cat</td>
<td>British Shorthair</td>
<td>Male</td>
<td>4 years</td>
<td>Sterilized</td>
<td>Urolithiasis Cystitis</td>
<td>- applying a urethral catheter; - antibiotics; - anti-inflammatory; - urinary acidifier; - antiemetics</td>
<td>Favorable evolution over 14 days</td>
</tr>
<tr>
<td>8</td>
<td>Smochină</td>
<td>Dog</td>
<td>Labrador Retriever</td>
<td>Male</td>
<td>2 years</td>
<td>Unsterilized</td>
<td>Urolithiasis Cystitis</td>
<td>- anti-hemorrhagic; - urinary acidifier</td>
<td>Favorable evolution after 3 days. Cured after 30 days.</td>
</tr>
<tr>
<td>9</td>
<td>Maya</td>
<td>Dog</td>
<td>Half breed</td>
<td>Female</td>
<td>6 years</td>
<td>Sterilized</td>
<td>Post-OHT urinary incontinence</td>
<td>- therapeutic diagnosis with Propalin</td>
<td>Favorable evolution from the first day.</td>
</tr>
<tr>
<td>10</td>
<td>Rita</td>
<td>Dog</td>
<td>Half breed</td>
<td>Female</td>
<td>7 years</td>
<td>Sterilized</td>
<td>Bacterial cystitis</td>
<td>- anti-hemorrhagic; - antispastic; - antipyretics; - rehydration; - antibiotics</td>
<td>Favorable evolution, improvement after 14 days</td>
</tr>
<tr>
<td>11</td>
<td>Zen</td>
<td>Dog</td>
<td>Bull terrier</td>
<td>Male</td>
<td>2 years</td>
<td>Unsterilized</td>
<td>Urolithiasis Cystitis</td>
<td>- urinary acidifier; protector of the bladder mucosa</td>
<td>Favorable evolution over 30 days</td>
</tr>
</tbody>
</table>
Cystitis remedied with antibiotics

Cystitis remedied without antibiotics

57%
43%

The percentage of cases in which the use of antimicrobial substances was required in cats

Fig. 2 Prevalence of the origin of cystitis according to sex in dogs and cats

From the point of view of the use of antimicrobial substances in the therapeutic management, in cats the results obtained are shown in figure 3.

The number of cases in which the use of antimicrobial substances was required in cats

43%
57%

Cystitis remedied with antibiotics
Cystitis remedied without antibiotics

Fig. 3 The number of cases in which the use of antimicrobial substances was required in cats

In dogs, depending on the need to use antimicrobial substances, the results are shown in Figure 4.
Fig. 4 The number of cases in which the use of antimicrobial substances was required in dogs

In the following images we present some of the results obtained in the imaging investigations, uroculture and serum biochemistry (Figures 5, 6, 7, 8, 9 and Table 2).

Fig. 5 Ultrasound appearance of the bladder (original)
Fig. 6 Struvite crystals (original)

Fig. 7 Collected urine (original)

Fig. 8 Ultrasound appearance of the bladder (original)

Fig. 9 The result of uroculture (original)
Table 2 Recorded values in serum biochemistry

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLU</td>
<td>191 mg/dL</td>
<td>71 – 159</td>
</tr>
<tr>
<td>ALKP</td>
<td>78 U/I</td>
<td>14 – 111</td>
</tr>
<tr>
<td>CRE</td>
<td>5.2 mg/dL</td>
<td>0.8 – 2.4</td>
</tr>
<tr>
<td>BUN</td>
<td>86 mg/dL</td>
<td>16 – 36</td>
</tr>
<tr>
<td>TP</td>
<td>8.2 g/dL</td>
<td>5.7 – 8.9</td>
</tr>
<tr>
<td>GPT</td>
<td>105 U/I</td>
<td>12 – 130</td>
</tr>
</tbody>
</table>

Conclusions
1. The anamnesis and the rigorous consultation are absolutely necessary to establish a correct diagnosis, while the ultrasound is indispensable in diagnosing the pathologies of the bladder providing valuable data on the location of the diseases and their nature.
2. It was observed that there has been a higher prevalence of developing cystitis among patients aged 1-6 years.
3. In both species, a predisposition to these conditions was observed depending on the sex of the patient, so that the males of both species presented cystitis secondary to urinary lithiasic processes, while the females had bacterial cystitis or post ovariohysterectomy.
4. Males with urinary lithiasis were both sterilized and non-sterilized, indicating that there is no direct correlation between the patient's hormonal status and the risk coefficient for developing urinary calculi.
5. The use of antimicrobial medication is not required to ensure therapeutic success, it is used with caution and only when pathogenic species have been isolated by uroculture or when a bacterial complication is imminent.

Bibliography