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RETROSPECTIVE STUDY OF RENAL OCCURRENCES IN THE HOSPITAL UNOESTE VETERINARY BETWEEN 2018 AND 2019 - PRESIDENTE PRUDENTE/SP

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Abstract

With the increase in the life expectancy of domestic animals, some diseases have become common in the veterinary routine, with chronic kidney disease (CKD) being one of these frequent pathologies. Chronic kidney disease is characterized by irreversible structural damage, which progresses progressively to uremia and renal failure. To establish clinical manifestations, IRIS (International Renal Interest Society) developed a guide for classifying the disease into 4 stages based on serum creatinine levels, proteinuria, clinical manifestations of disease progression. The present study aimed to make a retrospective study of the occurrence of chronic renal failure in the veterinary hospital of the Universidade do Oeste Paulista, campus of Presidente Prudente SP. Thus, a survey was carried out of the general registration data of patients seen in the years 2018 and 2019. Information on age, gender, anamnesis, blood count, serum biochemical tests and ultrasound examinations were obtained from the medical records. The patients were classified according to the stage of the disease, of the 217 files analyzed, 85 were in stage I, 18 in stage II, 46 in stage III and 47 in stage IV, a higher prevalence of cases was observed in animals over 9 years old deity. In addition, it was possible, through the evaluation of the records, to verify the importance of implementing a care and follow-up form for patients with suspected/diagnosed chronic kidney disease and thus be able to qualitatively evaluate routine cases.

Key words: dogs; nephropathy; uremia; kidney disease.

ESTUDO RETROSPECTIVO DE OCORRÊNCIAS RENAIS NO HOSPITAL VETERINÁRIO UNOESTE ENTRE OS ANOS DE 2018 E 2019 - PRESIDENTE PRUDENTE/SP

Resumo

Com o aumento da expectativa de vida dos animais domésticos, algumas doenças tornaram - se comuns na rotina veterinária, sendo a doença renal crônica (DRC), uma destas patologias

frequentes. A doença renal crônica é caracterizada por lesões estruturais irreversíveis, que evoluem progressivamente para uremia e falência renal. Para estabelecer as manifestações clínicas a IRIS (International Renal Interest Society) desenvolveu um guia para classificação da doença em 4 estágios baseados em níveis séricos de creatinina, proteinúria, manifestações clínicas de progressão da doença. O presente estudo teve como objetivo fazer um estudo retrospectivo da ocorrência de insuficiência renal crônica no hospital veterinário da Universidade do Oeste Paulista campus de Presidente Prudente – SP. Assim, foi feito um levantamento dos dados de registro geral dos pacientes atendidos nos anos de 2018 e 2019. Dos prontuários foram obtidas informações sobre idade, sexo, anamnese, hemograma, exames bioquímicos séricos e exames de ultrassonografia. Os pacientes foram classificados de acordo com o estágio da doença sendo das 217 fichas analisadas, 85 estavam no estágio I, 18 no estágio II, 46 no estágio III e 47 no estágio IV, foi observado maior prevalência de casos em animais acima de 9 anos de idade. Além disso, foi possível por meio de avaliação dos registros verificar a importância da implantação de uma ficha de atendimento e acompanhamento para pacientes com suspeita/diagnóstico de doença renal crônica e assim ser possível avaliar de forma qualitativa os casos da rotina.

Palavras-chave: cães; nefropatia; uremia; doença renal.

1. Introdução

Chronic kidney disease (CKD) refers to the best-known form of kidney disease in small animals, considered a common cause of morbidity and mortality (Rossi *et al.*, 2022) It occurs due to a loss of nephrons, which hinders the performance of basic renal functions such as excretion, control, and synthesis (Sandoval, 2018). Chronic kidney disease (DRC) is identified by abnormalities of the rim structure or renal function, present for more than three months (Spigolon *et al.*, 2018). With the increasing attachment of pet owners to their animals and improvements in veterinary medicine processes, animals are enjoying longer lifespans. Consequently, there is a progressive rise in cases of chronic diseases, such as chronic kidney disease (CKD). Renal functions are essential for maintaining the body's homeostasis; the kidneys receive approximately 25% of cardiac output, making them crucial allies in the excretion of metabolic waste, blood filtration, and the production of important hormones for blood pressure regulation and erythrocyte production, such as renin and erythropoietin (Bragato, 2013).

All renal functions are performed by a variety of cell types, each capable of responding specifically to indirect and direct signals that come together in a particular way to form the functional unit of the kidney, the nephron (Verlander, 2021). Understanding the functions of the nephron is necessary to comprehend renal function (Dukes, 2017). Nephrons are responsible for

urine production, forming a twisted and continuous system within the kidney (Konig; Liebich, 2021). Nephrons consist of the glomerulus, Bowman's capsule, and renal tubules. As the glomerular filtrate passes through the tubular segments, it is gradually transformed until it becomes urine and is excreted (Jericó; Andrade Neto; Kogika, 2023).

Clinical signs and laboratory abnormalities can vary depending on the stage of the disease. The first sign is when a dog cannot concentrate urine, which occurs when the patient already has approximately 66% of the renal parenchyma affected (Kogika *et al.*, 2023; Santos, 2014; André *et al.*, 2010). Additionally Electrolyte and water excretion disorders include edema, hypertension, hyponatremia, hyperkalemia, metabolic acidosis and hyperphosphatemia (Rigon, 2018). Various laboratory tests and physical examinations are necessary to identify these disorders and monitor the intrinsic disturbances contributing to CKD progression (Rabelo *et al.*, 2022).

Treatment is tailored to the stage at which each patient falls, with the International Renal Interest Society (IRIS) standardizing staging to enable veterinarians to provide the correct treatment for each phase, totaling four stages (Sandoval, 2018). Therefore, the present study aims to survey cases of CKD treated at the veterinary hospital of the University of Western São Paulo (UNOESTE) in the years 2018 and 2019.

2. Materials And Methods

This study was conducted at the Veterinary Hospital of the University of Western São Paulo (UNOESTE). We conducted an analysis of the medical records of dogs treated in the small animal medical clinic department based on their general records (RG). Specifically, we analyzed the records of dogs treated between the years 2018 and 2019 with suspected CKD.

All acquired information was organized using spreadsheets in Microsoft Excel® 2016 and Microsoft Word® 2016. We reviewed the information contained in the patient records, results of additional diagnostic tests, and selected the most relevant data for this project.

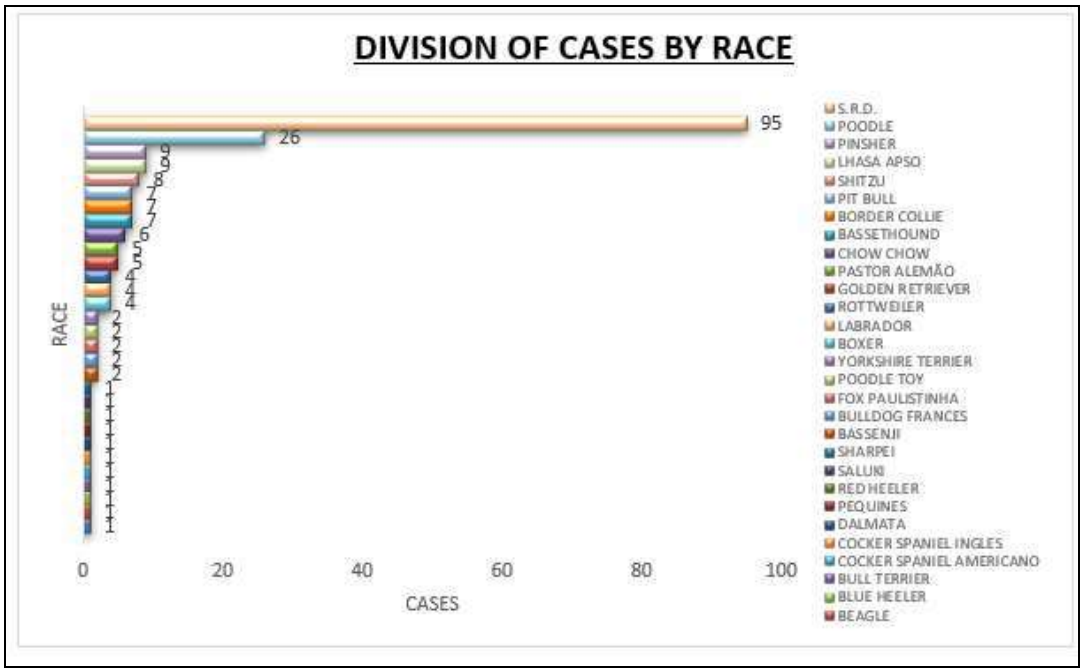
From the patient records, we collected information regarding species, breed, age, sex, weight, complete blood count (CBC), serum tests (urea and creatinine), and clinical signs. The CBC included measurements of red blood cells, hematocrit, white blood cells, hemoglobin, and platelets. In the biochemical tests, we evaluated urea, creatinine, and phosphorus levels.

The staging of the disease was determined according to the criteria established by the International Renal Interest Society (IRIS). Dogs were categorized based on the observed data, allowing us to assess the frequency of the disease in these animals.

3. Results And Discussion

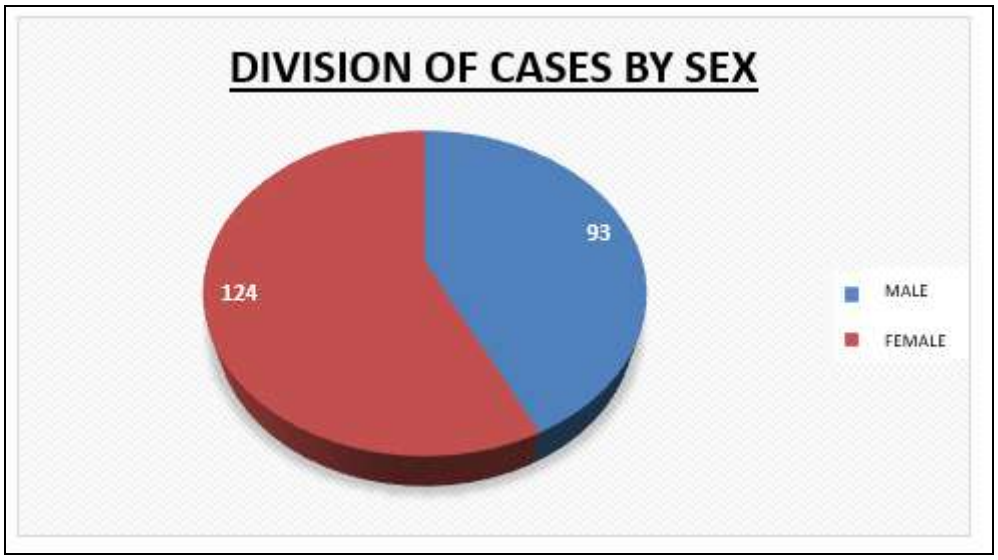
During the period from 2018 to 2019, a total of 247 animals with suspected CKD were seen in the small animal medical clinic department, comprising 217 dogs and 28 cats. The highest incidence of consultations for suspected CKD occurred in April of 2018 (Figure 1).

Figure 1. Survey of cases of renal failure - Division of cases by race. **Source**: Personal Archive, 2023.



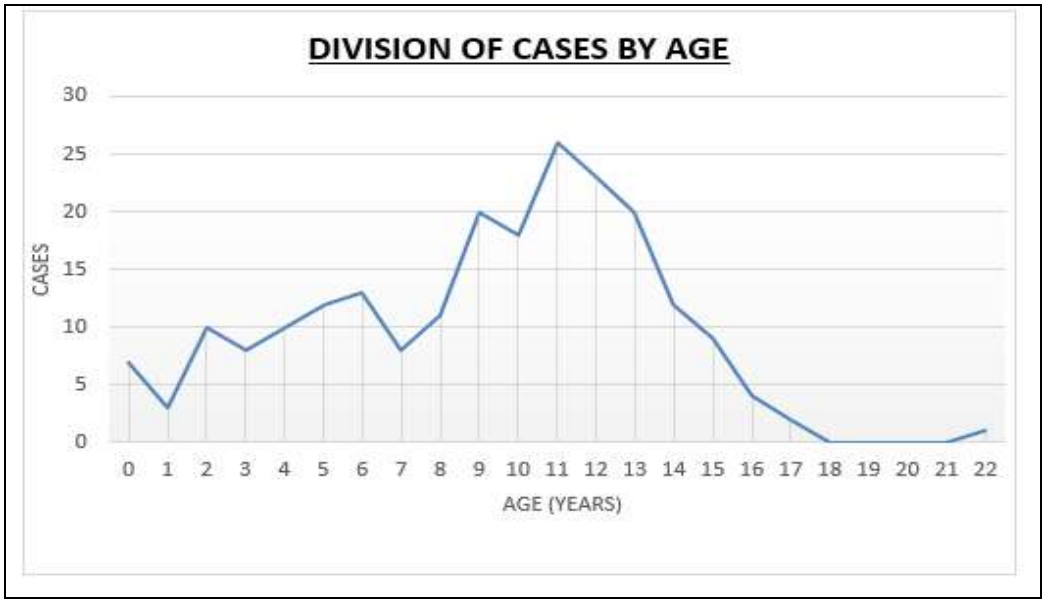
Through the database collected from 217 clinical cases, it is possible to highlight the higher incidence of renal failure cases in S.R.D. (95) dogs, followed by the POODLE breed (26). It is also noticeable that there is a higher incidence in dogs of the PINSCHER (9), LHASA APSO (9), and SHITZU (8) breeds. These findings align with the information cited by Notomi (2006), Hass (2008), and Sandoval (2018). It can be inferred that the higher incidence of cases in S.R.D. dogs coincides with the fact that they represent the most populous classification among adopted dogs.

Figure 2. Survey of cases of renal failure - Division of cases by sex. **Source**: Personal Archive, 2023.



Out of the 217 clinical cases of renal failure included in the survey, 57.14% (124 cases) were recorded in females, while 42.86% (93 cases) were in males. This demonstrates that the prevalence analysis of the disease is higher in females than in males, confirming the findings of (Kogika *et al.*, 2006) and (Scardoeli, 2017).

Figure 3. Survey of cases of renal failure - Division of cases by age. **Source**: Personal Archive, 2023.



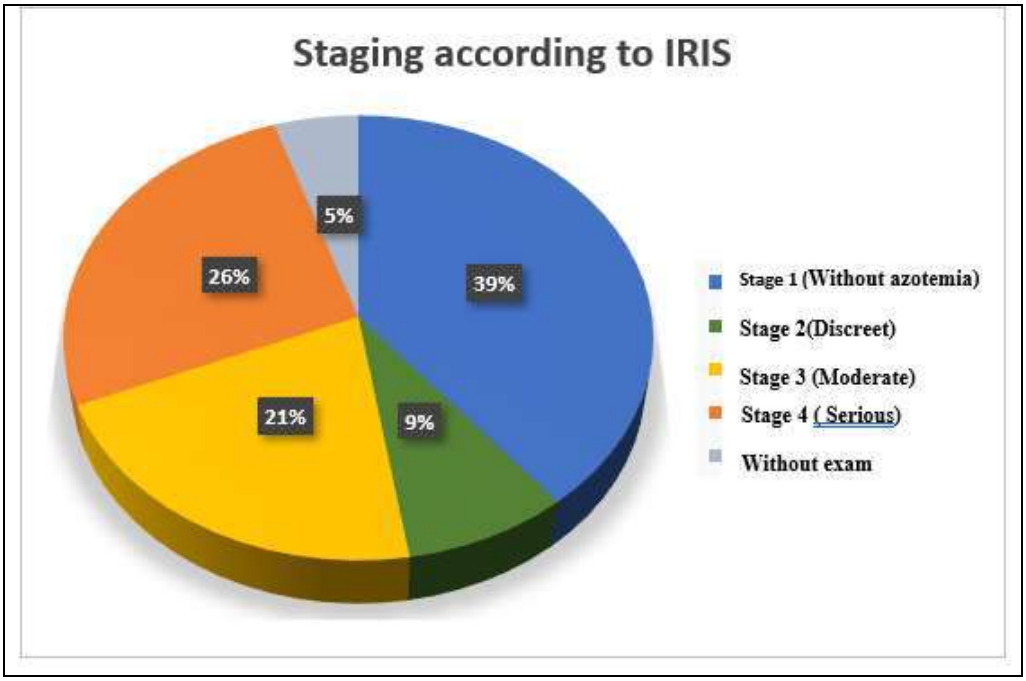
Considering the information gathered on cases by age, two regions can be identified where there is an increase in cases: The first one spans from 2 to 6 years, with a variation of 10 to 13 cases recorded. The second region shows a significant increase in the incidence of cases from 8 to 14 years, reaching a peak and inflection point at 11 years (26 cases).

It is important to highlight that the different breeds surveyed have different life expectancies associated with the size of the animal. This leads to the inference that the age range of 8 to 14 years represents an intersection between the old age of large breed dogs and the mature phase of small breed dogs, where renal diseases can manifest. This finding confirms the prevalence of cases in studies by Polzin (1992), Notomi (2006), Hass (2008), and Scardoeli (2017), and it also aligns with what Kogika *et al.* (2023) mentions, that cases are more common in animals over 10 years old.

The most frequent clinical alterations include vomiting in 70 patients, followed by weight loss and loss of appetite in 90 patients, and less frequently, dehydration and polyuria/polydipsia. This confirms what Krawiec (1996) and Dantas and Kommers (1997) mention regarding the clinical signs of Chronic Renal Disease (CRD), with vomiting, weight loss, and loss of appetite being the most common.

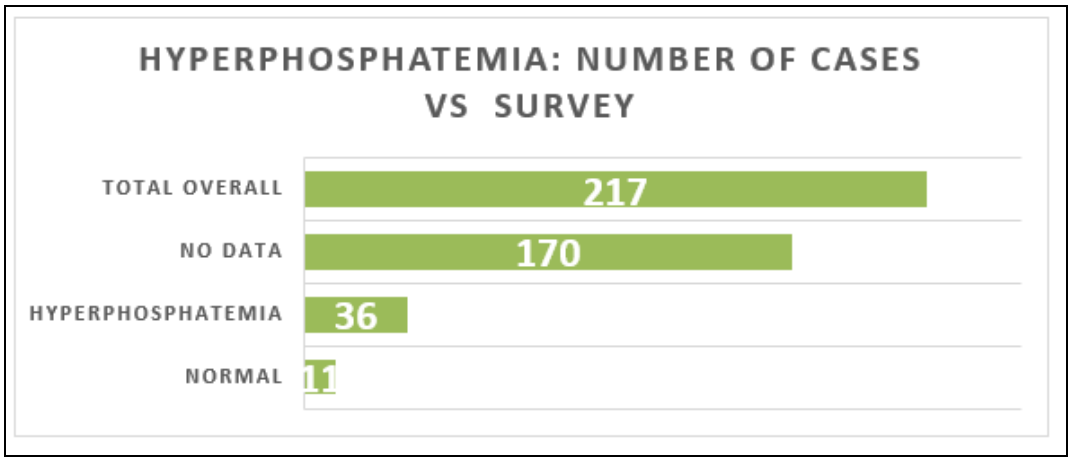
Based on the cases evaluated during the study period, 217 records included serum creatinine measurements, allowing us to assess the azotemia in patients. Azotemia is the increase in nitrogen compounds, such as urea and creatinine, in the blood compared to reference values (Ettinger, 2004). With this data, we can stage the animals according to the IRIS criteria, with <1.4 mg/dl considered stage 1 without azotemia, 1.4 - 2.0 mg/dl moderate with mild azotemia, 2.1 - 5.0 mg/dl stage 3 with moderate azotemia, and above 5.0 stage 4 with severe azotemia (IRIS, 2023). In this study, out of the total 217 patients, only 11 did not undergo this examination (5%). The rest were classified as 85 patients in stage 1 (39%), 18 patients in stage 2 (9%), 46 patients in stage 3 (21%), and 47 patients in stage 4 (26%). Thus, we can observe that during the study period, the hospital received 47% of CRD cases in stage 3 and 4. These results were similar to those of Poppl *et al.* (2004), who found that renal disorders had urea and creatinine levels above reference values. It is worth mentioning that urea, in the case of mammals, is the end product of protein metabolism, and elevated creatinine levels indicate decreased glomerular filtration, leading to urea retention and an increase in blood concentration, demonstrating renal nephrons becoming nonfunctional (Figure 4).

Figure 4. Staging according to IRIS. **Source**: Personal Archive, 2023.



Continuing with the evaluation of the animals, phosphorus, which is closely linked to calcium metabolism, with the kidneys participating in excretion (Rubin, 1997), only 48 out of the 2016 animals underwent testing to assess phosphorus levels (Figure 5). Among these, 37 animals exhibited hyperphosphatemia, while 11 had normal results. This finding aligns with what Polzin *et al.* (2005) and Mcgrotty (2008) emphasize regarding the laboratory abnormalities commonly found in renal patients, which include hyperphosphatemia and hemolytic changes. The results in this study were similar to those reported by Kojika *et al.* (2006), who found that hyperphosphatemia was present in approximately 92% of cases of CRD in dogs.

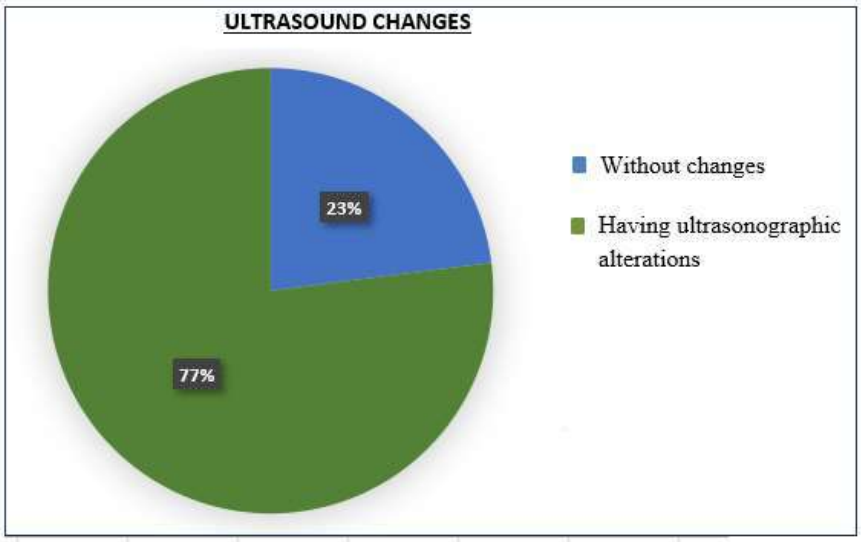
Figure 5. Hyperphosphatemia: Number of cases VS Survey. **Source**: Personal Archive, 2023.



Regarding the ultrasonographic evaluations (Figure 6), out of the 217 records evaluated, only 87 patients underwent the examination. These patients' reports were analyzed, and they were divided into two groups: those with no significant changes in kidney dimensions and those with alterations suggestive of nephropathy.

In the first assessment, there were 20 patients with no significantly altered dimensions, presented graphically as the group without changes (23%). In the second group, which was evaluated for alterations suggestive of nephropathy, 67 patients exhibited reduced or preserved dimensions, thickened cortex, increased echogenicity, decreased architecture, and corticomedullary boundary, and this group was defined graphically as having ultrasonographic alterations (77%). These findings are consistent with those reported by Carvalho *et al.* (2010), Scardoeli (2017), and Gonçalves *et al.* (2020).

Figure 6. Ultrasound changes. **Source**: Personal Archive, 2023.



Thus, a patient record form was designed for the care and monitoring of nephropathic patients at the university veterinary hospital. The idea is to include relevant information in the form, such as specific clinical signs, previous diseases, medical history, test results, and staging according to the IRIS criteria, to facilitate the quantification of the total cases. It was also recognized as crucial to create a form for fluid therapy and monitoring of nephropathic patients, as based on the research conducted, it was not possible to track the clinical progression of most patients.

4. Conclusion

In summary, this retrospective study highlights that chronic renal disease has a higher prevalence in animals considered seniors (above 8 years old), underscoring the importance of regular check-ups for elderly animals to enable early diagnosis, thus improving their life expectancy and quality of life.

Through the evaluation of patient records, it became possible to determine the staging and prevention of disease progression. The individual patient record form for suspected renal disease has proven instrumental in enhancing record-keeping and information management, thereby aiding in the appropriate therapeutic process.

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