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Clinical diagnosis of chronic kidney disease in canines: retrospective study

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Abstract
Chronic kidney disease (CKD) is an irreversible and progressive deterioration of renal function, resulting from a decreased number of functional nephrons. The study aimed to identify the significant differences in haematological and biochemical parameters between the breeds. The present study was conducted on 24 clinical cases of chronic renal failure were screened in Diagnostic Laboratory, Veterinary college hospital, Hassan during the month of March 2019 to July 2019 with the history of Anorexia, Halitosis, vomition. Major alteration in hematological profile were overall lower levels of hemoglobin (4.5 ± 1.1 g/dl), TEC (4.2 ± 0.40 x 106 /mm3), PCV ($26.8 \pm 5.3\%$) values and platelet count (196.23 ± 18.31x 103 /μL) in German shepherd dog. Serum analysis revealed elevated serum creatinine levels above 1.5 mg/dl is an indicative of Chronic Renal failure. Complete blood count and serum characteristics in CKD concludes useful information that there is significant difference among the parameters between the breeds.

Keywords: Chronic kidney disease, variation, breed

Introduction
Chronic kidney diseases(CKD) is a common in dogs and cats and can occur at any age but especially in geriatric patients [5]. Congenital renal diseases, including dysplasia and various glomerulopathies, may produce CKD at very early ages. Once diagnosed, CKD typically remains a life-long condition [3]. CKD is the third most common cause of death in dogs [1]. Kidney maintains normal concentrations of salt and water in the body, also help control blood pressure, aid in calcium metabolism and sustain phosphorous levels. Additionally, they manufacture a EPO hormone that encourages red-blood cell production. Renal failure is a urinary problem characterized by polyuria, polydipsia, gastrointestinal complications like anorexia vomiting, diarrhea, oral ulcers, halitosis, pale mucous membrane, neurological complications such as seizures, azotemia. Impairments in the above vital organs will lead to clinical and medical interventions at the early possible. Considering the clinical importance, the present study has been conducted at TVCC veterinary college, Hassan in order to assess the importance of serum hematology, creatinine and SGPT in renal and hepatic malfunctions and also to establish the basal values of these parameters in the dogs.

Materials and methods
Collection of Blood Samples
Blood samples, each of 5-10 ml, were withdrawn from cephalic vein from each animal into sterile vaccutainer containing anticoagulant and with no anticoagulant, immediately brought to laboratory. Vaccutainer with anticoagulant were immediately mixed properly and subjected for hematology analysis. Vaccutainer tubes without anticoagulant were centrifuged at 5,000 rpm for 10-15 min and the separated serum samples were collected into separate sterile Eppendorf vials, stored until analyzed. Hemoglobin, PCV, RBCs, and WBCs, were analyzed as per the manufacturer's instructions using Automated hematology analyser, ERMA Inc,.Pvt. Ltd.

Analysis of Serum Samples
All the serum samples were analyzed using automated serum analyzer from SWEMED India Pvt. Ltd available at TVCC department in the college; also the reagents and kits for analysis were procured from SWEMED India Pvt. Ltd. On the same day of blood collection, parameters like serum creatinine and SGPT were analyzed as per the manufacturer's instruction.

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Statistical Analysis of Data

The data obtained in the present study were subjected to statistical analysis by using the GraphPad Prism version 5.01 (2007), Anderson darling test and D Agostino and pearson test established the normality or log normality distribution of data. The Anderson darling test was used to evaluate differences between the times; $p < 0.05$ was chosen as the significance level.

Results and Discussion

The normal QQ plot of serum creatinine (CRT) revealed that values of GSD, POM and ND shows that are normally distributed with certain variation which could be attributed to the significant difference in the values among the breeds (Table 1). Increased creatinine level in renal failure might be due to marked reduction in glomerular filtration rate (GFR), diminished renal excretion, enhanced tubular absorption of urea and impaired ability of kidneys to excrete proteinaceous catabolites [5]. However the values of ND CRT shows no significant difference among the breeds attributing the genetic variation.
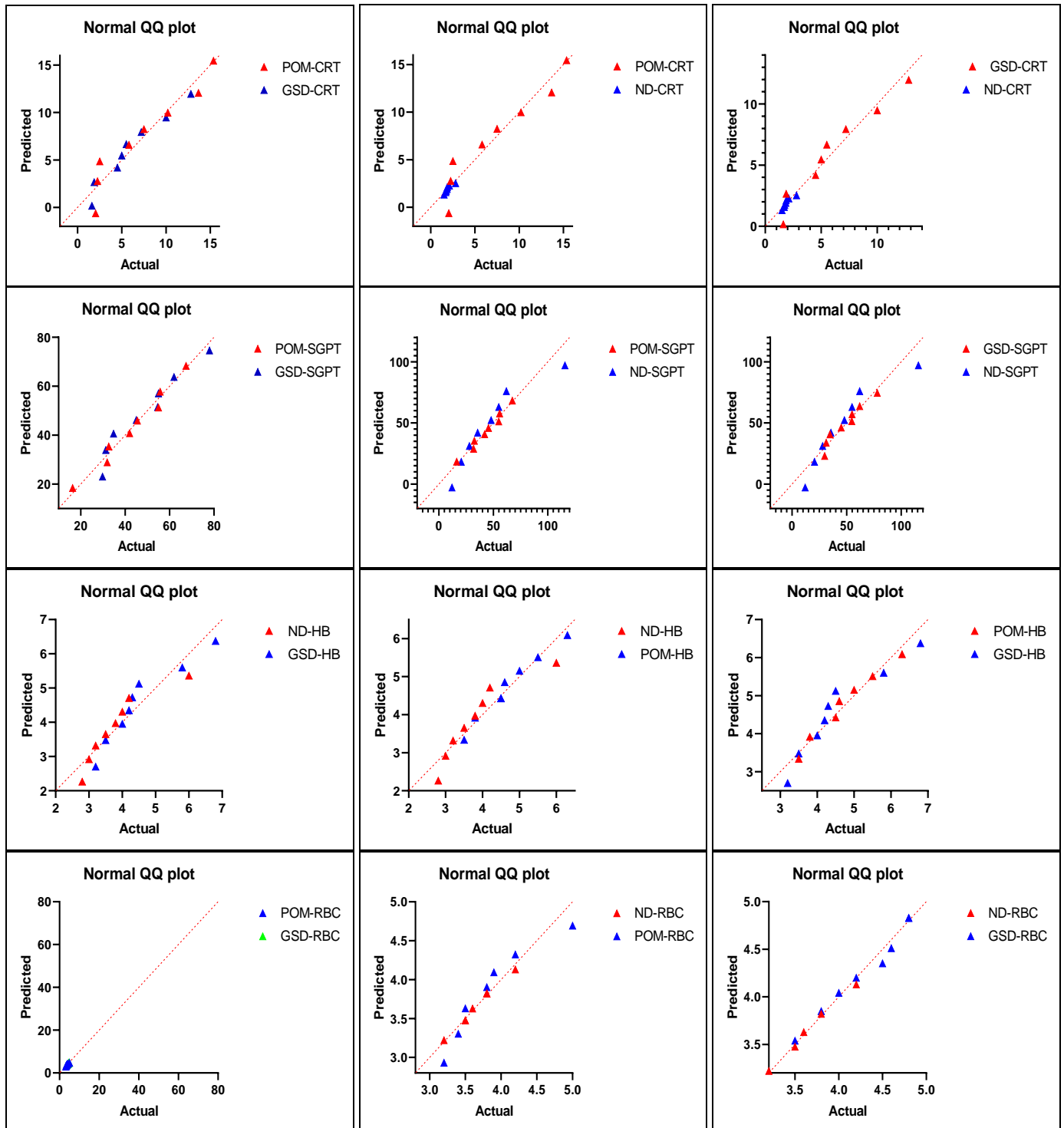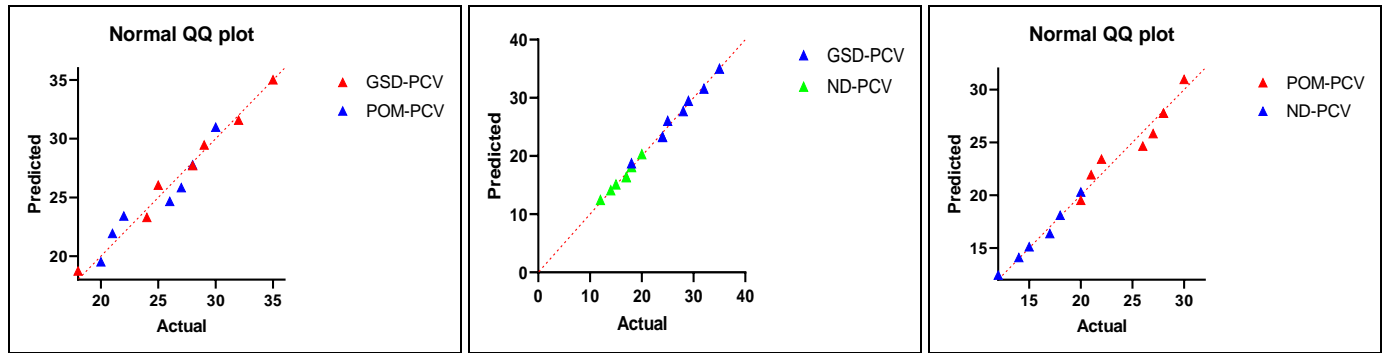
Fig 1: Depicting the Normal quantile–quantile graph (QQ Plot) -outcome of test (Anderson darling test and D Agostino and pearson) for Normal Distribution of SGPT – between Pom, GSD and ND.

The normal QQ plot of SGPT revealed that values of GSD, POM and ND shows that are normally distributed with certain variation which could be attributed to the significant difference in the values among the breeds (Table 1). Loss of the skeletal muscle mass during the CKD might be the reason of increased values of SGPT observed in the CKD patients [4].

Table 1: P values of deferent parameters for significance difference. The values of ND CRT shows non significant rest of the values shows significant difference among the breeds.

Sl. No.	Parameters	Level of significance (P-value)	Pom	GSD	ND
1	CRT	0.005	0.3857	0.58	0.03*
2	SGPT	0.005	0.8959	0.57	0.27
3	Hb	0.005	0.71	0.21	0.15
4	RBC	0.005	0.216	0.57	0.45
5	PCV	0.005	0.25	0.84	0.61

* The values superscripted are non-significant

The normal QQ plot of Hemoglobin (Hb) and PCV, RBC revealed that values of GSD, POM and ND shows that are normally distributed with certain variation which could be attributed to the significant difference in the values among the breeds. These observations were in accordance with Chibber [2]. Possible cause for this might be depressed production of renal erythropoietin factor from impaired kidney and blood loss in the form of hematemesis or melena.

Table 2: values of different blood parameters with Mean±SD in Chronic renal failure

Sl. No.	Parameters	Pom	GSD	ND
1	CRT (Mean ±SD)	7.4 ± 5.2	6.0 ± 3.8	1.9 ± 0.3
2	SGPT(Mean ±SD)	43.3 ± 16.2	48.8 ± 16.8	47.2 ± 32.5
3	Hb(Mean ±SD)	4.7 ± 0.8	4.5 ± 1.1	3.8 ± 1.0
4	RBC(Mean ±SD)	3.8 ± 0.5	4.2 ± 0.4	3.6 ± 0.2
5	PCV(Mean ±SD)	25.2 ± 3.7	26.8 ± 5.3	16.3 ± 2.5

Conclusion
From the present study, it can be concluded that there is significant difference among the parameters between the breeds. But there is no significant of creatinine among the ND breeds which could be attributed to the breed variation among the dogs (Table 1). However, there is significantly variation among the blood parameters like CRT, SGPT, Hb, RBC, PCV is mainly attributed to the physiological variation and genetic variation. However, the current study reveals that there is variation in the hematology and biochemical parameters during chronic kidney disorder.

Ethical Matters
In the present study, the data were analyzed from the Cases were presented to Veterinary Hospital, Hassan indicating no ethical issue related in this study.

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Conflict of interest
All the authors declares that they have no conflict of interest.

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