

Effect of age and sex on the serum biochemical profile of Local dogs

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Abstract

Biochemical values of sixty clinically healthy dogs of different ages and both sexes were determined for the normal activities of serum aspartate amino transferase (AST), Alanine amino transferase (ALT), alkaline phosphatase (ALP), Urea, Creatinine, sodium, potassium, chloride, calcium, phosphorus and glucose. Comparison of above values between males and females revealed that, there was no statistical difference between both sex in all biochemical parameters. The young dogs had higher concentrations of Creatinine, ALP and ALT while the adult dogs had higher concentrations of calcium, phosphorus and chloride. Differences in the mean value of the remaining values among young and adults were not statistically significant.

Introduction

The blood is an important medium in assessing the health status of animals. Both the physiological and pathological condition of animals can be assessed by the evaluation of haematological and biochemical parameters of the blood (Coles, 1986; Bush, 1991). Factors such as nutrition, age, sex, breed and climate were known to affect biochemical and haematological parameters of clinically healthy dogs (Awah and Nottidge, 1998, Ariyibi *et al*, 2002). Variations have been observed in these indices between temperate and tropical animals (Awah and Nottidge, 1998). These variations had been thought to be due to the effect of nutrition, climate and sub clinical disease (Ogunsanmi *et al*, 1999, Ariyibi *et al*.,

2002). The influence of age on blood parameters of animals have been determined in several species of mammals for example in white Fulani cattle (Oduye and Okunaiya, 1971); Nigerian goats and sheep (Oduye, 1976), Nigerian local dogs (Awah and Nottidge, 1998), and African giant rats (Nssien *et al*; 2002), and Newzeand rabbit (Olayemi and Nottidge, 2007). The influence of sex on blood parameters of animals have been determined in camel (Al. Delaimi *et al*, 1990) and Doberman dogs (Antonio *et al*, 2007). Therefore this study was done to evaluate the influence of age and sex on the serum biochemical profile of Iraqi dogs in different sexes and ages.

Material and Methods

This study was performed on 60 clinically normal dogs aged between two months to two years. These dogs were divided into two groups of 30 animals each as follow.

- ☒ Group 1: less than 6 months old
- ☒ Group 2: 6 months to two years old.

Blood samples were collected from the jugular vein in clean evacuated tubes. Serum was separated by centrifugation (1000 r.p.m) and stored at $-20^{\circ}C$ until

examination. Aspartate aminotransferase (AST). Alanin aminotransferase (ALT), Alkaline phosphates (ALP), Urea, Creatinin were estimated using kits from Randox company. Sodium, potassium, chloride, calcium, phosphorus and glucose were estimated using atomic absorption and kits from Randox Company. The traditional values were converted to SI values according to Lumsden, 1983.

Results

Table 1 shows the serum biochemical values in the young and adults Iraqi dogs. Sodium, Potassium, Chloride, Urea, AST were similar in both groups. The young

dogs (less than 6 months old) however had higher concentrations of Creatinin ($P < 0.01$) ALP ($P < 0.01$), ALT ($P < 0.01$), while the adult dogs had higher concentrations of

Calcium, Phosphorus and Glucose ($P < 0.05$). Table 2 shows the effect of sex on biochemical values of dogs. There were no

statistical difference in all parameters between males and females ($P < 0.05$).

Discussion

The serum biochemistry values reported in this study were lower than those reported in temperate dogs (Kelly *et al*, 1982). The young dogs had higher concentration of Creatinin, ALP and AST, there was no previous study in dogs for comparison but these results were similar to those reported by Olayemi and Nottidge (2007) in rabbit. Nottidge *et al*, (1999) reported that serum levels of total protein, albumin, globulin, ALP, AST, ALT, Urea, albumin / globulin ratio and creatinin were similar in young and adult Nigerian cats. There was no age difference

in the main of sodium, calcium, chloride, urea, and AST. There was no previous study in dogs but similar results were reported in rabbit (Nottidge *et al*, 1999) and giant rats; (Nssien *et al*, 2002). Adult dogs had higher concentration of calcium, phosphorus and glucose this result could be due to the increase in metabolic activity of animals in advancing age and there was no previous study for comparison. The means of the biochemical values reported in present study could serve as reference values for adult and young dogs.

Table 1: Serum biochemical values in local dogs according to age

| Parameters | Group 1 | Group 2 | P value |
|-------------------------------------|--------------|---------------|------------|
| AST lu/L | 17.2 ± 2.3 | 17.4 ± 3.1 | $P > 0.05$ |
| ALT lu/L | 18.3 ± 1.9 | 10.3 ± 2.1 | $P < 0.01$ |
| ALP lu/L | 24.8 ± 2.5 | 17.5 ± 2.1 | $P < 0.01$ |
| Urea mmol/L | 7.8 ± 0.62 | 8.2 ± 0.68 | $P > 0.05$ |
| Creatinin × 10 ⁻² mmol/L | 1.28 ± 0.23 | 0.82 ± 0.13 | $P < 0.05$ |
| Sodium mmol/L | 150.62 ± 3.6 | 150.23 ± 0.52 | $P > 0.05$ |
| Potassium mmol/L | 4.62 ± 0.63 | 4.53 ± 0.52 | $P > 0.05$ |
| Chloride mmol/L | 112.3 ± 6.5 | 113.1 ± 7.2 | $P > 0.05$ |
| Calcium mmol/L | 2.56 ± 0.21 | 4.2 ± 0.23 | $P < 0.05$ |
| Phosphorus mmol/L | 10.06 ± 0.07 | 2.52 ± 0.06 | $P < 0.05$ |
| glucose mmol/L | 5.12 ± 0.18 | 6.22 ± 0.03 | $P < 0.05$ |

Table 2: Serum biochemical values in local dogs according to sex

| Parameters | Male | Female | P value |
|-------------------------------------|--------------|--------------|---------|
| AST lu/L | 17.2 ± 2.6 | 17.5 ± 3.2 | N.S |
| ALT lu/L | 14.2 ± 2.3 | 14.3 ± 3.1 | N.S |
| ALP lu/L | 21.25 ± 1.2 | 20.8 ± 1.7 | N.S |
| Urea mmol/L | 8.62 ± 0.61 | 8.52 ± 0.71 | N.S |
| Creatinin × 10 ⁻² mmol/L | 1.2 ± 0.12 | 1.26 ± 0.26 | N.S |
| Sodium mmol/L | 150.25 ± 3.2 | 150.34 ± 4.6 | N.S |
| Potassium mmol/L | 4.65 ± 0.65 | 4.52 ± 0.73 | N.S |
| Chloride mmol/L | 112.63 ± 6.1 | 113.5 ± 7.15 | N.S |
| Calcium mmol/L | 3.52 ± 0.72 | 3.42 ± 0.523 | N.S |
| Phosphorus mmol/L | 2.126 ± 0.52 | 2.163 ± 0.42 | N.S |

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تأثير العمر والجنس على القيم الكيموحيوية في الكلاب المحلية

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لقد تم قياس القيم الكيموحيوية لستين من الكلاب العراقية بأعمار مختلفة ومن كلا الجنسين وشملت إنزيم اسبارتيت لمينو ترانسفيريز (AST) ، الالنين امينو ترانسفيريز (ALT) ، إنزيم الفوسفاتيز القاعدي (ALP) ، يوريا الدم ، الكرياتينين ، الصوديوم ، البوتاسيوم ، الكلورايد ، الكالسيوم ، الفسفور والكلوكوز وأوضحت المقارنة بين المجاميع المختلفة بعدم وجود فروق معنوية بين الذكور والإناث في جميع القيم المذكورة أعلاه. أظهرت النتائج أيضاً ان الكلاب الصغيرة العمر تمتلك مستويات أعلى من الكرياتينين وإنزيم الالنين امينو ترانسفيريز والفوسفاتيز القاعدي بينما تمتلك الكلاب الكبيرة العمر مستويات اعلى من الكالسيوم والفسفور والكلورايد. ولم تسجل فروقات معنوية في باقي المعايير بين الكلاب الصغيرة العمر والكبيرة العمر.