RESULTS

The work on “Studies on renal failure and its management in dogs” was carried out in the Department of Veterinary Medicine, R.V.C., Kanke, Ranchi. The results obtained in the present study were being described here under different headings:

Screening of Clinical Cases

A total of 150 general clinical cases of dogs were screened for renal failure. Out of which 25 cases were diagnosed as acute renal failure (ARF) and were selected for the present study.

25 clinical cases of ARF were divided into two parts i.e. conservative and dialytic treatment groups on the basis of Blood Urea Nitrogen (BUN) and serum creatinine (S.C.) levels. The conservative treatment group (BUN < 100 mg/dl and S.C. < 6 mg/dl) was further sub-grouped as T1, T2 and T3 groups on the basis of therapeutic regimens. The dialytic treatment group (BUN > 100 mg/dl and S.C. > 6 mg/dl) was also sub-grouped as T4 and T5 on the basis of dialysis frequency. Four clinical cases one each from conservative treatment group (T1, T2 & T3) and one from dialytic treatment group (T4) died within 4 days. One animal each from T1 and T4 group died on day 2 and one animal each from T2 and T3 group died on day 4 of post treatment. On 3rd day, BUN and serum creatinine level in T2 and T3 group were extremely high which directly affected the mean value of their corresponding groups, thus the data of all the 4 animals which died were eliminated from the experimental study.

Experimental group
Diagnosis of renal failure
The renal failure cases were diagnosed on the basis of estimation of BUN and serum creatinine having level more than 30mg/dl and 2mg/dl, respectively.

The BUN and serum creatinine levels in the present study ranged between 59.97 to 177.05mg/dl and 3.52to 9.52 mg/dl with a mean of 103.65±8.5 and 5.48±0.38mg/dl, respectively.

Clinical cases

Clinico-haematobiochemical observations and urine analysis of 21 cases of acute renal failure in dogs under both conservative (T1, T2 and T3) as well as dialytic treatment groups (T4 and T5) were done and the following results were observed.

Clinical observations

The clinical signs observed in dogs suffering from acute renal failure were anorexia, weakness, vomition, diarrhoea, dehydration, uremic breath, subnormal temperature, elevated respiratory and pulse rate.

Temperature (°F):

The changes in mean values of temperature in T1, T2 and T3 groups have been depicted in table–1.

The mean values of temperature before and after treatment were recorded as 99.65±0.38 and 101.05±0.15°F in T1 group; 99.50±0.34 and 101.2±0.29°F in T2 group and 99.60±0.42 and 101.3±0.17°F in T3 group, respectively.

The variation in mean values of temperature before and after treatment were highly significant (P<0.01) in all the three treated groups. Before treatment the mean values of temperature of dogs in T1, T2 and T3 groups were significantly lower than the values recorded after treatment of the same groups T1, T2 and T3 (Table-1).
Analysis of variance (Table-2) revealed non-significant effect of groups on mean values of temperature before and after treatment.

The changes in mean values of temperature in T4 and T5 groups have been depicted in table-3.

The mean values of temperature before and after treatment were recorded as 99.8±0.29 and 101.3±0.20 °F in T4 group and 99.64±0.38 and 101.4±0.26°F in T5 group, respectively.

The variations in mean values of temperature before and after treatment were highly significant (P<0.01) for both the groups (T4 and T5) of treatment. Before treatment the mean values of temperature of dogs in T4 and T5 groups were significantly lower than the values recorded after treatment of the same groups T4 and T5 (Table-3).

The table-3 revealed non-significant effect of groups on mean values of temperature before and after treatment.

Respiratory rate (per minute)

The changes in mean values of respiratory rate in T1, T2 and T3 groups have been presented in table-4.

The mean values of respiratory rate (per minute) before and after treatment were recorded as 27.5±0.95 and 22.5±0.95 in T1 group; 28±1.08 and 21.25±1.10 in T2 group and 27.25±1.25 and 22.25±1.03 in T3 group, respectively.

The variations in mean values of respiratory rate before and after treatment were highly significant (P<0.01) for all the three treated groups. Before treatment the mean values of respiratory rate of dogs in T1, T2 and T3 groups were significantly higher than the values recorded after treatment of the same groups T1, T2 and T3 (Table-4).

Analysis of variance (Table-5) revealed non-significant effect of groups on mean values of respiratory rate before and after treatment.
The changes in mean values of respiratory rate in T4 and T5 groups have been depicted in table-6.

The mean values of respiratory rate (per minute) before and after treatment were recorded as 28.25±0.62 and 22±1.08 in T4 group and 27.8±0.66 and 21.4±0.75 in T5 group, respectively.

The variations in mean values of respiratory rate before and after treatment were highly significant (P<0.01) for both the groups (T4 & T5) of treatment. Before treatment the mean values of respiratory rate of dogs in T4 and T5 groups were significantly higher than the values recorded after treatment of the same groups T4 and T5 (Table-6).

The table-6 revealed non-significant effect of groups on mean values of respiratory rate before and after treatment.

Pulse rate (per minute)

The changes in mean values of pulse rate in T1, T2 and T3 groups have been depicted in table-7.

The mean values of pulse rate (per minute) before and after treatment were recorded as 103.5±0.22 and 90.5±0.95 in T1 group; 104.25±1.6 and 91.75±0.85 in T2 group and 103±2.38 and 91±1.08 in T3 group, respectively.

The variations in mean values of pulse rate before and after treatment were highly significant (P<0.01) for all the three treated group. Before treatment the mean values of pulse rate of dogs in T1, T2 and T3 groups were significantly higher than the values recorded after treatment of the same groups T1, T2 and T3 (Table-7).

Analysis of variance (Table-8) revealed non-significant effect of groups on mean values of pulse rate before and after treatment.

The changes in mean values of pulse rate in T4 and T5 groups have been depicted in table-9.
The mean values of pulse rate (per minute) before and after treatment were recorded as 106±1.82 and 92.75±0.47 in T4 group and 107.25±1.5 and 91.40±0.67 in T5 group, respectively.

The variations in mean values of pulse rate before and after treatment were highly significant (P<0.01) for both the groups (T4 and T5) of treatment. Before treatment the mean values of pulse rate of dogs in T4 and T5 groups were significantly higher than the values recorded after treatment of the same groups T4 and T5 (Table-9).

The table-9 revealed non-significant effect of groups on mean values of pulse rate before and after treatment.

Haematological observations

Haematological parameters viz, haemoglobin estimation, packed cell volume estimation, total erythrocyte count, total leucocyte count and differential leucocyte count were done on “0”, 3rd, 6th and 9th day.

Haemoglobin (gm/dl)

The changes in mean haemoglobin levels in T1, T2 and T3 groups have ben presented in table-10.

The mean haemoglobin levels on “0”, 3rd, 6th and 9th day were estimated as 11.95±0.75, 11.40±0.34, 11.75±0.19 and 11.90±0.19 gm/dl in T1 group; 12.15±0.82, 11.60±0.45, 12±0.22 and 12.35±0.19 gm/dl in T2 group and 12±0.63, 11.30±0.42, 11.60±0.36 and 12.2±0.2 gm/dl in T3 group, respectively.

Analysis of variance (Table-11) revealed non-significant effect of groups on haemoglobin levels on all the periods under study. Similarly, non-significant influence of periods on haemoglobin levels was also recorded in each group (Table-12).

The changes in mean haemoglobin levels in T4 and T5 groups have been depicted in table-13.
The mean haemoglobin levels on “0”, 3rd, 6th and 9th day were estimated as 11.35±0.69, 10.75±0.22, 11.45±0.35 and 11.8±0.36 gm/dl in T4 group and 11.24±0.29, 10.92±0.28, 11.52±0.22 and 11.92±0.19 gm/dl in T5 group, respectively.

The table-13 revealed non-significant effect of groups on haemoglobin levels on all the periods under study. Similarly, non-significant influence of periods on haemoglobin levels was also recorded in each group (Table-14).

Packed cell volume (%): The changes in mean PCV levels in T1, T2 and T3 groups have been presented in table-15.

The mean PCV levels on “0”, 3rd, 6th and 9th day were estimated as 35.69±1.75, 34.39±0.78, 35.15±0.37 and 35.8±0.44% in T1 group; 36.02±25.15, 35.12±1.29 36.07±0.58 and 36.75±0.66% in T2 group and 35.72±1.58, 33.95±1.04, 34.55±1 and 36.42±0.74% in T3 group, respectively.

Analysis of variance (Table-16) revealed non-significant effect of groups on PCV levels on all the periods under study. Similarly, non-significant influence of periods on PCV levels was also recorded in each group table-17.

The changes in mean PCV levels in T4 and T5 groups have been presented in table-18.

The mean PCV levels on “0”, 3rd, 6th and 9th day were estimated as 34.17±1.90, 32.72±6.57, 34.42±0.82 and 35.42±0.88% in T4 group and 33.90±6.79, 33.0±0.76, 34.68±0.63 and 35.82±0.45% in T5 group, respectively.

The table-18 revealed non-significant effect of groups on PCV levels on all the periods under study. Similarly, non-significant influence of periods on PCV levels was also recorded in each group (Table-19).
Total erythrocyte count (10^6/μl):

The changes in mean erythrocyte count (TEC) in T1, T2 and T3 groups have been depicted in table-20.

The mean TEC values on “0”, 3rd, 6th and 9th day were estimated as 5.83±0.30, 5.56±0.13, 5.63±0.07 and 5.86±0.10×10^6/μl in T1 group; 5.75±0.46, 5.59±0.26, 5.77±0.06 and 6.07±0.12×10^6/μl in T2 group and 5.88±0.28, 5.55±0.18, 5.71±0.17 and 5.96±0.16 x 10^6/μl in T3 group, respectively.

Analysis of variance (Table-21) revealed non-significant effect of groups on TEC values on all the periods under study. Similarly, non-significant influence of periods on TEC values was also recorded in each group table-22.

The changes in mean TEC values in T4 and T5 groups have been presented in table-23.

The mean TEC values on “0”, 3rd, 6th and 9th day were estimated as 5.52±0.34, 5.30±0.18, 5.63±0.16 and 5.83±0.19×10^6/μl in T4 group and 5.54±0.11, 5.38±0.10, 5.57±0.08 and 5.90±0.12 × 10^6/μl in T5 group, respectively.

The table-23 showed non-significant effect of groups on TEC values on all the periods under study. Similarly, non-significant influence of periods on TEC values was also recorded in each group (Table-24).

Total Leucocyte Count (10^3/μl):

A mild to severe leucocytosis was noticed in the present study. Out of 21 ARF cases, 8 cases showed leucocytosis and remaining 13 had normal leucocyte count on day zero with a mean of 35.30±4.18 and 11.38±0.57×10^3/μl, respectively. Following therapy, a reduction in total leucocyte count was noticed on 3rd, 6th and 9th day of last treatment.
The changes in mean TLC values in T1, T2 and T3 groups have been depicted in table-25.

The mean TLC values on “0”, 3rd, 6th and 9th day were estimated as 14±3.53, 13.25±2.83, 11.56±2.16 and 10.4±1.26x10^3/μl in T1 group; 14.94±3.19, 11.05±1.24, 10.8±0.77 and 9.96±0.38x10^3/μl in T2 group and 20.19±5.19, 13.41±1.40, 11.63±1.20 and 10.78±0.53x10^3/μl in T3 group, respectively.

Analysis of variance (Table-26) revealed non-significant effect of groups on TLC values on all the periods under study. Similarly, non-significant influence of periods on TLC values was also recorded in each group (Table-27).

The changes in mean TLC values in T4 and T5 groups have been depicted in table-28.

The mean TLC values on “0”, 3rd, 6th and 9th day were estimated as 24.92±9.63, 17.20±4.66, 14.94±3.42 and 9.94±1.17x10^3/μl in T4 group and 26.22±8.99, 17.69±3.46, 13.56±1.43 and 11.29±0.80x10^3/μl in T5 group, respectively.

The table-28 revealed non-significant effect of groups on TLC values on all the periods under study. Similarly, non-significant influence of periods on TLC values was also recorded in each group (Table-29).

Differential Leucocyte Count (%):

DLC was carried out on “0”, 3rd, 6th and 9th day.

Neutrophil Count (%):

Out of 21 ARF cases, nine were neutrophilic and remaining 12 had normal neutrophil count on day zero with a mean neutrophil count of 83.33±0.99 and 67.41±1.43 percent, respectively. Following therapy, a reduction in neutrophil count was noticed on 3rd, 6th and 9th day of treatment.
The changes in mean neutrophil count in T1, T2 and T3 groups have been presented in table-30.

The mean values of neutrophil count on “0”, 3rd, 6th and 9th day were estimated as 69±5.50, 68.25±3.42. 68.75±2.05 and 68.75±2.49% in T1 group; 73.75±4.09, 71.75±3.17, 70.25±2.14 and 68.5±1.70% in T2 group and 77±4.79, 76.5±3.47, 73.75±1.65 and 71.75±1.18% in T3 group, respectively.

Analysis of variance (Table-31) revealed non-significant effect of groups on neutrophil count on all the periods under study. Similarly, non-significant influence of periods on neutrophil count was also recorded in each group Table-32.

The changes in mean neutrophil count in T4 and T5 groups have been depicted in table-33.

The mean values of neutrophil count on “0”, 3rd, 6th and 9th day were estimated as 77.25±6.04, 74.5±4.85, 72.5±3.40 and 69±1.47% in T4 group and 75.2±3.73, 73.4±2.56, 70.6±1.96 and 68.8±0.58% in T5 group, respectively.

The table-33 revealed non-significant effect of groups on neutrophil count on all the periods under study. Similarly, non-significant influence of periods on neutrophil count were also recorded in each group (Table-34).

Lymphocyte Count (%): 

Out of 21 ARF cases, nine were lymphopenia and remaining 12 had normal lymphocyte count on day zero with a mean lymphocyte count of 10.89±0.69 and 28.5±0.99, respectively.

The changes in mean lymphocyte count in T1, T2 and T3 groups have been presented in table-35.

The mean values of lymphocyte count on “0”, 3rd, 6th and 9th day were estimated as 25.5±5.56, 26±3.13, 26.25±1.93 and 26±1.82% in T1 group; 20.25±4.88, 23.25±3.54, 24.25±2.14 and 26.25±1.31% in T2 group.
and 19.5±4.92, 19.25±3.47, 22±2.16 and 22.5±0.64% in T3 group, respectively.

Analysis of variance (Table-36) revealed non-significant effect of groups on lymphocyte count on all the periods under study. Similarly non-significant influence of periods on lymphocyte count was also recorded in each group (Table-37).

The change in mean Lymphocyte count in T4 and T5 groups have been depicted in table-38.

The mean values of lymphocyte count on “0”, 3rd, 6th and 9th day were estimated as 19.5±5.67, 21±3, 22.75±2.92 and 25.25±0.48% in T4 group and 20.2±4.0, 21.6±2.65, 24±1.52 and 25.4±0.68% in T5 group, respectively.

The table-38 revealed non-significant effect of groups on lymphocyte count on all the periods under study. Similarly, non-significant influence of periods on lymphocyte count was also recorded in each group (Table-39).

Monocyte Count (%): 

The changes in mean monocyte count in T1, T2 and T3 groups have been depicted in table-40.

The mean values of monocyte count on “0”, 3rd, 6th and 9th day were estimated as 2.75±1.25, 3±0.40, 2.75±0.47 and 3±0.4% in T1 group; 4±1.29, 3.25±1.10, 3.75±0.62 and 3.25±0.47% in T2 group and 2.5±1.04, 3.25±0.75, 2.75±0.48 and 3.5±0.64% in T3 group, respectively.

Analysis of variance (Table-41) revealed non-significant effect of groups on monocyte count on all the periods under study. Similarly non-significant influence of periods on monocyte count was also recorded in each group (Table-42).

The changes in mean monocyte count in T4 and T5 groups have been depicted in table-43.
The mean values of monocyte count on “0”, 3rd, 6th and 9th day were estimated as 2±0.81, 2.37±0.92, 2.75±0.28 and 3.25±0.63% in T4 group and 2.8±1.15, 3±0.89, 3.5±0.57 and 3.2±0.73% in T5 group, respectively.

The table-43 revealed non-significant effect of groups on monocyte count on all the periods under study. Similarly, non-significant influence of periods on monocyte count was also recorded in each group (Table-44).

Eosinophil Count (%)

The changes in mean eosinophil count in T1, T2 and T3 groups have been presented in table-45.

The mean values of eosinophil count on “0”, 3rd, 6th and 9th day were estimated as 2.75±1.25, 2.75±0.85, 2.25±0.47 and 2.25±0.47% in T1 group; 2±0.70, 1.75±0.47, 1.75±0.62 and 3.25±0.48% in T2 group and 1±0.40, 1±0.57, 1.5±0.5 and 2.25±0.47% in T3 group, respectively.

Analysis of variance (Table-46) revealed non-significant effect of groups on eosinophil count on all the periods under study. Similarly, non-significant influence of periods on eosinophil count was also recorded in each group (Table-47).

The changes in mean eosinophil count in T4 and T5 groups have been presented in table-48.

The mean eosinophil count on “0”, 3rd, 6th and 9th day were estimated as 1.25±0.75, 1.75±1.18, 2±0.40 and 2.5±0.64 % in T4 group and 1.8±0.91, 2.2±0.73, 2.4±0.67 and 2.6±0.67 % in T5 group, respectively.

The table-48 revealed non-significant effect of groups on eosinophil count on all the periods under study. Similarly, non-significant influence of periods on eosinophil count was also recorded in each group (Table-49).

Biochemical observation
Biochemical parameters viz, estimation of Blood Urea Nitrogen (BUN), Serum creatinine, Total serum protein, serum albumin, serum Globulin, Albumin-Globulin ratio, serum sodium (Na) and potassium (K) levels of ARF dogs were carried-out on 0, 3rd, 6th and 9th day of treatment.

Blood Urea Nitrogen (mg/dl):

The changes in mean blood urea nitrogen (BUN) values in T1, T2 and T3 groups have been depicted in Table-50.

The mean BUN levels on 0, 3rd, 6th and 9th day were estimated as 88.29±4.10, 71.08±3.5, 49.98±3.41 and 28.95±2.21 mg/dl in T1 group; 90.74±4.31, 67.19±4.6, 45.33±3.45 and 25.6±3.4 mg/dl in T2 group and 91.42±5.1, 49.53±4.69, 29.53±2.85 and 22.16±2 mg/dl in T3 group, respectively.

Analysis of variance (Table-51) revealed significant variation in BUN levels on 3rd and 6th day of post treatment. However effect on 0 and 9th day of post treatment was non-significant. BUN levels of dogs treated with a combination of dopamine and furosemide (T3) therapy on 3rd and 6th day of post treatment were significantly lower (49.53±4.69 and 29.53±2.85 mg/dl) than those treated with dopamine (T1) and furosemide (T2) separately and the values recorded on 3rd and 6th day were (71.08±3.5 and 49.08±3.41 mg/dl) and (67.19±4.6 and 45.33±3.45 mg/dl), respectively which did not differ significantly between themselves.

The variations in BUN levels due to post treatment periods were significant (P<0.01) for all the three treated groups T1, T2 and T3 (Table-52).

Dopamine group (T1) and furosemide group (T2), declined significantly during post treatment periods and lowest values recorded on 9th day were 28.95±2.21 and 25.6±3.4 mg/dl, respectively. However, under dopamine and furosemide group (T3), it declined significantly upto
6\textsuperscript{th} day but the difference between 6\textsuperscript{th} and 9\textsuperscript{th} day was non-significant, though the lowest value was recorded on 9\textsuperscript{th} day (22.16±2 mg/dl).

These results revealed maximum reduction in BUN levels among dogs treated with a combination of dopamine and furosemide (T3) right from 3\textsuperscript{rd} post treatment indicating that a combination of dopamine and furosemide (T3) was having better results as compared to dopamine (T1) and furosemide (T2) alone.

The changes in mean BUN levels in T4 and T5 groups have been presented in table-53.

The mean BUN levels on "0", 3\textsuperscript{rd}, 6\textsuperscript{th} and 9\textsuperscript{th} day were estimated as 117.85±3.53, 60.90±2.59, 32.74±1.49 and 23.80±1.29 mg/dl in T4 group and 129.96±9.20, 37.58±8.01, 20.28±1.42 and 18.03±0.47 mg/dl in T5 group, respectively.

The table-53 revealed significant variation in BUN levels on 3\textsuperscript{rd}, 6\textsuperscript{th} and 9\textsuperscript{th} day of post treatment. However, its effect on "0" day was non-significant. BUN levels of dogs treated with peritoneal dialysis 4 times daily on 3\textsuperscript{rd}, 6\textsuperscript{th} and 9\textsuperscript{th} day of post treatment were significantly lower (37.58±8.01, 20.28±1.42 and 18.03±0.47 mg/dl) as compared to peritoneal dialysis twice daily (60.90±2.59, 32.74±1.49 and 23.80±1.29 mg/dl).

The variations in BUN levels due to post-treatment periods were significant (P<0.01) for both the groups (T4 and T5) of treatments (Table-54). Under peritoneal dialysis twice daily (T4), BUN levels declined significantly during post treatment period and lowest value was obtained on 9\textsuperscript{th} day (23.8±1.29 mg/dl). However, under peritoneal dialysis 4 times daily (T5), it declined significantly upto 3\textsuperscript{rd} day but the difference between 3\textsuperscript{rd} & 6\textsuperscript{th} day and also on 6\textsuperscript{th} & 9\textsuperscript{th} day were non significant though, the lowest value was recorded on 9\textsuperscript{th} day (18.03±0.47).
Serum creatinine (mg/dl) :

The changes in mean serum creatinine levels in T1, T2 and T3 groups have been presented in table-55.

The mean serum creatinine levels on 0, 3\textsuperscript{rd}, 6\textsuperscript{th} and 9\textsuperscript{th} day were estimated as 4.09±0.22, 3.37±0.26, 2.45±0.23 and 1.93±0.08 mg/dl in T1 group; 4.13±0.20, 3.27±0.26, 2.39±0.23 and 1.85±0.04 mg/dl in T2 group and 4.30±0.18, 2.26±0.10, 1.67±0.23 and 1.50±0.20 mg/dl in T3 group, respectively.

Analysis of variance (Table-56) revealed significant variation in serum creatinine levels on 3\textsuperscript{rd} and 6\textsuperscript{th} day of post treatment. However, its effect on “0” and 9\textsuperscript{th} day of post treatment was non-significant. Serum creatinine levels of dogs treated with a combination of dopamine and furosemide (T3) therapy on 3\textsuperscript{rd} and 6\textsuperscript{th} day of post treatment were significantly lower (2.26±0.10 and 1.67±0.26) than those treated with dopamine (T1) and furosemide (T2) separately, and the values recorded on 3\textsuperscript{rd} and 6\textsuperscript{th} day were (3.37±0.26 and 2.45±0.23) and (3.27±0.26 and 2.39±0.23), respectively which did not differ significantly between themselves.

The variations in serum creatinine levels due to post treatment periods were significant (P<0.01) for all the three treated groups (T1, T2 and T3 (Table-57).

Under dopamine groups (T1), serum creatinine levels declined significantly during post treatment periods and lowest value was obtained on 9\textsuperscript{th} day (1.93±0.08). However, under furosemide group (T2) it declined significantly upto 6\textsuperscript{th} day but the difference between 6\textsuperscript{th} and 9\textsuperscript{th} day was non-significant, though the lowest value was obtained on 9\textsuperscript{th} day (1.85±0.04 mg/dl). While, under dopamine and furosemide group (T3) it declined significantly on 3\textsuperscript{rd} and 9\textsuperscript{th} day but the difference between 3rd &
6th and also on 6th & 9th day were non-significant. Although the lowest value was recorded on 9th day (1.50±0.20).

These results revealed maximum reduction in serum creatinine levels among dogs treated with a combination of dopamine and furosemide right from 3rd day of post treatment, indicating that, a combination of dopamine and furosemide therapy was having better response as compared to dopamine and furosemide alone.

The changes in mean serum creatinine levels in T4 and T5 groups have been presented in table-58.

The mean serum creatinine levels on 0, 3rd, 6th and 9th day were estimated as 7.07±0.43, 3.10±0.16, 1.99±0.11 and 1.80±0.06 mg/dl in T4 group and 7.33±0.72, 1.89±0.42, 1.32±0.20 and 1.32±0.16 mg/dl in T5 group, respectively.

The table-58 revealed significant (P<0.05) variation in serum creatinine levels on 3rd, 6th and 9th day of post treatment. However its effect on “0” day was non-significant. Serum creatinine levels of dog treated with peritoneal dialysis 4 times daily (T5) on 3rd, 6th and 9th day of post treatment day were significantly lower (1.89±0.42, 1.32±0.20 and 1.32±0.16 mg/dl) than peritoneal dialysis performed twice daily (T4) and the values of serum creatinine recorded were 3.10±0.16, 1.99±0.11 and 1.80±0.06 mg/dl, respectively.

The variations in serum creatinine levels due to post treatment periods were significant (P<0.05) for both the groups (T4 & T5) of treatment (Table-59).

Under peritoneal dialysis twice daily (T4), serum creatinine levels declined significantly (P<0.05) upto 3rd day but difference among 3rd, 6th and 9th day were non-significant, though the lowest value was recorded on 9th day (1.80±0.06 mg/dl). However, under peritoneal dialysis 4 times daily, it declined highly significantly (P<0.01) upto 3rd day but the
difference among 3rd, 6th and 9th day were non-significant, though the lowest value was recorded on 9th day (1.32±0.16).

These results revealed maximum reduction in serum creatinine levels among dogs treated with peritoneal dialysis 4 times daily (T5) right from 3rd post treatment day. Indicating that, peritoneal dialysis 4 times daily was having better results as compared to peritoneal dialysis twice daily.

Total serum protein (g/dl):

The changes in mean total serum protein (TSP) levels in T1, T2 and T3 groups have been presented in table-60.

The mean total serum protein values on “0”, 3rd, 6th and 9th day were estimated as 6.41±0.28, 6.30±0.24, 6.34±0.24 and 6.48±0.29 g/dl in T1 group; 6.42±0.15, 6.31±0.17, 6.39±0.16 and 6.48±0.14 g/dl in T2 group and 6.26±0.12, 6.16±0.14, 6.20±0.16 and 6.30±0.14 g/dl in T3 group, respectively.

Analysis of variance (Table-61) revealed non-significant effect of groups on TSP levels on all the periods under study. Similarly non-significant influence of periods on TSP levels was also recorded in each group (Table-62).

The changes in mean TSP levels in T4 and T5 groups have been depicted in table-63.

The mean TSP values on “0”, 3rd, 6th and 9th day were estimated as 6.50±0.17, 6.13±0.11, 6.05±0.12 and 6.12±0.13 g/dl in T4 group and 6.81±0.09, 6.20±0.10, 6.04±0.08, and 6.12±0.14 g/dl in T5 group, respectively.

The table-63 revealed non-significant effect of groups on TSP levels on all the periods under study.
Analysis of variance (Table-64) revealed significant (P<0.05) effect of periods on TSP levels in group T5, whereas its effect had non-significant influence in group T4.

Under peritoneal dialysis 4 times daily (T5), TSP levels declined significantly on 3rd day but the difference among 3rd, 6th and 9th day were not significant. Total serum protein levels of dogs treated with peritoneal dialysis 4 times daily (T5) revealed significantly higher total serum protein (6.81±0.09 g/dl) on day “0” in comparison to 3rd (6.20±0.10 g/dl), 6th (6.04±0.08 g/dl) and 9th day (6.12±0.14 g/dl) which did not differ significantly among themselves.

Serum albumin (g/dl):

The changes in mean serum albumin levels in T1, T2 and T3 groups have been depicted in table-65.

The mean serum albumin levels on “0”, 3rd, 6th and 9th day were estimated as 3.20±0.10, 3.13±0.10, 3.28±0.08 and 3.39±0.09 g/dl in T1 group; 3.14±0.10, 3.10±0.07, 3.27±0.06 and 3.34±0.04 g/dl in T2 group and 2.98±0.06, 3.09±0.09, 3.28±0.05 and 3.32±0.06 g/dl in T3 group, respectively.

Analysis of variance (Table-66) revealed non-significant effect of groups on serum albumin levels on all the periods under study. Similarly non-significant influence of periods on serum albumin levels were also recorded in each group (Table-67).

The changes in mean albumin levels in T4 and T5 groups have been depicted in table-68.

The mean serum albumin levels on “0”, 3rd, 6th and 9th day were estimated as 2.84±0.15, 2.54±0.13, 2.51±0.13 and 2.56±0.12 g/dl in T4 group and 3.12±0.15, 2.41±0.14, 2.33±0.13 and 2.45±0.15 g/dl in T5 group, respectively.
The table-68 revealed non-significant effect of groups on serum albumin levels on all the periods under study.

Analysis of variance (Table-69) revealed significant (P<0.05) effect of periods on serum albumin levels in group T5, whereas, its effect had non-significant influence in group T4. Serum albumin levels of dogs treated with peritoneal dialysis 4 times daily (T5) revealed significantly higher serum albumin (3.12±0.15 g/dl) on “0” day in comparison to 3rd (2.41±0.14 g/dl), 6th (2.33±0.13 g/dl), and 9th day (2.45±0.15 g/dl) which did not differ significantly among themselves.

Serum globulin (g/dl):

The changes in mean serum globulin levels in T1, T2 and T3 groups have been depicted in table-70.

The mean serum globulin levels on “0”, 3rd, 6th and 9th day were estimated as 3.21±0.19, 3.17±0.19, 3.06±0.16 and 3.08±0.21 g/dl in T1 group; 3.28±0.11, 3.19±0.13, 3.11±0.12 and 3.14±0.10 g/dl in T2 group and 3.28±0.06, 3.06±0.15, 2.98±0.14 and 2.98±0.12 g/dl in T3 group, respectively.

Analysis of variance (Table-71) revealed non-significant effect of groups on serum globulin levels on all the periods under study. Similarly, non-significant influence of periods on serum globulin levels was also recorded in each group (Table-72).

The changes in mean serum globulin levels in T4 and T5 have been presented in table-73.

The mean serum globulin levels on “0”, 3rd, 6th and 9th day were estimated as 3.66±0.05, 3.59±0.04, 3.54±0.04 and 3.56±0.05 g/dl in T4 group and 3.69±0.13, 3.79±0.13, 3.72±0.10 and 3.67±0.14 g/dl in T5 group, respectively.

The table-73 revealed non-significant effect of groups on serum globulin levels on all the periods under study. Similarly, non-significant
influence of periods on serum globulin levels was also recorded in each group (Table-74).

Albumin-Globulin ratio (A : G ratio) :

The changes in mean A:G ratio in T1, T2 and T3 groups have been depicted in table-75.

The mean values of A:G ratio on “0”, 3rd and 6th and 9th day were estimated as 1±0.02, 0.99±0.03, 1.07±0.03 and 1.10±0.05 in T1 group; 0.96±0.05, 0.98±0.03, 1.05±0.03 and 1.06±0.02 in T2 group and 0.91±0.01, 1.01±0.06, 1.13±0.06 and 1.11±0.15 in T3 group, respectively.

Analysis of variance (Table-76) revealed non-significant effect of groups on A:G ratio on all the periods under study. Similarly, non-significant influence of periods on A:G ratio was also recorded in each group (Table-77).

The changes in mean A:G ratio in T4 and T5 groups have been depicted in table-78.

The mean A:G ratio on “0”, 3rd, 6th and 9th day were estimated as 0.77±0.04, 0.70±0.04, 0.71±0.03 and 0.72±0.03 in T4 group and 0.85±0.07, 0.64±0.06, 0.63±0.05 and 0.67±0.06 in T5 group, respectively.

The table-78 revealed non-significant effect of groups on A:G ratio on all the periods under study. Similarly, non-significant influence of periods on A:G ratio was also recorded in each group (Table-79).

Serum sodium (mEq/L) :

A mild to moderate hypernatremia was a consistent finding in the present study. Out of 21 ARF cases 11 dogs were hypernatremic and remaining 10 were under normal serum sodium levels on day zero with a mean of 151.35±1.27 and 140.37±1.37, respectively. Extremes of serum sodium noticed were 129.69 and 158.25 mEq/l.
The changes in mean serum sodium levels in T1, T2 and T3 groups have been presented in table-80.

The mean serum sodium levels on “0”, 3rd, 6th and 9th day were estimated as 145.56±4.46, 142.09±2.22, 139.50±1.10 and 138.81 mEq/L in T1 group; 147.17±1.69, 144.04±1.74, 142.29±1.67 and 140.99 mEq/L in T2 group and 142.49±4.6, 141.6±2.64, 140.21±1.36 and 137.4±1.18 mEq/L in T3 group, respectively.

Analysis of variance (Table-81) showed non-significant effect of groups on serum sodium levels on all the periods under study. Similarly, non-significant influence of periods on serum sodium levels was also recorded in each group (Table-82).

The changes in mean serum sodium levels in T4 and T5 groups have been presented in table-83.

The mean serum sodium levels on “0”, 3rd, 6th and 9th day were estimated as 146.91±2.72, 145.37±2.31, 143.50±0.99 and 140.76±0.81 mEq/L in T4 group and 148.09±3.74, 144.70±3.17, 142.94±2.84 and 141.72±2.66 mEq/L in T5 group, respectively.

The table-83 showed non-significant effect of groups on serum sodium levels on all the periods under study. Similarly, non-significant influence of periods on serum sodium levels was also recorded in each group (Table-84).

Serum potassium (mEq/L):

Out of 21 ARF cases, six were hyperkalemic and remaining 15 were normokalemic on day zero with a mean potassium levels 5.72±0.18 and 4.42±0.08 mEq/l, respectively. After treatment with sodium bicarbonate @ 0.5 mEq/kg and calcium gluconate 0.5 ml/kg body weight, a reduction in serum potassium levels was noticed on 3rd, 6th and 9th day of post treatment.
The changes in mean serum potassium levels in T1, T2 and T3 groups have been presented in table-85.

The changes in mean serum potassium levels on “0”, 3rd, 6th and 9th day were estimated as 4.77±0.52, 4.54±0.30, 4.33±0.16 and 4.24±0.12 mEq/L in T1 group; 4.85±0.47, 4.57±0.22, 4.46±0.22 and 4.29±0.06 mEq/L in T2 group and 4.74±0.43, 4.45±0.25, 4.38±0.16 and 4.34±0.04 mEq/L in T3 group, respectively.

Analysis of variance (Table-86) revealed non-significant effect of groups on serum potassium level on all the periods under study. Similarly, non-significant influence of periods on serum potassium levels was also recorded in each group (Table-87).

The changes in mean serum potassium levels in T4 and T5 groups have been depicted in table-88.

The mean serum potassium levels on “0”, 3rd, 6th and 9th day were estimated as 4.78±0.16, 4.57±0.09, 4.40±0.08 and 4.31±0.06 mEq/L in T4 group and 4.87±0.26, 4.60±0.12, 4.46±0.06 and 4.40±0.04 mEq/L in T5 group, respectively.

The table-88 revealed non-significant effect of groups on serum potassium levels on all the periods under study. Similarly, non-significant influence of periods on serum potassium levels was also recorded in each group (Table-89).

Urine analysis observations

Examination of urine for specific gravity pH, Albumin and sediments were done before and after treatment.

Urine specific gravity (USG)

The changes in mean values of specific gravity in T1, T2 and T3 groups have been presented in table-90.
The mean values of specific gravity before and after treatment were recorded as 1.0185±0.001 and 1.0165±0.008 in T1 group; 1.0175±0.008 and 1.0165±0.009 in T2 group and 1.0165±0.0025 and 1.0155±0.017 in T3 group, respectively.

The variations in mean values of specific gravity before and after treatment were non-significant for all the three treated groups (T1, T2 & T3) (Table-90). Similarly, non-significant effect of groups on mean values of specific gravity were also recorded before and after treatment (Table-91).

The changes in mean values of specific gravity in T4 and T5 groups have been presented in table-92.

The mean values of specific gravity before and after treatment were recorded as 1.0155±0.0022 and 1.0150±0.0012 in T4 group and 1.0164±0.0017 and 1.0156±0.0011 in T5 group, respectively.

The variations in mean values of specific gravity before and after treatment were non-significant for both the groups (T4 & T5) of treatment (Table-92). Similarly, non-significant effect of groups on mean values of specific gravity were also recorded before and after treatment (Table-92).

Urine pH:

The changes in mean values of pH in T1, T2 and T3 groups have been presented in table-93.

The mean values of pH before and after treatment were recorded as 5.25±0.47 and 5.75±0.48 in T1 group; 5.0±0.41 and 5.5±0.29 in T2 group and 5.5±0.64 and 6.25±0.47 in T3 group, respectively.

The variations in mean values of pH before and after treatment were non-significant for all the three treated groups (T1, T2 and T3) (Table-93). Similarly, non-significant of groups on mean values of pH was also recorded before and after treatment (Table-94).
The changes in mean values of pH in T4 and T5 groups have been presented in table-95.

The mean values of pH before and after treatment were recorded as 4.75±0.48 and 5.50±0.41 in T4 group and 5.20±0.58 and 5.76±0.14 in T5 group, respectively.

The variations in mean values of pH before and after treatment were non-significant for both the groups (T4 and T5) of treatments (Table-95). Similarly, non-significant influence of groups on mean values of pH were also recorded before and after treatment (Table-95).

Urine Albumin:

Six out of twelve ARF cases in T1, T2 and T3 groups and 8 out of 9 ARF cases in T4 & T5 groups showed presence of albumin in the urine.

The changes in the degree of proteinuria in T1, T2 and T3 groups have been depicted in table-96, 97 and 98.

On day zero, proteinuria of distinct narrow ring (+) to wider ring (++) was found in 2 out of 4 cases in T1 group, whereas proteinuria of wider ring (++) was present in 2 out of 4 cases in T2 and T3 groups each.

After completion of conservative treatment re-examination of urine sample was done on 9th day. It was found that proteinuria of distinct narrow ring (+) was present in 1 out of 4 cases in each of T1, T2 and T3 group.

The changes in the degree of proteinuria in T4 and T5 groups have been depicted in table-99 and 100.

On day zero, proteinuria of distinct narrow ring (+) to wider ring (++) was found in 3 out of 4 cases in T4 group where as, proteinuria of wider ring (++) to very wide ring (+++) was found in all the 5 cases of T5 group.

After completion of dialytic treatment re-examination of urine sample was done on 9th day. It was found that proteinuria of distinct
narrow ring (+) was present in one out of 4 cases in T4 group and 2 out of 5 cases in T5 group.

Urine sediments:

The results of the microscopic findings of the urine sediments of both conservative and dialytic treatment of 21 ARF cases of dogs have been depicted in table-96, 97, 98, 99 and 100.

On day zero, microscopic examination of urine sediments revealed presence of WBC, WBC cast, RBC, squamous epithelial cells, transitional epithelial cells, renal epithelial cells, granular cast and hyaline cast in variable numbers in individual dog under both conservative and dialytic treatment groups.

After completion of conservative and dialytic treatment again microscopic examination of urinary sediments was done on 9th day.

Under conservative treatment groups, it was found that there was complete absence of casts and cells in urinary sediments in 5 out of 12 ARF cases, however, in 7 cases, there was considerable reduction in the no. of cast and cells in urinary sediments.

Under dialytic treatment groups, it was found that there was complete absence of casts and cells in urinary sediments in 4 out of 9 ARF cases, however in 5 cases, there was considerable reduction in the no. of cast and cells in urinary sediments.

Healthy control (T6):

Clino-haematobiochemical observations and urine analysis of 5 healthy dogs, were done and the results obtained were as follows:

Clinical observations:
The clinical values observed in the healthy control group have been presented in table-101. The mean±S.E. of temperature, respiratory and pulse rate in the present study were 101.4±0.14°F, 22.2±0.8 (per minute) and 92±0.70 (per minute), respectively.

Haematological observations:
The haematological values observed in the healthy group have been presented in table-102. The Mean±S.E. of Haemoglobin (Hb), Packed Cell Volume (PCV), Total Erythrocyte Count (TEC), Total Leucocyte count (TLC), Neutrophil count, Lymphocyte count, Monocyte count and Eosinophil count in the present study were 12.8±0.34 g/dl, 39.68±1.14%, 5.93±0.34x10^6/µl, 9.53±0.75x10^3/µl, 62.2±1.16%, 27.4±1.80%, 3.4±0.68% and 3±0.55%, respectively.

Biochemical observations:
The biochemical values observed in the healthy control group have been presented in table-103. The Mean±S.E. of blood urea nitrogen, serum creatinine, total serum protein, serum albumin, serum globulin, albumin-globulin ratio, serum sodium and serum potassium in the present study were 19.24±0.85 mg/dl, 0.96±0.09 mg/dl, 6.61±0.13 g/dl, 3.41±0.13 g/dl, 3.20±0.11 g/dl, 1.07±0.11, 138.4±1.35 mEq/L and 4.20±0.15 mEq/L, respectively.

Urine analysis observations:
The physical tests like colour, pH, specific gravity, sediments and quantitative analysis of urine of healthy control group have been depicted in table-104. The Mean±S.E. of pH and specific gravity were 5.8±0.37 and 1.0184±0.002, respectively.