The present clinical study was conducted on 10 dogs presented for treatment of canine urolithiasis. The mean ± SE of total red blood cell count, total leukocytic count and haemoglobin content preoperatively were 4.17 ± 0.02 mill/cumm, 9177 ± 122 cells/cmm and 11.2 ± 0.6 grams/dl respectively while, the mean ± SE level of blood urea nitrogen and serum creatinine were found to be 16.7 ± 2.7 mg/dl and 0.95 ± 0.02 mg/dl respectively. Radiography and ultrasonography were found to be effective diagnostic aids in confirmation of urolithiasis.

Keywords: Urolithiasis, Canine, Haemotology, Biochemical tests, Imaging techniques

INTRODUCTION
Proper diagnosis of urolithiasis in dogs provide key for the selection of the treatment regimen. Urolithiasis is the common cause of radiopacities associated with the urinary tract detected radiographically (Johnston et al., 1995). Radiographic evaluation of urethra was useful to detect the site, number, density and shape of calculi obstructing the urethra (Osborne et al., 1985). Bumin and Soylu (2000) suggested that simultaneous examination of dogs using radiography and ultrasonography was helpful for diagnosing cystic calculi. Ultrasonography had a potential value in diagnosing urolithiasis (Voros et al., 1992). The present study was conducted to evaluate haemato-biochemical changes and the efficacy of radiographic and ultrasonographic diagnosis in canine urolithiasis.

MATERIALS AND METHODS
The present study was conducted on 10 affected dogs of different age groups with different body weights and belongs to different breeds. Three ml of blood samples were collected from cephalic vein in EDTA containing vials prior to surgery. The estimation of hemoglobin, total Red Blood cell Count (RBC) and Total Leukocyte Count (TLC), was done as per method of Schalm et al. (1975).
The serum samples were collected preoperatively for biochemical analysis. Blood Urea Nitrogen was estimated by modified scribners method (Reddy et al., 1976) and serum creatinine was estimated by the standard procedures described by Coles (1976). Survey radiographs of the abdomen of all dogs were taken by positioning the dogs on left (or) right lateral recumbency with legs extended backwards to view the bladder and urethra. Whereas ventrodorsal survey radiographs were taken to visualize uroliths in kidneys. Radiographic factors employed were 60-70 mAs and 70-90 Kvp with Pottor bucky grid and high speed intensifying screens. The films were processed in conventional manner, dried and preserved for subsequent interpretation. The radiographs were examined for the presence of calculi and the numbers of calculi in the urinary tract. For ultrasonographic study the dogs were prepared by hair clipping and shaving the abdominal area from xiphoid to pubis. An ultrasound gel was applied for achieving good contact between the transducer and body surface. Scanning was done in real time ultrasound with a GE logic 100 ultrasound scanner using a 5 MHz, curvilinear or a 7.5 MHz liner transducer, depending on the size of the dog. The kidneys and urinary bladder were sonated to detect the lesions.

RESULTS AND DISCUSSION

In the present study haematological values were recorded in all the dogs preoperatively. The mean ± SE of total red blood cell; total leukocytic count; haemoglobin content count before surgery were 4.17 ± 0.02 mill/cumm; 9177 ± 122 cells/cmm and 11.2 ± 0.6 grams/dl respectively. The mean ± SE level of blood urea nitrogen was found to be 16.7 ± 2.7 mg/dl while, the mean ± SE level of the serum creatinine before surgery was found to be 0.95 ± 0.02 mg/dl. All the dogs treated in the present clinical study had the haematological and biochemical parameters within the normal range indicating that renal damage has not yet ensued and that all the dogs were clinically fit to undergo surgery as reported by Bojrab (1975) and Bartges and Lane (2003).

The radiographic evaluation revealed the calculi at the urethra caudal to the ospenis (Figure 1), in the scrotal region (Figure 2) and at the level of ischial arch (Figure 3) in cases of urethral calculi. In two dogs calculi were found in the bladder and urethra (Figure 4). In 3 cases several calculi were found in the urinary bladder (Figure 5). The calculi size ranged from very small ones measured about 1 mm in diameter to larger ones measured about 5 mm to 8 mm in diameter. In one dog calculi were found in the left kidney (Figure 6). Only plain radiography confirmed the diagnosis of uroliths leaving no scope for any further contrast radiographic examination. Ghotoria et al. (2005) also exclusively used plain radiography for diagnosis of urinary calculi. Gleaton et al. (2001) reported that some types of calculi like cystine and radiodence urocystoliths less than 3 mm in size could not be seen on radiographs. However, no such incidence was encountered in the present study. In the present clinical study, the uroliths, irrespective of their location were clearly discernible on the radiographs in all cases. Osborne et al. (1990) and Gleaton et al. (2001) used contrast radiographic studies of the urinary tract for radiographic diagnosis of urinary calculi. No such need was felt in the present study since in all the cases, plain radiography confirmed the diagnosis leaving no scope for any further contrast radiographic examination of the urinary tract.
Figure 1: Lateral Abdominal Radiograph of the Dog Showing Calculi Caudal to the OS Penis

Figure 2: Lateral Abdominal Radiograph of the Dog Showing Calculi in the Scrotal Region

Figure 3: Lateral Abdominal Radiograph of the Dog Showing Calculi at the Ischial Arch

Figure 4: Lateral Abdominal Radiograph of Dog Showing Cystic and Urethral Calculi

Figure 5: Lateral Abdominal Radiograph of Dog Showing Several Calculi in the Bladder

Figure 6: Lateral Abdominal Radiograph of the Dog Showing Calculi in the Left Kidney

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Ultrasound scanning of the abdomen in the 3 cases of cystic calculi revealed the presence of hyper echoic focal echogenic spots accompanied with acoustic shadow corresponding to the calculi in the urinary bladder ultrasonography also confirmed the changes like thickening of the urinary bladder wall (Figure 7). In the lone dog of renal calculi, the sonogram revealed the presence of hyperechoic area with acoustic shadowing in the renal image (Figure 8). Nyland and Malton (1995) reported that the identification of urinary calculi by ultrasonography was sometimes difficult since the intensity of acoustic shadowing varied, depending on the machine used and the transducer frequency used. During the present study no such difficulty was faced and the machine and transducers used served the purpose well. However, it was not possible to count the number of calculi by ultrasonography. Bartges and Lane (2003) also stated that the number of calculi could not be reliably counted by ultrasonography. In conclusion, survey radiography and ultrasonography were proved to be helpful in diagnosing urolithiasis in dogs. In addition, as stated by Weichselbaum et al. (1999), the likelihood of ultrasonographic false negatives compounded the problem. This was confirmed by the radiographic examination and also actual retrieval of the calculi surgically.

REFERENCES


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