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Urinalysis findings in dogs: A preliminary clinical evaluation of fifteen cases

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Abstract

Background: Urinalysis is a routine and indispensable diagnostic procedure in veterinary medicine that provides valuable information regarding renal function, urinary tract integrity, hydration status, and systemic disorders. Evaluation of urine sediment can aid in the diagnosis of urinary tract infections (UTIs), urolithiasis, inflammatory conditions, and renal disease (Stockham and Scott, 2008).

Objective: The present study aimed to evaluate physical, chemical, and microscopic urinalysis findings in canine urine samples and determine the frequency of common urinary abnormalities encountered in clinical cases.

Materials and Methods: Fifteen urine samples collected from dogs presented to a veterinary clinical facility were subjected to routine urinalysis. Samples were obtained by catheterization (n = 6), cystocentesis (n = 5), and free-catch collection (n = 4). Physical examination included determination of urine specific gravity (USG). Chemical analysis included assessment of pH, protein, and nitrite using reagent strips. Microscopic examination of centrifuged urine sediment was performed under light microscopy.

Results: Proteinuria was observed in 60% (9/15) of samples. Urine pH ranged from 7.5 to 8.0 in 40% (6/15) of cases. Elevated urine specific gravity (>1.040) was recorded in 53.3% (8/15) of samples. Nitrite positivity occurred in 20% (3/15) of cases. Hematuria characterized by 20–40 erythrocytes/high-power field (HPF) was observed in 33.3% (5/15) of samples, whereas marked pyuria (50–60 leukocytes/HPF) was identified in several cases. Clusters of transitional epithelial cells were present in three samples, and occasional struvite crystals were detected.

Conclusion: Proteinuria, hematuria, pyuria, and alkaline urine represented the most common abnormalities. Microscopic evidence of inflammatory cells, erythrocytes, epithelial cell shedding, and struvite crystalluria suggested lower urinary tract inflammation and possible bacterial urinary tract infection.

Keywords: canine, urinalysis, proteinuria, pyuria, hematuria, cystitis, urinary tract infection, struvite crystalluria

Introduction

Urinalysis is among the most commonly performed diagnostic procedures in small animal practice and serves as a valuable tool for the evaluation of urinary tract disorders, renal disease, metabolic abnormalities, and systemic illnesses (Kaneko *et al.*, 2008) ^[4]. A complete urinalysis comprises physical, chemical, and microscopic examination of urine and provides important information regarding glomerular filtration, tubular function, inflammatory processes, and urinary tract integrity (Stockham and Scott, 2008) ^[7].

Proteinuria is one of the most clinically significant abnormalities encountered in canine urinalysis and may arise from glomerular disease, tubular dysfunction, urinary tract inflammation, or hemorrhage (Grauer, 2005) ^[3]. Likewise, hematuria and pyuria are commonly associated with bacterial cystitis, urolithiasis, trauma, and neoplastic conditions affecting the urinary tract (Bartges, 2004) ^[1].

Urine pH plays an important role in crystal formation and bacterial growth. Alkaline urine favors precipitation of magnesium ammonium phosphate (struvite) crystals and is frequently associated with urinary tract infections caused by urease-producing bacteria such as

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Staphylococcus spp. and *Proteus* spp. (Osborne *et al.*, 1999) [6]. Microscopic examination of urinary sediment further enhances diagnostic accuracy through identification of erythrocytes, leukocytes, epithelial cells, casts, microorganisms, and crystals (Cowell *et al.*, 2008) [2].

The present study was undertaken to document the urinalysis findings observed in canine clinical cases and to correlate chemical and microscopic abnormalities indicative of urinary tract disease.

Materials and Methods

Study Design

A descriptive observational study was conducted on fifteen canine urine samples submitted to the clinical pathology laboratory for routine diagnostic evaluation.

Urine Collection

Urine samples were collected using the following methods:

Collection Method	Number of Samples	Percentage (%)
Catheterization	6	40.0
Cystocentesis	5	33.3
Free Catch	4	26.7

Samples were analyzed immediately after collection to minimize cellular degeneration and crystal artifact formation (Bartges, 2004) [1].

Physical Examination

Urine specific gravity was measured using a refractometer. Gross appearance and color were recorded whenever applicable.

Chemical Examination

Chemical analysis was performed using commercially available urine reagent strips for determination of:

- pH
- Protein
- Nitrite

Microscopic Examination

Urine samples were centrifuged at approximately 1500–2000 rpm for 5 minutes. The supernatant was discarded and the sediment resuspended before examination under light microscopy.

The following parameters were recorded:

- Red blood cells (RBCs)
- White blood cells (WBCs)
- Transitional epithelial cells
- Crystals
- Casts (when present)

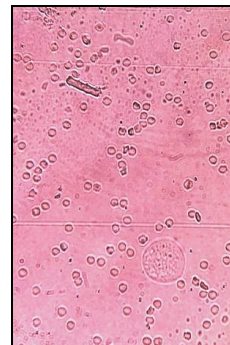
Results

Urinalysis Findings

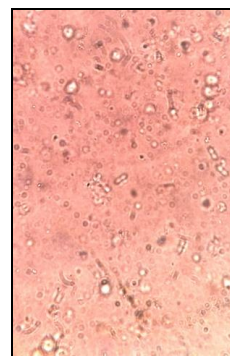
Parameter	Positive Cases	Percentage (%)
Proteinuria	9	60.0
pH 7.5–8.0	6	40.0
USG >1.040	8	53.3
Nitrite Positive	3	20.0
Hematuria (20–40 RBCs/HPF)	5	33.3
Transitional Epithelial Cell Clusters	3	20.0
Struvite Crystals	Occasional	-

Proteinuria represented the most frequently observed abnormality. Elevated urine specific gravity was present in more than half of the examined samples, indicating concentrated urine. Alkaline urine pH was observed in six samples and was occasionally associated with struvite crystalluria.

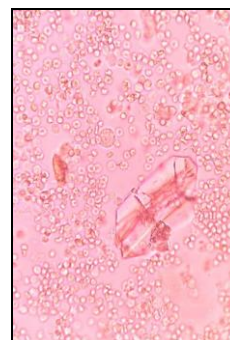
Microscopic examination revealed marked pyuria with approximately 50–60 leukocytes/HPF in several samples. Hematuria characterized by 20–40 erythrocytes/HPF was identified in five cases. Transitional epithelial cell clusters were observed in three samples, suggesting irritation or inflammation of the lower urinary tract.



Photomicrograph of canine urinary sediment demonstrating numerous erythrocytes distributed throughout the microscopic field. A large round cell morphologically consistent with a transitional epithelial cell is visible in the lower portion of the image. These findings support hematuria accompanied by urothelial cell desquamation, commonly associated with cystitis or lower urinary tract irritation.



Photomicrograph showing abundant inflammatory cells and cellular debris within the urinary sediment. Numerous leukocyte-like cells are present, consistent with pyuria and active urinary tract inflammation. The observed sediment pattern is suggestive of inflammatory or infectious cystitis.



Photomicrograph revealing marked erythrocyturia with scattered epithelial cells, struvite crystals and cellular debris. The findings are consistent with lower urinary tract inflammation and correlate with the elevated RBC counts observed during sediment examination.

Discussion

Proteinuria was identified in 60% of examined urine samples and constituted the most prevalent abnormality. Proteinuria may occur secondary to renal disease; however, inflammatory and hemorrhagic processes affecting the urinary tract can also contribute significantly to urinary protein excretion (Grauer, 2005) [3].

Hematuria was detected in one-third of examined samples. Similar findings have been reported in dogs suffering from bacterial cystitis, urolithiasis, urinary tract trauma, and neoplasia (Bartges, 2004) [1]. The presence of 20–40 RBCs/HPF observed in this study suggests active bleeding within the urinary tract.

Marked pyuria was one of the most notable microscopic findings. Leukocyte counts approaching 50–60 WBCs/HPF strongly indicate inflammatory processes and are frequently associated with bacterial urinary tract infection (Ling, 1984) [5]. The simultaneous presence of proteinuria, pyuria, and nitrite positivity in several samples further supports this interpretation.

Alkaline urine pH was observed in 40% of cases. Increased urine pH may result from dietary influences; however, bacterial urease activity is a well-recognized cause of urine alkalization in dogs (Osborne *et al.*, 1999) [6]. The occasional presence of struvite crystals in alkaline urine further supports this association.

Clusters of transitional epithelial cells identified in three samples likely reflect increased urothelial turnover associated with inflammation. Similar observations have been reported in canine lower urinary tract disorders (Cowell *et al.*, 2008) [2].

The photomicrographic findings corroborated the laboratory data and provided visual evidence of hematuria, pyuria, and epithelial cell shedding. Together, these observations indicate that inflammatory lower urinary tract disease was a prominent feature among the dogs evaluated in the present study.

The major limitations of this study include the relatively small sample size and the absence of urine culture and antimicrobial susceptibility testing, which prevented definitive confirmation of bacterial infection.

Conclusion

The present investigation demonstrated that proteinuria, pyuria, hematuria, elevated urine specific gravity, and alkaline urine were the most common abnormalities detected in canine urine samples. Microscopic examination revealed abundant erythrocytes, leukocytes, transitional epithelial cells, and occasional struvite crystals. These findings are suggestive of lower urinary tract inflammation and possible bacterial urinary tract infection. Routine urinalysis remains an effective diagnostic tool for the early detection and monitoring of urinary tract disorders in dogs.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Bartges JW. Diagnosis of urinary tract infections. *Veterinary Clinics of North America: Small Animal Practice*. 2004;34(4):923-933.
2. Cowell RL, Tyler RD, Meinkoth JH, DeNicola DB. *Diagnostic Cytology and Hematology of the Dog and Cat*. 3rd ed. St. Louis: Mosby Elsevier; 2008.
3. Grauer GF. Early detection of renal damage and disease in dogs and cats. *Veterinary Clinics of North America: Small Animal Practice*. 2005;35:581-596.
4. Kaneko JJ, Harvey JW, Bruss ML. *Clinical Biochemistry of Domestic Animals*. 6th ed. Amsterdam: Academic Press; 2008.
5. Ling GV. Therapeutic strategies involving antimicrobial treatment of canine urinary tract infections. *Journal of the American Veterinary Medical Association*. 1984;185:1162-1164.
6. Osborne CA, Lulich JP, Kruger JM, Ulrich LK, Koehler LA. Analysis of 77,000 canine uroliths. *Veterinary Clinics of North America: Small Animal Practice*. 1999;29:17-38.
7. Stockham SL, Scott MA. *Fundamentals of Veterinary Clinical Pathology*. 2nd ed. Ames: Blackwell Publishing; 2008.
8. Thrall MA, Weiser G, Allison RW, Campbell TW. *Veterinary Hematology and Clinical Chemistry*. 2nd ed. Ames: Wiley-Blackwell; 2012.

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