ULTRASONOGRAPHIC, ENDOSCOPIC AND URINALYTIC EVALUATION OF SOME URINARY TRACT DISEASES IN FEMALE BUFFALOES: 6 CASES

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ABSTRACT

The present article discusses screening of 25 female buffaloes reporting with complaint of haematuria, strangury, polyuria, dribbling of urine. These were subjected to urinalysis using urine reagent strips for a quick assessment of the quality of urine to ascertain possible urinary tract disorders. Out of these 25 buffaloes, six were suspected to be suffering from urinary tract disease on the basis of presenting history and symptoms and preliminary urinalysis. Diagnosis of haemorrhagic cystitis and post-partum vaginal trauma in one case, urinary bladder tumour in two cases, hydronephrosis and a cyst beneath the rectum in one case and having purulent cystitis and urethritis with renal cysts in two cases is reported.

Keywords: urinary tract, ultrasonography, urinalysis, endoscopy, urinary bladder, kidney

INTRODUCTION

Veterinary practice has seen a great advancement in diagnostic imaging of urinary tract disorders in dogs (Brearley and Cooper, 1987; Cannizzo *et al*., 2003; Basso *et al*., 2014), horses (Aleman *et al*., 2011) and cattle (Braun *et al*., 2007; Braun *et al*., 2008; Braun *et al*., 2009; Braun *et al*., 2009). Similarly, it is possible to examine the urinary tract for its disease in buffaloes using ultrasonography and urethrocystoscopy. Affections of kidneys like neoplasia, hydronephrosis, renomegally and ureteral dilatation, that of bladder like tumours, cytitides, haemorrhages, etc. can be easily diagnosed using ultrasonography and urethrocystoscopy. Early diagnosis of many of these affections can be satisfactorily treated which will help strengthen the economy of the poor farmer and sustain the livelihood.

MATERIAL AND METHODS

Twenty five clinical cases were screened during the period of study, for possible urinary tract disease reporting to the Teaching Veterinary Clinical Complex at the College of Veterinary Science and Animal Husbandry, U.P. Pandit Deendayal Upadhyaya Pashuchikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura.

Urine samples of these buffaloes were subjected to urinalysis viz., colour, clarity, aroma and other examinations namely Urobilinogen, bilirubin, ketone, blood, protein, nitrite, leucocytes,

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glucose, specific gravity and pH with Dx Urine Test 10 reagent strips provided by DiaSys Diagnostics India Private Limited, Navi Mumbai-400705. Of these 25 buffaloes six cases were found to be suitable for further study on the basis of clinical symptoms like strangury, frequent micturition, discoloured urine and urinalysis like presence of blood, nitrite and leucocytes in the urine samples. Ultrasonography and Urethrocystoscopy were performed on these six animals for evaluation of kidney, urethra, urinary bladder and urethra.

Two ultrasound machines namely, the Aloka SSD-500, Aloka Co. Ltd. Japan ultrasound machine, with 3.5 MHz transducer/probe and Mindray DP 6600 Vet ultrasound machine, Shenzen Mindray Bio-Medical Electronic Co. Ltd. China with 5 to 10.0 MHz transducer/probe, were used for the per-cutaneous and *per rectum* scanning, respectively.

Urethrocystoscopy was performed with the Karl Storz endoscopy unit, Karl Storz GmbH and Co. KG, Tuttlingen, Germany, which comprised of a rigid 30^{o} forward oblique 2.7 mm endoscope and corresponding sheath, a rigid forward straight (0^{o}) 5 mm endoscope and corresponding sheath, a veterinary video camera III and Xenon 100 cold light fountain.

RESULTS AND DISCUSSION

The values of the parameters examined under urinalysis of the six buffaloes are summarized in Table 1. All animals had urobilinogen within a normal range (ranging from 0.2 to 1.0 mg/dL of urine). Bilirubinuria was seen in one buffalo. Two buffaloes had ketonuria. Blood and protein were present in the samples of five buffaloes. Only two samples were found positive for nitrites and three for leucocytes. One buffalo had glucosuria. The specific gravity varied between 1.010 and 1.020 whereas, the pH varied between 5.5 and 9.0.

Case 1

A seven year old buffalo reported six days post partum with dystocia handled locally, having a history of discharges from genitalia. The case was diagnosed as retention of placenta and was further subjected to examination owing to a history of blood tinged urine. Urinalysis revealed 80 erythrocytes/µL and glucosuria (Table 1). Ultrasonography of the kidneys and urinary bladder did not reveal any abnormalities. Frank bleeding and petechiae were observed in the urethra upon urethroscopy (Figure 1 and Figure 2). Upon cystoscopy the mucosa of the bladder exhibited inflammatory increase in vascularity with thickened tortuous vessels and

Table 1. Values of urinalysis of urine samples buffaloes presented to clinics.

Sl. no.	UBG mg/dL	BIL mg/dL	KET mg/dL	BLD Ery/µL	PRO mg/dL	NIT	LEU Leu/µL	GLU mg/dL	SG	pH
1	1.0	-	-	80	<30	-	-	500	1.020	7.5
2	1.0	-	-	80	-	-	15	-	1.010	5.5
3	1.0	-	5	25	<30	-	-	-	1.010	6.5
4	1.0	Small	5	-	>300	-	-	-	1.015	9.0
5	0.2	-	-	80	100	Pos	>500	-	1.010	7.5
6	1.0	-	-	200	300	Pos	70	-	1.010	8.0

petechiae to ecchymosis suggesting haemorrhagic cystitis (Figure 3). Franz *et al.* (2004) reported petechial and striated bleeding in the urinary bladder in cattle. The vaginoscopy revealed vaginal trauma with dark traumatized mucosa and whitish discolouration of the vaginal mucosa immediately above the site of trauma (Figure 4).

After being informed about the lesions in the urogenital tract and possible surgical treatment the owner was inclined to sell off his animal rather than going for any further treatment.

Case 2

A two month pregnant buffalo heifer was brought with a complaint of strangury, making frequent attempts at micturition with only small amount of urine voided each time. The general condition of the heifer was normal. Urinalysis revealed 80 erythrocytes/μL and 15 leucocytes /μL of urine (Table 1). The ultrasonographic findings of the kidneys were normal. Cystoscopy revealed ecchymosis dorsal to the urachal cicatrix along with polyp like growths in the mucosa of the bladder (Figure 5 and Figure 6). The vessels in this area were thickened with increased tortuosity suggesting inflammation. The wall showed several polyps at the neck of the bladder (Figure 7 and Figure 8) along with haemorrhages. Urethroscopy did not show any abnormality in the mucosa. The development of tumours in bovine urinary bladder is common in certain parts of the world (Ozkul and Aydin, 1996). The mucosal form of papillomatosis in buffaloes occurs as urinary bladder tumours similar to enzootic bovine haematuria which is also associated to bracken fern infested areas (Somvanshi, 2011). The owner was informed and shown the images of the interiors of the bladder. Upon knowing the status he refused any further treatment. However, he demanded some treatment for the blood in the urine only.

Case 3

An eight year old buffalo was brought seven days post natural service with a complaint that it had difficulty in urination. Scant urine was voided while the animal strained to urinate. The owner informed that there was some difficulty in voiding at the previous pregnancy also but was not as severe. The animal had a good general condition. According to the owner the only problem was with micturition. The buffalo had ketones (5 mg/dL), and 25 erythrocytes/ μL in her urine samples (Table 1). The bladder appeared full and slightly hard upon rectal palpation. The ultrasound of the left kidney showed several round hyperechoic nodule like areas within the corticomedullary tissue (Figure 9) suggestive of abnormal growth in the renal parenchyma. The ultrasonographic examination also showed a thickened bladder wall and lump arising from the floor of the bladder (Figure 10) which occupied almost the entire bladder cavity.

Endoscopy of the urinary bladder showed an inflamed mucosa (Figure 12) and a lobulated lump arising from the floor of the bladder (Figure 11) which could easily obstruct the neck of the bladder while the animal tried to void urine. The lump had slimy stringy material adhering to it.

Pathania *et al.* (2014) have reported that enzootic bovine haematuria affected hill cows showed a thick bladder wall along with presence of some space occupying lesions suggestive of tumours. Urinalysis in such cases has revealed micro or macro haematuria.

The owner of this case was also the owner of case 2 and this animal was actually the dam of the heifer in case 16, needless to say, the owner refused any further intervention as he wanted an intact animal which would fetch him greater

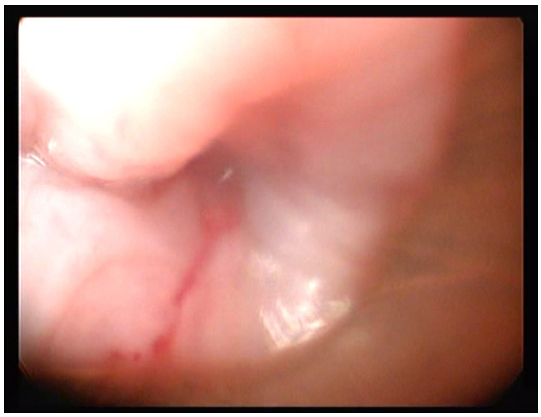

Figure 1. Haemorrhage in urethra.

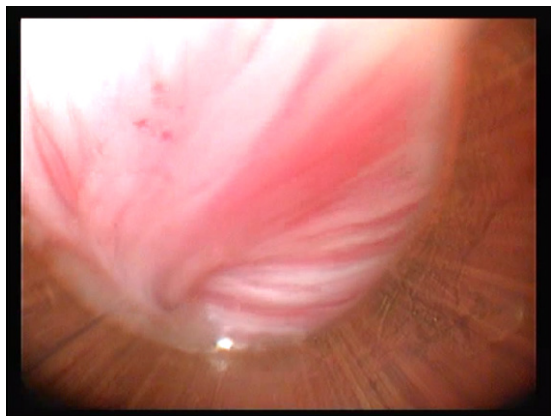

Figure 2. Petechiae in urethra.

Figure 3. Mucosa of the urinary bladder showing inflammatory signs.

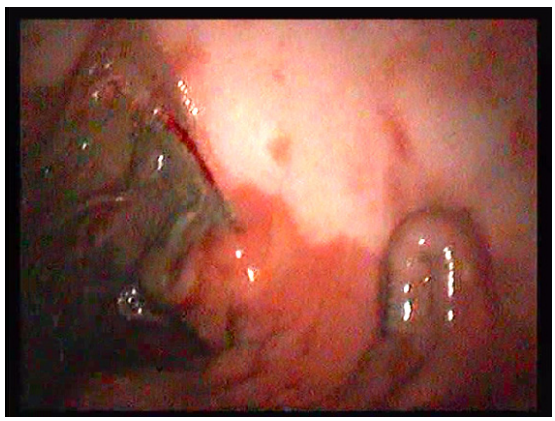

Figure 4. Same traumatic lesion in the vaginal fornix showing cervical opening.

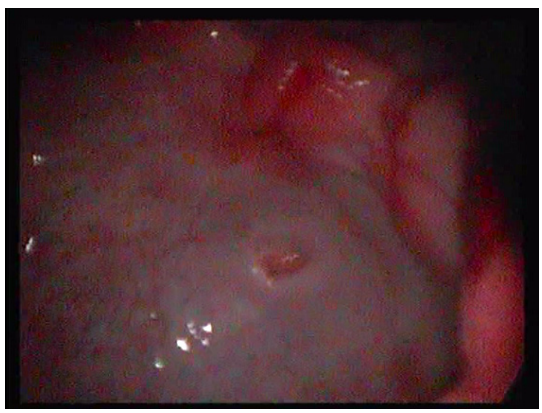

Figure 5. Abnormal sessile growths dorsal to urachal cicatrix with haemorrhages.

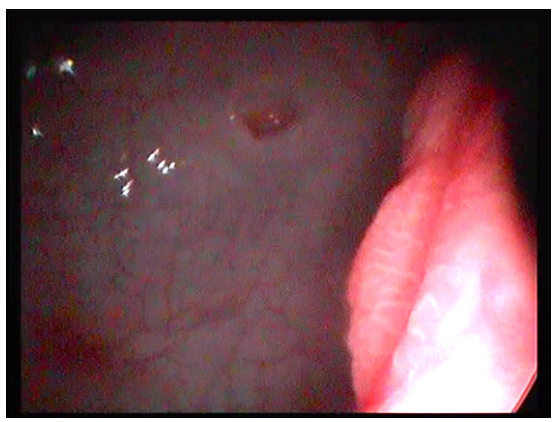

Figure 6. Abnormal growths on the bladder wall on the right side of the frame.

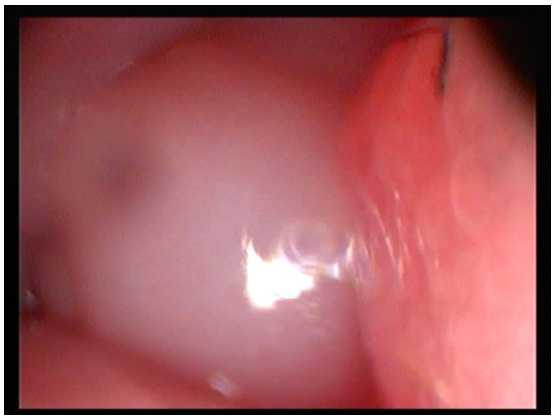

Figure 7. Abnormal growths on the bladder wall on the right side of the frame and the urachal cicatrix.

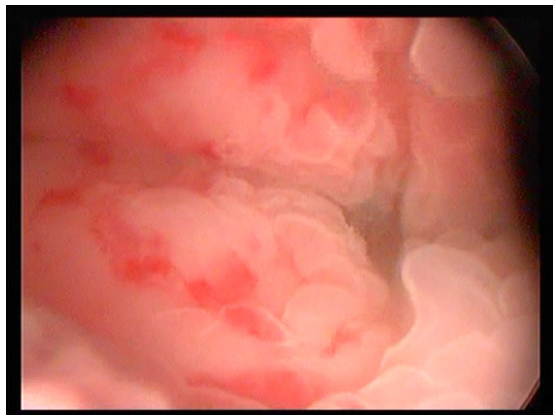

Figure 8. Abnormal sessile growths in the floor of the urinary bladder with haemorrhages.

Figure 9. ultrasonogram of the left kidney showing hyper echoic areas (arrows).

Figure 10. Ultrasonogram showing anechoic urinary bladder with an isoechoic sessile mass (arrows) originating from mucosa.

Figure 11. Endoscopic image of the bladder showing a lobulated lump along with a slimy stringy mucus.

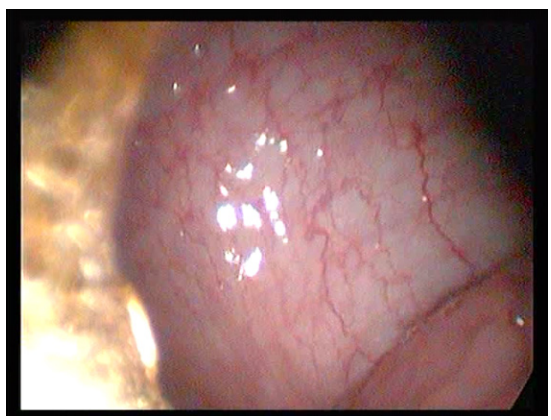

Figure 12. Endoscopic image of the bladder showing a congested mucosa adjacent to the lump.

returns.

Case 4

A multiparous buffalo was referred with a palpable lump *per-rectum* after a gynaecological examination.

The general condition of the animal was not good. Rectal palpation revealed a lump in the rectum which was very tough. The hardness did not allow further search for bladder. Urinalysis did not show any trace of blood but the animal had bilirubinuria and ketonuria (Table 1).

Ultrasonography with 3.5 MHz transducer placed in the ischiorectal fossa showed an anechoic round structure mimicking the appearance of bladder. The transducer was then introduced into the rectum over the lump. Ultrasonography *per-rectum* revealed a multi cavity lesion with anechoic fluid filled cavity, each cavity separated by hyperechoic trabecular structures (Figure 14). Further scanning revealed the urinary bladder compressed by a hypoechoic mass making an isthmus like connection between the two parts of the bladder (Figure 15). The right kidney was then scanned *transcutaneous*. The image showed anechoic areas within the hyperechoic sinus suggesting fluid accumulation and a dilated ureter at the hilus together indicating hydronephrosis (Figure 13). Using ultrasonography, hydronephrosis has been successfully diagnosed by Durgut *et al.* (2003) in cows. Similarly, Kurt and Cihan, (2013) have also diagnosed hydronephrosis sonographicaclly in cattle.

The owner did not allow any further intervention, diagnostic or therapeutic.

Case 5

A buffalo calved for a fourth time about two months back was brought to the clinical complex with stranguria for four days and haematuria for last two days and dribbling of urine. Urinalysis showed presence of blood, leukocytes, and nitrites (Table 1).

Urethroscopy revealed haemorrhagic urethral mucosa and streaks of white pus oozing from the lesions in the urethra (Figure 16, 17). Similar lesions were seen in the bladder (Figure 18). Sessile growths/lumps were also seen in the bladder mucosa (Figure 19). The fornix of vagina also appeared inflamed upon vaginoscopy (Figure 23). Ultrasonography of the bladder also showed thickened bladder mucosa and sessile polyps (Figure 20 and Figure 21). The sonogram of the right kidney revealed anechoic cavities with acoustic enhancements in the renal parenchyma suggesting presence of cysts or fluid filled cavities (Figure 22). The case was diagnosed as purulent cystis and urethritis with renal cysts.

Case 23

A multiparous buffalo was presented with a complaint of severe straining during urination and discomfort for more than eight days. The general condition of the animal was poor. The urinalysis showed haematuria, leucocyturia and nitrituria.

The bladder sonogram showed thick irregular bladder wall suggesting nodular formation (Figure 24). The cystoscopy revealed thickened mucosa (Figure 26), sessile growths in the bladder wall (Figure 27 to 29) and numerous pus filled foci with peripheral inflammation (Figure 27 and Figure 28). Ultrasonogram of the right kidney (Figure 25) showed dilation of the ureter, and distorted sinus contours and interspersed hypoechoic areas suggestive of nephropathy.

Durgut *et al.* (2003); Kurt and Cihan (2013) have also diagnosed hydronephrosis sonographicaclly in cattle. Franz *et al.* (2004)

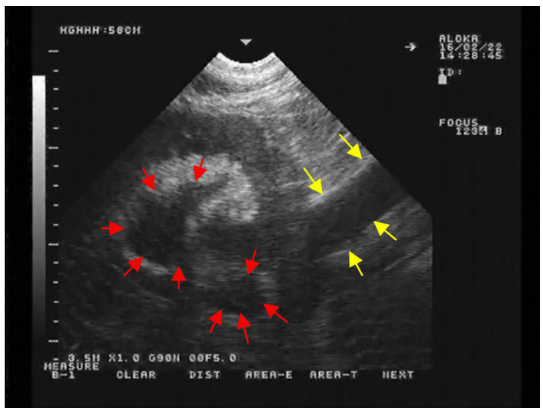

Figure 13. Ultrasonogram of the right kidney showing anechoic areas (red arrows) in the sinus suggesting fluid and a dilated ureter (yellow arrows).

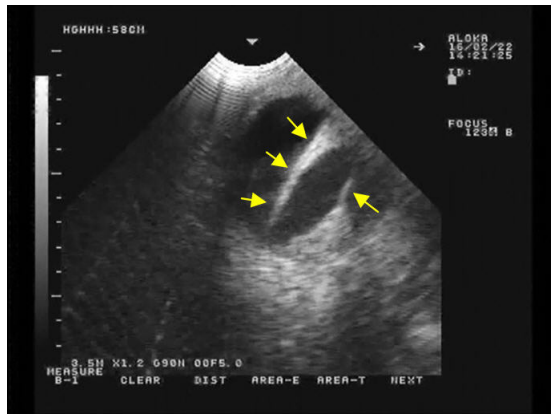

Figure 14. An ultrasonogram *per-rectum* showing anechoic structure divided by hyperechoic trabeculae (arrows).

Figure 15. An ultrasonogram *per-rectum* showing an isoechoic lesion compressing the urinary bladder (arrows).

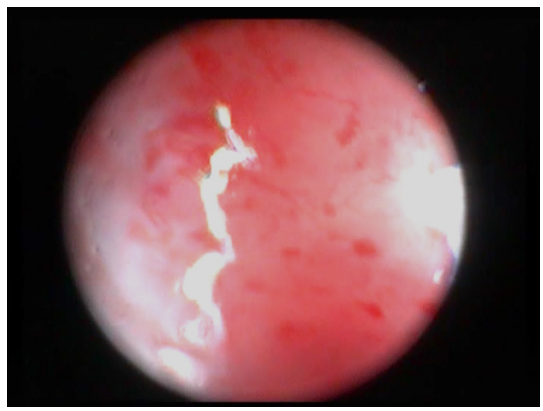

Figure 16. Endoscopic image showing haemorrhages in the urethra and pus streaks.

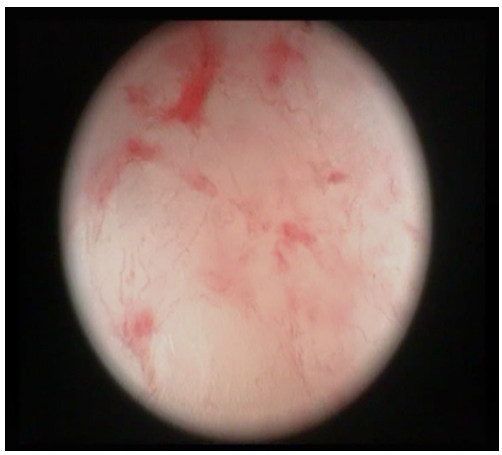

Figure 17. Endoscopic image showing haemorrhages in the mucosa of the urinary bladder.

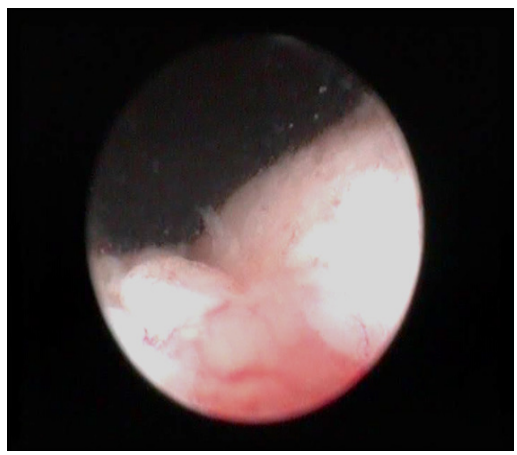

Figure 18. Endoscopic image showing pyogenic lesion in the mucosa in the floor of the urinary bladder.

Figure 19. Endoscopic image showing sessile nodular growths in the mucosa of the urinary bladder.

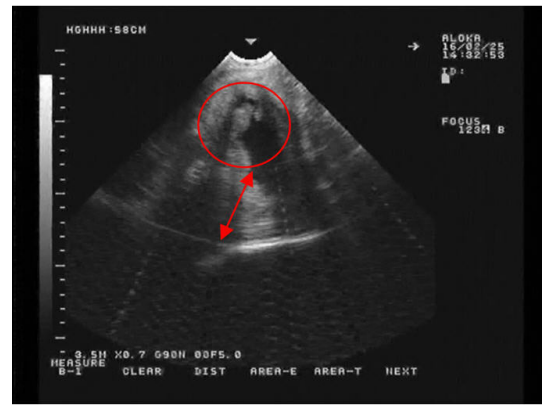

Figure 20. Ultrasonogram of the urinary bladder showing growths (red circle) and thickened mucosa (red double headed arrow) of urinary bladder.

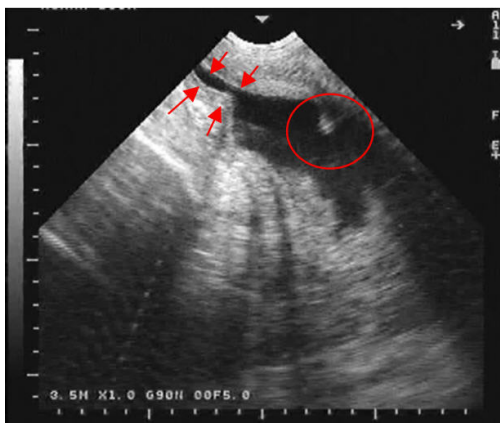

Figure 21. Ultrasonogram of the urinary bladder showing urethra arising from the bladder (red arrows) and a growth (red circle) in the mucosa of urinary bladder.

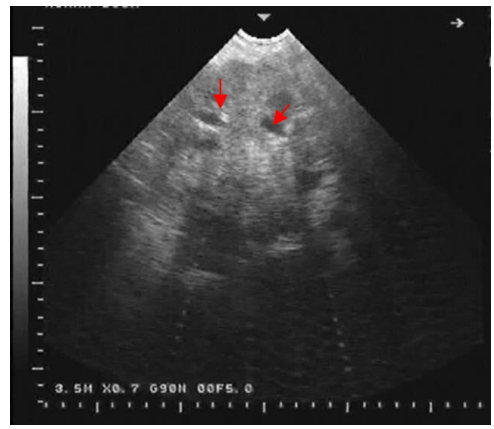

Figure 22. Ultrasonogram of the left kidney showing fluid filled anechoic areas with acoustic enhancement (red arrows).

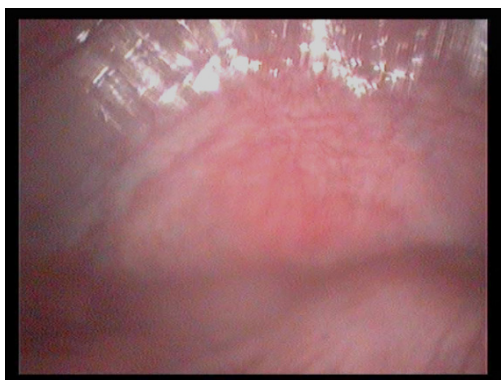

Figure 23. Endoscopic image of the fornix of vaginae showing increased vascularity.

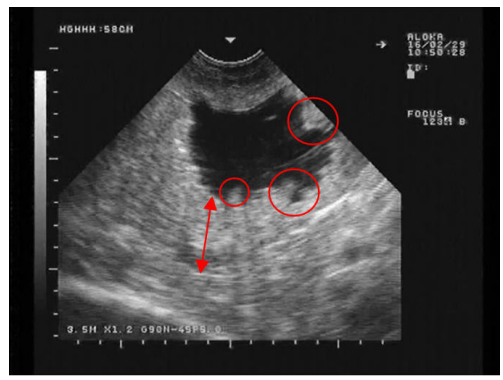

Figure 24. Trans-cutaneous ultrasonogram through ischio-rectal fossa, of the urinary bladder showing thickened mucosa (red double headed arrow) and sessile growths (red circles).

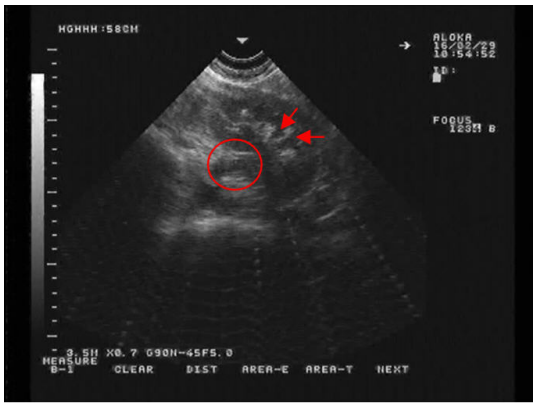

Figure 25. Ultrasonogram of the right kidney showing fluid (red arrows)in the distorted sinus and a slightly dilated ureter (red circle).

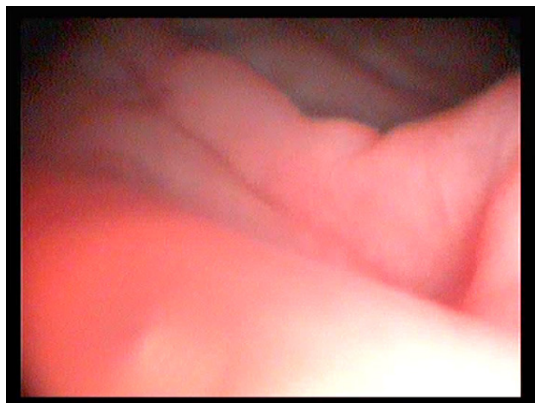

Figure 26. Endoscopic image of the urinary bladder showing thickened mucosa.

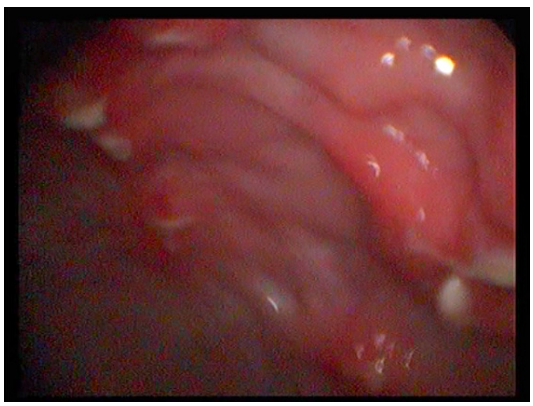

Figure 27. Endoscopic image of the urinary bladder showing multiple pyogenic focal lesions in the mucosa.

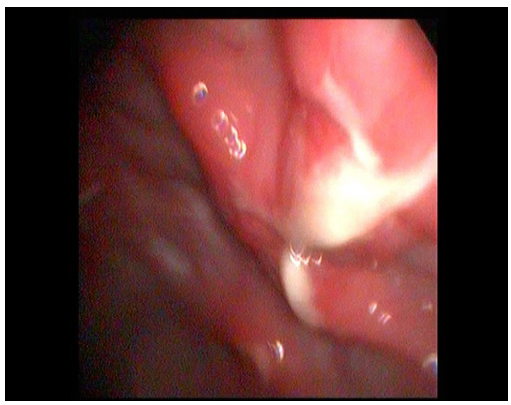

Figure 28. Endoscopic image of the urinary bladder showing close up of a pyogenic focal lesion in the mucosa.

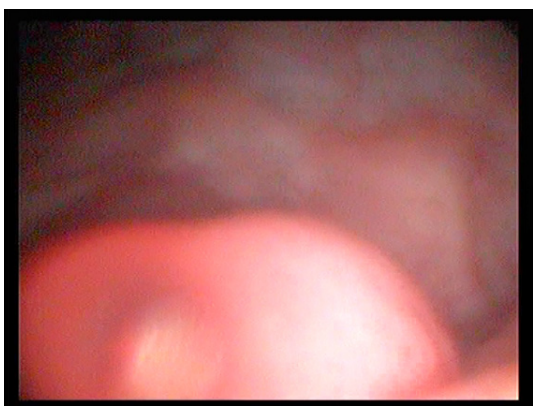

Figure 29. Endoscopic image of the urinary bladder showing sessile growth (fore ground) in the mucosa.

reported they found humped urinary bladder mucosa having dull appearance and accumulation of pus and fibrin during cystoscopy in cattle and diagnosed it as fibrinous-purulent cystitis.

In this study on the basis of the findings of urinalysis, ultrasonography and urethrocystoscopy, one case was diagnosed as having haemorrhagic cystitis, and post-partum vaginal trauma in addition to having retained placenta; two cases were diagnosed as having urinary bladder tumour, one case was diagnosed as having hydronephrosis and a cyst beneath the rectum, and two cases were diagnosed as having purulent cystitis and urethritis with renal cysts. It can therefore, be safely concluded that ultrasonography and endoscopy can be used in the diagnosis of the affections of the urinary tract in buffaloes.

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