Benha University
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Master Summary

DIAGNOSTIC IMAGING OF THE URO-GENITAL SYSTEM IN SHEEP AND GOAT

Thesis presented
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Summary and Conclusion

The present study was conducted in surgery department, faculty of veterinary medicine, Benha University. The aim was to throw light on the validity of diagnostic imaging (ultrasonography, radiography and CT) on diagnosis of sheep and goat urogenital affections specially urine retention and consequent hydronephrosis. It was divided into two main parts, an experimental part and the clinical part.

I- The experimental part:-

This part was carried out on 20 apparently healthy bucks, divided equally into four groups (5 animals for each):-

Group A: - Control group (sham-operated goats): -

Subjected to Left paramedian laparotomy and only gentle manipulation of two ureters was carried out without legation.

Group B: - Urethral Legation: -

Subjected to direct urethral ligation to induce urethral obstruction and subsequent urine retention.

Group C: - Bilateral ureteral Ligation: -

Subjected to ligation of both ureters.

Group D: - Unilateral Legation of the left ureter: -

Subjected to legation of the left ureter.

Animals in all groups were examined and evaluated before and after 12, 24, 36, 48 hours of surgical interference, while in group D evaluations and examinations were performed each 5 days post the first 48 hours (7 days, 12 days and 17 days post surgical interference).

Evaluations and examinations included clinical examination, ultrasonographic examination, radiographic examination, CT, full kidney function test, urine analysis and histopathological examination.

II-The clinical part:-

This part was conducted on 109 animals (40 sheep and 69 goat), all animals were admitted to veterinary clinic, Faculty of Veterinary Medicine, Benha University during the period from 2009-2011and were suffering from different urogenital surgical affections included; Urine retention (25 cases), Hydronephrosis (5 cases), Urinary calculi (5 cases), Urinary bladder sediment (8 cases), Blood clots inside the urinary bladder (2 cases), cystitis (12 cases), Ruptured Urethra (5 cases), Urethral dilatation (diverticulum) (18 cases), Orchitis and epididymitis (5 cases), Scrotal hernia (5 cases), Vaginal cyst (1 case), Rectovaginal fistula (7 cases) and Gangrenous mastitis (10 cases).

The results of this study were:

I- The experimental part:-

Group (A):-

The clinical parameters were within normal levels allover the time of the experiment, the urinary tract could be examined via ultrasonography; radiography and computed tomography and different measurements could be assessed and recorded. Kidney function test and urine analysis were performed and seemed to be within standard levels.

Group (B):-

Clinically, the animals showed different signs of restlessness and colic due to urine retention, elevated temperature, shallow-rapid respiration, elevated pulse rate, pale to congested mucous membranes and ruminal

atony. On palpation, the urethral pulsation was felt transrectaly and the full distended UB transabdominaly.

Ultrasonographically, there was significant increase in right and the left kidneys dimensions .Mild hydronephrosis was the main feature in which both kidneys appeared enlarged and more rounded with dilated anechoic renal pelvis and ureter. The diameter of the bladder was significantly increased and the UB appeared as full distended anechoic fluid filled sac with thin stretched hyperechoic wall.

By C.T, Kidneys were visualized at transverse section where they appear more rounded taken horse-shoe shape (hydronephrosis) with thin band like peripheral cortex and more radio opaque dilated medulla. The renal pelvis and the ureters of both kidneys were observed clearly dilated and radiopaque. The UB was scanned as dilated sharply demarcated slight radiopaque structure, less dense radiopaque due to urine stasis which prevents full saturation with contrast material.

Kidney function tests, Creatinine and Urea levels show significant increase.

Group (C):-

Clinically, the animals showed different signs of restlessness and colic due to urine retention, elevated temperature, shallow-rapid respiration, elevated pulse rate, pale to congested mucous membranes and ruminal atony.

Ultrasonographic changes of both kidneys were similar to that observed in case of urethral ligation but rapidly appeared and developed.

Kidney function test, Creatinine and Urea levels showed significant increase.

Group (D):-

Clinically, there was transient slight elevation in body temperature, respiration and heart rate; ruminal atony and pale mucous membrane till first 7 days post ligation.

Ultrasonographically, there was non significant increase in left kidney dimensions all time of the experiment. Seven days post-ligation the ultrasonographic changes in the left kidney were similar to that observed in case of urethral ligation and only show mild hydronephrosis, while 17 days post-ligation, left kidney size was increased and the distended fluid-filled pelvis became more obvious and the normal strong echoes of the peripelvic fat and fibrous tissue was lost completely and distended fluid-filled ureter could be detected which representing sever advanced degree of hydronephrosis. The non legated right kidney didn't show any changes except mild dilatation of renal medulla representing functional dilatation (pre legation, 5.8±0.4mm while 17 days post legation, 7±0.32).

Kidney function test, Creatinine showed significant increase at 12 and 24 hours post ligation and non significant decrease at 17 days post ligation. Urea showed transient non significant increase at 12 and 24 hours post ligation till 7days post ligation followed by non significant decrease at 12 and 17 days post ligation.

Histopathological examination of the hydronephrotic kidney after 17 days post unilateral ureteral ligation revealed affected renal tubules represented by cystic dilatation of these tubules and flattening of their lining epithelium with interstitial inflammatory cells infiltration mostly lymphocytes.

II- The clinical part:-

Following the confirmatory diagnosis of each case either by ultrasonography, radiography or by both (according to case nature), they were subjected to the required therapeutic treatment or the suitable surgical interference.

Conclusion

1- Abdominal ultrasonography was used as a rapid, safe and non invasive technique for obtaining information and for diagnosis of different urinary tract and genital tract affections in contrast to radiographic examination.

2- Compared with conventional radiography and ultrasonography, CT eliminates superimposition of structures and dramatically improves resolution so allows better distinction among specific tissue densities and detection of subtle changes in organ size, shape, margin contour and position within a very short scan time. CT has begun to compete with radiology and ultrasound for evaluation of certain urinary tract conditions as it offer excellent anatomical insights into kidneys, ureters, UB and urethra.

3- Thorough knowledge of the cross sectional anatomy aided to achieve accurate interpretation of ultrasonography or CT, hence establish reference standards for normal urinary tract organ's size, position and structure and compare it with the abnormal conditions.

4- Small ruminants with a tentative diagnosis of urine retention, all parts of the urinary system should be subjected to thorough ultrasonographic examinations of each part of the urinary tract to early confirm the diagnosis and evaluate degree of damage caused by urinary obstruction.

5- Renal and ureteral obstruction requires radiographic or ultrasonographic studies for accurate diagnosis. So early recognition, evaluation and correction of urinary obstruction may result in complete restoration of renal function.

6- Unilateral urinary obstruction doesn't cause azotemia if the contralateral kidney is functioning normally while bilateral upper urinary tract and lower urinary tract obstruction causes progressive azotemia and hydronephrosis and ended by animal death due to life threatening metabolic disorders.