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## EXAMINATION OF COWS FOR THE PRESENCE OF URINARY TRACT INFECTIONS

(With 3 Tables)

By

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إجراء الفحوس للأبقار التي تعاني من إصابات الجهاز البولي  
في محافظة المنيا

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أجريت هذه الدراسة على 53 بقرة بلدي منها 11 بقرة ( مجموعة أ ) في حالة  
عسر ولادة و 22 بقرة ( مجموعة ب ) في الفترة الأولى من الحمل تعاني من أعراض إصابات  
في الجهاز البولي بالإضافة إلى عشرة حيوانات أخرى سليمة أستخدمت للمقارنة . تم عزل  
أنواع مختلفة من الميكروبات في المجموعتين أ ، ب بنسب 90.9% ، 62.5% على  
الترتيب . ثبت في تحليل البول في المجموعتين (أ،ب) وجود نسب مختلفة في كل من  
الزلال ( 100% ، 81.82% ) ، الدم ( 81.82% ، 56.25% ) والخلايا الصديدية  
( 90.9% ، 62.5% ) على الترتيب . وجد من تحليل الدم ارتفاع ملحوظ في كل من  
البولينا ، الكرياتينين والمغنسيوم في كل من المجموعتين أ ، ب مع انخفاض ملحوظ  
في مستوى الكالسيوم بالدم . تلاحظ ارتفاع نسبة الإصابة بالجهاز البولي في الأبقار التي  
تعرضت لسر ولادة عن غيرها مما ينصح باتباع الشروط الصحية لمنع حدوث التهابات في  
الجهاز البولي .

### SUMMARY

A total of 53 female balady cows was included in this study. Animals were classified into 3 groups, group A (with a history of dystocia), group B (in early pregnancy) and group C (control healthy). Bacteriological examination of urine samples collected from group A and group B revealed that 90.9% and 62.5% of samples harboured different types of micro-organisms respectively; such organisms were not detected in members of group C. Semi-quantitative chemical analysis of urine samples of group A showed that the incidence of albumin, blood, pus cells and casts were 100%, 81.82%, 90.9% and 90.9% respectively. The incidence of these 4 elements were 62.5%, 56.25%, 62.5% and 39.38% respectively in the urine samples of group B while they were totally absent in samples of healthy animals of group C. Biochemical analysis of blood from cows of group A and B revealed a marked increase in urea nitrogen, serum creatinine and magnesium level with a marked decrease in calcium level in contrast to those of group C. From this work, it is quite evident that urinary tract infections by potentially pathogenic micro-organisms were much more common among cows with dystocia, therefore, hygienic precautions must be taken during dystocia to prevent or at least to decrease urinary tract infection.

## INTRODUCTION

Urinary tract infections in cattle give rise to various problems for animals breeders everywhere. Too many causes were reported by BLOOD and HENDERSON (1974) and EL-SAID (1968). Recently reports from Animal Health Veterinary Laboratory in Minia governorate pointed out that urinary tract infections predominate in some cows either after delivery or sometimes following dystocia. The aim of this work was to investigate the propable causes of urinary tract infection.

## MATERIAL and METHODS

Fifty three female balady cows with an average age of 4-7 years, were chosen for this work. Clinical signs of urinary tract infection appeared and included arching back, straining at urination, discolouration of urine, in addition to loss of appetite, decreased milk yield in some of them. Fever was evident in some individuals.

Examined cows were classified into 3 groups:

- 1 - **Group A:** Comprised of eleven cows with history of dystocia.
- 2 - **Group B:** Consisted of thirty-two cows at early pregnancy (3<sup>rd</sup>-4<sup>th</sup> month).
- 3 - **Group C:** Comprised of ten cows serving as control group as shown by the results of clinical examination and urine findings which proved absence of apparent disease.

Urine samples from examined cows were collected, using catheters, under aseptic conditions in sterile containers. Both semi-qualitative chemical as well as sediment examination of urine was conducted according to COLES (1974).

Bacteriological examination of urine samples was conducted following the technique of EDWARD'S and EWING'N (1962). Blood samples for biochemical analysis were also collected from normal and affected cows for determination of blood urea nitrogen, serum creatinine, calcium and nitrogeanic phosphorus. Respective methods were after MARSCH, *et al.* (1975); HUSDAN and ROPOPORT (1968); GINDLER and KING (1972) and FISKE and SUBBAROW (1925).

Statistical analyses of obtained results was performed according to KALTON (1967).

## RESULTS

The incidence and frequency of bacteria isolated from tested cows are shown in table (1).

Bacteriological examination of urinary samples collected from normal cows group C revealed absence of the aforementioned bacteria. From cows with dystocia (Group A), ten samples (90.9%) harboured different micro-organisms and only one (9.1%) was sterile.



## COWS, TRACT INFECTIONS

Results of the 32 samples collected from cows at early pregnancy (Group B), revealed that 20 cows (62.5%) harboured different types of micro-organisms, while the rest (37.5%) were sterile.

Results of chemical and microscopical examination of urine sediment are presented in table (2). Proteinuria was detected, in varying degrees, in all cases of group A and 20 cases in group B, while glucose and bile pigment seemed to be in significant finding in affected cows. In addition to the presence of blood in 9 cases group A & 18 cases of group B.

Varying types of casts (granular, pus cells, hyaline and red cells) were found in 10 to 19 cases in group A and B respectively. The mean values of biochemical analysis of blood serum of the 3 groups of cows, are given in table (3).

### DISCUSSION

Incidence of urinary tract infection in cows with dystocia (Group A), reached 90.9% as judged by the results of urine and blood examination. This high percentage may be due to the unhygienic measures and contaminated lubricants usually used by farmers to facilitate delivery specially in these cases.

The high frequency of incidence of infections to E.coli (81.82%) may explained by the existence of the filthy environment of cows at the time of parturition.

On the other hand, the incidence of infection in pregnant cows (Group B) was 62.5%. Such infection is most probably ascending in nature and usually occur via serving with infected bulls as previously reported by BLAM and DAM, (1965). An additional local factor, may be the submerge of pregnant animals under stagnant contaminated water.

The results of this study showed that 32 and 68 different types of micro-organisms were isolated from urine samples of group A and B respectively. On the other hand the urine samples collected from group C were free from pathogenic bacteria; similar results were obtained by ELYAS (1979).

The most predominant bacteria isolated from group A were E.Coli (81.82%), Coryn. renale (45.45%), Enterococci (36.36%), Proteus mirabilis (36.36%), Pseudomonas pyocyanea (36.36%), Staph. epidermides (27.27%) and Staph aureus (27.27%).

On the other hand, isolated bacteria from cows in group B were as follows E.Coli (53.13%), Coryne renale (34.38%), Staph. epidermides (31.25%), Staph. aureus (28.13%), Pseudomonas pyocyonea (25%), Proteus mirabilis (21.88%) and Enterococci (18.75%).

Mixed infection was observed among the majority of cases of both groups yet, a pure culture of either E.Coli and Coryne renale was isolated from two cases (group A). These results nearly coincide with obtained by EL-SAID (1968), DOXEY (1971) and BLOOD & HENDERSON (1974) and MOHAMED et al. (1984).



## KALDES &amp; HENIN

The results of the examination of urine specimens microscopically and chemically showed variable degrees of albuminuria and pyuria in most of the cows other than those of the control group C. Haematuria and renal casts were present in 81.82% and 56.25% of the diseased cows of group A and group B respectively. According to several authors, the presence of more than 10 pus cells/ H.P.F in centrifuged urine sample is considered as an indication of inflammation or necrosis of tissues of urogenital tract (CAMPBELL, 1963; EL-SAID, 1968; DOXEY, 1971 and KELLY, 1974). A similar result was obtained in this study especially when the number of pus cells was compared with that of the normal cows.

MEDWAY *et al.* (1969) described that varying quantities of protein in urine samples depend on the severity of the infection and tissues involved, while the presence of renal casts may be arising from disruption of cell membrane and damage to the renal epithelium.

As regards the biochemical examination of blood for four elements, a marked difference was noticed between their values of members of group A and B on one hand and those of members of the control healthy group on the other hand. COLES (1974) reported similar results of these elements in inflammatory processes of the urinary tract.

It seemed that mixed infection induces high levels of urea nitrogen which reached, in some cows, 60.67 mg%. However, by screening the individuals levels in both groups (A & B) it may be concluded that there is no regular pattern for a specific micro-organism to induce a degree of kidney insufficiency and consequently high levels of urea nitrogen or creatinine are reached. These changes were accompanied by a slight increase in magnesium level.

## REFERENCES

- Blom, E. and Dam, A. (1965): E Coli in bull semen Meddr. St. Vet. Serum Lab., No. 409, pp. 6.
- Blood, D.C. and Henderson, J.A. (1974): Veterinary Medicine, 4th Ed., Bailliere, Tindall, London.
- Campbell, M.E. (1963): Urology, 2nd Ed., W.B. Saunders, Co. Philadelphia and London.
- Coles, E.H. (1974): Veterinary Clinical Pathology 2nd Ed., W.B. Saunders, Company, Philadelphia, London and Toronto.
- Doxey, D.L. (1971): Veterinary Clinical Pathology 1st Ed., Bailliere, Tindall and Cassel Ltd., London.
- Edwards, P.R. and Ewing, W.H. (1962): Identification of Enterobacteriaceae, 2nd Ed., Burgess Publ. Co., Minneapolis.
- El-Said, W.A.G. (1968): The bacterial flora of urine of cattle and sheep in health and disease. M.D. Thesis, Fac. Vet. Med., Cairo University.
- Elyas, A.H. (1979): Some studies on pyelonephritis in buffaloes, M. Vet. Sc. Assiut University.

## COWS, TRACT INFECTIONS

- Fiske, C.H. and Subbarow, Y. (1925): The calorimetric determination of phosphorus. *J. Biol. Chem.*, 66: 375-400.
- Gindler, E.M. and King, I.D. (1972): Rapid colorimetric determination of calcium in biologic fluid with methoxythymol blue. *Am. J. Clin. Path.*, 58: 376-382.
- Husdan, H. and Rapoport, A. (1968): Estimation of creatinine by the Jaffe reaction. A comparison of three methods. *Clin. Chem.*, 14 (3): 222-228.
- Kalton, G. (1967): Introduction to statistical ideas from social scientists 2nd ed., Academic Press, London.
- Kelly, W.R. (1974): *Veterinary Clinical Diagnosis*, 2nd Ed. Bailliere, Tindall, London.
- March, W.H.; Fingerhut, B. and Miler, E. (1965): Determination of urea nitrogen by the diacetymonoxime method *Clin. Chem.*, 11: P. 624.
- Medway, W.; Prifr, J.E. and Wilkinson, J.S. (1969): *Textbook of Veterinary Clinical Pathology*. Williams and Wilkins Co., Baltimore, U.S.A.
- Mohamed, A.R.; El-Nagar, H.; Attar, H. Omran, H. (1984): Urine analysis as a diagnostic mean for detection sub-clinical cases of urinary tract infections in buffaloes. *Assiut Vet. Med. J.* 14: 161-165.

Table 1

Incidence and frequency of bacteria isolated from the examined cows

Organisms	Group A (n=11)		Group B (n=32)		Group C (n=10)
	No. of	%	No. of	%	No. of
	isolation		isolation		isolation
<u>E. coli</u>	9	81.82	17	53.13	0
<u>Proteus mirabilis</u>	4	36.36	7	21.88	0
<u>Pseudomonas pyocynea</u>	4	36.36	8	25	0
<u>Staph. epidermidis</u>	3	27.27	10	31.25	0
<u>Staph. aureus</u>	3	27.27	9	28.13	0
<u>Enterococci spp.</u>	4	36.36	6	18.75	0
<u>Coryn. renale</u>	5	45.45	11	34.38	0

Mixed infection was common except with two animals of group A.



## KALDES &amp; HENIN

Table 2  
Results of semi qualitative chemical and microscopical examination of  
urine samples from both normal and abnormal cows

Test for the presence of	Number and percentage of positive cases of					
	Abnormal cows				Normal cows	
	Group A (11)		Group B (32)		Group C (10)	
	Number	%	Number	%	Number	%
Albumin	11	100	20	63	0	0
Glucose	0	0	0	0	0	0
Blood	9	81.8	18	56.3	0	0
Bile pigment	0	0	0	0	0	0
Pus cells /HPF.*	10	91	20	63	0	0
Casts	10	91	19	59.4	0	0

\* Pus cells in positive cases were more than 12 cells / HPF., while in the control group they did not exceed 3 cells / HPF.

Table 3  
Mean values\* of some blood elements of both normal and diseased cows

Blood parameters	Normal cows	Abnormal cows	
		Group A	Group B
Urea nitrogen	24.30 ± 3.01	48.74 ± 1.48	33.04 ± 1.97
Serum creatinine	2.50 ± 0.44	4.12 ± 0.16	3.69 ± 0.24
Serum calcium	11.22 ± 0.62	8.97 ± 0.33	8.82 ± 0.19
Inorganic phosphorus	6.21 ± 0.41	6.92 ± 0.11	6.62 ± 0.13
Magnesium level	2.11 ± 0.14	3.01 ± 0.12	3.34 ± 0.12

\* The value is expressed as mg%.