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CLINICAL AND BACTERIOLOGICAL INVESTIGATION OF LIVER ABSCESSES OF FEED LOT BEEF CATTLE. AT BEHERA GOVERNORATE

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ABSTRACT

A total of 45 liver samples collected from slaughter houses in Behera Geverncrate. Including 5 samples found to be affected with fasciola and abscesss, 10 cases were affected with liver abscesses, 4 samples was infested with fasciola only and the remaining 26 samples revealed signs of hepatitis.

All samples were submitted to aerobic and anaerobic bacteriological examinations and the results showed that 12 samples harboured only aerobic bacteria with an incidentce of 26.7% and 11 samples harboured anaerobic bacteria only with an incidence of 24.4%. All isolates obtained were subjected to biochemical identification. While 22 samples harboured cultures of mixed isolate of aerobic and anaerobic bacteria with an incidence 48.9%.

The results of in vitro of antibiogram showed that all isolates were highly sensitive to amoxicillin gentamycin and florfenicol on different types of the isolates E-coli, Actinomyces pyogenes, Fusobacterium necrophorum and staphylococcus aurus.

INTRODUCTION

Local suppurative infections of the liver do not cause clinical signs of hepatic dysfunction unless they are particularly massive or extensively metastatic .

They may however cause signs of toxeamia because of the destruction of hepatic tissue or the liberation of potent toxins abscessed liver are common in cattle fed heavily on concentrate Brent (1976) Roberts (1982) Brink et al (1990) Nagaraja and Chengappa (1998) who found that in grain-fed cattle liver abscesses were 5.6% and 11.1% (after 80 and 120 days in the feedlot, while in grass – fed cattle liver abscesses were 0.2% .

Ruminal lisions resulting from acidosis generally are accepted as the predisposing factors for liver abscess Nagaraja and chengappa (1998).

Liver holds a unique position in the body because of its anatomical connection and multiple and varied function it performs. Any alteration in its structure may affect most body constituents Roderick et al. (1979).

Damage of liver and pathological affections of liver may be attributed to a variety of causes including viruses, parasites, mycoses in addition bacteria which is one of these causes and causes a great economic losses in

animal production represented by liver condemenation at slaughter houses Blood and Radostitis (1989). Also has direct economic effect in the animals as it lead to reduced feed intake, reduced weight gain, decreased feed efficiency and decrease yield Brink et al. (1990). Several specific diseases of the liver cause reduced weight gain and slaughtcr house condemnation of the liver with a fibrinous and purulant exudate, typical of early generalized peritonitis, the changes are more advanced and chronic in another case resulting from septic reticuloperitonitis Blowey and Weaver (1991).

Control of liver abscesses in feed lot cattle generally has depended on the use of antimicrobial compounds Nagaraja and Chengappa (1998). The mode of action of antibiotics in preventing liver abscesses is belived to be via inhibition of ruminal F.necrophorum so most of antibiotics commonly used feed additive Nagaraja et al. (1999).

This study was directed mainly to the role played by aerobic and anaerobic bacteria in hepatitis. Also recomendation for using antimicrobial compounds as feed additive.

MATERIAL AND METHODS

Atotal of 45 liver samples were collected from beef cattle at slaughterhouses in Behera Governorate. Including 5 samples were found to be affected with fasciola and abscesses, 10 cases were affected with liver abscesses and 4 samples was affected with fasciola only. The remaining 26 samples showed signs of hepatitis.

Samples were collected from abscess content in case of presences of abscess or from area of hepatitis.

In all cases, mature fasciola worms were detected within the lumen of the main bile ducts. On other hand all samples had liver abscesses which were detected at the peripheral zone of hepatic lobes, and varied in consistency from soft to hard in texture. Liver appeared dark brown in colour and tough in consistency . All samples were collected separately in ice plastic bags and transferred directly to the laboratory for bacteriological examination. Samples were divided into two portions were submitted to aerobic and anaerobic bacteria.

Aerobic isolation :

A loopful of liver content was streaked on to the surface of nutrient agar, Macconky agar and blood agar media, all inoculated plates were incubated for 24 hours at 37cº. Then all different colonies were selected and purified by subcultruring on its selective media including Eosin Methylene blue agar media for the isolation of E.coli, paired barker agar for isolalion of staph aureus, heart brian infusion media for corynebacterium as well as blood agar for the isolalion of pasteurella species according to Cruickshank et al (1975).

Bacterial isolates were examined morphologically, culturally and biochemically according Baily and Scott (1990) and Burrows (1985).

Anaerobic isolation :

A loopful from the affected part was inoculated into two tubes of prepared cooked meat broth, one of them was heated at 80cº for 10 minutes to eliminate non spore forming organisms

while the other tube was left without heating, both tubes were incubated anaerobically at 37cº for 48 hours. The used media were blood ager and neomycin blood agar for isolalion of sporeforming anaerobes and C.perfringens respectively. All isolates were identified according to Koneman et al (1992). Antimicrobial sensitivity test on isolated bacterial strains for determination of the most effective antimicrobial agent for used as feed additive of beef calves, was applied according to (Quinn et al. 2002).

RESULTS

All collected liver samples were from catlle had signs of reduced feed intake, reduced weight gain and fever, and some of these animals had signs of ruminal acidosis came from farm put there animal under fed heavily concentrated these animal show clinical signs includes anorexi, teeth grinding, rumen stasis, increase respiratory rate and had tachycardia. The liver samples were subjected for aerobic and anaerobic bacteriological investigation and the results obtained showed that 22 samples harbored mixed infection of aerobic and anaerobic bacteria with the percentage of 48.9% while 11 samples showed only obligatory anaerobic with the percentage of 24.4% and 12 samples showed aerobic organisms only with the percentage of 26.7% table (1).

Table (1) : Prevalence rates of aerobic and anaerobic bacteria recovered from examined liver samples

Types of liver samples	No. of samples examined	Aerobic organisms		Obligatory anaerobic organisms		Mixed infection	
		No	%	No	%	No	%
Liver showing abscesses with fasciola	5	2	16.67	0	0	3	13.6
Liver with hepatic abscesses	10	4	33.33	6	54.5	0	0
Liver with fasciala	4	0	0	0	0	4	18.2
Liver with hepatitis	26	6	50	5	45.5	15	68.2
Total	45	12	26.7	11	24.4	22	48.9

Aerobic bacteriological examination were applied for all the liver samples collected and the results showed that 34 out of 45 were positive to aerobic examination with percentage of 75.6% and the most predominant isolates of bacteria were Escherichia coli 22 samples followed by and actinomyces pyogenus 7 samples, staphylococcus aureus 4 samples and pasteurella heamolytica one sample as shown in table (2).

Table (2) Incidence Of Aerobic Microorganisms Isolated From Affected Livers

Types of microorganism	No	%
Escherichia coli	22	64.7
Actinomyces pyogenes	7	20.6
Staphylococcus aureus	4	11.8
Pasteurella haemolylica	1	2.9
Total	34	100

Table (3) reveals that 33 out of 45 liver samples were positive for obligatory anaerobic organisms with an incidence of 73.3%. Including 11 isolates in pure form and 22 isolates in concurrently mixed forms with an incidence of 33.3% and 66.7% respectively. The most anaerobic isolates were. isolates). On other hand mixed organisms were including fusobacterium necrophorum with peprostreptococcus indolicus (10 isolates), fusobactrium necrophorum with C. sordellii (7 isolates) and C. sordellii with peprostreptococcus indolicus (5 isolates).

Table (3) prevalence rates and types of anaerobic microorganisms isolated from liver

No.of samples	Positive samples No	%	Single form	No	%	Mixed form	No	%
45	33	73.3	Fusobacterium necrophorum	8/11	72.7	Fusobacterium Necrophorum + Peptostreptococcus Indolicus	10/22	45.5
			C. Sordellii	3/11	27.3	Fusobacterium Necrophorum + C.sordellii	7/22	31.8
						C.sordellii + Peptostreptococcus indolicus	5/22	22.7

Table (4) prevalence rate of single and mixed organisms isolated from infected livers

No. of samples	Types of bacteria					
	Single infection	No	%	Mixed infection	No.	%
45	E. coli	12	26.7	E. coli + fusobacterium necrophorum	4	8.9
	Fusobacterium necrophorum	8	17.8			
	C.Sordellii	3	6.7	E.coli + peptostreptococcus indolicus	3	6.7
	Actinomyes pyogens	4	8.9	C.sordellii + staph.aureus	1	2.2
	Staphylococcus aureus	3	6.7	Actinomyces pyogens + E.coli	3	6.7
	Pasteurella heamolylica	1	2.2	+ fusobacterium necrophorum		

Table (5) the sensitivity of micro-organisms to certain antibiotics

No.	Antiboitics	E-coli spp.		Actinomyces pyogenes		Fusobacterium necrophorum		Staph. aureus	
		Total no.=22		Total No. = 7		Total No. = 15		Total No. = 4	
		No	%	No	%	No	%	No	%
1	Gentamycin	15	68.2	5	71.4	8	53.3	3	75
2	Neomycin	12	54.5	2	28.6	8	53.3	-	-
3	Oxytetracyclin	10	45.5	3	42.9	6	40	1	25
4	Streptomycin	8	36.4	1	14.3	4	26.7	-	-
5	Amoxycillin	18	81.8	6	85.7	10	66.7	4	100
6	Florfenicol	14	63.6	4	52.1	8	53.3	2	50

DISCUSSION

Liver diseases affect all kinds of meat producing animals which lead to great losses in income due to condemnation of great numbers of livers. In addition in the abattoirs, the local infection of the liver cause significant losses in beef calves because it lead to rejection of the affected liver.

In our study, the bacteriological examination indicates that many aerobic and or anaerobic microorganisms in single or mixed forms were identified and found to play a role in this infection as E. coli, Actinomyces pyogenes, staphylococcus aureus, fusobacterium necrophorum and C.sordellii. Similar findings were described by **Z**ienab et al. (1991) .

In this study, it is obsereved that liver flukes play a role in this disease condition as 9 out of 45 samples collected were manifested by fasciola. This observation neraly similar to that mentioned by **F**ahmy and **El**-Attar (1990) who found 6 out of 50 cases of liver collected from abattoirs showed lesions of fascioliasis. Moreover **A**hmed (1991). Recorded that parasitic infestation of the liver may lower the resistance of the hepatic tissues and gives the chance for the bacterial agents to attack as a secondary invaders and produced their pathological lesions.

Bacteriological examination of the liver samples revealed that the incidence of aerobic, obligatory anaerobic and mixed organisms were 26.7%, 24.4% and 48.9% respectively as showing in table (1) including Escherichia coli, staphylococcus aurus, Actinomyces pyogenes and pasteurella heamolytica as an arobic bacteria table (2). These resuelts agree with **R**osa et al. (1989) and **A**bdel-**F**attahetal (1995) who isolaled E-coli, C.pyogenes, staphylococcus aurus and pasteurella heamolytica. Also lechlenbereg et al. (1988) isolated Actinomyces pyogenes from most cases of hepatic abscesses in cattle. It is obsereved that 5 out of 9 cases infested with fascioliasis were accompanied by liver abscesses and this may be attributed to that bacteria were acquired by the flukes in the small intestine of ruminants and during migration, the flukes spread pathogenic bacteria **Al**-Khafaji and Rhaymah (1993). Moreover anaerobic bacteria were isolated from 33 out of 45 hepatic samples in an incidence of 73.3% as showing in table (3). Similar results were obtained by **L**echtenberg et al. (1988). The most predominant anaerobic isolates were fusobacterium necrophorum which represented as incidence 72.7% in single form. This result confirms the findings of **L**echtenberg et al. (1988), **M**akhareta (1988) and **C**iftci et al. (1993) who isolated fusobacterium necrophorum from hepatic abscesses which may give an idea about its role in liver abscesses, **B**lood and **R**adostitis (1989) also stated that Fusobacterium necrophorum is considered to be one of the most common causes of hepatic abscesses C.sordellii isolates were isolated from beef calves in a single and mixed form as Showing table (4). This results agreed with that obsereved by **I**tman et al (1989), **B**lood and **R**adostitis (1989) and **D**arwish (1996) who isolated C.sordelli from beef calves livers and stated that C.sordellii plays a role increating abscesses in ruminant liver.

Control of liver abscesses in feed lot calves generally has depended on the use of antimicrobial compounds.

Results of the in vitro sensitivity test (table 5) revealed that Amoxycillin was the most effective antibiotic against baeteria followed by gentamycin and florfenicol on the different types of the isolates E-coli, Actinomyces pyogenes,fusobacterium necrophorum and staphylococcus aurus with the percentage of 81.8%, 85.7%, 66.7%, and 100% respectively for Amoxycillin and 68.2%, 71.4%, 53.3% and 75% respectively for gentamylin and 63.6%, 52.1%, 53.3% and 50% respectively for florfenicol. Such these drugs are used for prevention of liver abscesses in feed lot beef calves **N**agaraja and **C**hengappa (1998) and **N**agaraja et al. (1999) who found that using antimicrobial compound as a feed additive reduce abscesses incidence by 40 to 70%. The mode of action of antibiotics in preventing liver abscesses is belived to be via inhibaition of ruminal fusobacterium necrophorum.

REFERENCE

1. **Abd El-Fattah, A.M., Said, A.M. and Said, Ash. M. (1995)** : Bacteriopogical assessment of inflammed cattle livers with special view to hepatic abscesses. Assiut vet. Med. J. 32 (63) : 96-101.

2. **Ahmed, L.S. (1991)** : Incidence of hydatid disease in camels. Assiut. Vet. Med. J. 24 (48) : 6.

3. **Al-Khafaji, N.J. and Rhaymah, M.S. (1993)** : Prevalence of clinical diseases in sheep in ninevah province Iraq. J.Vet. Sci 6 (2) :114-117.

4. **Baily W.R. and Scott, E.G. (1990)** : Diagnostic Microbiology, 7th ed. C.V. Mosby Co., U.S.A.

5. **Blood, D.C. and Radostitis, O.M. (1989)** : Veterinary Medicine. A text book of the disease of cattle, sheep, pigs, goats and horses. Six Ed. Bailliere Tindapp.

6. **Blowey R.W. and weaver, A.D. (1991)** : Acolour atlas of disease and disorders of cattle published by wolfe publishing LTD. PP. 71.

7. **Brent, B.E. (1976)** : Relationship of acidosis to other feedlot ailments, J. Anim. Sci. 43: 930-935.

8. **Brink, D.R., Lowry S.R., Stock R.A., and parrott J.C. (1990)** : Severity of liver abscesses and efficiency of feed utilization of feedlot cattle. J.Anim. Sci. 68 : 1201-1207.

9. **Burrows, M.S. (1985)** : Textbook of Microbiology 2nd Edition. The C.V. Mosby Company.

10. **Ciftci, M.K., Berkis and Turkutanit, S.S. (1993)** : Incidence and pathology of liver abscesses in beef cattle. Veteriner Fakultesi- Dergisi Selcuk – Universitesi 9 : (1) 26-32.

11. **Cruickshank, R. Duguid J.R. Marmion B.P. and Swain R.H.A (1975)** : Medical microbiology : the practice of Medical Microbiology 12th Ed. Vol. 2 Churchill Livingestone London.

12. **Darwish M.A. (1996)** : Pathological Studies on some liver affections in camels. Thesis Fac. Vet. Med. Cairo Univ.

13. **Fahmy, M.F. and El-Attar, S.R. (1990)** : Pathological study on

Fascioliasis in camel and solipeds. Egypt J.Comp. Path. Clin. Path. 3 (2).

14. **Itman, R.H. Farrag, I. And Arab R.M.A. (1989)** : A preliminary investigation on some anaerobic bacteria in the liver of buffaloes and camels. A scientific Cong. Of Fac. Vet. Med. Cairo Egypt.

15. **Koneman E.W. Paul C.Schreckenberger S.D., Allen W.M.J. and Washington C.W (1992)** : Colour atlas and textbook of diagnostic microbiology. Fourth Edition J.B. Lippin cott company Pheladelphia.

16. **Lechtenberg K.F., Nagaraja T.G. Leipold H.W. and chengappa M.M. (1988)** : Bacteriologic and histologic studies of hepatic abscesses in cattle. Amer. Vet. Res. 49 (1) : 58-62.

17. **Makhareta M.A.M. (1988)** : Some studies on anaerobic microorganisms isolated from liver of buffaloes and camels. Thesis, Mv.Sc. Fac. Vet. Med. Cairo Univ.

18. **Nagaraja T.G. and chengappa M. M. (1998)**: Liver abscesses in feedlot cattle : a review J.Anim. Sci. 76: 287-298.

19. **Nagarja T.G. Beharka A.B., Cengappa M.M. Carroll L.H., Raun P.A., Laudert S.B and parrot J.C. (1999)** : Bacterial flora of liver abscesses in feedlot cattle fed tylosin or not tylosin. J.Anim. Sci 77 : 973-978.

20. **Roberts J.L. (1982)** : The prevalence and economic significance of liver disorders and contamination in grain- fed and grass – fed cattle. Aust. Vet. J. 5 : 129 – 132.

21. Quinn P.J. Carter M.E, Markey B.K. and Carter G.E. (2002) : Clinical veterinary Microbiology. Mosby-year Book Europe Limited Co.

22. **Roderick, N.M. peter, P.A. and peter J.S. (1979)** : Pathology of liver. Edinburgh London and New York 1979.

23. **Rosa J.S. Johnson E.H. Alves, F.S.F. and Santos L.F.L. (1989)** : A retrospective study of hepatic abscesses in goats : pathological and microbiological finding. Brit. Vet. J. 145 : (1) 73 – 76.

24. **Zienab, E-Sayed M. El-Seedy F.R. Bardisy, M. Kamel S.M. (1991)** : A bacteriological Study of sheep liver abscesses. Vet. Med. J. (Giza) 39 : 101 – 103.