

Agric. Res. Center

Animal Health Research Institute

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## BACTERIOLOGICAL ASSESSMENT OF INFLAMMED CATTLE LIVERS, WITH SPECIAL VIEW TO HEPATIC ABSCESSSES

(With 2 Tables & One Fig.)

By

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### التقييم الميكروبيولوجي لالتهابات كبد الماشية وبنظرة خاصة لخراج الكبد

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أجرى هذا البحث لعزل وتصنيف الميكروبات المسببة لالتهابات الكبد وبصفه خاصه  
الالتهابات الصديديه أو المصحوبه بخراج .

مثل ميكروب الفيوزوباكتروم نيكروفورم المسبب الرئيسى لهذه الالتهابات الصديديه حيث تم  
عزله بنسب ٨٣ % ، ٨٠ ر ٣٠ % تلاه الكورينى بيوجينز بنسب ٧ ، ٤٦ % ، ٤٠ ، ٦٥ % معزولين من الخرايج  
وأنسجة الكبد على التوالى . وأيضاً قد تم عزل الميكروبات القولونيه والعنقوديه وبعض الخمائر  
من العينات المستخدمه .

## SUMMARY

The study was conducted to outline the microorganisms mainly inducing or taking part in liver disorders specially hepatic abscesses. The examined samples included 30 livers with multiple abscesses and 26 inflamed livers. *F. necrophorum* represented the major causative agent (83%) and (30.8%) followed by *C. pyogenes* (46.7%) and (65.4%) which were isolated from liver abscesses and hepatic tissues respectively. Enterobacteriaceae, Staphylococci and yeast were also detected in both types of samples.

**Keywords:** Bacteriological, assessment, inflamed, cattle liver, hepatic abscesses

## INTRODUCTION

A relatively high incidence of hepatic abscesses has been recently reported in various areas of the world. Although liver abscesses occur in all breeds and ages of cattle, the highest incidence and major economic impact is in feedlot animals, (SCANLAN and HATHCOCK, 1983). The damage of the affected livers results in reduced feed efficiency or causing occasional deaths and condemnation of affected livers at slaughter (FOSTER and WOODS 1970).

Ruminitis and liver abscesses in cattle constitute a disease complex when the rumenal lesions are primary foci of infection and liver abscesses the secondary foci of infection (JENSEN et al. 1954, NAKAJIMA, et al. 1985; LECHTENBERG and NAGARAJA 1991).

Numerous investigators evaluated the microflora of bovine abscesses (SIMON and STOVELL, 1977; HUSSEIN and SHIGIDI, 1974 KANOE et al., 1976). The anaerobic rumen microflora *Fusobacterium necrophorum* is a major etiologic agent of bovine hepatic abscesses, along with other bacteria as Streptococci; Staphylococci, *Corynebacterium pyogenes*, Enterobacteriaceae and yeasts (KANOE, et al., 1976; LECHTENBERG et al., 1988).

The present investigation was designed to assess the bacteriology of inflamed liver and hepatic abscesses and to arouse the attention on this economic problem facing cattle at milk-production farms in Assiut.



## MATERIAL AND METHODS

A total of 30 frezian cattle livers after emergency slaughtered or death were collected each in a clean bag with its full data. These livers were inflammed and contained multiple abscesses.

Another 26 livers were brought at different occasions after emergency slaughter to the Assiut Veterinary Laboratory for routine bacteriological examination, these samples also showed signs of inflammation and some of them contained hepatic abscesses see Fig.1).

Media employed for aerobic and anaerobic cultures were blood agar along with McConkey's and Sabouraud's agar.

Under aseptic precautions, a loopful of pus at the time of excision was streaked directly onto the agar plates. The same technique was done from liver tissue in absence of pus.

Aerobic plates were incubated at 37 °C for 24-48 hrs.

Anaerobic culture technique was done in Gas-pack with the aid of Coz bage generator and incubated also at 37 °C up to 4 days.

Identification of the suspected colonies was performed microscopically for its morphology and Gram reaction, then characterized biochemically using Triple sugar iron (TSI), Methyl red indole urease (MIU) and Litmus milk media (CRUICKSHANK et al, 1975).

Antibiotic sensitivity test was done on some of the isolated organisms against 10 types of antibiotics using the disc diffusion method (CRUICKSHANK et al., 1975).

## RESULTS

The results of identification of the cultured bacteria are demonstrated in tables (1), (2).

the antibiogram of the important isolated organisms *F. necrophorum* and *C. pyogenes* showed that they were all the same highly sensitive to tobramycin, Naladixic acid, Garamycin, Amikin, Rifamicin and Erythrocin, while less sensitive to Neomycin, Netilmicin and Ampicillin, the organisms were resistant to the action of penicillin.

## DISCUSSION

Liver infection is an important disease that affects all kinds of meat animals specially fat beef cattle. This secondary complex syndrome brings about great economic losses to



livestock production even in developed countries, the disease does not only reduce the efficiency of utilization of food material, but can also cause occasional deaths or at least reestablish condemnation of the organs (SIMON and STOVELL, 1971; TAMATE, 1973).

*F. necrophorum* was isolated from 83% of liver abscesses and from 30.8% of the liver tissues, this shows the predominance of *F. necrophorum* as the etiologic agent of bovine hepatic abscesses. Our findings are similar to those previously reported by (KANOE et al., 1976; BERG and SCANLAN, 1982; SCANLAN et al., 1982; KAKAJIMA et al., 1985; LECHENBERG et al., 1988).

*C. pyogenes* was detected in a wide range of liver abscesses (46.7%), as well as hepatic tissues (65.4%). This observation is coincident with the results of several authors (JENSEN et al., 1954; KANOE et al., 1976; SCANLAN and HATHCOCK 1983; LECHTENBERG et al., 1988; KHATZIMANOLAKIS and KOSKOLOS, 1991).

Isolation of *C. pyogenes* either alone or in combination with other organisms suggested the role of the organism in the etiology of liver disorders and abscesses. The synergistic relationship between it and the anaerobic *F. necrophorum* is evident since growth of *C. pyogenes* would lower the oxidation-reduction potential of the tissue. There is also a possibility that *C. pyogenes* would produce diffusible factor that would favour *F. necrophorum* growth, as suggested by some workers (ROBERTS, 1967; RUDER et al., 1981; BERG and SCANLAN, 1982; LECHTENBERG et al. 1988).

Isolation of Enterobacteriaceae, Staphylococci and yeasts from similar conditions was recorded by other authors (KANOE et al. 1976; SCANLAN and HATHCOCK, 1983; LECHTENBERG et al., 1988, KHATZIMANOLAKIS and KOSKOLOS, 1991).

*F. necrophorum* and *C. pyogenes* revealed similar antibiogram, this is accorded with the results of BERG and SCANLAN (1982).

According to our results a great attention should be given to the animal feed to avoid ruminal injuries which would facilitate the pathogenesis of abscess-forming bacteria.

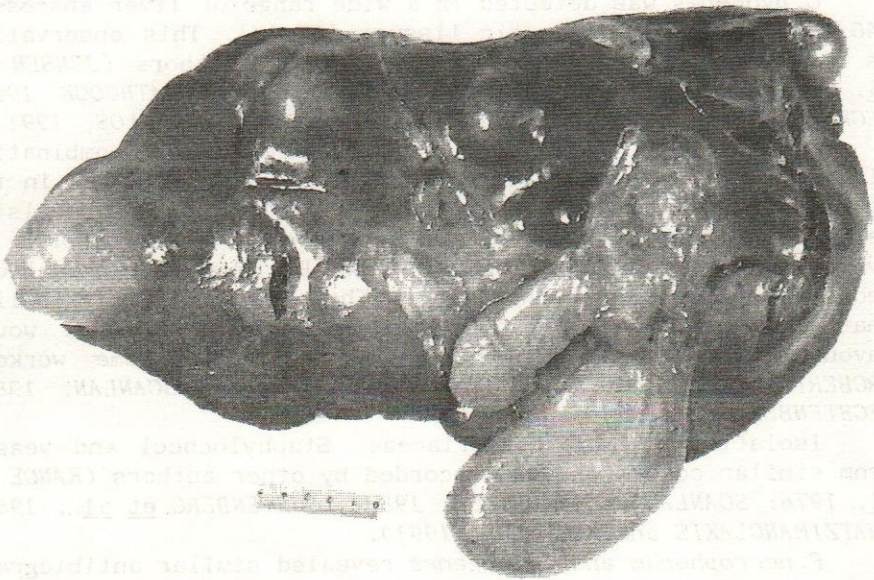
Such precautions in the same time would not favour the production of liver lesions by normal ruminal microflora such as *F. necrophorum*. Needless to say, these measures would save animal production from the losses due to these diseases.

#### REFERENCES

- Berg, J. and Scanlan, C. (1982): Studies on *F. necrophorum* from bovine hepatic abscesses: Biotypes, Quantitation, virulence and antibiotic susceptibility. Am. J. Vet. Res. 43, 1580-1586.

Tamate, H. (1973): "High incidence of ruminal lesions and liver abscess in the beef associated with intensive fattening in Miyagi prefecture "Tohoku J. Agr. Res. 23, 184-195.

Fig. (1): Show s Inflamed Cattle liver with abscesses formation.



REFERENCES

Burg, J. and Garcia, C. (1987): Studies on *S. typhimurium* from bovine hepatic abscesses. *Biological Journal of the Royal Microscopical Society*, 116, 1-10.



BACTERIOLOGY, INFLAMMED CATTLE LIVERS & HEPATIC ABSCESSSES

Table (1): The type of the microorganisms isolated from hepatic abscesses.

Microorganism	No. of cases	%
<i>F. necrophorum</i>	6	20%
<i>F. necrophorum</i> + <i>C. pyogenes</i>	10	33.33%
" + " + coliform + Staphylococci	4	13.33%
" + coliform + staphylococci	5	16.66%
coliform + Staphylococci	4	13.33%
" + " + yeasts	1	3.33%
Total	30	100%

Table (2): The type of the microorganisms isolated from 26 inflamed livers

Microorganisms	No. of cases	%
<i>F. necrophorum</i> + <i>C. pyogenes</i> + coliforms	5	19.23%
" + " + " + Staphylococci	3	11.54%
<i>C. pyogenes</i> + coliforms + Staphylococci	9	34.62%
coliforms + Staphylococci	4	15.38%
coliforms	5	19.23%
Total	26	100%