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MICTOBIOLOGICAL STUDIES ON CLAW AFFECTIONS IN FARM ANIMALS

By

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SUMMARY

Clinical examination of 8473 adult animals of different breeds (3413 friesian cattle; 1500 native cattle, 1710 buffalaes, 1000 sheep and 850 goats) in Governomental and private populations, showed that a number of 376 animals were suffering from foot problems (215 friesian cattle, 42 buffaloes, 25 sheep, 28 goats and 36 native cattle). A total of 198 cases of claw affections exhibiting different lesions in different animals were examined. The majority of the encountered cases were interdigital necrobacillosis, pododermatiis circumscripita septica (cattle), heel erosions and under-runnin (cattle and buffaloes), tenosynovitis (cattle and buffaloes), distal interphalangeal arthritis (cattle and sheep) and inflammation of interdigital sinus (sheep). The isolated micro organisms were mainly Fuso. necrophorum, Bact. melaninogenicus, Bact. Nodosus, Coryne pyogenes, Sapro. anthracoid,Staph. aureus, Staph. citreus, Staph. albus, E. Coli, Pseudo. aeruginosa, Mucor sp., Candida sp., Penicilium sp., Rhizopus and aspergillus SPP. The applied preventive measures, together with specific antibiotic therapy after antibiotic sensitivity culture were successfuly solved thes foot problems.

INTRODUCTION

Soundness of the claw is necessary to reach the optimal performance in farm animals, regarding milk and meat production as well as fertility. Neglected claw hygiene can be considered as a performance reducing factor on the productivity of animals (Amstutz 1965). Long standing neglected cases of claw deformities frequently develop secondary complications at the other digital structures such as phalangeal bones, interphalangeal joints and supportived apparatus (Prentice and Newal 1972). Clinical lameness is reported to be caused by digital lesions in cattle and sheep (Prentice and Neal, 1972; Russel et al., 1978; Eddy and Scott, 1980). The affections consisted mainly of panaritium, infectious pododermatitis and specific traumatic ulcer of the sole after rusterholz. The panaritium (foot rot) disease is believed to the caused by treansdermal invasion of the interdigital subcutaneous tissue by Bacteroides melaninogenicus and Fusobacterium necrophorum (Peterson and Nelson, 1984; Clark et al., 1985 and Greenough, 1987). Coryne pyogenes is the msot common organism isolated from pododermatitis (Roberts and Egerton, 1969, Zantinga 1973). It enhances the local invasion of the feet with F. necrophorum. In Egypt Soliman et al. (1984) found that different varieties of microorganisms were responsible for the most prevalent foot problems in sheep and goats such as interdigital dermatitis, ulcerative dematitis, foot rot, sole ulcers, claw deformities and inflammation of the biflex canal.

The present study is done to throw light on the etiology and pathogenesis of claw affections among farm animals (cattle, buffaloes, sheep and goat) with special attention to microbiological examination.

MATERIAL AND METHODS

A total number of 6623 large ruminants (cattle and buffaloe) and 1850 small ruminants (Sheep and goat) of both sexes and different ages were examined for different varities of foot affections.

those animals were collected from different Governomental and private farms in Sharkia province and those cases admitted to the surgery clinic, Faculty of Vet. Med., Zagazig Univesity, (15 native cattle, 12 buffoles, 17 sheep and goat and 5 Friesian cattle). The samples were collected as follows; 84 samples from cattle and buffaloes suffered from interdigital necrobacillosis dermatitis, 30 samples from interdigital necrobacilosis in sheep and goat, 35 samples form pododermatitis circumscripta septica in cattle, 20 sampels from Heel erosions and under running heel in cattle and buffaloes, 4 samples from tenosynovitis in cattle and buffaloes, 10 samples from the septic distal interphalangeal (D.I.P.) arthritis in cattle and sheep, and 15 samples from the inflammation of interdigital sinus in sheep.

Bacteriological samples for bacteriological examinations were collected from the affected claws by sterile swabs under strict aseptic measures. Smears from the necrotic septic materials were directly stained by Gram's methods for primary detection of the possible causative microorganisms (Boundy, 1983). The collected swabs were directly cultured on duplicate plates of serum agar, blood agar and brain heart infusion agar (DIFCO laboratories, Detroit, MI) supplemented with 5% bovine blood. A set of the plates was aerobically incubated at 37°C for 24-48 hours. The remaining set of plates was incubated anaerobically at 37°C for 3-4 days (Roberts and Egerton, 1969; Bergand Loan, 1975 and Samy et al., 1984). The identification of the isolated organisms was carried out by the method described after Willis (1977) and Finegold and Martin (1982). Tissue samples for fungal examination were taken and mounted on 10% potassium hydroxide in dimethyl sulphoxide. Isolation and identification were carried out as described by Zaias and Taplin (1966).

The antibiotic sensitivity disc diffusion technique for the isolated organisms were done as described by Bauer et al. (1966).

RESULTS

The results of the present study showed that, the incidence of claw disease in different species was 4.4% from the total wxamined diseased animals (376). Friesian cattle showed a higher incidence (6.3%), followed by sheep (5.5%), goat (3.3%), buffaloe (2.5%) and lastly native cattle (2.4%). The encountered claw disases in this work were illustrated in (Table 1). The incidence of claw diseases in different animals were recoreded in (Table 2). Microbiological examiantion revealed that the prevalent bacterial isolates discovered from cases affected with interdigital necrobacillosis (Fig. 1) and interdigital dermatitis in cattle and buffaloes (Fig. 2), were Fusobact. necrophor.

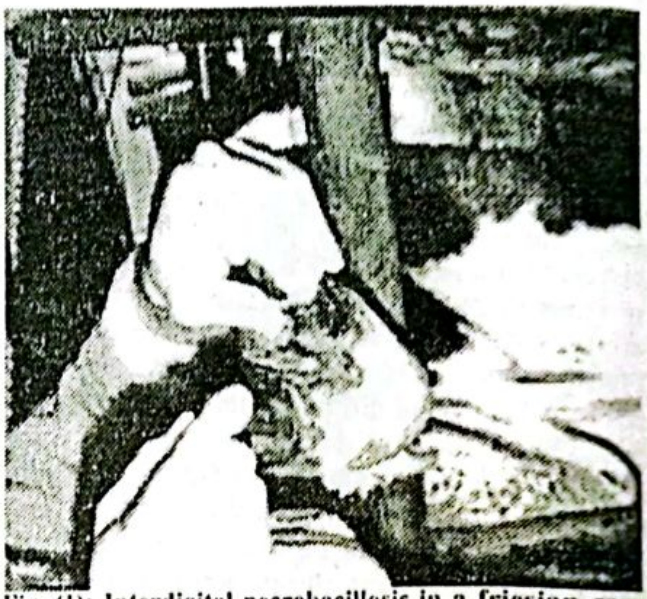

Fig. (1): Interdigital necrobacillosis in a friesian caw. note the dark necrotic interdigital skin and the swelling above the coronet.

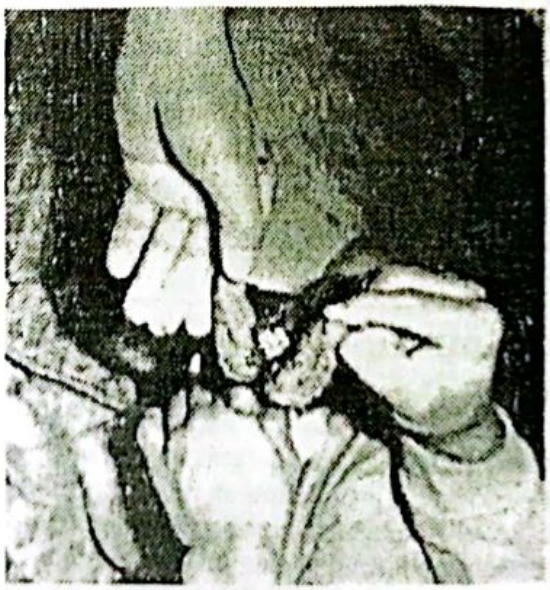

Fig. (2): Interdigial necrobacillosis of the left hind limb of an ewe (Benign foot rot).

Table (1): Incidence of the different claw affections among the total number of examined animals.

Species	Total inspected animals	Claw deformties deformities		Claw disease		Total affections
		No.	%	No.	%	
Friesian Cattle	3413	162	4.7	215	6.3	377
Native Cattle	1500	23	1.5	26	2.4	59
Buffaloes	1710	62	3.6	42	2.5	104
Sheep	1000	43	4/3	55	5.5	98
Goat	850	32	3.8	28	3.3	60
Total	8473	322	3.8	376	4.4	698

um, Bact. melaninogenicus, Coryn. pyogenes, Saprophytic anthracoid, Staph. aoureus, E. Coli and Pseudo, aeruginosa. Mucor sp. was the fungal isoaltes (Table 3), similar microorganisms wer isolated mostly, Fusobact. necrophorum and Bact. nodusus. The microbiological examination of pododermatitis circumscripita sptica cases (Fig. 4) revealed that, the most bacterial in descending frequences, were Fusobact. necrophorum, Bact. melaninogenisus, croyn. pyogenes and Staph. aureus. while, mucor spp. and Candida spp. were the fungal isolates (Table 3). the bacteriological isolates from hell erosions in cattle and buffaloe (Fig. 5, 6) and sole under-running and ulceration were similar to cases of pododermatitis circumscripita septica while the fungal isolates were Aspergillus sp., Rhizopus and Penicilium sp. (Table 3). In cases of, septic tenosynovitis (Fig. 7), the results revealed that the isolated bacteria were mainly Coryn. pyogenes, Pseudo. aeruginosa, stap. aureus and e. Coli. The results obtained in case of D.I.P. Joint arthritis (Fig. 8) were th smae as the previously isolated from cases of interdigital necrobacillosis with predominace of coryn. pyogenes. The inflammation of the interdigital sinus (biflex canal) was common in sheep and microbial examination revealed that the isolated microorganisms were Coryn. Pyogenes and Pseudo. The results of microbiological examination and incidence of isolated microorganisms from different claw affections were illustrated in (Table 3). The results of antibiotics sensitivity tes, on the isolated bacteria are listed in (Table 4).

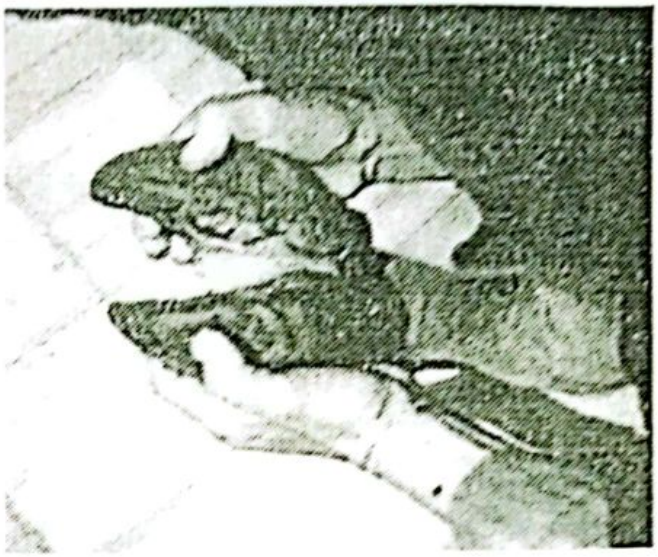

Fig. (3): Early stage of interdigital dermatitis in its early stage in a buffaloe.

Fig. (4): Pododermatitis circumscripta septica (sole ulcer) of friesian cow.

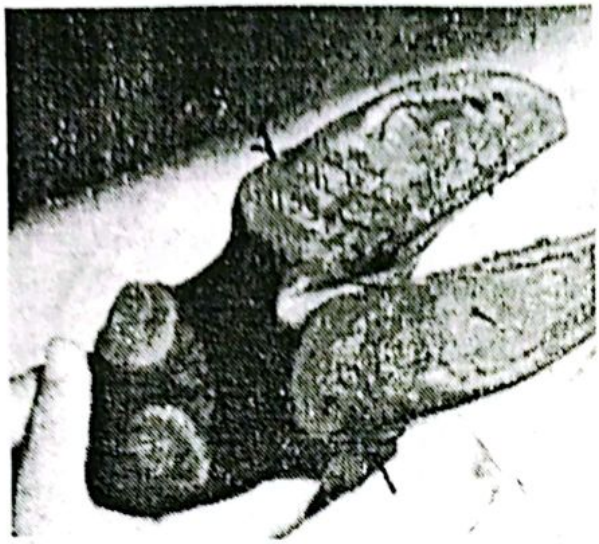

Fig. (5): Mild case of heel erosions in anative breed beefbull note small pits in the heels (Arrows).

Fig. (6): Extensive heel erosions with inter digital dermatitis (Arrow) of a native breed beefbull.

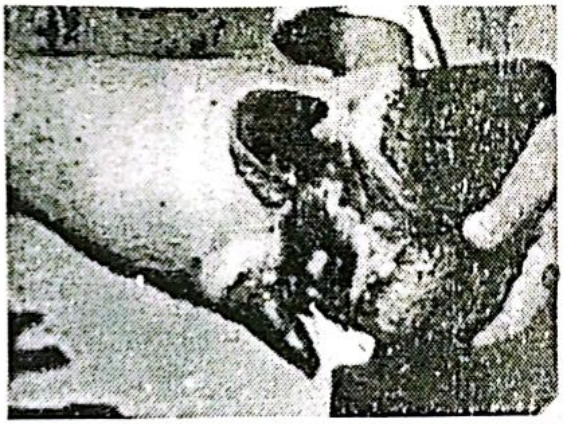

Fig. (7): Tenosynovitis of the flexor tendons at the palmar aspect of the pastern region of a buffaloe. (Arrow)

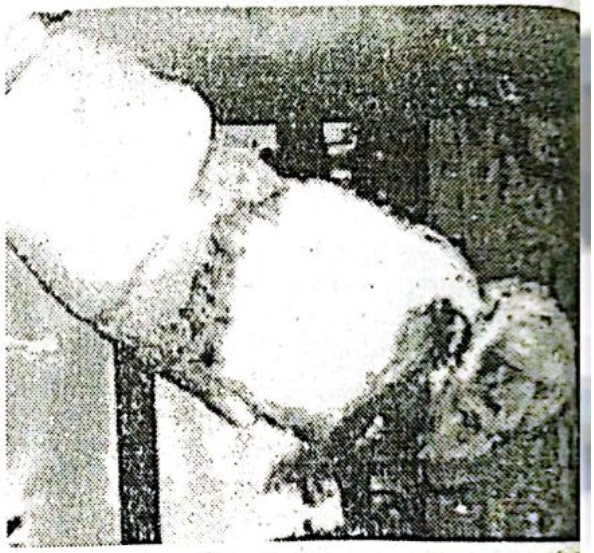

Fig. (8): Advaneed case of distal pedal arthritis.

DISCUSSION

Foot diseases in farm animals especially cattle cause great economic loss to either dairy or meat industry. Claw diseases constituted the man cause of lameness among livestock in Egypt, nearly was 4.4%. In the present study similar incidence of claw diseases were obtained (5.5%).

Fusobacterium necrohorum and B. melaninogenicus were the prevalent isolated bacteria. Synergy between F. necrophorum, B. melaninogenicus and C. pyogenes had been demortstrated in the development of ovine foot rot and invective bulbar necrosis (Roberts and Egerton, 1969 and Roborts et al., 1988) and seemingly similar relation might occur in bovine foot rot. Hite et al. (1948) demonstrated synergy between F. necrophorum and b. melaninogencus in the induction of lesions in mice and this was confirmed by Berg (1975) using strains isolated from foot rot in cattle. Also Berg and Loan (1975) induced typical lesions of foot rot in cattle when (F. necrophorum and B. melaninogenicus) were applied to scarified interdigital skin or inoculated intradermally into the interdigital skin of experimental cattle. Theis information led to the suggestion that F. necrophorum and B. melaninogenicus, act synergistically, and considered as the infective agents causing foot rot in cattle. The obtained results were agree with this suggestion. The high incidence of foot rot (infectious podocermatits) in the herds containing large numbers of different speeies of animals i.e. cattle, buffalses, sheep or goat, coincided with that reported by Morcos and Zein el-din (1971) and Boundy (1983) who considered foot rot as the highly contagious disease in Merino sheep which appeared to be particularly susceptible to the disease when exposed to wet contaminated soil bedding. Also, this could be supported by the findings of Egerton et al. (1969) who failed to induce experimental specific foot infection through incised interdigital skin of sheep kept on wet conditions free of urine and faecal matters. concerning the obtained results, there are different varieties of microorganisms were identified as in (Table 3). The fungal infections the least role in the claw diseases as compared with bacterial infections. Egerton et al. (1969) and Roberts and Egerton (1969) found that there were 2 primary bacterial (F. necrophorus and F. nodosus) invadors of the epidermis which cause foot rot in sheep. On the other hand, Boundy (1983) and Soliman et al. (1984) stated that the suitable environment of wetness and humidity, favours the invasion of F. necrophorous which attacks the soft, inflammed interdigital skin inducing dermatitis. The affected interdigital skin becames susceptible to other anaerobes particularly, F. nodosus. Both types cause sever necrosis and disruption of the epidermal matrix, with gradual separation of the hoof. The necrotic changes seen in the deeper epidermal layers and consequent hyperkeratosis of the superficial one indicated the colonization of F. necrophorous in the interdigital skin. In addition F. nodosus considered one of the main causes of foot rot. Isolation of Coryne pyogenes from most of foot lesions was considered to be the actual cause of those affections, alone or with other invadors especially in foot rot. This coincides with the results of Akins (1981) and Rowlands et al. (1983) who found that C. pyogenes is considered one of the causes of foot diseases in cases of interdigital necrobacillosis in different animals and it also enhances the local invasion of feet with F. necrophorous. The application of sensitivity test on the isolated bacteria (in vitro) showed that penicillin and streptomycin are highly effective against most of the organisms. The parenteral administration and local application of these drugs in diseased cases resulted in a good recovery rate. Similar results were obtained by Boundy (1983) and Gradin and Schmitz (1983). The application of strict hygienic measures were also recommended by the authors.

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