A STUDY ON DIGITAL DISEASES OF CATTLE IN MOROCCO
L. Mahin, M. Chadli, A. Addi

To cite this version:
L. Mahin, M. Chadli, A. Addi. A STUDY ON DIGITAL DISEASES OF CATTLE IN MOROCCO. Annales de Recherches Vétérinaires, INRA Editions, 1986, 17 (1), pp.7-13. <hal-00901604>

HAL Id: hal-00901604
https://hal.archives-ouvertes.fr/hal-00901604
Submitted on 1 Jan 1986

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
A STUDY ON DIGITAL DISEASES OF CATTLE IN MOROCCO

L. MAHIN1, M. CHADLI1 and A. ADDI2

1: Department of Medicine and Surgery, Unit for Ruminant Husbandry and Diseases, Institut Agronomique et Vétérinaire Hassan II, Rabat, Morocco
2: ORMV du Tadla, Fqih Ben Salah, Morocco

Résumé


In western countries, digital diseases of cattle are of increasing concern (Baggott and Russel, 1981). Over the last 20 years, European and North American dairy cattle have been imported into Morocco on a large scale. They now number about 200,000 head, which represent 5 percent of the total cattle population.

In the Moroccan dairy herd, clinical digital diseases are commonly encountered (Chadli and Mahin, 1980). The prevalence of the condition was investigated from data recorded on 6 state farms over a 10 years period. It was estimated that 90 percent of lameness problems were due to digital diseases and that the resulting economic losses ranged from 1500 to 15000 dirhams (about 150 to 1500 US dollars) per year for a 100 head herd (Addi, 1981). From these data, it was not possible to make an accurate diagnosis of digital diseases, referring to the nomenclature proposed by the «International Council on Digital Diseases of the Ruminants» (Weaver et al., 1981; Mahin and Addi, 1982; Espinasse et al., 1984). This prompted us to carry out a study on clinical and subclinical digital conditions occurring in different management systems in Morocco, in order to determine their prevalence, main symptoms and mutual relationships under our conditions.
Materials and Methods

Animals and methods

The study involved a total of 1004 adult cattle, mainly females, of different breeds with various management conditions. The farms were chosen as a random sample of milk-producing enterprises of Morocco. A quick observation of the claw shape and the stance was carried out on 953 cattle without lameness. Within that group, the limbs of 279 animals were raised in order to inspect the solar surface and the interdigital skin. A detailed clinical study, including semiological trimming of the eight claws was performed on 89 lame cattle. In this group, corrective trimming and other specific treatments which have been detailed elsewhere (Mahin and Addi, 1981) were eventually implemented after accurate diagnosis of the digital disease.

Definitions for recording

The shape of the eight claws of each cattle was classified into the following categories (Greenough, 1980a): normal, normally elongated (ungula normalis elongata), spiral-shaped (ungula curvata spiralis) concave (ungula curvata concava) and wrinkled (ungula rugosa). Spiral-shaped claws and concave claws were occasionally grouped as curved elongated claws. The concept of "four types of claws" refers to the position of the claw on the animal viz. antero-medial, antero-lateral, postero-medial, postero-lateral.

On a given limb, interdigital dermatitis (dermatitis interdigitalis) was classified into complicated and non-complicated. Degree 0 referred to the absence of the disease (dry interdigital skin with presence of hair). Non-complicated forms were divided into: mild (degree 1) (interdigital skin wet; loss of hair); and severe (degree 2) (interdigital skin with exsudation and mild hyperplasia). Complicated forms (degree 3) consisted of a thickening of the dermis of the interdigital skin, with subsequent swelling and wrinkling of its plantopalmar extremity, between the axial bulbular walls.

On a given animal, severity of interdigital dermatitis was scored mild (no lesions or mild lesions on one limb); moderate (mild lesions on two limbs) and severe (mild lesions on more than two limbs, or severe lesions, included complicated forms on at least one limb). Ungular erosion (erosio ungulae) as defined as an irregular loss of bulb, at the surface of the horn capsule (Weaver et al., 1981) was recorded in the eight digits of each cow. Lesions of both interdigital skin and bulbular horn (interdigital dermatitis and unguular erosion) were classified as severe (animals with complicated forms of interdigital dermatitis, on at least one limb, or animals with moderate lesions of interdigital dermatitis or unguular erosion on the four limbs) or mild (animals with no lesions of interdigital dermatitis nor unguular erosion, or animals with mild lesions limited to one or two limbs).

Chronic diffuse aseptic pododermatitis (pododermatitis aseptica diffusa), which was previously known as chronic laminitis, was diagnosed following observation of wrinkled claws, or the finding of sole haemorrhage during trimming.

Lesion of circumscribed pododermatitis (pododermatitis circumscripta, sole ulcers) were classified as perforated and not non-perforated ulcers.

Deep digital diseases were divided into interdigital phlegmon (phlegmona interdigitalis), retroarticular abscess of the distal interphalangeal joint (heel abscess) (Greenough, 1980 b) and septic distal interphalangeal arthritis.

Environmental factors under study included hygiene and feeding. Hygiene was classified as good or bad following subjective judgement based on observations during two to five visits on the farm. The level of concentrate feeding on the farm was classified as high (farms in peri-urban areas with limited surfaces devoted to pasture or forage production with, subsequently, a high proportion of wheat bran and sugar beet pulps in the diet) or low (farms in irrigated areas with a succession of two legumes: berseem (Trifolium alexandrinum) in winter and alfalfa in summer; and farms of non-irrigated areas with grazing during the rainy season and cereal or vegetable by-products during the dry season).

Chi-square tests were used to demonstrate relationships between different pairs of clinical and environmental characteristics.

Results

1. Abnormal stances

Abnormal stances were found in 395 out of the 953 cows under study (41.5 percent). The main abnormal stances involved the hind limbs and were divided into: antero-external rotation (240 cows; 25.2 percent), camped-under position (99 cows; 10.4 percent) and abduction (51 cows; 5.4 percent). Internal rotation and camped position were noticed occasionally (5 cows; 0.5 percent).

2. Deformed claws

A comparison between the occurrence of deformed claws in cattle with and without lameness is given in table 1. The prevalence of deformed claws was higher in cows with lameness. The difference between both groups was observed within the different categories of deformed claws.

The distribution of claw deformities in the four types of claws is given in table 2. Spiral-shaped claws were only discovered in postero-lateral claws and concave claws in antero-medial claws. Therefore, the prevalence of these deformities should be calculated referring to the total number of the respective types of claw where they were observed (table 1). In the group without lameness, only 413 cows (43.3 percent) were found with eight normal claws. In 390 animals (40.9 percent), abnormal claws were distributed in both fore and hind limbs. Claws abnormalities involving one or more claws of the posterior limb only, were observed in 58 cows (6.1 percent). Claws abnormalities involving one or more claws of the anterior limbs only, were observed in 92 cows (9.7 percent). On a given animal, spiral-
shaped postero-lateral claws were often associated with concave antero-medial claws.

3. Interdigital dermatitis and ungular erosion

The prevalence of interdigital dermatitis and ungular erosion in cattle with and without lameness is given in table 3. The number of limbs affected by non-complicated and complicated interdigital dermatitis and its distribution in fore and hind limbs is given in table 4. The number of claws affected by ungular erosion and its distribution in the four types of claw is given in table 2. Non-complicated interdigital pododermatitis was distributed equally in fore and hind limbs. On the contrary, complicated interdigital dermatitis and ungular erosion were more frequently found on the hind limbs. There was a highly significant correlation between the number of limbs affected by interdigital dermatitis on the one hand, and the number of claws with ungular erosion on the same animal on the other hand (P < 0.0005) (animals from stables with good hygiene distributed as follow: 535 with degree 0 of interdigital dermatitis, 130 with degree 1, 47 with degrees 2 or 3; animals from stables with bad hygiene distributed as follow: 195 with degree 0 of interdigital dermatitis, 75 with degree 1, 134 with degrees 2 or 3; each animal had been recorded referring to the limb with the most severe degree of interdigital dermatitis; observed chi-square: 140.6; theoretical chi-square for alpha equal to 0.0005: 15.2). The statistic made on the group with lameness did not show a correlation between the intensity of lesions and the number of limbs affected by interdigital dermatitis on the one hand, and the number of claws with ungular erosion on the same animal on the other hand (P > 0.05) (animals with 0 to 3 claws with ungular erosion distributed as follow: 37 in animals with mild lesions of interdigital dermatitis, 7 in animals with moderate lesions, 17 in animals with severe lesions; animals with ungular erosion on more than 3 claws distributed as follow: 14 animals with mild lesions of interdigital dermatitis, 8 with moderate lesions, 6 with severe lesions; observed chi-square 4.01; theoretical chi-square for alpha equal to 0.05: 5.99).

4. Chronic diffuse aseptic pododermatitis

The prevalence of wrinkled claws in cattle with and without lameness is given in table 1. Sole haemorrhages were found in 77 out of the 712 trimmed claws (10.8 percent). Both lesions were found in the four types of claws, although sole haemorrhages were slightly more prevalent on postero-lateral and antero-medial claws. In postero-lateral claws, sole haemorrhages were more numerous but their size remained limited. There was a highly significant correlation between the number of claws with lesions of chronic diffuse aseptic pododermatitis and the number of concentrates in its diet (P < 0.0005) (animals from stables with a high level of concentrates distributed as follow: 5 animals with lesions of chronic diffuse aseptic pododermatitis on 0 to 2 claws, 6 with lesions on
3 to 5 claws, 13 with lesions on 6 to 8 claws; animals from stables with a low level of concentrates distributed as follow: 28 with lesions of chronic aseptic diffuse pododermatitis on 0 to 2 claws, 30 with lesions on 3 to 5 claws, 7 with lesions on 6 to 8 claws; observed chi-square: 19.0; theoretical chi-square for alpha equal to 0.0005: 15.2).

5. Circumscribed pododermatitis

Circumscribed pododermatitis was found in 55 trimmed claws (7.5 percent). Non-perforated ulcers were more common than perforated ulcers (on 41 and 13 claws, respectively). Both stages of the disease were far more prevalent in postero-lateral claws (table 2). There was a highly significant correlation between the occurrence of circumscribed pododermatitis in at least one claw and the number of elongated claws in the same animal (P<0.0005) (animals with circumscribed pododermatitis distributed as follow: 32 with 6 to 8 elongated claws, 7 with 3 to 5 elongated claws, 5 with 0 to 2 elongated claws; animal without lesions of circumscribed pododermatitis distributed as follow: 15 with 6 to 8 elongated claws, 7 with 3 to 5 elongated claws, 23 with 0 to 2 elongated claws; observed chi-square: 19.7; theoretical chi-square for alpha equal to 0.0005: 15.2).

6. Deep digital diseases

Interdigital phlegmon was diagnosed in 21 lame animals (23.6 percent). This disease was more prevalent in hind limbs (table 4). There was no significant correlation between the occurrence of interdigital phlegmon and the intensity of lesions of interdigital skin and bulbar horn (P>0.05) (animals with interdigital phlegmon distributed as follow: 11 animals with severe lesions of interdigital skin and bulbar horn, 10 animals with mild lesions; animals without interdigital phlegmon distributed as follow: 29 animals with severe lesions of interdigital skin and bulbar horn, 39 animals with mild lesions; observed chi-square: 0.61; theoretical chi-square for alpha equal to 0.05: 5.99).

Retroarticular abscess was diagnosed in eight patients, mainly in the hind limbs (table 4). In 5 cases the lesion originated from circumscribed pododermatitis. In 3 cases, the portal of entry of the germ could not be observed. Septic distal interphalangeal arthritis was found in one case in the postero-lateral digit.

Discussion

The present study confirms the economic signi-
Significance of digital diseases in the Moroccan dairy cattle. They rank next to nutritional sterility, contagious diseases as tuberculosis and brucellosis, tick-borne haemoprotozoosis (babesiasis and theileriasis) and mastitis as the most prejudicious diseases for the country’s dairy economy.

Following Addi (1981), who compared economic losses due to digital diseases in farms with and without prophylactic claw trimming, this practice seems to be a good preventive measure. Unfortunately, it is not yet widespread in our field conditions. The lack of claw trimming is obvious from the high prevalence of deformed claws found in the present study. In roughly similar groups of cattle in Sweden, where preventive claw trimming is regularly performed, Anderson and Lundstrom (1981) found far lower prevalence of deformed claws.

Other general factors influencing occurrence of digital diseases include breed predisposition and type of stable floor (Brochart and Fayet, 1981). In a parallel study, Addi (1981) found a correlation between the occurrence of deformed claws and the breed: this disease was more frequent and more severe in Friesian cattle than in native Moroccan cattle and crossbreds. The same relationship was found with interdigital dermatitis, this disease being more prevalent and more severe in Friesian than in native cattle (Addi, 1981).

Nevertheless, the influence of environment was stated to have biased these correlations, as Friesian cattle were generally kept inside on concrete floor and native Moroccan cattle on extensive pasture. On the other hand, clinical observations made on one farm of 600 dairy cows (half of them of the Montbéliard breed, half of them Friesian, all kept on concrete), showed a higher prevalence of claw deformities (especially antero-medial concave claw and postero-lateral spiral-shaped claw) and of circumscribed pododermatitis in Montbéliard than in Friesian cattle (Mahin, unpublished data). In Friesian cattle, deep digital diseases were more frequently found in animals kept in paddocks with unfrequent removal of the manure, than in traditional tying-up system (Addi, 1981).

Concave antero-medial claw has been suggested to originate from overburdening of the fore legs because of a low distant feeding area (Peterse, 1980). Spiral-shaped postero-lateral claws were considered to be due to inherited abnormal position of the distal interphalangeal joint (Bouckaert et al., 1958). In our sampled animals, both defects were often associated. This would suggest that both types of deformed claws might be just a special modality of overgrowth for non-worn antero-medial and postero-lateral claws.

The prevalence and the intensity of lesions of chronic diffuse aseptic pododermatitis in the present study were low in comparison with those characteristics of the disease in countries with high yield dairy cows like the Netherlands (Peterse, 1980) and Denmark (Mortensen and Hesselholt, 1982).

<table>
<thead>
<tr>
<th>Type of lesions</th>
<th>Number of affected limbs in cattle (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without lameness</td>
</tr>
<tr>
<td><strong>Dermatitis interdigitalis</strong></td>
<td></td>
</tr>
<tr>
<td>Non-complicated</td>
<td>370 (33.2)</td>
</tr>
<tr>
<td>Complicated</td>
<td>16 (1.4)</td>
</tr>
<tr>
<td><strong>Erosio ungulae</strong></td>
<td>169 (15.2)</td>
</tr>
<tr>
<td><strong>Total examined limbs</strong></td>
<td>1116 (100.0)</td>
</tr>
</tbody>
</table>
This must be related to the low levels of concentrates in the dairy rations in Morocco. In this country, concentrate feeding is widely based on sugar beet pulps and wheat bran (Mahin et al., 1982 b), both feedstuffs being of relatively low energy and protein content. Despite such low concentrate levels the relationship between roughage:concentrate ratio in the diet and prevalence of chronic diffuse aseptic pododermatitis could be definitely established. Comparative epidemiological considerations suggest that the feeding of concentrates as a separate meal is always associated with high prevalence of chronic diffuse aseptic pododermatitis while high milk yield dairy cows fed all mash rations may show few lesions of the disease (Weaver, personal communication).

The characteristics of circumscribed pododermatitis as observed in the present study are in accordance with the litterature on the subject, especially for higher prevalence on postero-lateral claws and association with elongated claws (Mahin and Addi, 1982). A relationship between circumscribed pododermatitis and sole haemorrhages, as observed by Anderson and Lundstrom (1981) was also obvious in our trimmed animals, although it was not investigated statistically.

The deep digital diseases are important to recognize because of a poor prognosis if inadequately handled. The accurate recognition of the involved tissues may be important before deciding the type of treatment to be implemented (Mahin, 1982). Interdigital phlegmon remains the most common cause of severe digital lameness in cattle. The lack of correlation between this condition and interdigital dermatitis confirms that interdigital phlegmon is primarily due to small puncture wounds of the interdigital region rather than to deep extension of interdigital skin inflammation.

The main characteristics of retroarticular abscess of the distal interphalangeal joint found in this study are in accordance with the previous description of the disease (Greenough, 1980). The lack of concommitent sole lesions in 3 cases suggests that the disease may also originate from puncture wounds into the upper digital structures.

Acknowledgements

We are indebted to Pr Greenough, veterinary extension services, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, for critical reading of the manuscript.

Summary

Digital diseases of cattle, as defined by the « International Council on Digital Diseases of the Ruminants »

<table>
<thead>
<tr>
<th>Table 4. --- Distribution of interdigital dermatitis and deep digital diseases in fore and hind limbs of lame cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed diseases</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Interdigital dermatitis</td>
</tr>
<tr>
<td>Non-complicated</td>
</tr>
<tr>
<td>Complicated</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Interdigital phlegmon</td>
</tr>
<tr>
<td>Retroarticular abscess</td>
</tr>
<tr>
<td>Septic distal interphalangeal arthritis</td>
</tr>
<tr>
<td>Total examined limbs</td>
</tr>
</tbody>
</table>

Received, April 5th, 1985
Accepted, May 5th, 1985
were studied on 32 farms with various management systems in Morocco. This study involved 953 cattle without lameness for claw examination and 89 lame cattle for detailed clinical examination and semiological trimming of the eight claws. Claw deformities, interdigital dermatitis and ungular erosion, chronic diffuse aseptic pododermatitis, circumscribed pododermatitis and deep digital diseases were described regarding their prevalence and clinical characteristics, including their distribution on fore and hind limbs, and on antero-medial, antero-lateral, postero-medial and postero-lateral claws. Interrelationships between different digital diseases and relationships between some digital diseases and environmental factors were searched by correlation studies. The results are compared with the characteristics of the same digital diseases in other countries.

References


