

COMMUNICATION

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Clinical and epidemiological aspects of bovine digital lesions in southern Brazil

[*Aspectos clínicos e epidemiológicos das lesões digitais em bovinos no Sul do Brasil*]

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Although regarded as a serious problem that affects animal behaviour and performance, the bovine digital disorders have often been neglected and underestimated. This tendency is probably due to the difficulties with bovine foot handling (Weaver, 1991; Bergsten et al., 1998). The lack of a consistent nomenclature to describe the different bovine digital anomalies has been reported (Radostits et al., 1994; Silveira et al., 1988; Molina et al., 1999). Economic losses associated to foot lesions are related to decreased milk production, body weight loss, sour milk, low reproductive performance, increased health costs and involuntary culling (Weaver, 1991; Bergsten et al., 1998; Molina et al., 1999).

The introduction of modern technology in the Brazilian dairies has been associated with an increased prevalence of bovine digital disorders (Borges et al., 1998; Molina et al., 1999). Lesions affecting the interdigital skin or claws, especially of the hind feet most commonly cause lameness in dairy cattle. The distribution of claw lesions has been approximately 85% higher in the lateral rear claws, where higher loads are supported due to its biomechanic properties (Toussaint Raven, 1985). The principal foot lesions recorded are heel horn erosion (8.7–88%), sole hemorrhage (28–48%), white line diseases (15.6–45%), digital dermatitis (26–29%), sole gap and abscess (10.4–28%), interdigital necrobacillosis (14.3–16.7%), sole ulcer (9–13.6%) and interdigital hyperplasia (1–7%) (Eddy & Scott, 1980; Russell et al., 1982; Clarkson et al., 1996; Bergsten et al., 1998). Recent Brazilian investigation revealed 30.3% of affected lactating dairy cows in the region of Belo Horizonte, being horn erosion (48.5%), interdigital dermatitis (13.5%) and interdigital necrobacillosis (9.6%) the most frequent lesions (Molina et al., 1999).

Direct trauma or a combination of predisposing nutritional and environmental factors may cause foot diseases in dairy cattle. A varying degree of laminitis is considered to be the principal contributory cause of metabolic lesions of the feet. Major environmental factors include the quality and hygienical conditions of the floor and ground surfaces on which cows either walk or stand and the degree of stall comfort (Radostits et al., 1994; Vermont & Greenough, 1994; Dias, 1999). Poor underfoot conditions have been linked to infection-related feet lesions (Radostits et al., 1994; Rodriguez-Lainz et al., 1996; Read & Walker, 1998).

Clinical and epidemiological aspects of bovine digital lesions in southern Brazil

This communication presents the clinical and epidemiological aspects of the foot lesions responsible for lameness in four Holstein dairy herds in the Rio Grande do Sul State. It also concerns the observations on treatment and control measures.

Over an 18-month period, 524 lame cattle out of 1043 were treated for lameness. The survey was restricted to dairy cows and heifers over six months of age which were lame during the aforementioned period. The herds were kept confined approximately 17 months before the beginning of this study and no previous regular foot trimming or care had been provided. All of the dairies had recently bought heifers from the United States, Canada and Argentina. Lactating cows were housed in free stall barns with passageways on slatted or solid concrete. Heifers and dry cows were kept on paddocks which had shelters, water and feed bunks on concrete floors. The stalls, yards and pathways were poorly designed or maintained, often with mud or excessive manure accumulated in the passageways. Poorly bedded stalls were also observed. The feeding programme included ingredients such as corn silage (chopped 1 inch long), fresh forages (oat and millet), citrus pulp, wet brewers grains (brewing beer by-product), okara (soybean by-product) and commercial concentrates. Proper feeding practices, as complete diets and frequent trough system were not used.

After restrained in a hydraulic chute, the cow's feet were washed, all claws trimmed using a hoof knife, nipper and electrical grinder; clinical lesions treated and recorded on a simple form. Lesions were responsible for lameness or painful response to pressure. If two or more lesions were present in the same foot, the most painful or serious one was regarded as the cause of lameness. If two or more legs were involved, these were recorded. Recurrent cases were not re-counted. Foot lesions were classified by morphology according to reports in the literature (Weaver et al., 1981; Petersen & Nelson, 1984; Blowey & Sharp, 1988; Hull et al., 1993; Allestein, 1994; Bergsten et al., 1998; Read & Walker, 1998).

The cumulative prevalence of lameness caused by foot lesions among all animals was 50.2%. A total of 524 animals presented 883 feet lesions. Most lesions (84%) occurred in the rear feet, and the commonest were digital dermatitis (29.9%), sole ulcer (18.3%) and interdigital dermatitis (17.8%). Of the claw lesions, 91.5 % occurred in the hind lateral ones and of these, almost all occurred in abnormally shaped claws. The prevalence of feet lesions recorded is presented in Table 1.

Table 1. Percentages of 883 digital lesions causing lameness diagnosed during the 18-month period in four dairy herds (%). Rio Grande do Sul, Brazil

Lesion	Herd 1	Herd 2	Herd 3	Herd 4	Total
Digital dermatitis	27.6	38.2	26.5	21.3	29.9
Interdigital dermatitis	19.5	19.4	17.5	13.9	17.8
Interdigital hyperplasia	7.3	16.7	7.6	5.0	10.4
Interdigital necrobacillosis	5.7	1.4	2.7	1.5	2.4
Heel erosion	4.9	3.9	4.5	5.4	4.5
Sole ulcer	17.1	9.3	21.9	30.2	18.3
Sole gap and abscess	10.2	7.0	12.6	15.7	10.7
White line diseases	7.3	3.3	6.7	5.9	5.3
Deep sepsis	0.4	0.8	-	1.1	0.7

The dermatitis lesions were treated with local applications of formaldehyde aerosol in combination with oxytetracycline powder and wrapped for three days. The cases of interdigital necrobacillosis were usually treated with one injection of long term action oxytetracycline. Sole ulcer, heel erosion, sole abscess and white line disease were treated by trimming away diseased tissue, off loaded diseased claws were treated by applying a block to the healthy ones and administration of systemic antibiotics whenever necessary. Interdigital hyperplasia, whenever causing lameness, was treated by surgical excision, local application of iodine solution, wrapped for seven days and injection of systemic antibiotics. Severe complications as

septic arthritis of the distal interphalangeal joint and osteomyelitis of the distal phalanx were treated by digital amputation.

The results from this investigation are only related to clinical cases of lameness, many of long duration prior to treatment. However these data reflect the relative proportions of the different digital lesions causing lameness in the dairy herds at study. Subclinical lesions, as sole haemorrhages and varying degrees of heel erosions, and interdigital hyperplasia not associated with lameness were not recorded. The higher distribution of lesions of the rear feet, and of hind lateral claws observed in the present study are findings consistent with earlier surveys (Eddy & Scott, 1980; Russell et al., 1982; Clarkson et al., 1996). The high occurrence of digital and interdigital dermatitis detected in this investigation is probably associated with the poor hygiene conditions observed, but the possibility of the introduction of digital dermatitis into the herds by the purchase of heifers can not be dismissed (Rowlands et al., 1983; Williams et al., 1986; Rodriguez-Lainz et al., 1996; Read & Walker, 1998; Molina et al., 1999). The high humidity of the Brazilian southern region has probably contributed as an increased environmental risk. Although the digital and interdigital dermatitis were classified as different entities in this study, recent research has strongly indicated that both are part of the same disease complex (Blowey & Done, 1995; Walker et al., 1995). Interdigital hyperplasia was an expected outcome to the present environmental-irritation problem (Weaver et al., 1981; Petersen & Nelson, 1984; Hull et al., 1993; Allestein, 1994) and appeared especially prevalent in the herd 2, which showed the dirtiest facilities. Low comfort stalls are associated with excessive standing time and higher prevalence of foot lesions, especially laminitis-related (Radostits et al., 1994; Vermont & Greenough, 1994; Borges et al., 1998). Additionally, the dietary components used in these farms are consistent with low fibre rations, which can cause rumen acidosis and predispose to corium disorders (Livesey & Fleming, 1984; Radostits et al., 1994; Vermont & Greenough, 1994). The prevalence of sole ulcer suggests that laminitis was an entire herd problem. Furthermore, it is probable that the majority of sole abscesses found in this report is a result of bacterial contamination of previous laminitis-related lesions. The effect of long time footcare lack must be considered when assessing the results from this communication. The recovery of diseased animals after treatment was very good. The improvement of environmental management, feeding an appropriate fiber diet, and the use of oxytetracycline and formalin footbaths have been beneficial as control measures.

Although infectious agents may cause certain foot anomalies, this report may contribute to the knowledge that the nutritional and environmental management of the animals can have a substantial impact on the occurrence and severity of foot diseases. The bovine digital disorders also occur in southern Brazil and practitioners involved in the dairy herd health programs should be informed about the major ailments and their predisposing factors.

Keywords: Dairy cattle, foot lesion

RESUMO

Realizaram-se o diagnóstico e o tratamento de afecções podais responsáveis por claudicação em bovinos leiteiros no Estado do Rio Grande do Sul. Durante 18 meses, 524 animais apresentaram 883 lesões digitais clínicas. A prevalência de bovinos afetados foi de 50,2% e as lesões mais comuns foram dermatite digital (29,9%), úlceras de sola (18,3%) e dermatite interdigital (17,8%). Das lesões córneas, 91,5% ocorreram nas unhas laterais posteriores.

Palavras-chave: Bovino leiteiro, lesão digital

REFERENCES

- ALLESTEIN, L.C. Distúrbios da locomoção dos bovinos. In: Simpósio Internacional Sobre Produção Intensiva de Leite, 1. 1994, São Paulo. *Anais...* São Paulo, 1994. p.53-65.
- BERGSTEN, C., HANCOCK, D.D., GAY, J.M. et al. Claw diseases: the most common cause of dairy lameness diagnoses, frequencies and risk groups in a University herd. *Bov. Proc.*, v.31, p.188-194, 1998.
- BLOWEY, R.W., SHARP, M.W. Digital dermatitis in dairy cattle. *Vet. Rec.*, v.122, p.505-508, 1988.
- BLOWEY, R.W., DONE, S.H. Failure to demonstrate histological changes of digital or interdigital dermatitis in biopsies of slurry heel. *Vet. Rec.*, v.137, p.379-380, 1995.
- BORGES, J.R., PITOMBO, C.A., SILVEIRA, J.M. et al. Digital disease in confined milk cows in the southeastern region of Brazil. In: International Symposium on Lameness in Ruminants, 10. 1998, Lucerne. *Proceedings...* Switzerland, 1998. p.85-86.
- CLARKSON, M.J., DOWNHAM, D.Y., FAUL, W.B. et al. Incidence and prevalence of lameness in dairy cattle. *Vet. Rec.*, v.138, p.563-567, 1996.
- DIAS, R.S. Afecções de casco em vacas leiteiras. *Cad. Tec. Vet. Zootec.*, v.29, p.71-75, 1999.
- EDDY, R.G., SCOTT, C.P. Some observations of the incidence of lameness in dairy cattle in Somerset. *Vet. Rec.*, v.106, p.140-144, 1980.
- HULL, B.L., WEAVER, A.D., WELKER, B. et al. Diseases of the musculoskeletal system. In: HOWARD, J.L. *Current Veterinary Therapy – Food Animal Practice* 3. Philadelphia: Saunders, 1993. p.864-881.
- LIVESEY, C.T., FLEMING, F.L. Nutritional influences on laminitis, sole ulcer and bruised sole in Friesian cows. *Vet. Rec.*, v.114, p.510-512, 1984.
- MOLINA, L.R., CARVALHO, A.U., FACURY FILHO, E.J. et al. Prevalence and classification of foot problems in lactating cows in Belo Horizonte, Brazil. *Arq. Bras. Med. Vet. Zootec.*, v.51, p.149-152, 1999.
- PETERSEN, G.C., NELSON, D.R. Foot diseases in cattle. Part II. Diagnosis and treatment. *Comp. Cont. Educ.*, v.6, p.565-573, 1984.
- RADOSTITS, O.M., LESLIE, K.E., FETROW, J. *Herd Health – Food Animal Production Medicine*. Philadelphia: Saunders, 1994. 631p.
- READ, D.H., WALKER, R.L. Papillomatous digital dermatitis (footwarts) in California dairy cattle/ clinical and gross pathologic findings. *J. Vet. Diagn. Invest.*, v.10, p. 67-76, 1998.
- RODRIGUEZ-LAINZ, A., DAVID, W.H., CARPENTER, T.E. et al. Case-control study of digital dermatitis in southern California dairy farms. *Prev. Vet. Med.*, v.28, p.117-131, 1996.
- ROWLANDS, G.J., RUSSELL, A.M., WILLIAMS, L.A. Effects of season, herd size, management system, and veterinary practice on the lameness incidence in dairy cattle. *Vet. Rec.*, v.113, p.441-445, 1983.
- RUSSELL, A.M., ROWLANDS, G.J., SHAW, S.R. et al. Survey of lameness in British dairy cattle. *Vet. Rec.*, v. 111, p.155-160, 1982.
- SILVEIRA, J.B., MENECELLI, A.A., ANDRADE, E.F. et al. Levantamento epidemiológico das principais afecções podais em bovinos no município de Votuporanga – SP. *Cienc. Vet. Jab.*, v.2, p.18-19, 1988.
- TOUSSAINT RAVEN, E. *Cattle footcare and claw trimming*. Suffolk: Farming Press, 1985. 126p.
- VERMOUNT, J.J., GREENOUGH, P. Predisposing factors of laminitis in cattle. *Br. Vet. J.*, v.150, p.151-164, 1994.
- WALKER, R.L., READ, D.H., LORETZ, K.J. et al. Spirochetes from dairy cattle with papillomatous digital dermatitis and interdigital dermatitis. *Vet. Microbiol.*, v.47, p.343-355, 1995.
- WEAVER, A.D., ANDERSON, L., DE LAISTER-BANTING, A. Review of disorders of the ruminant digit with proposal for anatomical and pathological terminology and recording. *Vet. Rec.*, v.108, p.117-120, 1981.
- WEAVER, A.D. Symposium on managing bovine lameness: An often neglected means of decreasing production losses. *Vet. Med.*, December, p.1217-1239, 1991.
- WILLIAMS, L.A., ROWLANDS, G.J., RUSSELL, A.M. Effect of wet weather on lameness in dairy cattle. *Vet. Rec.*, v.118, p.259-264, 1986.