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Hoof associated lameness in dairy cows in Tabriz region of Iran

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Abstract

The purpose of this study was to determine hoof associated lameness in dairy cows in Tabriz region, Iran. Total two hundred cows with laminitis were evaluated. The main lesions were digital dermatitis and sole ulcer. The other lesions include heel horn erosion, foot rot and white line disease. The rate of lameness in hind limbs was greater than forelimbs. It was concluded from this study that lesions of hoof were the main causes of lameness in cows in Tabriz region of Iran.

Keywords: Lameness, Hoof, Digital Dermatitis, Cow

Introduction

Dairy cows are exposed to several environmental and managemental stresses. High-energy diets, concrete beds, permanent contact with hoof irritating substances, defects of body composition are factors that increase the risk of lameness. Lameness is a condition that leads to decrease in production, increasing the culling rate and the cost of veterinary treatment. Most cases of laminitis in cattle due to the various injuries in the finger structures which, if not timely diagnosed and treated may result in serious consequences. In most cases of cattle lameness, hoof injuries such as white line abscesses or double sole are the secondary complications of subclinical laminitis (Blowey, 1993; Bergsten, 1995). The purpose of this study was to survey common causes of laminitis in the farms of Tabriz region, Iran.

Materials and Methods

This study was conducted on two hundreds mature dairy cows with laminitis in East Azarbaijan province, Iran. Cows were divided into three groups: heifers, cow's with ≤3 parturition and >3 parturition. Sprecher movement scoring methods (grade 1 to 5) was used to assess laminitis in cows (Sprecher et al., 1997). We used unsound cows with a range of locomotion scores from very mild (≤2) to severely lame (≥4). Lesions were evaluated separately in the three regions:
Hoof wall: In this part, horizontal or vertical cracks and fractures were evaluated as major diseases. Hoof sole: In this part sole ulcer, white line disease, subclinical laminitis, digital dermatitis, foot rot and heal erosion were evaluated. Inter digital space: In this part, inter digital dermatitis, inter digital hyperplasia with extended digital dermatitis lesions were evaluated.

Results

All problems included: digital dermatitis with 72 percent prevalence (144 cases), sole ulcers with 12 percent (24 cases), wear heels 9.5 percent (19 cases), 4 percent of foot rot (8 cases), white line disease with 2 percent and inter digital dermatitis with 0.5 percent prevalence (4 and 1 cases, respectively). The percentage of lameness in the fore and hind limbs were 33 and 67 percent, respectively. In the 31 cases, both of fore and hind limbs were affected. Some of the cows affected from digital dermatitis had other problems such as sole ulcer (8 cows) and wear heels (5 cows). Totally 8 percent of cows had complex problems (16 cows).

Discussion

Lameness in dairy cows is a chronically painful condition that causes economic losses through poor reproductive performance, reduced milk yield and early culling (Walker et al., 2008; Néstor et al., 2010). Digital dermatitis is a transmissible disease of the skin of the limbs. It may vary in irritation and pain (Bergsten, 1997). High number of cows may have once experienced lameness in life and at least one of its

Table 1: Number and percent of cows affected by different kinds of hoof associated problems

Lesion type	Physiological status	Number of cows	Locomotion score		Plus other problems	
	Heifer	32 (16%)	≤2	0	sole ulcers	8
Digital	≤3	39 (19.5%)	3	75 (37.5%)		
dermatitis	>3	73 (36.5%)	≥4	69 (34.5%)	Heel horn erosion	5
		Total = 144 (72%)				
	Heifer	3 (1.5%)	≤2	0	Digital dermatitis	8
Sole ulcer	≤3	6 (3%)	3	3 (1.5%)		
	>3	15 (7.5%)	≥4	21 (10.5%)	Foot rot	2
		Total = 24 (12%)				
	Heifer	0	≤2	0		
Heel horn	≤3	8 (4%)	3	6 (3%)	Digital dermatitis	5
erosion	>3	11 (5.5%)	≥4	13 (6.5%)		
		Total = 19 (9.5%)				
Foot rot	Heifer	0	≤2	0	Interdigital	1
	≤3	1 (0.5%)	3	0	dermatitis	
	>3	7 (3.5%)	≥4	8 (4%)		
		Total = 8 (4%)			Sole ulcer	2
White line	Heifer	0	≤2	0		
disease	≤3	0	3	1 (0.5%)	--------	----
	>3	4 (2%)	≥4	3 (1.5%)		
		Total = 4 (2%)				
Interdigital	Heifer	0	≤2	0		
dermatitis	≤3	1 (0.5%)	3	1 (0.5%)	Foot rot	1
	>3	0	≥4	0		
		Total = 1 (0.5%)				

Table 2: Number and percent of lesions in fore and hind limbs

Limb	Digital dermatitis	Sole ulcer	Heel horn erosion	White line disease	Interdigital dermatitis	Foot rot	Total (%)
Fore limb	53	9	4	0	0	0	66 (33%)
Hind limb	91	15	15	4	1	8	134 (67%)
Both limbs	27	2	2	0	0	0	31(15.5%)

limbs were affected by laminitis (Murray et al., 1996). Ninety percent of overall cases of laminitis caused by lesions of the digits and a small percentage of cases of laminitis are due to damage to segments above the hoof (Weaver et al., 2005). The prevalence of laminitis and hoof lesions in the U.S.A and in the UK were estimated at 38 and 54 percent, respectively (Collick et al., 1989).

Clarckson et al. (1996) was of the opinion that sole ulcer is the dominant abnormality in animals. Weaver et al. (2005) believed that digital dermatitis, sole ulcers and white line disease are major causes of bovine lameness (Weaver et al., 2005). In the study in England, 31 percent of cases of lameness related to sole ulcer; 48 percent related to the white line disease, haemorrhage on the hoof, foreign body penetration and 21 percent of the lesions were included in inter digital space lesions such as inter digital hyperplasia or inter digital dermatitis (Collick et al., 1989).

According to multi-factorial nature, lameness in animals is a reflection of management of livestock and also amount of animal production. Factors such as animal's breed, regional rainfall, the density of animals and the managemental factors must be considered. In most studies, the majority of hoof injuries have been reported in the hind limbs (Offer et al., 2000). In this study, the frequencies of injuries in the hind limbs are higher than the fore limbs. The frequency of hoof injuries in heifers is significantly lower because of its lower weight and no milk production but in other stages, the hoofs are more at risk for injuries (Bergsten et al., 1998; Mohamadnia et al., 2003). In most studies, the majority of hoof injuries have been reported in the external digit of hind limbs (Barker et al., 2007). In this study, the frequency of lesions in the hind limbs is significantly more than fore limbs. In conclusion, the main lesions were digital dermatitis and sole ulcer (144 and 24 cases, respectively). The other lesions include heel erosion, foot rot and white line disease. The rate of lameness in hind limbs was greater than forelimbs (67 vs. 33%, respectively).

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