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Monitoring and management of congenital entropion in lambs: A prospective study

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ABSTRACT

This prospective study investigated the prevalence, the ocular features and the impact on zootechnic performance of congenital entropion in a sheep flock. A total of 318 Ile de France and Texel purebred and crossbred lambs were observed from birth to the age of 14 days. Repeated ocular examinations were performed and clinical signs were scored at different time points with a three-point severity scale. Spontaneous evolution of ocular clinical signs presented by entropic eyes was then monitored on a weekly basis from the age of 14 days until complete recovery occurred. The impact of entropion on growth was evaluated by measuring the bodyweight and by comparing affected animals with a breed-, gender- and litter size-matched-control group. Fifty-two lambs were affected by entropion. There were no gender-related differences, but significant differences among litter size and breed: triplet lambs, Ile de France and crossbred lambs were significantly more affected by entropion than purebred Texel lambs. The median time after which eyes with entropion recovered spontaneously was 7 days (range 2–42 days). No significant differences were found between groups regarding average daily gain. In conclusion, traits such as litter size and breed did influence the occurrence of congenital entropion in lambs. Moreover, this condition did not impact on lamb growth and resolved spontaneously.

1. Introduction

Entropion is defined as the condition in which one or more eyelids are turned in against the corneal surface (Warwick and Berry, 1962). It may be congenital, spastic or cicatricial (Cameron et al., 2005). This defect is described in different species of mammals. Congenital entropion is relatively frequent among small domestic ruminants (Cameron et al., 2005).

In sheep, this congenital defect is described as usually bilateral and affects both sexes of lambs (Joyce, 1981). The lower lid is more often concerned with occasional cases involving the upper lid (Rasmussen, 1980). This defect causes the eyelashes and the eyelid margin to rub against the eyeball resulting in ocular damages (Hosie, 2007). Entropion in lambs is usually detected by observation of excessive lacrimation during the first weeks of life (Sakul et al., 1996). Clinical signs commonly associated with entropion are epiphora, photophobia, conjunctivitis, keratitis and blepharospasm. Secondary corneal ulceration may develop with variable severity (Cameron et al., 2005).

In sheep, incidence rates of congenital entropion vary among breeds and flocks ranging from 1.0% to 80.0% (Cameron et al., 2005). It has been reported in several breeds (e.g. Columbia, Oxford, Cheviot, Suffolk, Border Leicester, Rambouillet, Texel and Charollais). Green et al. (1995) found that the only significant variable associated with the presence of entropion was the breed of the sire. In sheep, entropion may also be inherited as a polygenic trait

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Table 1
Percentages of entropion by sex, litter size and breed in the surveyed lamb population.

X	% X in population	% X in population with entropion	X	% entropion in reference (X)
Entropion				
Unilateral	11% (36/318)	69% (36/52)		
Bilateral	5% (16/318)	31% (16/52)		
Sex			Sex	
Male	47% (149/318)	42% (22/52)	Male	15% (22/149)
Female	53% (169/318)	58% (30/52)	Female	18% (30/169)
Litter size			Litter size	
Single	14% (46/318)	10% (5/52)	Single	11% (5/46)
Twin	63% (199/318)	56% (29/52)	Twin	15% (29/199)
Triplet	20% (65/318)	35% (18/52)	Triplet	28% (18/65)†
Quadruple	3% (8/318)	0% (0/52)	Quadruple	0% (0/8)
Breed			Breed	
Texel	30% (95/318)	10% (5/52)	Texel	5% (5/95)
Ile de France	19% (61/318)	27% (14/52)	Ile de France	23% (14/61)*
Crossbred	51% (162/318)	63% (33/52)	Crossbred	20% (33/162)*

X: male, female. . . or crossbred.
† Significantly different from single or twin ($P < 0.05$).
* Significantly different from Texel purebred ($P < 0.05$).

(Cameron et al., 2005). Sakul and Kellom (1996) estimated heritability of 0.21 and 0.17 for Columbia and Suffolk. They thus emphasized the importance of selection to reduce the incidence of entropion in farms as determined by Formston (1991) and Taylor and Catchpole (1986).

Some authors agree that it is fundamental to treat lambs affected by entropion for economic and animal well-being reasons (Green et al., 1995; Sakul et al., 1996). In contrast, others have reported that many cases of entropion resolve spontaneously or with minor medical intervention (Warwick and Berry, 1962). At a time when the welfare of farm animals and the profitability of the lamb meat industry become increasingly important, the evaluation of entropion and its possible spontaneous resolution is of critical interest.

The aims of this prospective study were (1) to evaluate prevalence of entropion in a sheep flock composed by Ile de France and Texel purebred and crossbred lambs and to describe associated ocular features, (2) to describe the spontaneous evolution of ocular clinical signs presented by affected lambs and (3) to evaluate impact of entropion on short-term lamb growth by monitoring their bodyweight.

2. Materials and methods

2.1. Animals

A total of 318 lambs born in March 2011 were prospectively observed from birth to the age of 14 days at the Centre for Ovine Research (CRO, Centre de Recherche Ovine) of the University of Namur. The studied population included purebred lambs (either Texel (95), Ile de France (61)) and crossbred (162) lambs produced by mating purebred rams to crossbred ewes.

For the first 2 days after birth, lambs were housed with their ewes in lambing boxes before being grouped. If colostrum/milk intake (assessed by drinking behaviour and weight gain after 48 h) and adoption of the lamb(s) by the ewe were considered as appropriate, several ewes with their lambs were housed in large indoor pens where they were fed hay and received drinking water ad libitum. Concentrates were distributed once a day. All animal investigations were performed by the research staff of the CRO of the University of Namur during the spring 2011 when average daily temperatures ranged between 10 and 20 °C. The weather conditions were fairly mild and dry. The study was approved by the Ethical Committee for Animal Welfare of the University of Namur.

2.2. Study design

Lambs were examined for entropion and other possibly associated ocular signs on the day of birth and then 1, 2, 7 and 14 days after birth (DAB). At last investigation, animals that did not show clinical evidence of entropion were no longer evaluated, while others were followed-up on a weekly basis until complete recovery occurred. Entropion status was recorded as entropic or normal.

2.2.1. Ocular examination

The ocular signs evaluated were epiphora, photophobia, blepharospasm, conjunctivitis, keratitis and macroscopic corneal ulceration. They were scored for each eye using a three-point severity scale: 0 (absent), 1 (present and moderate), 2 (present and severe). A total ocular score (range 0–12) was obtained by summing up the score assigned to each ocular sign. On days 1, 7 and 14, a fluorescein dye test was used to detect corneal ulceration with a Wood's lamp.

2.2.2. Assessment of bodyweight

All animals were weighed at each time point. Bodyweight was measured with a digital scale (accurate to 0.1 kg). Lambs affected by unilateral entropion were compared to a breed-, gender- and litter size-matched control group.

2.2.3. Data handling and statistical analysis

The level of significance was set at $P < 0.05$. All variables were tested for normal distribution with the Shapiro–Wilk statistic and for homogeneity of variances using the F_{max} test. Rates of entropion were compared between subgroups (e.g. male versus female) using the Z test for two independent proportions. The time after which eyes with entropion recovered spontaneously was determined using the non-parametric survival Kaplan–Meier method. In this study, the event is the fact that an affected eye was scored as 0. For the average bodyweight gain, statistical analysis was performed with the non-parametric Mann–Whitney test for independent groups.

3. Results

3.1. Prevalence and ocular features of congenital entropion in the surveyed population

Entropion was detected at birth or within hours after lambing. Birth prevalence of entropion was 10.4% (33/318). Incidence rates at 1 and 2 days after birth (DAB) were 4.0% (13/318) and 2.0% (6/318), respectively. No further cases were detected at 7 and 14 DAB. The total number of lambs