

# Enzootic posthitis in post-weaning lambs: a case series



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## SUMMARY

Enzootic posthitis is a disease that causes ulcerative lesions in the external genitalia of lambs, leading to negative effects on animal welfare, animal health, and profitability. The disease can be observed anywhere in the world where sheep breeding is common. Enzootic posthitis has a multifactorial aetiology but is primarily caused by rations with high protein concentration. Older lambs and adult rams during the mating term are more commonly affected, whereas the occurrence in younger lambs is a rare finding. This report describes the disease detected in 6 Merino male lambs 75-90 days old and compares their clinical and laboratory findings with six healthy lambs. Approximately 100 male lambs in a flock of 300 reportedly had varying degrees of difficulty in urinating, preputial lesions, and bloody urine. Clinical examination of the affected lambs revealed an inflamed prepuce (hot, painful, and swollen) and lesions with slight hyperemia to ulcerative changes. Preputial lesions generally consisted of circular ulcerative lesions and scabs, and the tissue was prone to bleeding when the scabs were removed. Blood and urine samples, as well as preputial swabs, were taken for laboratory analyses. *Corynebacterium renale*, *Staphylococcus intermedius*, *Streptococcus uberis*, and *Truoperella pyogenes* were isolated during the microbiological examination of the preputial samples. A diagnosis of enzootic posthitis was made based upon the clinical and laboratory findings of the affected lambs. For comparison, six healthy lambs were selected and evaluated. Clinical examination and some laboratory analyses performed for all lambs revealed no statistical differences in body temperature ( $39.78 \pm 0.13$  and  $39.43 \pm 0.13$  °C), total leukocyte count ( $7773.33 \pm 649.13$  and  $6916.66 \pm 802.25/\text{mm}^3$ ), and hematocrit (PCV%) ( $47.00\% \pm 3.54$  and  $39.33\% \pm 1.45$ ) between the diseased and healthy lambs; however, the mean urine pH values were 8.41 and 7.66, respectively ( $p < 0.05$ ). After the diagnosis, ration was rearranged with addition of ammonium chloride and reduction of protein concentration. Additionally, amoxicillin (15 mg/kg, two doses 48 hours apart, IM), metamizole sodium (20 mg/kg daily for two days, IM), and vitamin C (20 mg/kg for three days, IM) were administered together with local treatment of preputial lesions by using pomade rivanol for three days. With this treatment and management practices, lesions in many animals were healed on the 7th day of treatment and completely healed on the 10th day. Here, for the first time to the best of our knowledge, we document the presence of severe and widespread enzootic posthitis in male lambs aged 75-90 days to emphasize the importance of correct ration planning during the rearing period.

## KEY WORDS

Enzootic posthitis, ulcerative posthitis, lambs.

## INTRODUCTION

'Enzootic balanoposthitis', also called 'enzootic posthitis', 'ulcerative posthitis', 'pizzle rot', 'sheath rot', and 'peestersiekte', is a multifactorial disease characterized by ulcerative changes in the external genital organs<sup>1-6</sup>.

Although enzootic posthitis has been reported mainly in Australia, New Zealand, Scotland, England, Spain, South Africa, and South America, the disease can be seen in all regions where sheep breeding occurs<sup>2,7,8,9,10</sup>. While the disease has been identified in different sheep breeds, Merino sheep reportedly have a higher incidence rate because of the long hairs surrounding the prepuce, which can cause contamination with urine and the causative agent<sup>2,7,8,11</sup>.

Alkaline urine output, associated with a high protein ration (> 16%, especially 18%), is the most important predisposing factor for disease formation<sup>2,12,13</sup>. Pellet feeds with high protein concentration, legume-rich rations, and even grazing on pastures treated with nitrogen fertilizers can play a predisposing role in this disease<sup>2,9,13</sup>.

While enzootic posthitis has generally been described in adults or older lambs<sup>6,8,9,13</sup>, we aimed to evaluate weaning young lambs for the disease based on their clinical and laboratory findings and compare those findings with that of healthy lambs.

## CASE PRESENTATION

The study animals consisted of six male lambs from a Merino flock with preputial lesions exhibiting varying degrees of difficulty urinating, along with six healthy lambs as a control group. In the flock anamnesis, it was stated that, in the last 20 days, about 100 out of 300 male lambs, 75-90 days old, had dif-

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**Figure 1** - Ulcerative lesions in the prepuce.

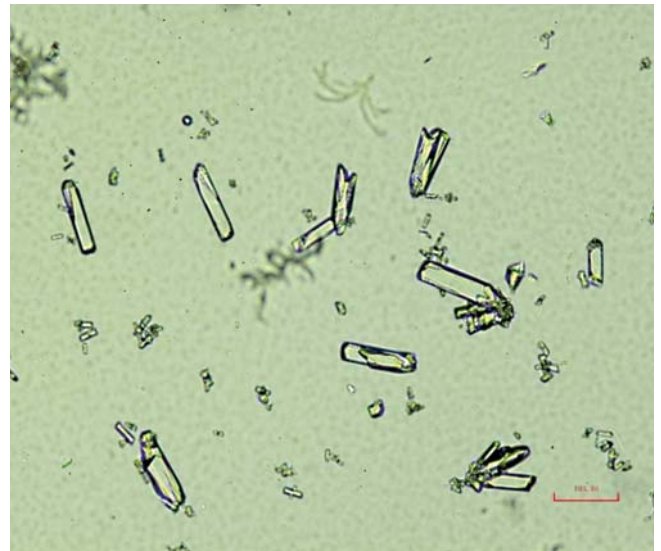
ficulty urinating, bloody urination, or intermittent urination (stranguria). It was reported that three diseased lambs died, and four were slaughtered during this period due to these problems. Based on the flock feeding and management regimen, all lambs were weaned and consumed lamb starter feed (17% protein, 5.15% cellulose, 8.34% crude ash) and roughage (hay and alfalfa mix) ad libitum. It was also reported that one spoon of ammonium chloride (about 10 g) was added to the drinking water (50 liters) once a week for the flock.

Examination of the flock revealed the prepuce of sick lambs to be usually hot and painful on palpation, and preputial lesions from mild hyperemia to severe ulcerative changes were observed. Some lambs had necrosis and scabs on the prepuce, and the tissue was prone to bleeding when the scabs were removed. In addition, the prepuce of severely affected lambs was edematous, with circular ulcerative lesions at the external orifice of the urethra, narrowing the preputial entrance (Figure 1).

The temperatures (°C) of healthy and diseased lambs were  $39.43 \pm 0.13$  and  $39.78 \pm 0.13$ , respectively. White blood cell (WBC) (/mm<sup>3</sup>) values in healthy and diseased lambs were  $6916.66 \pm 802.25$  and  $7773.33 \pm 649.13$ , respectively. Similarly packet cell volumes (PCV) were  $39.33\% \pm 1.45$  and  $47.00\% \pm 3.54$  and urine pH levels were  $7.66 \pm 0.10$  and  $8.41 \pm 0.15$  ( $p < 0.05$ ) (Table 1). *Corynebacterium renale*, *Staphylococcus intermedius*, *Streptococcus uberis*, and *Truperella pyogenes* were isolated following microbiological cultivation of preputial swab samples from two diseased lambs. In addition, it was observed that one affected lamb had marked crystalluria (magnesium ammonium phosphate = struvite) in the urine sediment (Figure 2).

**Table 1** - Clinical and laboratory findings with mean and standard error vaules of diseased and healthy lambs.

Parameters	Diseased group (n=6)	Healthy group (n=6)	Significance
Temperature (°C)	$39.78 \pm 0.13$	$39.43 \pm 0.13$	$p = 0.092$
Urine pH	$8.41 \pm 0.15$	$7.66 \pm 0.10$	$p = 0.002$
WBC (/mm <sup>3</sup> )	$7773.33 \pm 649.13$	$6916.66 \pm 802.25$	$p = 0.426$
PCV %	$47.00 \pm 3.54$	$39.33 \pm 1.45$	$p = 0.073$



**Figure 2** - Struvite (magnesium ammonium phosphate) crystals in urine sediment. Struvite crystals are refractile, colorless, tabular, three-dimensional, wedge-like, prism-like crystals.

Based upon the clinical and laboratory examinations, a diagnosis of enzootic posthitis was made. For treatment, amoxicillin (Moksidif LA®, Ceva; 15 mg/kg, two doses 48 hours apart, IM), metamizole sodium (Calor®, Ekomed; 20 mg/kg daily for two days, IM), and vitamin C (Tekno-C®, Teknovet; 20 mg/kg for three days, IM) were provided and pomade rivanol (Rivanol®, Ülkeim İlaç) was applied to the prepuce for three days. In addition, the feed ration was changed, reducing the lamb starter feed to half the amount and replacing it with corn-barley. Ammonium chloride was added to the drinking water three times a week. With this treatment and management practices, lesions in many animals were healed on the 7th day of treatment and completely healed on the 10th day.

## DISCUSSION

It has been reported that ulcerative posthitis can be seen in lambs of almost all ages, but it is more common in rams 1-4 years of age<sup>6,9</sup>, especially in castrated rams older than three years<sup>2</sup>. In many flocks, the disease has been described in older rams, especially during and after the mating period<sup>6,8,13</sup>, but rarely reported in young lambs 4-5 months of age<sup>11</sup>. It has been suggested that young lambs are more resistant to this disease because they use more protein for growth and development, and since adult lambs have a lower rate of growth, they can not tolerate excess protein intake<sup>9,11</sup>. Also, the larger and wider preputial surface of older rams increases the incidence of this disease<sup>9,11</sup>. Based on these claims, some suggest that young lambs are more resistant to this disease; however, here, we present severe and widespread enzootic posthitis in 75 to 90-day-old male lambs for the first time.

Isolation of *Corynebacterium renale* and *Truperella pyogenes* in microbiological cultivation of preputial swabs from sick lambs support the literature<sup>5,7,8</sup>. The destruction of epithelial cells by ammonia, which occurs with *Corynebacterium renale*, is of great importance in the pathogenesis of the disease<sup>2,9,14</sup> and *Truperella pyogenes* contributes to the pathogenesis of the disease by causing cell damage with its virulence factors<sup>7,15</sup>.

Apart from these findings, other bacteria isolated, such as *Staphylococcus intermedius* and *Streptococcus uberis*, were interpreted as contaminant bacteria.

In this case report, similar to another study<sup>9</sup>, body temperature was similar in sick and healthy lambs. The absence of a significant difference in total leukocyte counts between healthy and affected lambs has been interpreted as a result of the disease's local course. Although there was no statistical difference in PCV% values between the sick and healthy lambs, the PCV% value was higher in the sick lambs ( $47.00 \pm 3.54$  vs.  $39.33 \pm 1.45$ ). This situation is thought to be caused by the decrease in water consumption due to pain in the sick lambs and hemoconcentration due to anuria-dysuria.

In this study, urine pH values increased in diseased lambs ( $p < 0.05$ ). In a study conducted by Loste et al.<sup>9</sup> on diseased rams, the mean urine pH was 8.6, similar to our study. Although the urine pH levels were increased in both studies, differences between pH values in the two reports may be related to differences in animal ages (2.5-3 months vs. 1-4 years) and rations. It is known that as the amount of protein in the ration increases, the urea concentration in the urine, the urine pH, and the severity of lesions increase in parallel<sup>9,11,12</sup>. Likewise, Loste et al.<sup>9</sup> demonstrated the relationship between rations with high protein (16.8%), alkaline rumen (pH: 7.7), alkaline urine (pH: 8.6), and posthitis which led them to emphasize the importance of ration protein content. Similarly, in our study, lambs were fed lamb starter feed containing 17% protein, and sick lamb urine pH values were higher than healthy lambs. Struvite crystals, which are refractile, colorless, tabular, three-dimensional, wedge-like, prism-like, or coffin lid in appearance, can be seen in alkaline urine conditions<sup>16</sup>. Thus, the detection of struvite crystals in the urine of one of the diseased lambs supports the clinical diagnosis of enzootic posthitis due to high protein ration consumption and alkaline urine pH.

## CONCLUSION

In conclusion, although ulcerative posthitis is known to affect male lambs of different ages, especially older lambs, for the first time in this case series, clinical and laboratory findings of the disease are described in young lambs aged 75-90 days after wean-

ing. Based on these findings, we emphasize that care should be taken in selecting lamb grower feeds and ration planning as prophylaxis for this disease.

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