



Surgical Intervention in Case of Apex Necrosis of Bovine Claw

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Abstract

Lameness is an important reason for premature culling of cattle on a dairy farm. Lameness in those animals can be caused by affection of the skin of the under feet primarily, most important cause here by is digital dermatitis and inter digital phlegm on, or by affection of the horn shoe itself. Toe-Tip Necrosis (TTN) is a very painful and frequently unnecessary long lasting claw horn lesion that can be repaired by a relative simple intervention that results in a complete recovery of the lameness of the dairy cow. Correct intervention prevents preliminary culling of dairy cattle due to TTN.

Keywords: Surgical intervention; Lameness; Toe-tip necrosis; Bovine claw

Introduction

Lameness is an important reason for premature culling of cattle on a dairy farm [1]. Lameness in those animals can be caused by affection of the skin of the under feet primarily, most important cause hereby is digital dermatitis and inter digital phlegm on, or by affection of the horn shoe itself [2]. The main causes of the latter are mainly: White line lesions and sole ulcer, with a cow-prevalence in 2020 in The Netherlands of respectively 16.6% and 8.6% at the moment of regular claw trimming by professional claw trimmers, who perform digital registration of disorders at leg level (CRV, Arnhem, 2021). Lesions recognized and correct treated at an early stage give cows a reasonable prognosis, although the percentage of reoccurrence is fairly high. Other disorders of the horn shoe, like Toe-Tip Necrosis (TTN) and axial wall fissure, are sometimes difficult to treat also and then result in long-term lameness (from months to years) [3]. There for the term non-healing claw lesions was introduced [4], which included not healing after regular or therapeutic claw trimming by professionals. TTN is diagnosed in The Netherlands in 90% of the herds and in around 2% of the dairy cows, and a recent investigation in UK found a prevalence of around 6% to 8% [5]. The etiopathogenesis of TTN is complex with a combination of soft claw-horn quality, mechanical trauma causing excessive sole horn abrasion and infective agents like *Treponema*'s and also an acute BVDV-infection [6].

The objective of this contribution is to present and discuss 2 practical treatment strategies that provide a good prognosis for the affected animals. This makes this intervention life-saving for the cows and not only economically interesting for the livestock farmers, but also from a welfare perspective.

Case Presentation

The "life saving intervention"

Toe-Tip Necrosis (TTN) is in most cases caused by an ascending and progressive infection of the bone within the horn shoe, but in fact as for most claw disorders, the etiology is multifactorial [3,6]. Without correct intervention the dairy remains lame seriously for the times that the cow is not support by a block under the claw of the same leg. This is unacceptable lameness for the farmer and there for such patients leaves the herd preliminary. Despite all the good intentions, treatment by the claw trimmer cannot solve the problem of TTN. As far as I have noticed, while visiting dairy herds with such patients, claw trimmers had tried to remove all the deviant-claw horn and apply different topical therapeutics, but it seems not easy to really suppress the local necrotic osteitis within the horn shoe and the result is a progressive inflammation with a continuation of the lameness due to the pain. A practical and relatively simple to execute way to break this, is a surgical intervention. Hereby is only the affected part of the bone removed, instead of the complete affected claw, under local anesthesia of course. This intervention can be applied simple with a really good prognosis. To my opinion it is the role of every bovine practitioner to discuss the findings of and with the claw

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Figure 1a: A typical presentation of TTN as a non-healing gap at the medio-plantar side of the claw-horn shoe. Very typically is shortening of the horn shoe due to loss of bone tissue. Claw trimmers remove all the deviated horn normally and apply products of different origin (antibiotics, copper sulphate etc).



Figure 1d: After own preparation a wire suture is applied just cranial of the external lesion so that the necrotic bone tissue is removed (see next picture).



Figure 1b: The intervention starts with applying elastic around the metatarsus (in case of hind feet) and the blood vessels of the under feet (V. ...) to apply the anesthetic product and to be able to execute a painless surgical intervention.



Figure 1e: After removal of this tip, no necrotic tissue may be left. The fresh cut can be treated with a tetracycline spray topically and covered with sterile gauze and an elastic bandage.



Figure 1c: Before starting the intervention a block is applied on the contralateral claw (here already present) and the claw is cleaned and disinfected before starting the intervention itself.



Figure 1f: Final result immediately after intervention, whereby the cow is housed separately and we refresh the bandage at D4 and D7. At D10 the patient can return into the barn without any bandage.

trimmer (and the farmer of course) and the best way of intervention regularly.

The practical implementation

The practical implementation of the intervention is shown in (Figures 1a-1g). The total intervention takes no more than 30 min,

assuming a good preparation of the horn shoe by the claw trimmer. Of course do not forget to remove the ligature. Over 90% of the intervention resulted in almost complete recovery of the patients, which resulted in a better milk production, fertility and absence of pain and lameness.



Figure 1g: Result after 4 months: Gap is closed. A complete recovery from lameness is present; Size of the claw has been increased again to almost normal.

After care

After care for such patients is minor and starts with checking for leakage of the wound through the bandage (seen a very single time) and checking for walking normally on the block, whereby it is advisable to house the patient separately in the first week. It is remarkable that the patient uses the affected leg normally almost immediately, due to the absence of pain. Refreshing of the bandage at D4 and at D7 is advisable to keep a fresh bandage and to be able to check the wound.

Discussion

Toe-Tip Necrosis (TTN) is a serious cause of lameness and irreparable by claw trimming or applying local or parenteral antibiotics. This means that most of these patients leave the herd preliminary and the farmer does not want to have permanent lame cows (welfare) and pay all the extra energy into the patients without seeing any improvement. The intervention described here is because of the complete painless recovery, a life saving intervention and contributes to a better durability of the dairy cows. This intervention is advisable above a complete claw amputation due to the forming

of a new claw horn shoe and a complete carrying surface, instead of a single inner claw, which is normally a small claw also [7]. Complications are seen seldom and also when a cow is housed inside, infections of the wound after intervention are noticed seldom. So this is a cow saving intervention that should be part of every veterinary practitioner his/her toolbox.

Conclusion

Toe-Tip Necrosis (TTN) is a very painful and frequently unnecessary long lasting claw horn lesion that can be repaired by a relative simple intervention that results in a complete recovery of the lameness of the dairy cow. Correct intervention prevents preliminary culling of dairy cattle due to TTN.

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