Wound healing following cautery disbudding in calves: a photographic survey

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Introduction

Farm veterinarians and veterinary technicians use cautery procedures to disbud thousands of calves each year. Often, calves are only directly observed by the person creating the wound during the procedure.

Concurrently administered vaccines may not be boosted for a period of up to six weeks. Consequently, the period of wound healing is largely unobserved by those responsible for creating the wounds.

A field study conducted in the Spring of 2024 provided the opportunity to document the progression of cautery disbudding wound healing over 35 days and on six occasions. This paper delivers a photographic survey of wound healing progression following cautery of calf horn buds.

Materials and methods

Calves from three commercial dairy farms in North Waikato were subjected to a clinical assessment of health by a veterinarian. Five hundred and four calves between the ages of 7 and 35 days were enrolled following determination of normal gait, demeanour, skin condition, absence of masses or lacerations and with a rectal temperature between 38.0–39.5^{o}C.

Disbudding was performed according to the New Zealand Veterinary Association (NZVA) standard operating procedure (NZVA 2019). Calves were sedated with 2% xylazine at 0.2mg/kg liveweight administered intramuscularly (Phoenix Xylazine 2% Injection® PhoenixPharm Distributors Ltd. (NZ), ACVM reg. no. A5541). A single intramuscular dose of 0.5ml of meloxicam 40mg/ml was administered concurrently (Metacam® 40mg/ml, Boehringer Ingelheim Animal Health (NZ) Ltd., ACVM reg. no. A011754). Upon recumbency, 2.5ml to 5ml per site, of a local anaesthetic, lignocaine 2% (Nopaine 2% Local Anaesthetic, Phoenix Pharm Distributors Ltd. (NZ), ACVM reg. no. A6597) was administered to block the cornual nerve on either side of the head. Cautery disbudding was performed with a standard butane-fuelled cautery dehorner with a 15mm tip. Total contact time of the cautery dehorner tip to the epithelium was approximately five seconds and the cauterized bud was removed, 'flicked', from the wound.

A series of photographs were captured from several calves when wounds were examined on days 0, 7, 11, 14, 21, 28 & 35.

Animal ethics approval

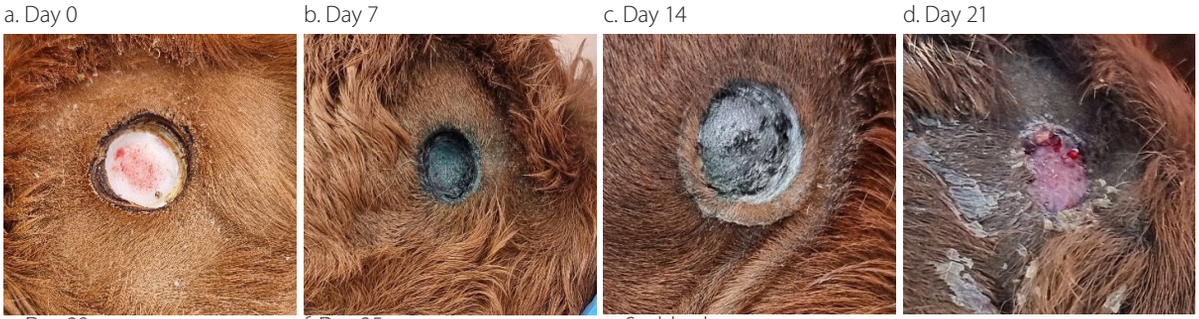
The study from which this paper derives was carried out under the approval of the COMETA ethical committee of Vetoquinol S.A, 2024, #2.

Results

Data was excluded from 24 data sets for a variety of reasons leaving data from 480 calves to be analysed. One calf was polled on one side resulting in 959 disbudding sites for assessment. Three broad categories of wound healing were observed. The following series of photos (Figure 1) is from different calves but describes what was observed to be the 'desired' progression of wound healing in calves following disbudding. This represented 188/959 wounds that remained clean and dry throughout the progression of healing (19.6%, 95CI 17.1–22.3%).

Figure 1. The 'desired and normal' progression of wound healing in calves following cautery disbudding under sedation between 2-5 weeks of age.

a. Day 0 b. Day 7 c. Day 14 d. Day 21



e. Day 28 f. Day 35 g. Scabbed cup

Day 0 shows the clean wound left following cautery disbudding where the bud is removed or 'flicked out'. At Day 7, the wound has dried out. By Day 14, a ring of dead tissue at the wound edge caused by the heat of the cauterisation is evident. Together with the cauterised tissue at the base of the wound, a calcified periosteal scab, this forms a 'cup' of scabbed tissue that is moving away from the skull as granulation occurs below. At Day 21 this 'scabbed cup' has lifted from the wound exposing granulation tissue underneath. Epithelialisation of the wound is progressing at Day 28. By Day 35 the wound has fully healed.

This next series of photos (Figure 2) outlines the progression of 'delayed' healing that represents 209/959 wounds (21.8%, 95CI 19.2–24.5%). The wounds ranged from mildly (Figure 2) to severely exudative in the early phases of healing. Wounds experienced delays in healing due to retention of calcified periosteal scabs in the wound, despite the ring of cauterized skin tissue being expelled from the wound early in the healing process. Rapid closure of granulation tissue over the periosteal scabs trapped the scabs in the wounds for varying amounts of time. Mostly, these were expelled by Day 28 as part of the calf's healing process and subsequently, wound closure occurred rapidly. Figure 2d shows the expulsion of a periosteal scab at 21 days. Periosteal scabs were removed by the veterinary team from 10 wounds considered by farm staff to be causing significant discomfort to calves between Days 11 and 21. NSAIDs were used in the treatment of these wounds and all healed quickly following scab removal.

The final series of photos (Figure 3) outline the 'typical' progression of healing representing 562/959 wounds (58.6%, 95CI 55.4–61.7%). Exudate and an increase in the wound size occurred early in the healing process. Expulsion of the tissue 'cup' was followed by rapid healing with the only observable difference from the 'desired' healing progression being the degree of exudate in the early phases of healing.

Conclusion

Following cautery disbudding in calves, wounds typically progress to healing over a period of 28 to 35 days. Evidence of a cauterized ring of tissue, exudation and crusting is typical by Day 14. Where this cauterised ring of tissue remains attached to and is expelled from the wound with the calcified periosteal scab, wound healing progresses quickly. Entrapment of periosteal scabs within the wound by granulation tissue appears to delay healing. Where periosteal scabs are not expelled by the calf's own healing process, physical removal promotes a rapid return to the typical healing process without the use of antibiotics.

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Figure 2. Progression of wound healing in a calf where a calcified periosteal scab is trapped in the wound following cautery disbudding.

a. Day 7 b. Day11 c. Day 14 d. Day 21

e. Day 35 f. Calcified periosteal scab

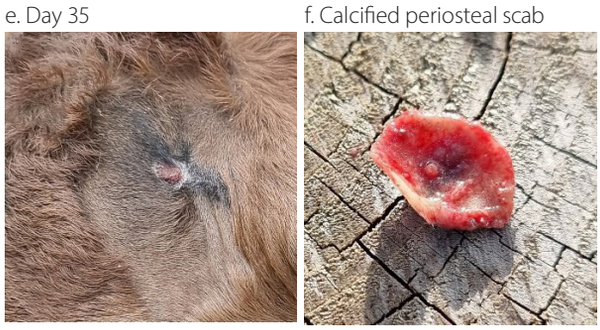

Figure 3. Typical progression of wound healing following cautery disbudding in dairy calves.

a. Day 7 b. Day 14 c. Day 21 d. Day 35

References

NZVA. Standard Operating Procedure for disbudding of calves. *NZVA Policy* May 2019