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Teat Endoscopy (Theloscopy)

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Milk flow disorders often occur as a consequence of covered teat injuries. The outer teat skin is unaffected - the injury is located in the inner teat⁵. Covered teat injuries may be treated conservatively or surgically.

Conservative Therapy

Conservative therapy consists of resting the teat for 9 days total of 3 x 3 days^{1,17}. The sooner the teat is rested the better is the prognosis. If mastitis is diagnosed in the quarter of the affected teat, it should be treated first before resting. Procedure: 1. Administer xylazine and oxytocin, 2. The teat is cleaned and disinfected, 3. Drain the milk by using a sterile milking tube^a, 4. Administer an antibiotic^b intracisternally to treat subclinical mastitis and to prevent clinical mastitis, 5. Insert a sterile silicone implant^c into the teat canal to prevent adhesions in the teat canal, 6. Bandage the teat by using an elastic adhesive tape^d to prevent the silicone implant from coming out, and to indicate to the herdsman to not milk this teat. Apply this procedure on the day of the injury (day 0), 3 days later (day 3), and 6 days later (day 6). Rest and do not milk the teat from the day of the injury until 9 days (day 9) after (Table 1). The milk may appear watery and production may drop after resting the teat for several days. Milk appearance returns to normal, and production will rise after milking is resumed. There is more chance that the milk yield will be back to previous production if the injured teat is rested early in lactation⁴. It was hypothesised that about 50% of all teats affected with a covered injury will be milkable again after conservative therapy¹¹. However, if the teat is not milkable, other treatment option should be considered like surgery, drying off the affected quarter or finally culling of the animal.

Surgical Therapy

A precise diagnosis is a prerequisite for successful surgical therapy. Teat endoscopy or theloscopy, is very helpful in a rural practice setup to precise a diagnosis^{2,6,15}. The necessary equipment consists of a theloscope^e for air insufflation and endoscopy, and appropriate sized surgical instruments. Procedure: The cow is sedated with xylazine and oxytocin is administered. The cow is properly restrained in a claw trimming chute. Following cleaning and disinfection of the teat, a rubber ring is placed at the teat base, an anesthetic injected into a teat vein distal to the ring. Finally, the cistern is irrigated with sterile saline. Theloscopy can be

performed through either the teat canal or the lateral teat wall. When theloscopy is performed through the teat canal, the teat canal and the teat cistern can be visualized in an upwards direction. When theloscopy is performed through the lateral teat wall, the teat cistern and the inner opening of the teat canal can be visualized in a downwards direction ¹⁵.

244 patients presented to the Veterinary Clinic Babenhausen were predominantly young Braunvieh cows kept in tie-stall barns, and belonging to herds with an average herd size of 38 cows. These patients were at a median of three months in milk, and most of them were previously treated. Predominantly, hind teats were affected by an acute milk flow disorder. In 96% of the affected teats a rupture in the area of the teat canal was diagnosed (49% with tissue dislocation, 47% without tissue dislocation); 4% had other diagnosis such as ruptures in the teat cistern area or papilloma. In 64% of the affected teats, inflammation of the teat lining (cisternitis) was diagnosed. Subclinical mastitis was present in 52% of the affected quarters ¹¹.

Minimal invasive surgical therapy was performed with the help of teat endoscopy. Ruptured and dislocated tissue were precisely removed by using a teat punch^f. Narrowed teat canals were dilated with a teat knife^g, and papilloma were extracted by using teat forceps ¹⁵. After surgery the rubber ring was removed, and the quarter was milked out. Antibiotics were administered in the affected teat after the surgery. A silicone implant^c was inserted and the teat bandaged and rested for several days to speed up healing. Before surgery peak milk flow from teats with milking disorders was on average 24 (22, 22) % as compared to the contralateral (ipsilateral, diagonal) teats; one month later: 73 (68, 69), six months later: 82 (77, 80) %. This may indicate that milk flow from the affected teats was decreased before surgery, and increased thereafter. Before surgery the milked + drained milk mass from the affected teat was 115 (106, 107) % as compared to the contralateral (ipsilateral, diagonal) teats; one month later the milked mass from the affected teat was 67 (69, 68), and six months later 69 (74, 73) %. This may indicate that milk had congested in the affected quarter before surgery, and that the affected quarter did not entirely meet the milk production of not affected quarters after surgery ^{12,13}. Before surgery somatic cell count (SCC) from affected quarter was on average 18 (23, 22) times higher than in the milk from contralateral (ipsilateral, diagonal) teats; one month later: 10 (13, 15), six months later: 6 (9, 7) times higher. Before surgery pathogens were detected in the milk from affected teats 4 (4, 5) times more frequently than in the milk from contralateral (ipsilateral, diagonal) teats; one month later: 4 (5, 8), six months later: 3 (4, 6) times more frequently. This may indicate that the quality of the milk from affected quarters was abnormal before surgery; SCC decreased significantly after surgery, however, infection with pathogens did not change significantly ^{14,16}.

During the lactation the injury occurred as well as the subsequent lactation, affected cows yielded as much milk as unaffected herdmates on test day and throughout lactation. However, covered teat injuries increased test day SCC by 128,000 in average. Covered teat injuries that were managed surgically as described did not affect survival in the herd nor calving interval ³.

Conclusion

Teat endoscopy (theloscopy) is an excellent diagnostic and therapeutic procedure for covered teat injuries. Minimal invasive theloscopic surgery may help to restore milk flow, milk yield and SCC of the affected quarter; infection with pathogens, however, may not change

significantly. Cows treated as described may yield as much milk as their herdmates at a slightly increased udder SCC, and stay as long in the herd as their herdmates. Theloscopy may also be used for diagnosis and therapy of various other disorders of the inner teat⁶⁻¹⁰.

Instruments

^a STERIL disposable milking tube; profs-products.com, Wittibreut, Germany, www.profs-products.com

^b the antibiotic should be a penicillinase-resistant antibiotic, and effective against gram-positive and gram-negative pathogens (e.g. cloxacilline)

^c SIMPL silicone implant; profs-products.com, Wittibreut, Germany

^d ELASTOPLAST elastic adhesive tape; Beiersdorf, Hamburg, Germany

^e THELOSKOP teat endoscope; Eickemeyer, Tuttlingen, Germany, www.eickemeyer.de

^f THELOTOM teat punch, Eickemeyer, Tuttlingen, Germany

^g HUG teat lancet, Eickemeyer, Tuttlingen, Germany

Abstract

Teat endoscopy (theloscopy) may be used for diagnosis and therapy of covered teat injuries. Minimal invasive theloscopic surgery may help to restore milk flow, milk yield and SCC of the affected quarter; infection with pathogens, however, may not change significantly. Cows treated as described may yield as much milk as their herdmates at a slightly increased udder SCC, and stay as long in the herd as their herdmates. Theloscopy may also be used for diagnosis and therapy of various other disorders of the inner teat.

L'endoscopie du trayon (thélioscopie) peut être utilisée à des fins diagnostics et thérapeutiques pour les blessures inapparentes du trayon. La chirurgie par thélioscopie peut aider les problèmes d'éjection du lait et par conséquent améliorer la production lactée et diminuée le comptage de cellules somatiques (CSS) ; cependant, il y aura peu d'effet si l'infection est causée par des bactéries pathogènes. Les vaches traitées par cette méthode peuvent donner autant de lait que les autres mais avec un CSS légèrement élevé et avec une vie productive tout aussi longue. La thélioscopie peut être utilisée pour le diagnostic et le traitement des problèmes de la portion interne du trayon.

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Table 1: Resting the teat for 3 x 3 days.

Day	0	1	2	3	4	5	6	7	8	9
administer xylazine & oxytocin	x			x			x			
clean & disinfect the teat	x			x			x			
drain the milk	x			x			x			
administer an antibiotic	x			x			x			
insert the silicone implant	x			x			x			
bandage the teat	x			x			x			
resume milking										x