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Theloscopy - The Advancement in Teat Surgery and Diagnosis

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Abstract

Teat endoscopy is an excellent diagnostic procedure for covered teat injuries. Minimal invasive surgical therapy with the help of teat endoscopy. The teat endoscopy provided exact condition of the mucosa, intensity/grade and eventual duration of pathological changes. Theloscopy requires minimum time for giving accurate diagnosis about the internal teat injuries. By using theloscopy milk flow disorder can be diagnosed easily and precisely. Theloscopy allows to treat injuries according to a précised diagnosis and to monitor the treatment.

Keywords: Teat, Surgery, Diagnosis, Theloscope, Milk, Disorder

Introduction

In recent diagnostic procedures in veterinary practice related to teat and udder in large animals, minimum invasion has become the watchword and there is no better method to achieve this, other than theloscopy for diagnosis, therapeutic and to monitor the treatment along with research purpose. In the past it was very difficult to exactly diagnose the reasons of milk flow disorders of teats and udder with undamaged skin. Inspection, palpation, probing and hand milking of the affected teat are certainly helpful in the diagnosis of teat and udder disorder. Now sonography, (Cartee, 1986) radiography (Witzig and Hugelsdofer, 1984) or theloscopy (Heidrich, 1958) are the advanced diagnostic methods, which can be used for the diagnosis of these orders.

The word theloscopy was derived from Greek word “Thela” and “Skopeo”. Thela means “Teat” and Skopeo means “I view”. In general theloscopy is known as the “Teat endoscopy”. With teat endoscopy (theloscopy), a new and simple technique has become available to exactly diagnose milk flow disorders. The theloscopy allows safe and definite intervention for situation with comparatively less risk and inconvenience to the patient than the conventional methods for diagnosis, therapeutic and to monitor the treatment.

The aim of theloscopy is to exactly diagnosis milk flow disorders and to monitor the treatment. Insight into the teat may be gained via the teat canal or via the lateral teat wall. With the sight via the teat canal (axial theloscopy) the view is directed upwards into the teat canal or the teat cistern. With the insight via the lateral teat wall (lateral theloscopy) the view is directed downwards into the teat cistern and into the inner opening of the teat canal. The most frequent disorders located the area of the inner opening or the teat canal may better be visualized via the lateral wall than via the teat canal due to this it is safe and effective method for monitoring of the teat after treatment without damaging the teat.

History

Theloscopy was first described by Wilhelm and Schebitz (1979) and Tulleners and Hamir (1990). However, it was Meld and colleagues who introduced theloscopy in bovine practice in the year 1994 (Meld et al 1996).

Anatomical Consideration

Mammary gland are modified skin glands, rudimentary in the male but functional in female. In cows and buffaloes, the mammary glands are highly developed and consist of four quarters. The shape of the udder may very from bowl to trough type, around or pendulous. Teat may cylinder to conical in shape. The suspensory apparatus and blood and nerve supplies of the two halves are independent of each other. So one half of the udder can be easily removed without affecting the other. Each half consists of a cranial and a caudal quarter. The two quarters of each half have independent glandular tissue but common blood and nerve supply and lymph drainage. The arterial supply is from the branches of the external

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pudic and perineal arteries. The venous drainage is through the external pudic, perineal and large subcutaneous abdominal (mammary) veins. The nerve supply is primarily through the inguinal nerves and the caudal mesenteric plexus of the sympathetic system.

The teats are membranous tubes of variable length, diameter and wall thickness. From outward to onward, the teat consists of the skin, muscular layer (intermediate layer), fibrous layer and mucosa. The skin of the teat is free from sebaceous for sweat glands. The intermediate layer is made of smooth muscles arranged in two layers i.e. superficial in a longitudinal fashion and deep in a circular fashion. The heavy circular muscles also from spincture of the teat canal. The fibrous layer acts as a binding material for the muscular layer with the skin and mucosa. The mucous membrane of the teat sinus is not uniform but has transverse, oblique and longitudinal folds. The first two folds to form pockets or reservoir for bacteria. At the proximal end of the teat cistern, the folds from peg like structures called trabeculae. At the distal end, the folds are loose and in a rose flower like pattern to form rosette of Furstenberg. The duct system of the teat has two main parts i.e. the teat sinus or cistern and the streak canal (papillary duct). The cistern is separated from the gland cistern by a circular ridge (annular fold). Ventrally the rosette of Furstenberg separates the teat cistern from the streak canal. The streak canal is surrounded by a spincture and opens at the ostium papillae.

The closing mechanism of the teat consists of circular muscles forming the spincture, the rosette of Furstenberg and circular elastic fibers around the streak canal. This closing mechanism prevents the leakage of milk from the teat and entry of microbes from outside. When milking is done from a normal teat, the closing mechanism is overcome by the pressure of milk and muscles again close the duct when pressure is released.

Teat Abnormalities

- Polyps
- Spider teat
- Teat calculi (Lactolith)
- Stricture of the teat orifice
- Teat peas

Equipment

The equipment consists of a small, wireless, battery operated theloscopy to inflate and to look into the teat (instruments for small surgery are also needed), rigid scope, a blow pipe and a handle.

Rigid Scope: The rigid scope allows for straight insight (00) in to the teat and has a working length of 10 cm. It turns in a blow pipe with an outer diameter of 3.0 mm.

Blow Pipe: The blow pipe is used to blow the air into the teat cistern in order to dilate the teat for its examination.

Handle: The rigid scope and blow are bolted and attached to the handle. The handle contains a lamp, an air pump and batteries (rechargeable), which power the lamp and pump for several hours. Lamp and pump can switched on separately.

Sterilisation of Equipment

The theloscopy may be disassembled for cleaning and sterilization. Blow pipe and view pipe may be sterilized by using liquid or gaseous disinfectants (70 % isopropyl alcohol, savlon or formalin chambers.)

Instrument for Small Surgery

Thelometer to measure teat canal length, round ended probe, milking tubes, stretching forceps and rubber rings, obturator, California mastitis (CMT) cup, slight tube, syringes, needles, teat knife, teat punch (thelotom), foreign body forceps (thelokal), natural teat inserts, silicon implants, needle holder, dissecting forceps, scissor, needle thread combination. Along with the above instruments swabs, bandage, xylazine, oxytocine. 70% isopropyl alcohol, normal saline and 2% lignocaine solution are also required.

Preparation of the Patient

First of all before going for the examination case history is recorded followed by general examination of the affected teat and its quarter along with examination of normal teat and their quarter in standing position inside the travis after tying the legs. Prior to the endoscopic examination of the animal, admini-stration of xylazine (10mg/100kg b.wt. IM) and oxytocine (10 IU IM) is done. The teats are thoroughly clean with 3% acridine solution. Scrupulous cleanliness is the prerequisite, for successful examination and surgery.

Inspection, Palpation, Probing and Hand Milking of the teat

First of all teat is examined from outside, followed by palpation of teat canal, the teat cistern and the teat wall (Grunert and Rosenberger, 1979). The potency of the teat canal is tested by drawing off few streams of milk. The change in teat canal length may be determined with a Thelometer as compared to the contra lateral teat. Teat canal lengthening by more than 2 mm is indicated of a rupture in the teat canal with inversion of tissue into the teat cistern (Inzmisawa et al.,1995). The course of the teat canal may be examined with a round ended probe. A sterile milking tube or teat siphon may be used to test the potency of the teat canal to obtain milk sample. The California mastitis test should be performed on each milk sample.

Clamping the teat base, anesthetizing and rinsing the teat cistern

A rubber ring is placed around the teat base to prevent milk from entering the teat cistern and blood from entering the teat wall. The teat is anaesthetized by puncturing a tea vein with 24 or 26 gauge needle, draining blood and injecting 8 to 10 ml of a 2% lignocaine solution (Surborg, 1984). Then the teat cistern is rinsed through a milking tube with sterile saline until the draining saline is clear.

Nsignt via the teat canal

For axial theloscope the scope and blow pipe are inserted into the teat canal and cistern via the teat sphincter. After switching on the pump, air is blown into the teat to dilate the cistern. After switching the lamp on, the teat cistern may be examined and also during withdrawal of scope and blow pipe.

Nsignt via the lateral teat wall

For lateral theloscopy a small opening is made in the lateral teat wall. Through this opening scope and blow pipe are inserted into the teat cistern. For this purpose an obturator is inserted via the teat canal into the teat cistern and pushed through the lateral teat wall. The slide pipe is inserted from outside along the obturator into the teat cistern and the obturator is removed. Then scope and blow pipe are inserted via the slide pipe into the teat cistern. The slide pipe protects the artificial opening during the examination. After this the pump is switched on and air is blown into the teat to dilate the cistern. After switching on the lamp the distal part of the teat cistern and the inner opening of the teat canal are examined (Shakaspeare, 1998).

The theloscopy can be used for both diagnosis and monitoring of the surgical treatment (Querengasser et. Al., 1999). For treatment the thelotom or Hug's lancet are used. Tissue impending milk flow may be removed with the thelotom. A guideline may be "Removal of sick tissue and preservation of healthy tissue". Tissue removal may be monitored through the theloscopy inserted via the lateral teat wall (John et. Al., 1998). A assistant may hold the theloscopy while the surgeon performs the treatment.

Forceps may be used to remove bodies from the teat cistern that may stem from (papilloma, blood or milk clots) or from outside (foreign bodies) the teat (Querengasser et. al., 2000)

Post-operative care

1) The skin of the artificial opening is closed with interrupted suture. the rubber ring at the teat base is cut with scissors. The milk flow is tested by hand milking and the residual milk from the quarter is drained. Normal milk may be drained with a narrow disposable milking tube. Mastitis milk may be drained with a specially designed wide milking tube. Draining the milk washes off tissue left from surgery.

2) Instillation of intramammary antibiotic into the teat cistern is done with suitable intramammary preparation to prevent or to teat mastitis. A sterile natural teat insert or a sterile silicon implant is inserted into the teat to prevent teat canal stenosis.

Advantages:

1. Teat endoscopy is an excellent diagnostic and therapeutic procedure for covered teat injuries.
2. Minimal invasive surgical therapy with the help of teat endoscopy.
3. The teat endoscopy provided exact condition of the mucosa, intensity/grade and eventual duration of pathological changes.
4. Theloscopy requires minimum time for giving accurate diagnosis about the internal teat injuries.
5. By using theloscopy milk flow disorder can be diagnosed easily and precisely.
6. Theloscopy allows to treat injuries according to a précised diagnosis and to monitor the treatment.

Disadvantages:

1. High cost of instrument.
2. High expenditure of work

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First detection of Ebola-Reston virus in pigs - FAO/ OIE/WHO offer assistance to the Philippines

MANILA 23 December 2008 – Following the detection of the Ebola-Reston virus in pigs in the Philippines, the UN Food and Agriculture Organization (FAO), the World Organisation for Animal Health (OIE) and the World Health Organization (WHO) announced today that the government of the Philippines has requested the three agencies send an expert mission to work with human and animal health experts in the Philippines to further investigate the situation. An increase in pig mortality on swine farms in the provinces of Nueva Ecija and Bulacan in 2007 and 2008 prompted the Government of the Philippines to initiate laboratory investigations. Samples taken from ill pigs in May, June and September 2008 were sent to international reference laboratories which confirmed in late October that the pigs were infected with a highly virulent strain of Porcine reproductive and respiratory syndrome (PRRS) as well as the Ebola-Reston virus. Although co-infection in pigs is not unusual, this is the first time globally that an Ebola-Reston virus has been isolated in swine. It is not, however, the first time that the Ebola-Reston virus has been found in the Philippines : it was found in monkeys from the Philippines in outbreak s that occurred in 1989-1990, 1992, and 1996. The E bola virus belongs to the Filoviridae family (filovirus) and is comprised of five distinct species: Zaïre , Sudan , Côte d'Ivoire, Bundibugyo and Reston . Zaïre , Sudan and Bundibugyo species have been associated with large Ebola hemorrhagic fever (EHF) outbreak s in Africa with high case fatality ratio (25–90%) while Côte d'Ivoire and Reston have not. Reston species can infect humans but no serious illness or death in humans have been reported to date. Since being informed of this event in late November, FAO, OIE and WHO have been making every effort to gain a better understanding of the situation and are working closely with the Philippines Government and local animal and human health experts. The Department of Health of the Philippines has reported that initial laboratory tests on animal handlers and slaughterhouse workers who were thought to have come into contact with infected pigs were negative for Ebola Reston infection, and that additional testing is ongoing. The Bureau of Animal Industry (BAI) of the Philippines Department of Agriculture has notified the OIE that all infected animals were destroyed and buried or burned, the infected premises and establishments have been disinfected and the affected areas are under strict quarantine and movement control. Vaccination of swine against PRRS is ongoing in the Province of Bucalan. PRRS is not transmissible to humans. The planned joint FAO/OIE/WHO team will work with country counterparts to address, through field and laboratory investigation, important questions as to the source of the virus, its transmission, its virulence and its natural habitat, in order to provide appropriate guidance for animal and human health protection. Until these questions can be answered, the FAO and WHO stressed the importance of carrying out basic good hygiene practices and food handling measures. Ebola viruses are normally transmitted via contact with the blood or other bodily fluids of an infected animal or person. In all situations, even in the absence of identified risks, meat handling and preparation should be done in a clean environment (table top, utensils, knives) and meat handlers should follow good personal hygiene practices (e.g. clean hands, clean protective clothing). In general, hands should be r egularly washed while handling raw meat. Pork from healthy pigs is safe to eat as long as either the fresh meat is cooked properly (i.e. 70°C in all part of the food, so that there is no pink meat and the juices run clear), or, in the case of uncooked processed pork, national safety standards have been met during production, processing and distribution. Meat from sick pigs or pigs found dead should not be eaten and should not enter the food chain or be given to other animals. Ill animals should be reported to the competent authorities and proper hygiene precautions and protection should be taken when destroying and disposing of sick or dead pigs. The Philippines Department of Agriculture has advised the Philippine public to buy its meat only from National Meat Inspection Services certified sources. As a general rule, proper hygiene and precautionary measures (wearing gloves, goggles and protective clothing) should also be exercised when slaughtering or butchering pigs. This applies both to industrial and home-slaughtering of pigs. Children and those not involved in the process of slaughtering should be kept away.