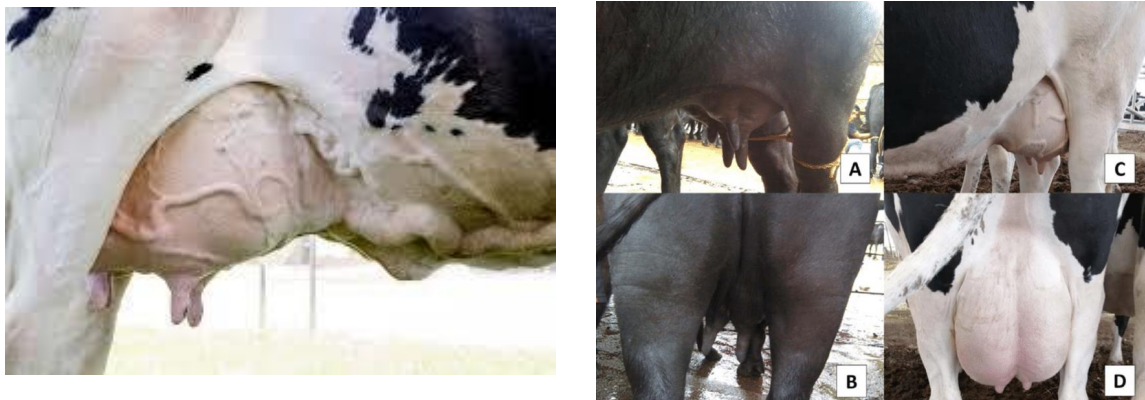


Teat and Udder Surgery

Mammary system begins producing milk before or after parturition. Milk alone contributes around 63% to the total output from livestock.

Generally, teat and udder affections are common in domestic animals especially cattle and it may lead to duct stenosis and mastitis or Gangrenous mastitis which latter need surgical treatment or Mastectomy; so early diagnosis and treatment of diseases of teat and udder is very important for maintenance of their health. It is well known that udder and teat affections always lead to economic loss in milk yield, loss in antibiotic-treated milk, possible loss of quarter if there is a necessary to dry off, and finally reflected on the economic value of dairy animal. Hence, a better knowledge on udder and teat surgical affections and abnormalities is found to be highly needed.

Therefore, good udder health produces good-quality milk for both human consumption and the calf.

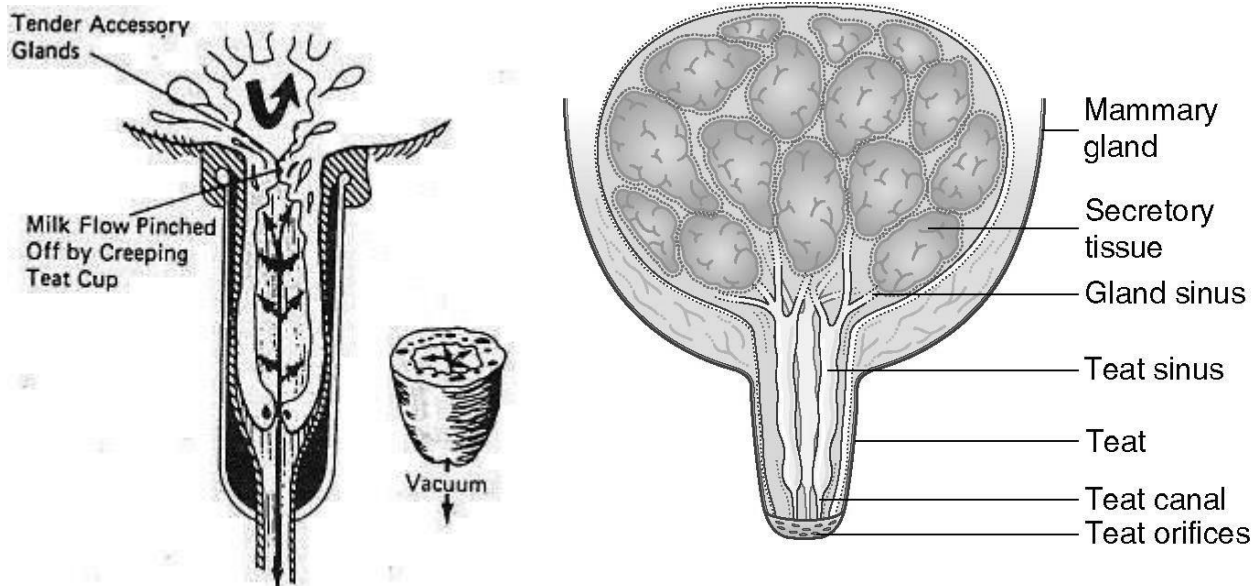


Anatomy

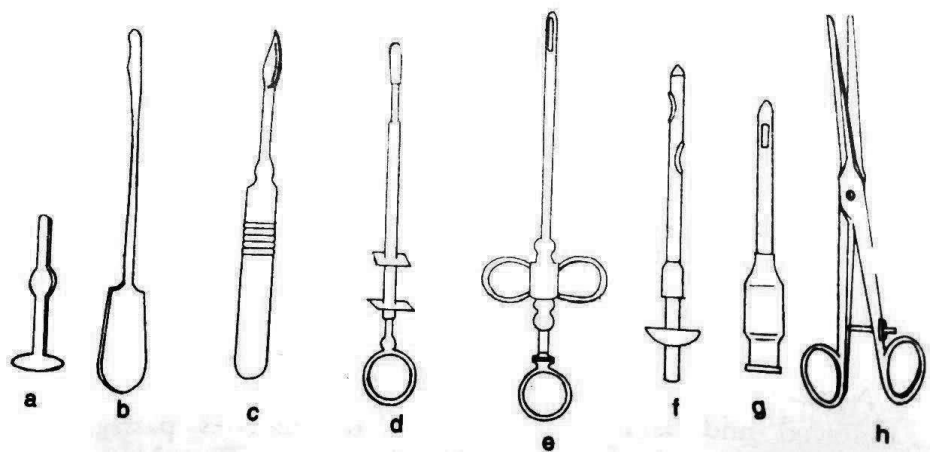
The udder of the cow and buffalo has four quarters each of which is a separate unit. Each quarter is an independent compartment. Affection of one quarter does not necessitate the involvement of the other quarters. In buffaloes, the anterior teats are shorter than the posterior. In cow, the teats of the anterior quarters are longer than the posterior. This makes the anterior teats of the cow and the posterior teats of

buffaloes more prone to injuries. The udder in sheep and goat is composed of two halves, right and left.

Most of surgical procedures of the udder and appendages performed on the bovine are the same adopted on small ruminants and other large species.



Teat Instruments



a- Teat plug **b-** Teat bistoury **c-** Lichtig teat knife with sharp point
d- Teat tumor extractor **e-** Teat splitter **f-** Udder infusion tube
g- Milk tube **h-** Teat scissors

✓ **Classification of surgical affections of teat and udder**

| <p><i>According to the site</i> Surgical conditions of the udder and teats can be grouped into three main categories. A. Conditions of epithelial surface of udder and teats. B. Conditions of glands and tea cistern or canal. C. Conditions of teat sphincter.</p> | | | <p><i>According to the main cause</i> Surgical affections of the udder and teats may be A. congenital B. Acquired</p> | |
|--|---|---|---|--|
| A | B | C | A | B |
| <p>1. Supernumerary glands. 2. Sore teat. 3. Udder and teat abscess 4. Teat laceration and teat fistula 5. Udder bruising 6. Udder edema 7. Lumpy-Skin disease (LSD) 8. Warts. 9. Peeling /sloughing off</p> | <p>1. Lactolith calculi of the teat canal (milk stone) 2. Polyps of the teat canal 3. Teat spider 4. Fibrosis of teat canal 5. Tumor of mammary gland 6. Canal prolapsed</p> | <p>1. Teat stenosis (hard milker). 2. Teat leaker (free milker). 3. Blind teats 4. Inverted teat opening</p> | <p>1. Absence of the udder. 2. Absence of the teat. 3. Supernumerary glands 4. Contracted sphincter or teat orifice "hard milker" 5. Enlarged teat orifice "Free Milker" or (Leaker) 6. Occlusion of the teat orifice.</p> | <p>1. Lacerations 2. Teat Fistula 3. Haematoma of the Udder 4. Lactiferous Calculi (Milk Stones) 5. Abscess of the Udder</p> |

According to the main cause

A. Congenital surgical affections of the udder and teats

1. Absence of the udder:

Is extremely rare and only met with in cases of hermaphroditism.

2. Absence of teat (athelia):

Complete absence of teats is extremely rare condition

Athelia was reported in buffaloes and in a Japanese Black Heifer

3. Supernumerary glands (teats) or extra teats

It occurs only in multiparous animals.

(Multiparous animals= give birth two or more times; Giving birth more than one at a time).

*Supernumerary teats can be classified into **functional** and **Non-functional***

Supernumerary teats may occur and can be present anywhere on the udder but are most frequently seen posterior to the last two normally placed teats. These additional number teats may not or may have adjacent glandular tissue that will become functional. If there is a glandular tissue that has a functional potential, it will atrophy if not milked.

Treatment:

It is better to amputate the accessory teats when that animal is young heifer, before the gland becomes active. It is essential that care must be taken to assure that only the supernumerary teats are removed and not normal. It may be desirable to remove the supernumerary teats for cosmetic reasons or because some may be so close to normally placed teats that they interfere with milking procedures.

Procedure:

Identify extra teats and wash udder with soap and warm water.

Disinfectant the udder. Stretch “extra” tea firmly with one hand.

Infiltrate the base of the teat by means of 2 % Xylocaine as local anesthetic; a sharp two elliptical incisions are made including the necessary teat at the junctions the teat with udder. Crush the tissue and using scissors for removing. Paint cuts with tincture of iodine, then close skin wound with interrupted suture using non absorbable suture material. Stop bleeding routinely, Disinfectant powder

Then close skin wound

In fly season, Paint wounds with pine oil (الصنوبر) to repel the flies

4. Contracted sphincter or teat orifice "teat stenosis" "hard milker":

The condition may be congenital in origin or may be acquired as a result of trauma to the end of the teat in which teat sphincter gets contracted due to repeated trauma resulting in hard milking of teat. There is a small stream of milk (During milking one has to apply more force to take the milk out and milk will come out in fine stream), and prolonged milking time. There may be loss of milk due to incomplete milking or trauma to the teat due to attempts for hard milking methods.

Treatment:

Local infiltration anesthesia or instillation of 5 ml of 2 % xylocaine or similar local anesthetic into the teat canal will provide anesthesia. The orifice should be cleansed, antiseptic applied, and the orifice enlarged. The enlarging procedure may be accomplished by inserting of lichtig teat knife, teat slitter or teat bistoury. The opening in the sphincter is maintained at the desired size by inserting a Larson teat tube and leaving it in place for 5-7 days. Milking is accomplished by removing the cap of the tube.

Note: Stenosis of streak canal without acute inflammation can be treated successfully by incising the sphincter in three directions with teat Knife, Bard parker blade No.11, Udall's teat knife, McLean teat knife.

5. Enlarged teat orifice "Free Milker" or (Leaker):

This condition is just reverse of teat stenosis. it is occur due to a relaxed or a traumatized sphincter. Milk leaks from the teat at times other than milking and result in milk loss. Sometimes infection may leading to mastitis.

Treatment:

The condition may be helped by injecting small amounts of sterile mineral oil or 0.25ml lugol's solution around the orifice to reduce its

size to the desired effect this may have to be done more than once to obtain the optimal size for milk flow. If it is overcorrected and result in stenosis, handle as contracted sphincter or orifice. Or it could be treated by scarification and suturing with one or two stitches with monofilament nylon.

6. Occlusion of the teat orifice:

This is a **congenital** anomaly characterized by the occlusion of the teat orifice deposit the teat fills with milk at the time of lactation. It **may also be acquired** as a result of trauma at the teat orifice that results in healing with occlusion.

Treatment:

A small amount of local anesthetic is injected into the area. Insert a septic needle where the opening should be located. Insert the needle into the teat canal until milk flows out; then withdraw the needle and enlarge the opening as described for contracted sphincter.

B. Acquired surgical affections of the udder and teats

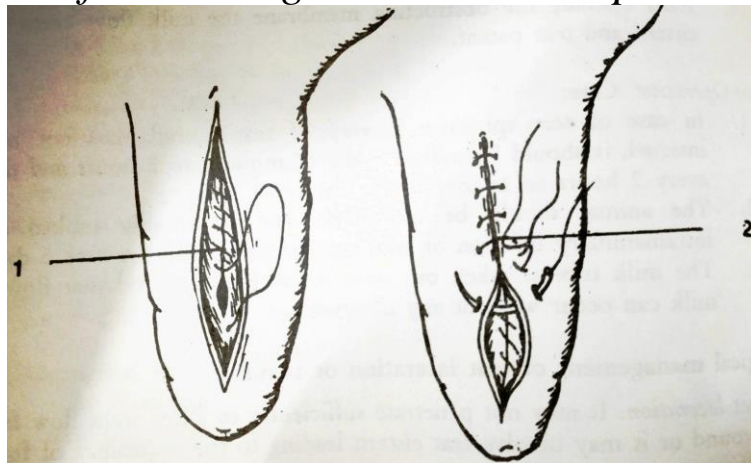
1. Teat lacerations

Superficial teat lacerations (not penetrated teat mucosa) Suturing is not required, topical medication and bandaging are usually sufficient to allow healing

Deeper laceration and penetrated teat mucosa, lead to opened teat canal and milk will start flowing through the teat portion this may converted to **teat fistula** is required surgery if not sutured may be interference with normal teat function, the complication are teat necrosis, or acute mastitis. Systematic antibiotic is required. Proper drainage, cover the wound. Larson's teat plug is used. Different suture techniques are used to repair the teat fistula but Double layer simple continuous suturing with PGA 3/0 vertical mattress ,simple interrupted suturing of skin with nylon 1/0 is found suitable for repair of teat fistula.

Lacerations

Lacerations of teats and or udder that do not penetrate sufficiently to allow milk to flow from the wound may be handled as any other laceration, keeping in mind that large amounts of scar tissue or flaps of skin may interfere with milking or have an undesirable cosmetic effect. Lacerations or trauma in the area of the teat sphincter may lead to stenosis. If there are flaps of skin that protrude, they should be sutured or removed. Portions of nonviable skin should be trimmed back to conform to normal contour of the teat. Sutured wounds may be protected by a wrap of an adhesive elastic bandage. The insertion of a Larson-type teat tube to facilitate milking is of value to the person milking as well as to the animal because the pain associated with the trauma. Replacing the cap on the tube after milking will reduce the possibility of mastitis.



Repair of teat laceration. 1. Continuous suture on mucosa and submucosa. 2. Interrupted sutures on the skin

2. Teat Fistula

The term, teat fistula, refers to an opening in the wall of the teat, connecting the exterior to the pre-existing channel; the teat canal is characterized by persistent outflow of milk.

Such fistula may be **congenital or acquired**. It is **mostly acquired** as a result of penetrating wound that extend to the teat canal or cistern and fails to heal completely because of the continuous drainage of milk. Fistula will vary in size from that one which is so tiny it is difficult to locate to large ones through which the mucous membrane may be seen.

Symptoms:

It characterized by presence of tract and milk coming through it at milking time.

Treatment:

1. Anesthesia can be obtained by a ring block at the base of the teat or local infiltration anesthesia of the wound edges using 2 % solution of xylocaine.
2. The entire area is prepared for aseptic surgery by washing the field of the operation with soap and water, swap with alcohol. **Tincture iodine should never be used because of its marked irritant effect.**
3. Apply a suitable tourniquet as the rubber tube of the blood transfusion set at the base of the teat or teat band as much high as possible to secure hemorrhage during the operation.
4. The wound edges should be, if necessary, debrided before suturing. If the fistula is old and the tissue around it has healed, the tract should be excised before suturing.
5. Apply a teat siphon to guard against injuring tissues of the other side and to avoid excessive trimming.
6. The teat fistula is then sutured after dusting the site with an antibiotic powder.
7. The suture is carried out in two rows including all layers with the exception of the mucosa using non-absorbable, non-capillary suturing material. A vertical mattress or similar stitch is used to effect the apposition of the edges deep in the tissue and superficially. The

apposition must be complete and firmly held in place or milk seepage will cause the fistula to recur.

- 8. A teat bougie is applied to prevent adhesion of both sides of the teat cistern.*
- 9. An elastic adhesive bandaged is wrapped around the teat to reduce milk pressure on the sutures, to protect the wound.*
- 10. The tourniquet is then removed. The stitches may be removed in 10-14 days post operation. Remove the bandage after 5-7 days. Siphon the milk (2-3 days).*
- 11. Intra-mammary infusion of broad-spectrum antibiotic ointment to guard against mastitis.*

Care must be taken that it is contraindicated to carry out such surgery if mastitis is supervening or the lips of the wound are edematous. This should be first treated before the surgery.

3. Hematoma of the Udder (Udder Bruising)

Haematoma of the udder is relatively common in cattle having pendulous udder as a result of trauma and rupture of a subcutaneous blood vessels. The condition is characterized by its sudden onset and fluctuency. A septic puncturing the swelling may be necessary to confirm diagnosis, but this is not preferable. If the haematoma is subcutaneously, it can be palpated but if it parenchymatus it cannot be detected by visual examination and the diagnosis in such cases depends upon the sudden onset of bloody milk.

Treatment:

Small haematomas of the udder should never be opened immediately (could be left without treatment until the body resorption by using cold application then hot application to promote hematoma resorption also Antiseptic could be used to prevent infection in addition to milking the udder several time daily to reduce the pressure.

It is well known that opening the hematoma may lead to some complication especially in the early forming hematoma so opening the haematoma is after a week post occurrence. The blood clot is removed and the cavity is painted with tincture of iodine. The cavity is then packed tightly to guard against further bleeding.

Large haematomas or Big size hematoma should be left several days then open and remove the clot and prevent the infection, large hematomas in front of the udder should not be opened till the blood is clotted, usually after 10 days and proceed as before. Some case open the big hematoma and when abscess formed then treated as an abscess.

4. Abscess of the Udder

Abscesses of the udder may develop beneath the skin as a result of infection of a haematoma. It may occur in the parenchyma of the udder as a result of chronic mastitis especially in goats. It may also occur as a result of supra mammary lymphadenitis. Generally, abscess formations most commonly occurs secondary to the traumatic wound.

Udder and teat abscess diagnosed by puncturing the swollen, then drainage.

Treatment:

Following confirmation of diagnosis, the treatment should be done on the general principles for treatment of abscesses; the cavity is dressed with tincture iodine and application of sedative agents until healing occurs. If there are multiple abscesses, mastectomy (partial or total) according the involvement of one quarter or more on the entire udder, is then indicated followed by daily dressing till complete healing of wound occurs. If there is involvement of the supra mammary lymph node, lymphadenitis it should be extirpated.

According to the site

A. Conditions of epithelial surface of udder and teat:

1. Sore teat or Chapped teat (تقرح الحلمة او تشققها)

A- Pathogenic: Bovine ulcerative mammitis or mammillitis

Ulcerative mammillitis (pseudo-lumpy) is a viral disease caused by Bovine herpes virus.

For treatment of such painful lesions:-

Wash the wound with light potassium permanganate solution.

Sterilized teat siphon used to drain the milk out.

Sedative preparation such as iodized glycerin, bismuth iodoform paraffin paste, zinc oxide ointment or antiseptic dressing with Soothing emollient (مطريات مهدئة).

B- Non-pathogenic

Such conditions often occur in the winter and spring months.

The ulceration may occur as a result of irritation due to the feeding of the calf or moist mechanical milking machine, wet bedding or wet air in the barn. The skin is initially rough and then the wrinkles (تجاعيد) are formed and become solid and deep. These wrinkles may turn into narrow cracks (fissures) that bloom and swell, they are sensitive to touch and then difficult to milking the cow and breast feeding by the calf.

Treatment

Teat should be dry after each milking with using soother antiseptic like 20% Tannic acid and glycerin which is very helpful in case of superficial chapped. Very excellent preparation could be used also which contain liquid phenol: Camphor: Vaseline at ratio 1:2:3 respectively.

2. Udder edema

It's caused by excessive accumulation of fluid in extravascular spaces of the udder and surrounding tissues.

*Udder edema is indicated by swelling of the lower part of the udder due to excessive fluid accumulation (as mentioned above) between the milk secretory cells. Often the swelling extends forward, under the skin in front of the udder. **The cause of udder edema is unknown**, although there is some evidence to indicate that excessive sodium or potassium intake might increase its severity (So usual recommendations for minimizing the problem include avoidance of excessive salt and potassium, before calving). Effective treatment of cows with udder edema is limited to massaging swollen tissue in an upward direction for 15-20 minutes after each milking, in an attempt to help drain excess fluid into the general circulation. Diuretics may help by increasing fluid excretion. Some diuretic treatments also contain corticosteroids which may reduce inflammation.*

3. Lumpy-skin disease (LSD)

This is a viral disease. It is called lumpy-skin disease because of the lumps (كتل) it causes on the body of an animal, including the udder and teats.

Lumpy skin disease (LSD) is an economically important disease of cattle and can produce a chronic weakness in infected cattle comparable to that caused by foot-and-mouth disease (FMD). Mortality rates as high as 40 percent or more have been encountered but they are usually lower. Severe and permanent damage results from the skin lesions. Lesions in the mouth, pharynx and respiratory tract commonly occur, resulting in a

rapid weakening in condition and sometimes severe emaciation, which can persist for months. Serious economic losses can follow outbreaks that have a high morbidity. It was noticed that shortly afterwards, the characteristic skin lumps develop; they may cover the whole body or be restricted to the head, neck, perineum, udder, genitalia or limbs.

Extensive sloughing of necrotic skin from the udder or limbs can occur when they have become enlarged and edematous.

Severely infected animals become emaciated and may require euthanasia. The weakness persists for one to three months and occasionally for up to six months. The mouth lesions interfere with feeding; milk production ceases and udder and teat lesions may result in serious infections with the sloughing of necrotic tissue.

Note that LSD can be confused with Allerton disease (bovine herpes mammilitis) which also causes lumps on the body and udder

Treatment

LSD can be prevented by vaccinating all animals (cattle) above the age of 6 months and then annually thereafter

LSD is a controlled disease and if suspected should be reported to your nearest state veterinarian or animal health technician. Infected animals should not be moved to other areas.

4. Warts

Warts are caused by viruses.

Warts can be cauliflower (قرنابيط) like or thin and long in shape. There are up to 7 different shapes.

Warts sometimes disappear within 2 months but sometimes they persist and have to be removed.

Cattle can also be vaccinated against warts. The vaccine used is made from warts.

Treatment

Cattle can also be vaccinated against warts. The vaccine used is made from warts.

5. Peeling (تقشر)/Sloughing off

1. Mastitis

In some severe cases of mastitis, the skin of the udder and the teats peels off. The udder is crusty and when the crusts are removed red sores (القروح الحمراء) are seen.

2. Photosensitivity

There are certain poisonous plants which, when eaten, make animals to be very sensitive to light. Areas exposed to direct sunlight, especially with light pigmentation (colour), are affected first and most, especially where the hair cover is sparse (متناثر). This can affect the udder.

3. Chemicals

Use only registered teat dips for teat dipping. Avoid home-made dips!

4. Udder edema

Sometimes the udder gets bigger than normal because fluid collects in the tissue. As the cow walks, the udder rubs against the inner thighs, causing reddening of these areas. Constant rubbing at these areas causes the skin to peel off, leaving raw lesions on the udder.

5. Blue udder

This disease of the udder is caused by a bacterium. The udder and teats have a blue-black colour and the skin peels off.

6. Extremely cold environment

During cold-weather periods the udder may start to peel off.

B. Conditions of glands and tea cistern or canal***1. Lactolith calculi of the teat canal (milk stone) = Lactiferous Calculi (Milk Stones)***

Milk stone are formed into the teat canal when the milk is rich in minerals and salty in taste.

Lactolith is usually not attached and moves freely in the teat canal, and hinder (delay) the milk flow. It obstructs only when it is lodged at the orifice.

It may be removed by milking out via the orifice.

*In case of **large calculus**, it is crushed by passing a mosquito or alligator forceps and milked out.*

*In case it is **too hard and large**, teat sphincter is slit by inserting a Lichtig teat knife or teat bistoury and calculus is milked out.*

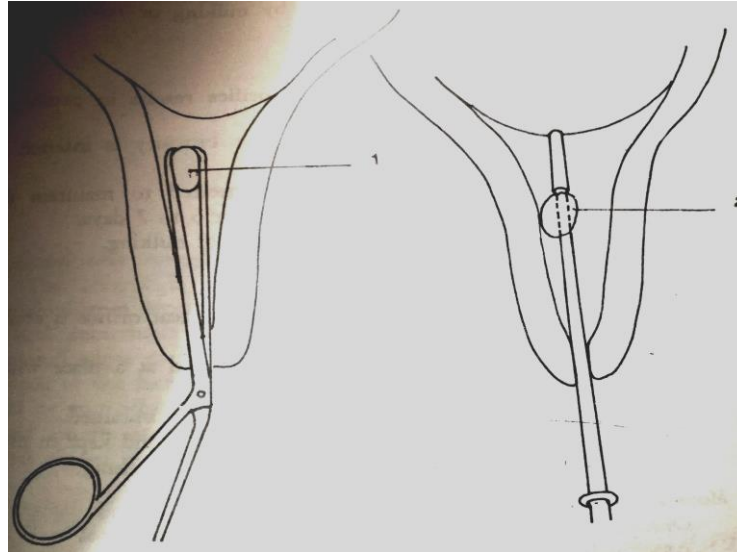
A Larson teat tube is inserted and left in place for 5 to 7 days, and milking can be removing the cap of the tube.

2. Polyps of the Teat canal.

These are small peace growths attached to the wall of teat canal.

The polyps prevent the milking process and sometimes even block the passage of teat canal. Teat polyps can easily take out by huge teat tumor extractor (in which teat tumor extractor is inserted into the teat canal after ascertaining (determining) the location of polyps). If its location is above the teat canal surgically removed. The polyps are excised (removed) by milking or relived with alligator forceps.

Postoperative Gentamicine and prednisolone infusion for 5 days respectively found suitable to check infection as well as helpful in checking further growth of the polyp.



Surgical removal of Lactolith and polyp:

- 1. Crushing of Lactolith by alligator forceps.***
- 2. Removal of polyp by teat tumor extractor.***

3. Teat spider = Membranous obstruction of the teat canal.

*Teat spider in cattle and buffalo is congenital as well as acquired condition; the condition usually due to **congenital absence** or improper development of the teat cistern or teat canal. In case of improper development of the teat cistern, it may impossible to feel the milk pocket. **Treatment of such cases is not recommended.***

*When it become **acquired** in cases of injury, tumor or inflammation of mammary tissue resulting in formation of thin or thick membrane, situated either at the base or middle of the teat. Palpation reveals fluctuating milk above the obstruction but milking is not possible. This membranous obstruction removed by teat scissor, Huge teat tumor extractor, teat bistouries or Hudson spiral teat instrument.*

4. Fibrosis of teat canal

This condition is commonly observed in most of the lactating animals where a hard fibrous cord like structure is observed in the teat.

Causes:

It's not clear. However, repeated trauma due to mechanical injuries.

Thumb milking and calf suckling are the main contributory factors.

Sometimes mastitis result into fibrosis of quarter and teat canal.

Fibrotic cords obstruct the teat canal and create hindrance during milking.

Hot water application followed by counter irritant massage such as iodine ointment and turpentine liniment massage is very useful.

In some cases it is advisable to place a catheter after removal of fibroid mass by Hugs teat tumors extractor.

5. Tumor of mammary gland.

It's rarely in lactating animals, fibro adenoma reported in heifer.

It's surgically removed under perineal nerve block or local infiltration analgesia.

C. Conditions of teat sphincter

1. Blind teats

*This condition may be **congenital or acquired** due to any trauma near the teat sphincter.*

Such cases generally reported just after parturition on palpation milk thrill found in teat cistern on pressing.

Milk passed backward toward udder cistern. Imperforated teat (blind teat) treated by 15 gauge needle, after creating opening, it is further dilated using huge teat tumor extractor, milk cannula fixed for 24 hour after that frequent milking advised at 4 to 6 hours Intervals to prevent adhesion.

Administration of proper antibiotics is done for a minimum period of 3-5 days.

2. Inverted Teat Openings

This condition, where the teat opening folds inward, can be congenital (female calf is born with the defect).

It is mainly caused by high-vacuum pressure when using a milking machine.

To prevent this condition, read the instructions and set the machine vacuum level and other settings according to the manufacturer's recommendation.

Mastectomy means udder amputation or remove of the mammary gland.

Indication:

1. Chronic mastitis not responded to treatment.

Gangrenous mastitis it may affect one or more of the quarters of the udder. It's likely as a result of clostridia or E. coli bacterial affection causes complete necrosis of the udder and teat tissue.

2. Udder tumors.

3. Rapture of the suspensory ligament.

4. Keep the cow for breeding purpose.

5. Keeping the cow as a donor in embryo transfusion before slaughtering for meat healthy for human consumption.

Preparation of the patient:

Off food 24 hours prior to the operation and water few hours before the operation.

Sedation or muscle relaxant to restraint the animal.

Insert the stomach tube.

Insert the endotracheal tube.

Put the animal in the lateral position or in the semi dorsal position, with the hind limb distended.

Prepare the fluid therapy and the blood (to prevent shock due to great loss of the soft tissues and blood).

Prepare the site of operation by clipping, shaving, wash with soap and tap water, and disinfect the site of operation.

Cover all the body with sterile drapes except the field of operation (surgical incision).

Type of anesthesia:

Local anaesthesia:

Infusion with local anesthetic, inverted V- block, ring block.

Regional anaesthesia:

Perineal nerve block may be used for surgery on the caudal teats and the udder.

Epidural anaesthesia: *may be used as an alternative to local anaesthesia for teat surgery in cows*

Lumbar Paravertebral anaesthesia: *(blocking L1, L2, and L3) may be used in the standing cow.*

General anaesthesia: *This is occasionally indicated for teat surgery*

Surgical procedures:

Make surgical incision at the midline caudal to the base of mammary gland then cranially at the mammary base.

Then the skin separated bluntly from the lateral side of the body, (leave skin flap to cover the area after udder amputation).

Find the blood vessels then stop bleeding by two transfixing sutures using no. 1 non absorbable suture materials then fold the end for more secure from bleeding (pudendal artery and veins, perineal artery and veins, and large subcutaneous veins).

Cutting the suspensory ligaments (two laterals and one middle).

Repeat the same technique in the other side of the body.

Remove the mammary gland, Suture the skin flaps to the body with non capillary non absorbable suture materials no.1 or 2 (don't leave

space or sinuses) to prevents the infection. The site heals by granulation tissues.

Post operative car:

Daily check the sight of operation (from inflammatory signs, rupture of the stitches, hernia, hematoma, stitches abscess).

Give local treatment to the site of incision and Pain killer daily.

Inject the animal with systemic antibiotics for 3-5 days.

Keep the animal away from others animals in clean stable.

Remove the sutures materials 7-10 days post operation.

Complication of the operation:

- 1. Bleeding.*
- 2. Abscess and Stitches abscess.*
- 3. Subcutaneous emphysema.*
- 4. Hernia.*
- 5. Adhesion.*
- 6. Infections and Dead occurs duo to shock.*