

Reproductive system 2



Caesarean Section in the domestic animals

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REF:

1- Adugna, Solomon Amente, et al. "Review on a cesarean section in the cow: Its incision approaches, relative advantage, and disadvantages." Veterinary Medicine and Science 8.4 (2022): 1626-1631.

2- Douglas Slatter_text book of_small Animal Surgery volume 2 chapter 98

Definition and facts

Cesarean Section: is delivery of neonate by hysterotomy (not hysterectomy).

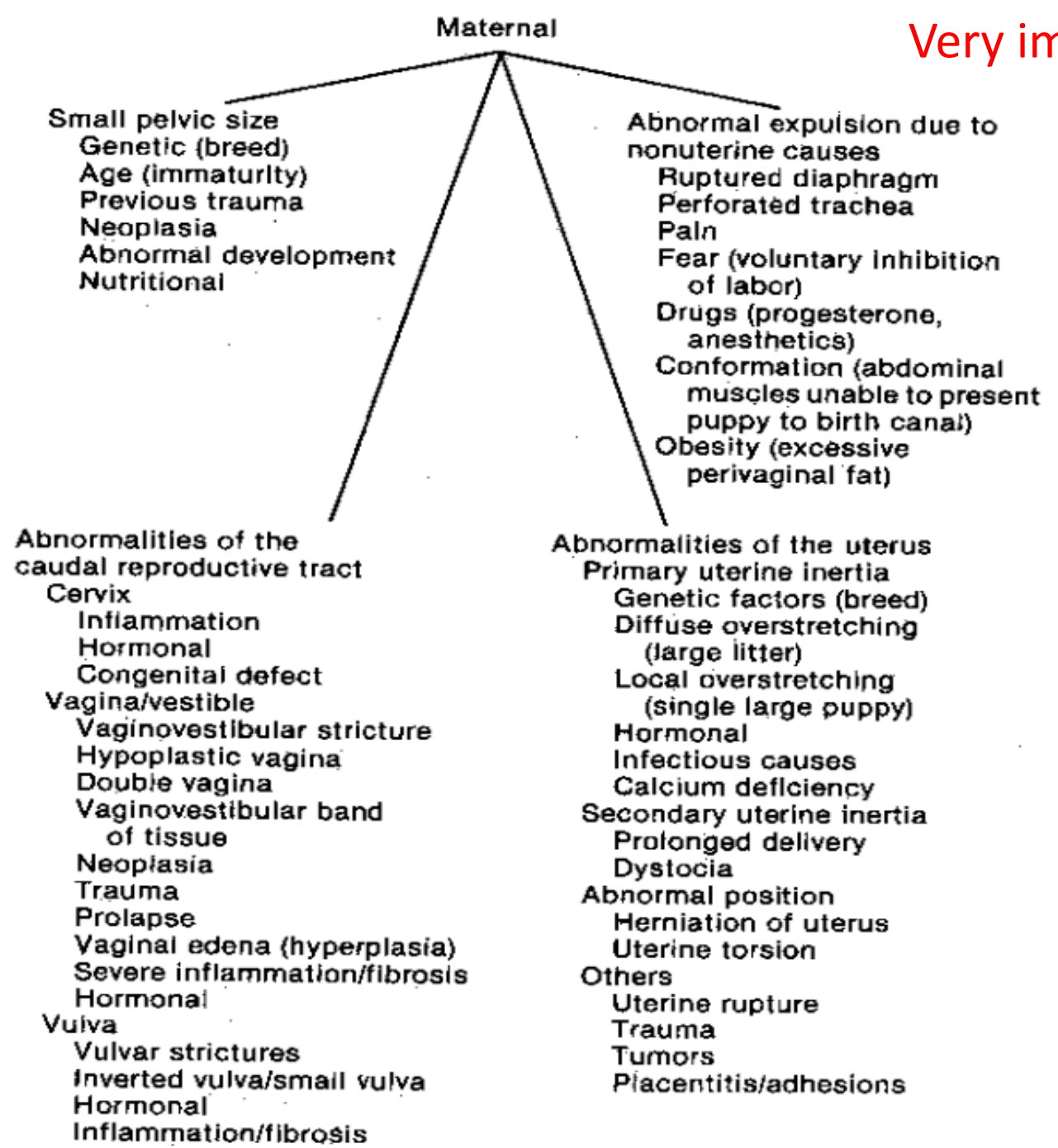
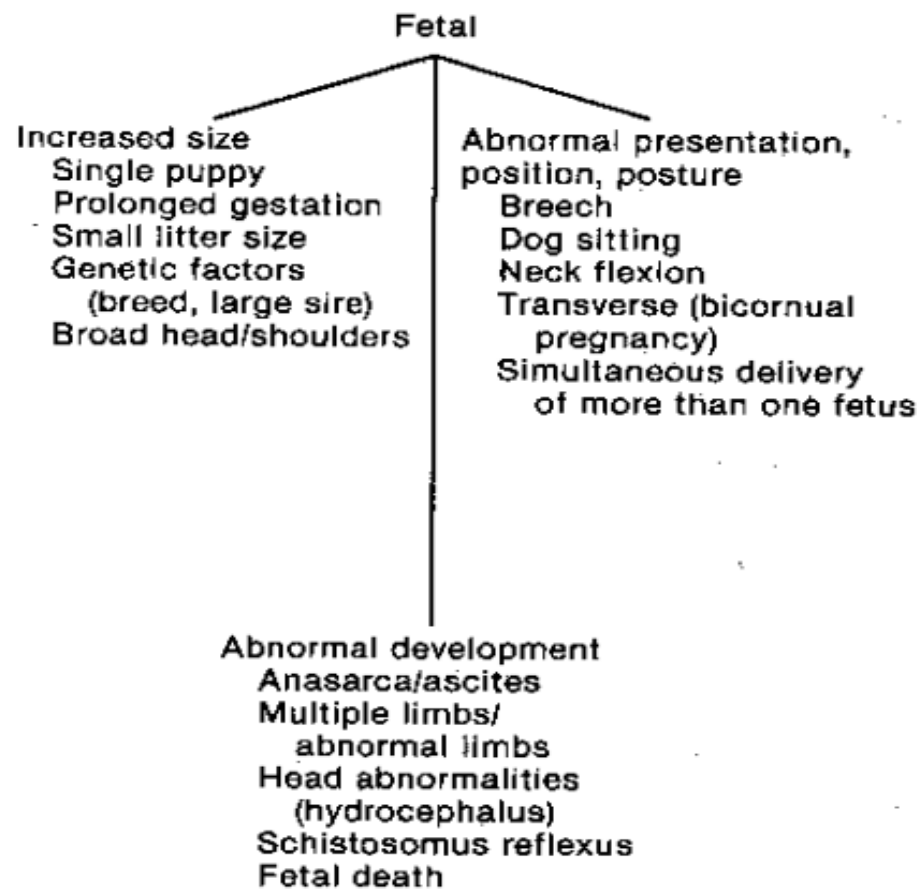
- 60 % to 80 % of dystocia cases required surgery
- 20 % to 40 % can successfully be treated by various combinations of medical therapy and manipulation
- The most important step for successful surgery is the appropriate treatment of the dam including:

- a) Physiological stabilization
- b) efficient surgical preparation
- c) and safe and effective anesthesia

Without these considerations, the surgery may fail to produce a healthy neonate; or save the mother

Indication for the C/S Surgery

- The only indication for the C/S surgery is dystocia

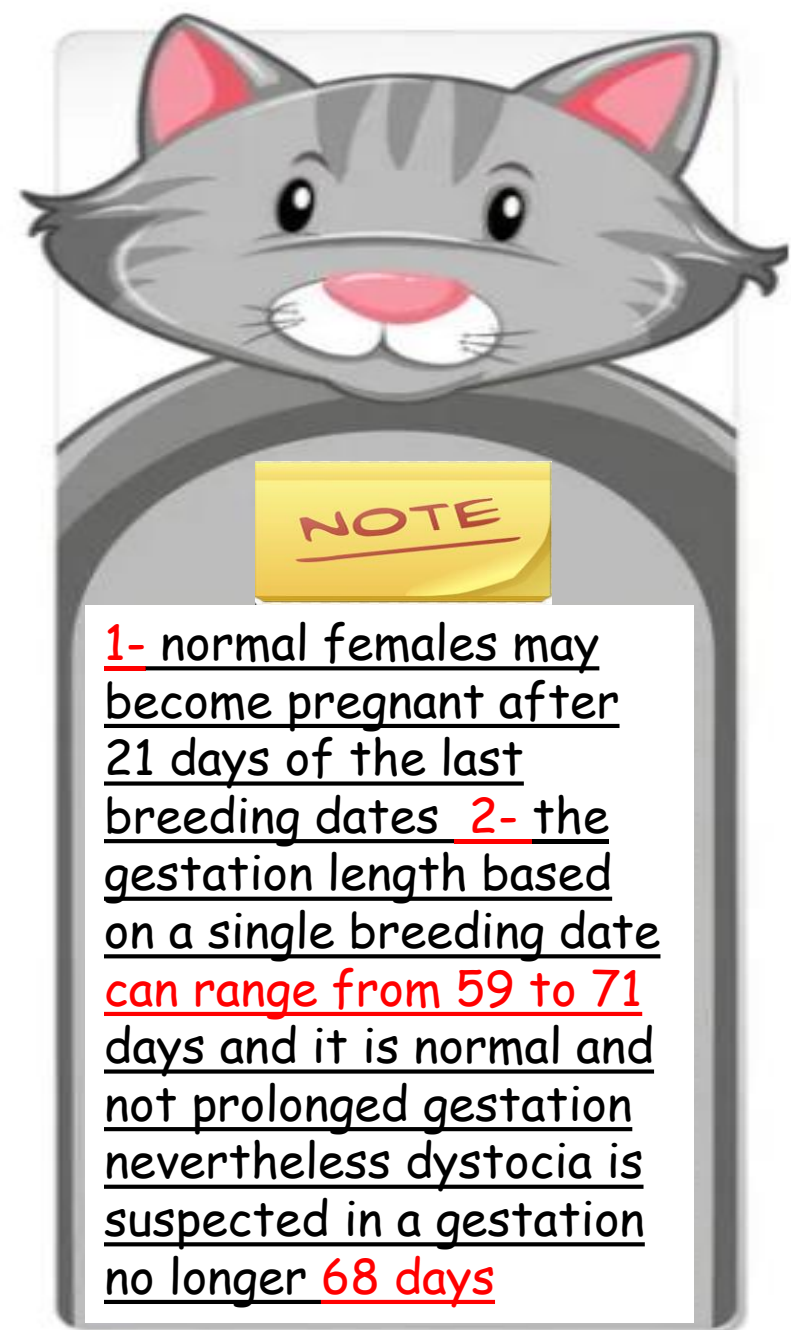


Very important

Dystocia clinical signs in dogs

- Tacking history is very important to establish the presence of dystocia.
- calculate the gestation days **is limit value** to confirm a prolonged gestation period
- History of past whelping and previous dystocia.

Note :the date of mating time is not the gestation date.





Dystocia clinical examination in dogs

- a complete physical examination assist in determining the stage of gestation
- The animal's general health status must be established.
- A digital examination of the vestibule and vagina to determine whether a fetus longs in the birth canal
- determined the nature of the vaginal discharge and the presence of lochia suggesting that placenta separation has begun for at least one neonate.
- Usually the patient was able to **deliver one or two pups normally**. But **When examined and palpated her abdomen can notice the presence of another puppy**. The animal is exhausted and has what is called ***uterine inertia***. Her uterus does not have the strength to deliver the puppies.

Dystocia clinical physiology in dogs

NOTE :

Animal in Dystocia is physiologically compromised, and abnormalities can include:

- Physical exhaustion,
- Dehydration,
- Acid-base disorders,
- Hypotension
- Hypocalcemia,
- Hypoglycemia

Treatment

Medical consideration and preoperative preparation

Physiological abnormalities should stabilize or correct to minimize the risks to the dam and the fetuses.

- i/v injection fluid therapy (balanced electrolyte solution with dextrose)
minimum 10 ml/kg hr. DNS
- Corticosteroid
- Antibiotic
- **Calcium gluconate**
- Preparation for the surgery quickly
- Clipping the area from the xiphoid to the pubis (in small animals).
- The regional or general anesthetic technique can be used



Note: A female with uterine inertia usually has low calcium. Calcium is needed for muscle contractions, which is why the uterus might have inertia and not be able to contract enough to expel the pup

Treatment

Surgical treatment of dystocia

- ❑ *When the medical treatment and or the manipulation fail, the emergency surgery is the only choice to save the neonate or at least the mother.*
- ❑ *The surgical site is **midline celiotomy***

NOTE: Usually, a spay (OVH) is routinely performed after removing the pup. Because most of animals with dystocia and C/S are not used for breeding, and of course we don't need to repeat the problem again. (once a cesarean, always cesarean).

NOTE: Attention should be taken during making the incision in the uterine body using scalpel to not lacerate the fetus. Using bandage scissors also recommended for that purpose



Bandage scissors

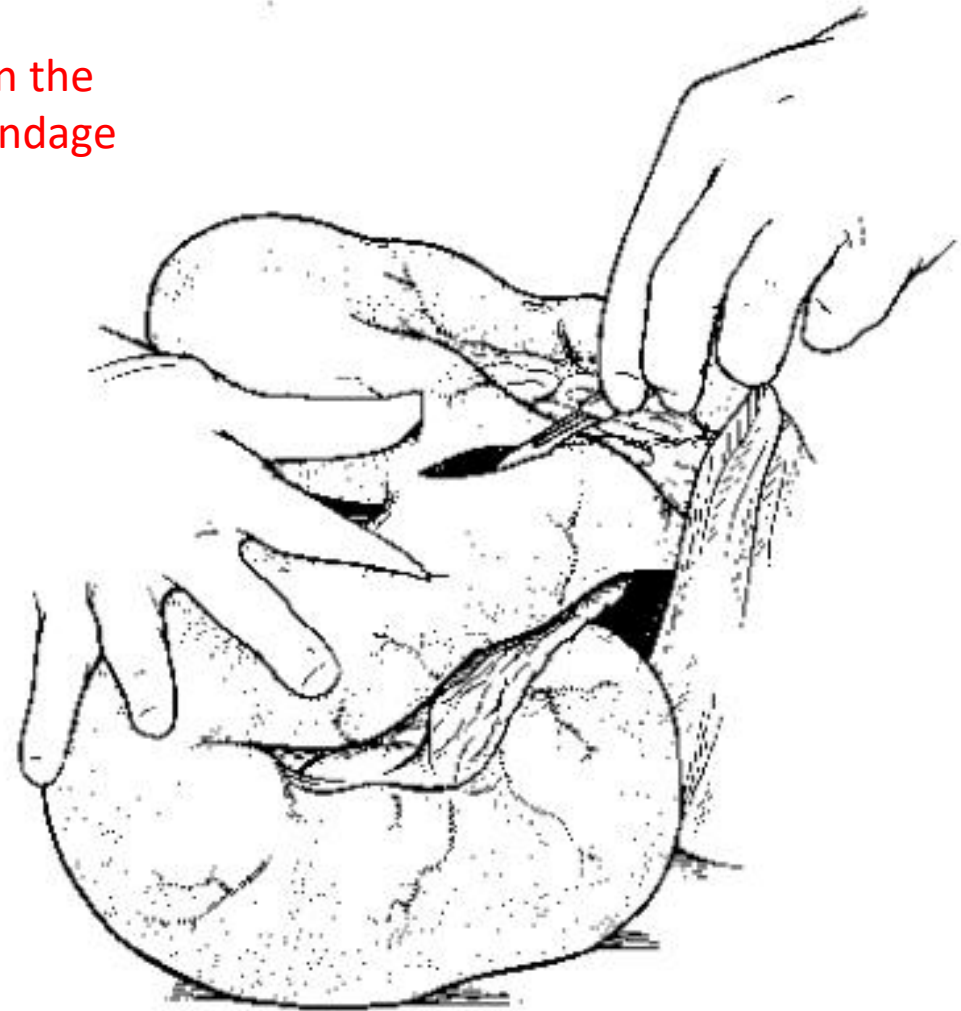


Figure 101-1. The uterus is exteriorized and isolated with moistened laparotomy sponges. A ventral midline incision is made in the body.

- The umbilicus of the fetus is clamped 2 to 3 cm from the body wall
- After remove the last neonate, through palpation of the uterus is performed from ovaries to cervix to ensure that no fetuses remain
- The uterine serosa and incision are wiped clean in preparation for closure
- Retained placenta are removed immediately Before hysterotomy closure or left to pass naturally

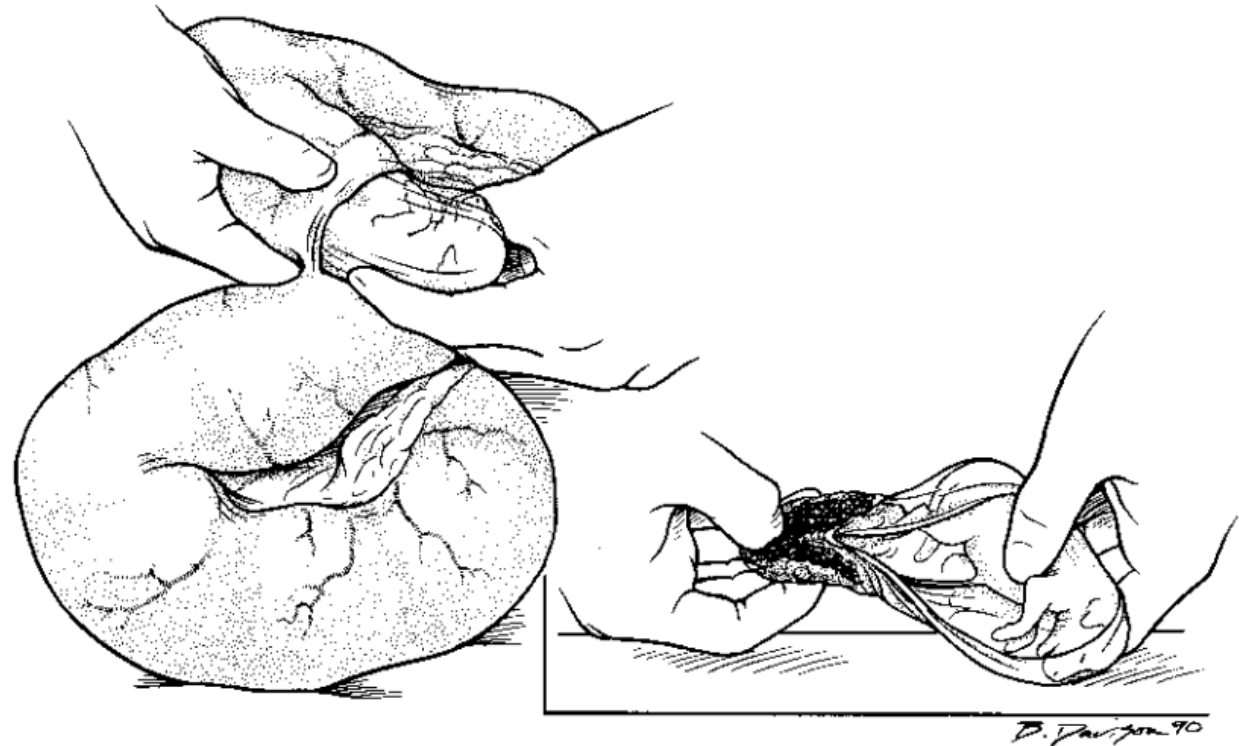


Figure 101-2. A fetus is gently brought to the incision site and removed with the placenta. The amniotic sac is broken and removed from the fetus.

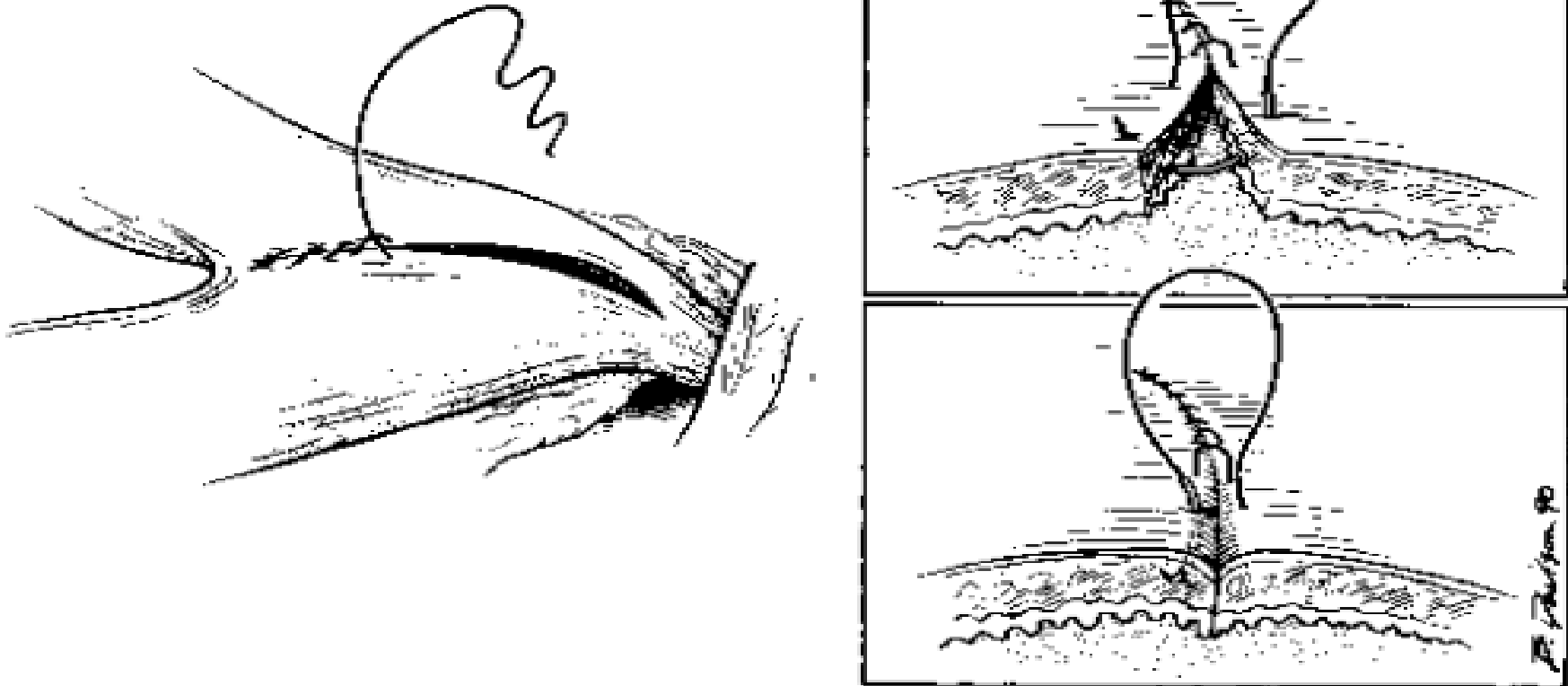
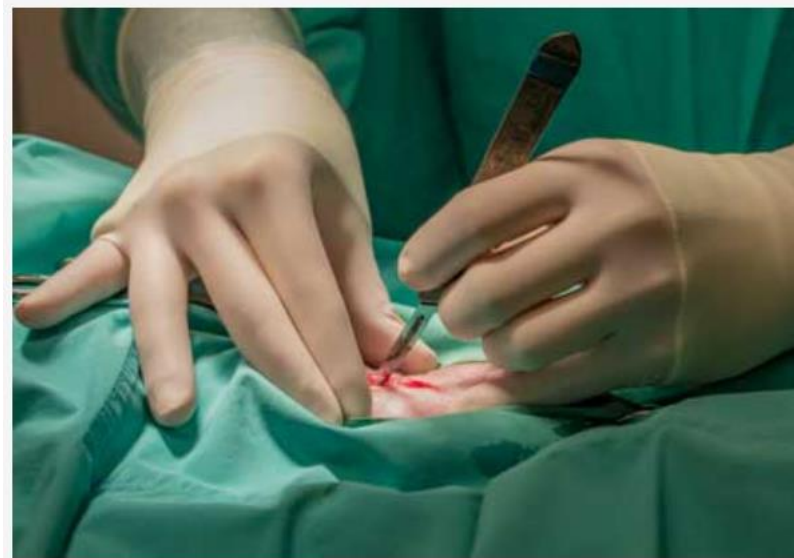
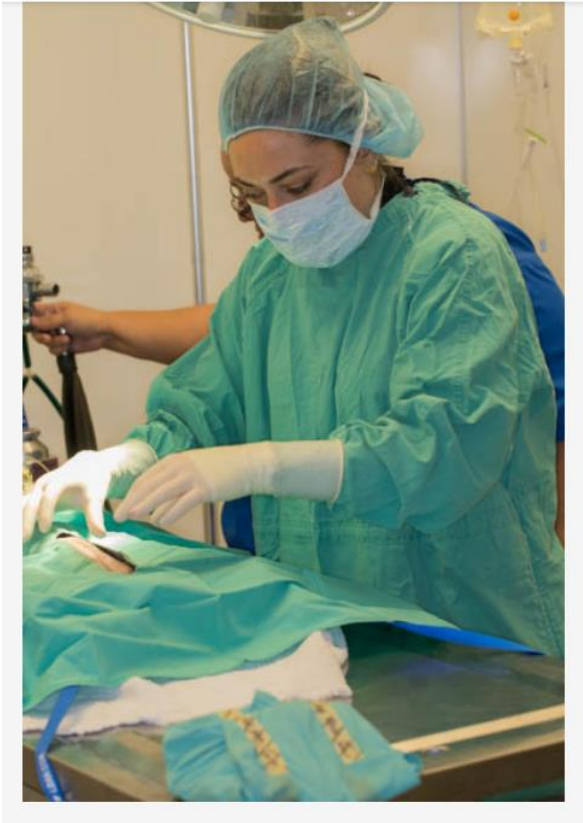


Figure 101-3. Fetal fluids are cleaned from the surgical field. *Upper right*, the hysterotomy incision is closed with a simple continuous suture pattern (avoid penetrating the uterine lumen). *Lower right*, a Cushing pattern oversew follows.

Complication

- ❑ Urinary and gastrointestinal tract trauma.
- ❑ Endometritis
- ❑ Peritonitis
- ❑ wound infection
- ❑ Mastitis (!!!!!) why ???

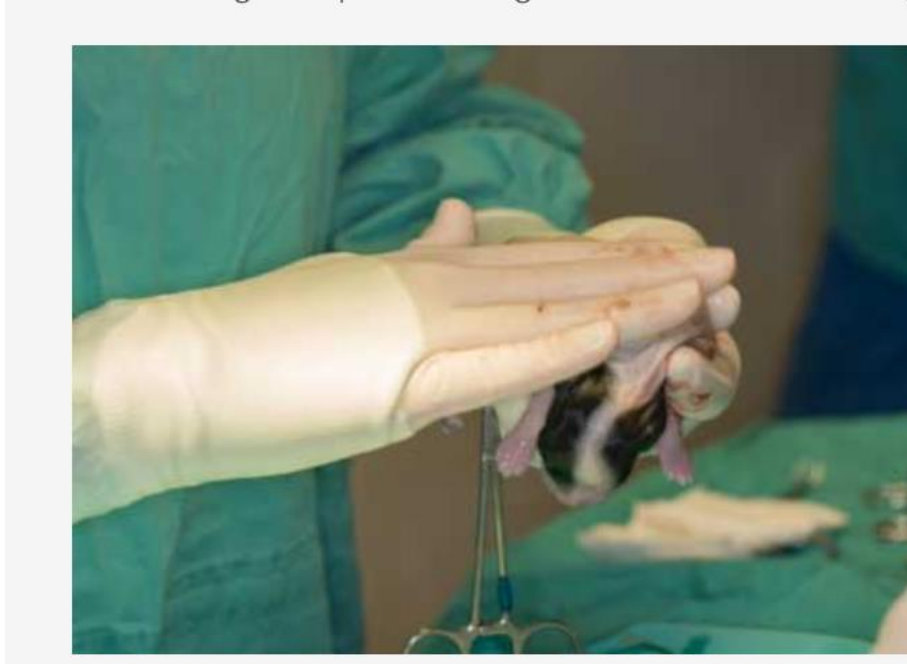
The surgery steps







Care of the neonate puppy



After the initial suction quick rub to stimulate respiration must be performed



Keep the puppy in a warm towel and make more suctioning..

Cesarean section in large animal practice

Cesarean section is one of the emergency surgical interventions performed for the delivery of calf (foal, kid...) during dystocia by opening the abdominal cavity.

Causes:

It may be performed due to several reasons which come **from maternal and/or fetal factors.** (same factors on slide no.6).



Cesarean section in large animal practice

There are several surgical approaches for cesarean section in a cow and each have advantages and disadvantages.

- Standing left paralumbar celiotomy.
- Recumbent ventral midline celiotomy and recumbent ventral paramedian celiotomy.
- The ventrolateral celiotomy.
- Standing left oblique celiotomy.

Furthermore, the selection of the approaches depends on various factors for the positive outcome of the procedure.

Cesarean section in large animal practice

The procedure can be performed in different ways:

which in turn relies on the following:

- the breed,
- space,
- availability of assistance,
- location,
- and the veterinarian's training, experience, and confidence.

NOTE: Based on the above conclusion, the following points were recommended:

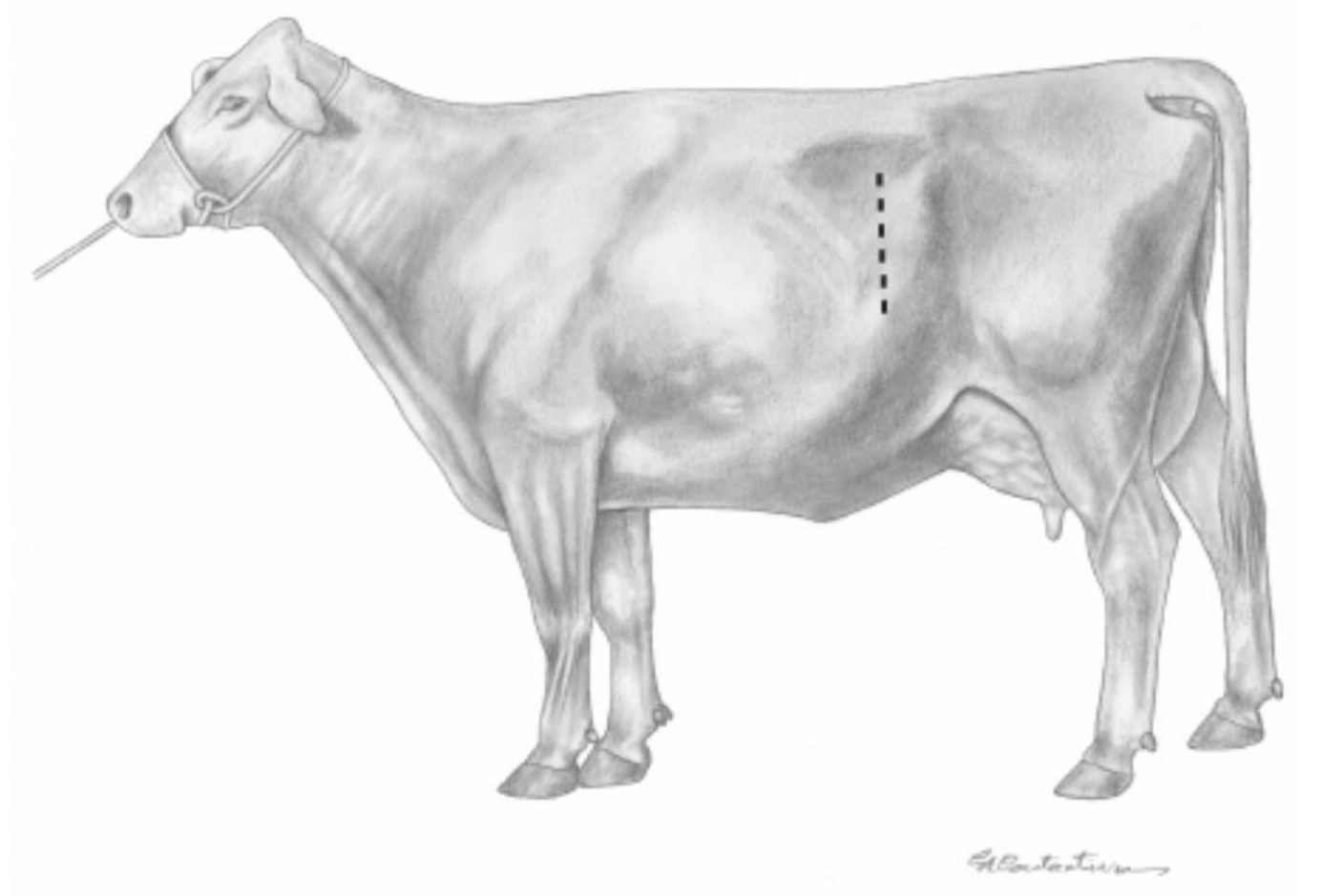
Veterinarians should have to consider alternate surgical approaches during cesarean section depending on the circumstances for a better outcome of the surgical procedure.

Veterinarians should analyze the:

- 1) survival of the cow and the calf
- 2) maintenance of post-operative productivity

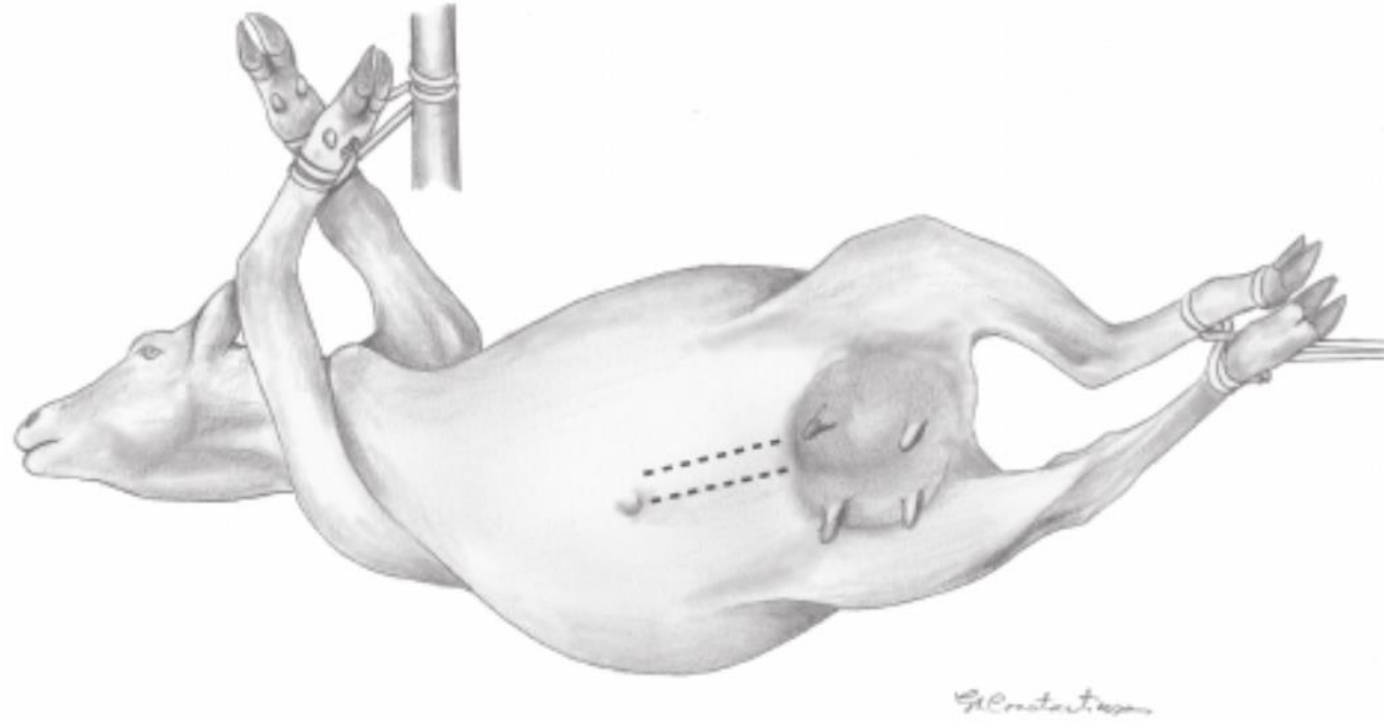


1. Standing left paralumbar celiotomy



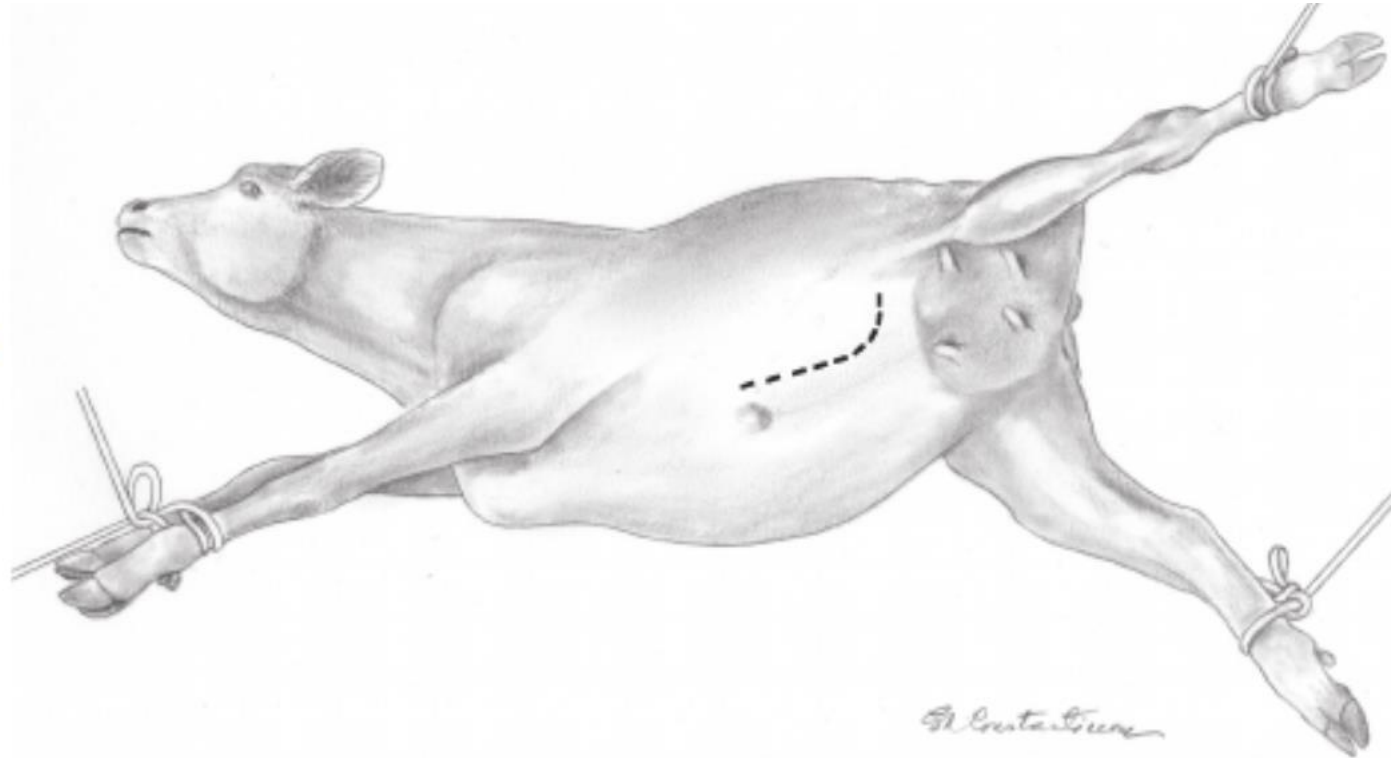
Standing left paralumbar celiotomy. The placement of the incision is indicated by the dashed line.

- 2- Recumbent ventral midline celiotomy and/ or
- 3- **recumbent ventral paramedian celiotomy**



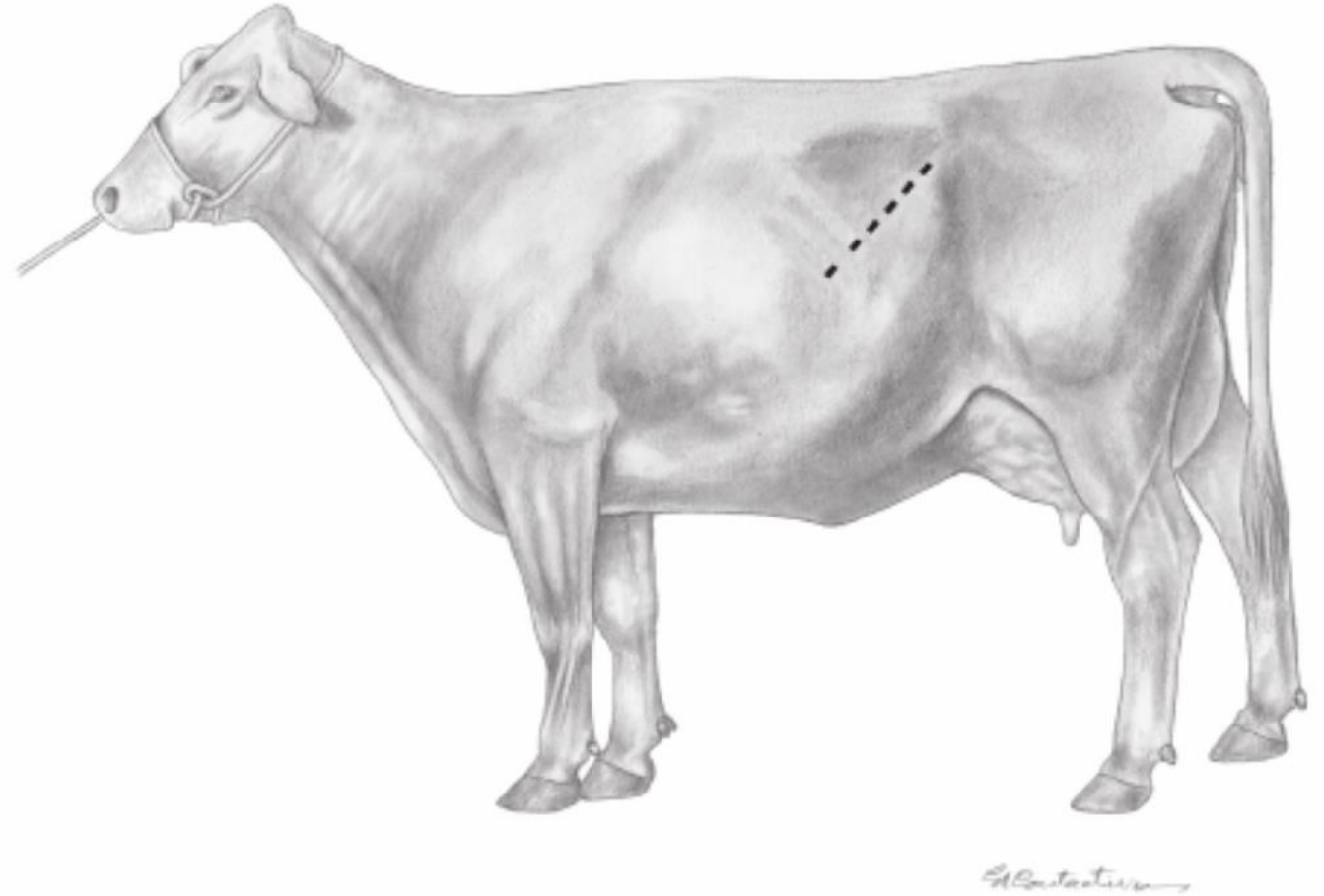
Recumbent ventral midline celiotomy and recumbent ventral paramedian celiotomy. The placement of the incision is indicated by the dashed line.

4- Ventrolateral celiotomy



The proper positioning of the cow and incision site for the ventrolateral celiotomy. The placement of the incision is indicated by the dashed line.

5- Standing left oblique celiotomy.



Standing left oblique celiotomy. The placement of the incision is indicated by the dashed line.

Xylazine 25 µg/kg in sheep

Xylazine (0.05 mg/kg IV or 0.1 mg/kg IM) will result in recumbency in 50% of tractable cattle.

Note:

- 1) A wide surgical field will need to be clipped, to ensure cleanliness of the procedure.
- 2) The wound needs to be around **20cm in length**, running vertically in down from approximately 10-12cm below the transverse processes .
- 3) The muscle layers are very thin and ***care should be taken to ensure no incision of rumen wall occurs.***

Note:

- 4) The incision in the uterus should be made along the greater curvature, starting between the hoof of the fetus (**to avoid cutting the fetus**) and extended with scissors along the appropriate long bone.
- 5) The fetus care should be passed to an assistant, who should be fully briefed before the start of the procedure.

Note:

- 6) The uterus should be sutured with a continuous inverting pattern (**standardly a Cushing pattern is used**) without full penetration of the muscle layers
- 7) using a non-synthetic absorbable suture material (ie Catgut). The uterus should be lavaged externally with warm sterile fluid to remove blood clots.

Antibiotic and non-steroidal cover should be given pre-operatively to begin as soon as possible. Tetanus antitoxin should be given if the ewe is not covered with vaccination.

Troubleshooting

- 1) *Retained fetal membranes* - Do not forcefully breakdown cotyledon/caruncle units. Section of membrane which protrude through uterine incision should be resected and the remainder left in situ.
- 2) Give oxytocin post-operatively.
- 3) Endometritis - Try to be cleaner both in the surgery and in any pre-op vaginal exam. A course of systemic antibiotics should be started at the time of surgery.
- 4) *Subcutaneous emphysema* - Flank incision was too small for fetus and/or surgeon's arms - leading to trauma to subcutaneous tissues.
- 5) Peritonitis - Ensure a good seal on the uterus when closing, making sure there are no fetal membranes protruding through the wound site.

Caesarean section in sheep and goat

- **Surgery is carried out with the surgical wound on the **left flank**, although other approaches are also used, at the preference of the surgeon.**

Caesarean section of sheep and goats

Caesarean section is less frequently required in small ruminants compared to cattle, (only 1 in 5 compared with 1 in 2 in cattle).

Causes

Maldispositions are by far the most common of the causes of dystocia in sheep and goats. These can usually be corrected per vaginum.

The most common indication for caesarean in small ruminants is obstruction of the birth canal with either soft tissue or bone..

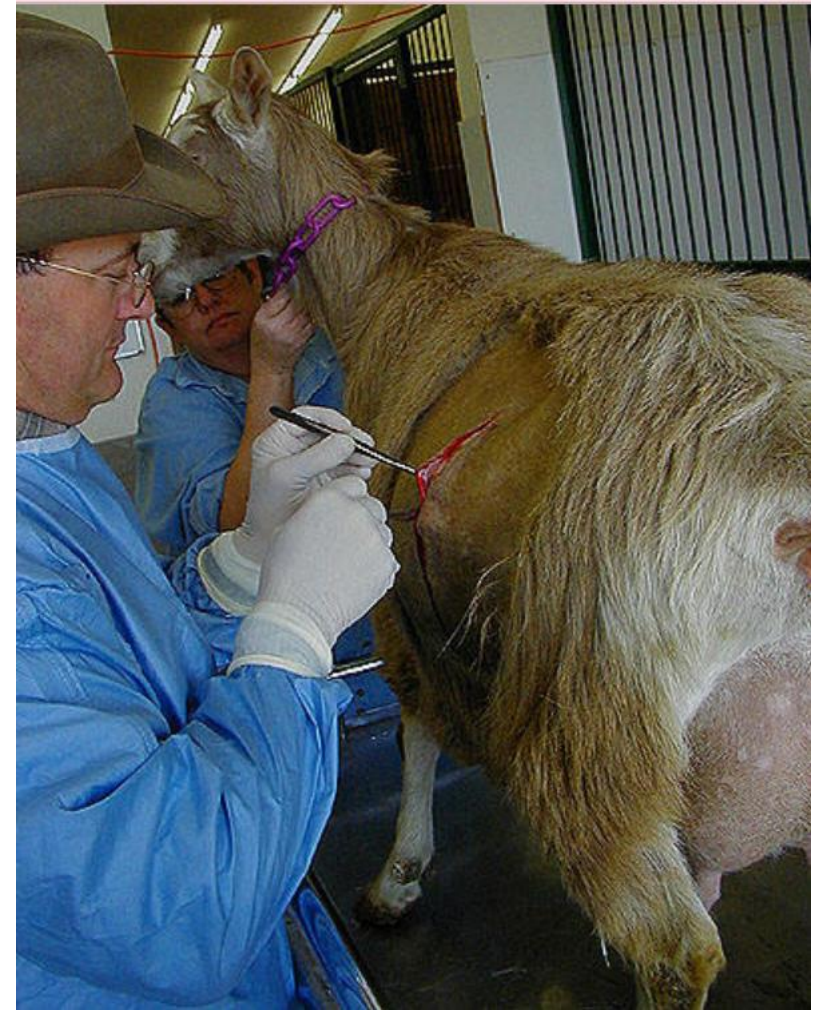
Where caesarean is completed as an elective procedure, the ewe/doe should be induced prior to the procedure if time allows. This should be completed with corticosteroids and prostaglandin F_{2α}. Caesarean should be completed when the cervix begins to dilate. Elective caesarean is probably best completed under general anaesthesia, while in the case of dystocia, sedation and local anaesthesia is recommended. Great care should be taken using local anaesthetic techniques in does, as the toxic dose is easily reached using a line or inverted-L block. Paravertebral block or epidural techniques use a lower dose and are hence safer. If a line/inverted-L block is to be used, it is recommended to dilute the anaesthetic agent 1:1 with sterile water, to enable a suitably wide field to be anaesthetised with a safe dose.



Standing position For does in active labor , giving the animal 1cc of Banamine per 100 pounds to stop labor and relax the uterus. This allows the vet to begin the procedure as soon as he arrives. (Usually within 30 minutes of my call



The doe is given a local anesthetic along the surgical line and allowed to stand for a few minutes while the anesthetic takes full effect.



The incision through the skin is made as high in the flank area as possible to help keep the rumen in place. The doe is alert and comfortable as the local anesthetic has worked well



The uterus is palpated searching for a kids' back leg. After the leg is located the vet makes an incision in the uterine wall equal to the distance from the hock to the pastern of the kid.



The leg is carefully manipulated through the opening and then the other leg is extracted in a similar fashion.



The kid is carefully and gently delivered and immediately handed off to be dried and stimulated and then is held by the doe's head as she nickers to him and licks



The second kid is quickly located and gently extracted. Then he is passed off to be dried and kept warm. The doe is quietly talking to her kids and very relaxed and happy.



Working quickly Dr. John and his technician close the incision in the uterine wall as the uterus shrinks in size.



The muscle layers are quickly closed. Often 3-5 cc of Pen G are squirted over the uterine sutures, into the uterus and over the muscle layer sutures as a precaution



The skin is closed from top to bottom and carefully sponged off.



The doe was returned to the herd 12 hours post surgery and in 14 days the sutures were removed. She recovered rapidly. Post surgical care consisted of: administration of 2 shots of Oxytocin to help her clean and 7 days of Pen G injections 2X per day. The suture line was checked twice daily for signs of infection and triple antibiotic ointment applied for 3-5 days.



Her twins were healthy and thrived.

THANK YOU