

ANIMAL HEALTH CARE SERVICE Level -I

Learning Guide #41

Unit of Competence Support Health Care Provision for Pregnant, Parturient and Lactating Animals

Module Title: Supporting Health Care Provision for Pregnant, Parturient and Lactating Animals

LG Code: AGR AHC1 M11LO3LG41

TTLM Code: AGR AHC1 TTLM 0919V1

LO3. Support health care for parturient animals



Instruction sheet

Learning guide #

This learning guide is developed to provide you the necessary information regarding the following content Recording Information on quality and other indicators of production performance.

- Identifying hazards in assisting with birthing and following safe work practices
- Checking and preparing birthing equipment, resources and materials for use.
- Maintaining clean, safe and secure environment for pregnant animals according to the organizational guideline and as directed by the supervisor.
- Monitoring environment and animals to ensure normal birth progresses
- Identifying and reporting animals experiencing birthing abnormality supervisor.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to:**

- Identify hazards in assisting with birthing and following safe work practices
- Check and prepare birthing equipment, resources and materials for use.
- Maintain clean, safe and secure environment for pregnant animals according to the organizational guideline and as directed by the supervisor.
- Monitor environment and animals to ensure normal birth progresses
- Identify and report animals experiencing birthing abnormality supervisor.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.

3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” **in page -6, 9, 12 and 14** respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2 and Operation Sheet 3 ” **in page -15.**
6. Do the “LAP test” **in page – 16** (if you are ready).

Information sheet-1	Identifying hazards in assisting with birthing and following safe work practices
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1.1 Identifying hazards in assisting with birthing and following safe work practices

During assisting birth clinicians and other personals can exposed to different hazards mainly biological hazards or Zoonotic diseases and physical hazards or injury as discussed in OHS module and learning guide.. To reduce exposure to biological hazards we need to use personal protective equipment like obstetrical glove. To

reduce injury to human during birthing, the area should be comfortable and animal should be handled properly.

Most domestic animals are prone to maximum injuries and infections, some of them endangering the life of the fetus and the dam immediately, and some of them affecting the future productive and reproductive life of the mother. Therefore, due care must be exercised in advance and sufficient vigilance must be kept during parturition to minimize parturient problems. The veterinarian should be focused on minimizing case of dystocia.

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the hazards during birthing to persons and how to reduce (5 points)

2. Discuss hazards to animals during birthing and how to reduce (5 points)

Note: Satisfactory rating - 6 points

Unsatisfactory - below 5 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

Information sheet-2	Checking and preparing birthing, equipment, resources and materials for use.
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Equipments or instruments required can be categorized as obstetrical, fetotomy, clinical or hoof and restraining materials.

2.1 PPE

There must be full personal protective equipments including arm length glove, overall, apron, boot, hat, etc

Protective Clothing and Equipment for Handling of Bulk Caustic Soda Solution.



2.2 Obstetrical kit

Obstetrical kits include vaginal speculum, forceps, scissors, and handlers (hooks) as observed in picture below

Obstetrics Instruments

Sort by: [Product](#) [Price](#) **▲Default**



Calf Puller

Our price: \$122.36
(€ 93.61)



Caming Forceps

Market price: ~~\$90.00~~
Our price: \$78.65
(€ 60.17), save 13%



Hook Handle

Our price: \$26.87
(€ 20.56)



Krey Hook

Our price: \$72.65
(€ 55.58)



Obstetrical Cable Swine Snare

Our price: \$33.62
(€ 25.72)



Obstetrics Forceps

Market price: \$120.12
Our price: \$86.35
(€ 66.06), save 28%



Obstetrics Hook



Polansky Vaginal Speculum

Market price: \$125.00
Our price: \$84.87
(€ 64.93), save 32%



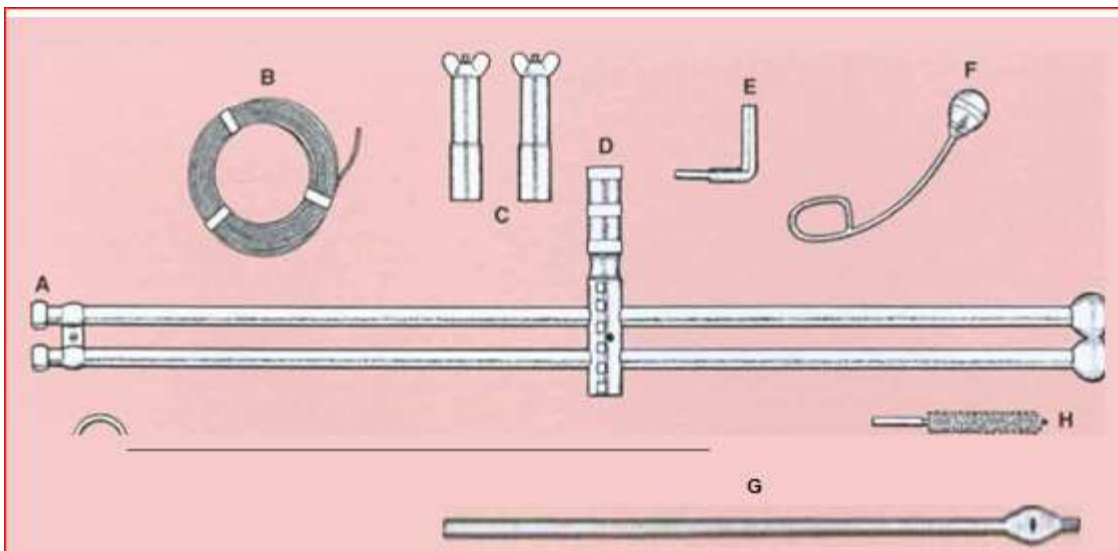
Witt Obstetrics Forceps

Market price: ~~\$120.12~~

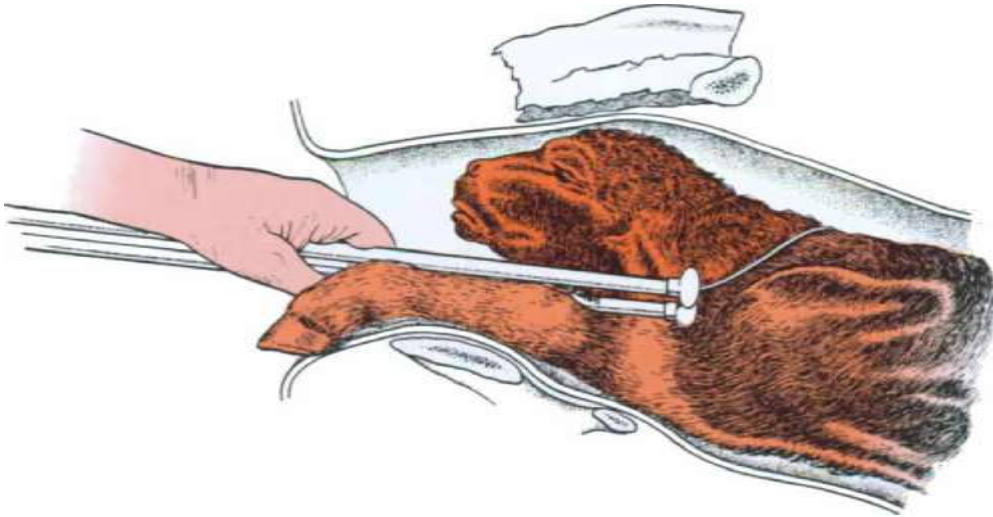
Our price: \$40.24

(€ 30.78), save 67%

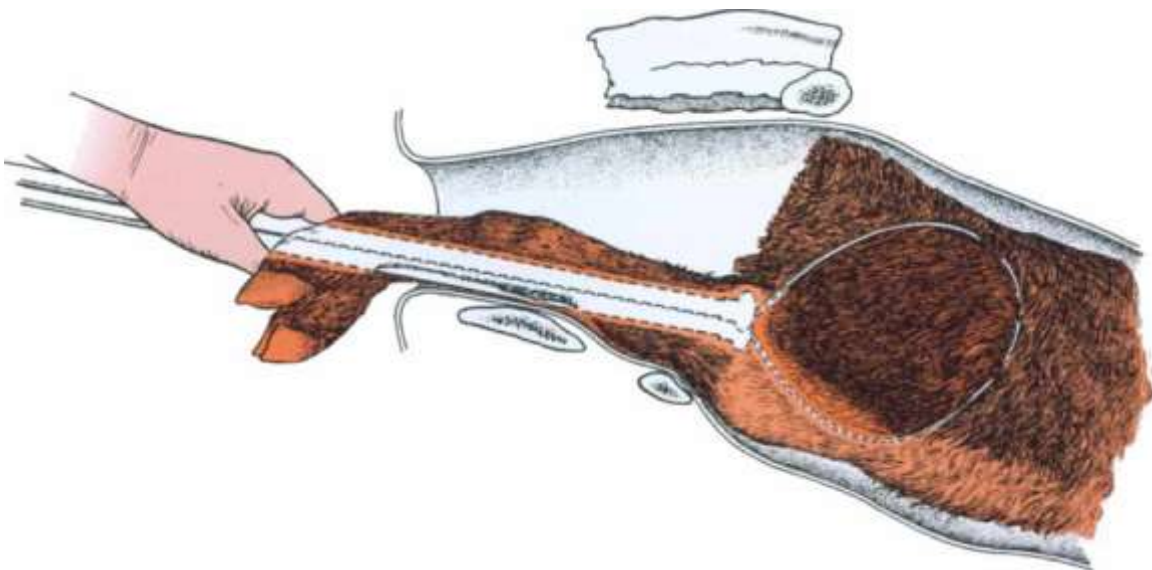
2.3 Fetotomy kit and its application



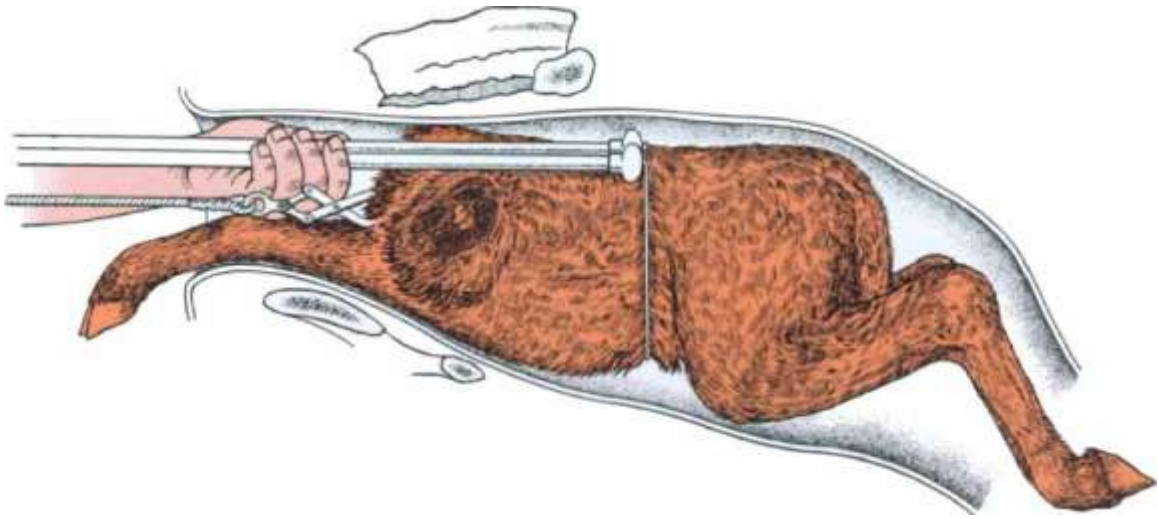
1. **Figure 12.1** Fetotomy equipment. (A) Tubular embryotome, (B) fetotomy wire, (C) handles for wire, (D) handle for embryotome, (E) screw to tighten handle, (F) introducer, (G) threader, (H) cleaning brush.



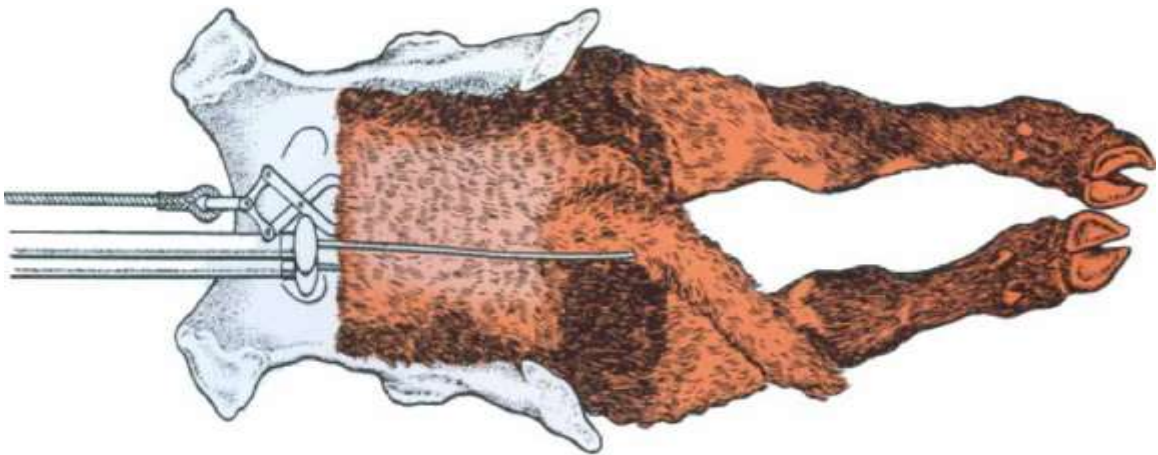
Removal of The Head.



Removal of a forelimb.



Removal of the thorax.



Splitting the pelvis (dorsal view).

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention personal equipments (4 points)
2. Mention obstetrical and fetotomy kits (4 points)
3. Discuss use of fetotomy (4points)

Note: Satisfactory rating - 6 points

Unsatisfactory - below 6 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

Information sheet-3	Monitor environment and animals to ensure normal birth progresses (Pregnancy)
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3.1 Monitoring the pregnancy

Monitoring pregnancy and parturition include pregnancy diagnosis, general health of the animal as discussed in previous module.

- *Accurate diagnosis of pregnancy to determine* date of birth of the offspring
- *Diagnosing* litter size for species like sheep for prevention of pregnancy toxemia, this may predispose to fetal loss and dystocia.
- Careful nutritional management of those animals with multiple fetuses will help reduce the risk of pregnancy toxemia.
- Regular checking of plasma (3-hydroxybutyrate levels in ruminants provides a useful early warning sign of impending energy deficiency during pregnancy.
- In the mare, early diagnosis of unwanted twin pregnancy enables prompt action to be taken to terminate it or destroy one of the two fetuses.
- *Careful investigation and treatment of any maternal illness or abnormal signs during pregnancy at all ages using* ultrasonographic monitoring
- *Supervision of pregnancy:* to ensure that the mother is as free as possible from stress, nutritional deficiency or environmental stress.
- *Monitoring the fetus during pregnancy:* Using the ultrasonographic probe (either externally or per rectum, depending on species) to assess the fetus and its surrounding fluids in considerable detail.
- *Monitoring the hormonal support of pregnancy:* regular assay of plasma progesterone in animals with a history of habitual abortion
- *Rectal examination in cattle:* - to estimate the size of the calf and its presentation. *Using technology:* including ultrasonographic evaluation and the

monitoring of fetal electrocardiographs.

3.2 Monitoring the birth process

- *Ensuring that proper facilities are available for the animal to give birth:* the facilities should allow sufficient space, protection, and comfort for the patient. They should also permit unobtrusive observation of the patient by her attendants, who should be able to monitor her progress without disturbing her. Facilities for catching and restraining the patient with ease for a more detailed obstetrical examination to be performed with minimum disturbance to the patient should be available.
- *Supervision:* the degree of supervision should increase as the anticipated time of birth approaches. In all species the external signs of approaching birth, although well documented, are variable, as are the lengths of the stages of normal parturition. In the mare, daily evaluation of various cations in the milk (if it is present in the udder) can be used to assess fetal maturity and the proximity of impending birth.
- *Observing the birth process:* when birth is underway its progress should be monitored unobtrusively to ensure that proper progress is being made. Inexperienced owners should be advised about the progress of normal birth and the variations that can occur.
- *Investigating abnormalities:* any apparent abnormality should be investigated and professional help sought without delay. Excessive interference should be avoided but in general it is better to examine a case prematurely than when it is too late.
- *Managing prolonged gestation:* the management of prolonged gestation is discussed in detail in the chapters on dystocia in the various domestic species. In some circumstances it may be necessary to induce birth and the methods for achieving this in each species are discussed below.

3.3 Induction of pregnancy

Pregnancy can be induced in prolonged gestation providing oxytocin and prostaglandin $F_{1\alpha}$ on the uterine muscles. The induced fetus may need special care if it is immature and planning to ensure the availability of colostrums is important.

Importance of induction of pregnancy

- To terminate pregnancy in an animal mated 'by mistake', e.g. in a post pubertal heifer calf served by her father. Also in cases of mummified fetus.
- To avoid prolonged gestation and the probability of an oversized calf causing dystocia.
- To terminate an abnormal pregnancy like pregnancy toxemia, ventral hernia, etc
- To tighten the calving pattern in a herd.
- To time calving to coincide with grass availability (this happens in New Zealand).

Methods available for induction of pregnancy in cow

These are dependent on the stage of pregnancy and the speed with which it is required to induce calving or abortion.

*Induction of parturition of up to **120** days gestation*

Until 120 (range 100-150) days of pregnancy, maintenance of bovine pregnancy depends solely on the corpus luteum, after this stage the placenta is the main source of progesterone.

Treatment Prostaglandin F_{2a}: cloprostenol 500 µg or dinoprost 25 mg both by intramuscular injection. Abortion is expected in about 3 days - the fetus may need to be removed from the vagina after it has been expelled from the uterus.

Induction of parturition of up to 120-250 days gestation

At this stage of pregnancy, induction is normally carried out to terminate an undesired pregnancy or to induce lactation at a time when good supplies of grass are available for the dairy herd.

Treatment Long-acting corticosteroid: e.g. 25 mg dexamethasone trimethyl acetate given by intramuscular injection. Abortion is expected in 14-16 days. Treatment is effective in 80-90% of animals. Dystocia due to fetal malpresentation may occur and the aborted fetus may require assistance to allow it to be delivered.

Although calves may survive after only 8 months gestation they may not do so unless they are at least 275 days gestation. Placental retention is less common following the use of the long-acting corticosteroids than after prostaglandins or the short-acting steroids. Colostrum production is often very reduced and anti-body absorption by the calf is poor.

Induction of parturition at 250-275 days gestation

Treatment

Medium-acting corticosteroid: e.g. 20-30 mg betamethasone given by intramuscular injection. Fetal delivery is expected in 5-11 days. If calving has not occurred by 5 days a further injection of either prostaglandin F_{2a} or short-acting steroid, e.g. 20 mg dexamethasone phosphate, may be given.

Induction of parturition at, near, or after term

Treatment

Medium-acting or short-acting corticosteroid and/or prostaglandin F_{2a}: e.g. 20-30 mg betamethasone or 500 µg cloprostenol given by intramuscular injection. Fetal delivery is expected within 3 days. Some claim that prostaglandin used alone may increase the risk of retained fetal membranes or even uterine rupture. At Cambridge, the author has successfully used a

Note: Satisfactory rating - 6 points

Unsatisfactory - below 6 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

4.1 Abnormality in fetal development and pregnancy

- **Super fecundation-** occurs when the female served by more than one males (common in pigs)
 - **Superfetation** -occurs when an animal that is already pregnant comes into estrus, is served, and conceives a second litter(common in pigs).
 - **Telegony**-is the misconception that a pure bred animal mated accidentally by a mongrel may never breed true again. Believed occasionally by some dog and horse breeders.
 - **Interspecies breeding-** between species may occur successfully in some cases, e.g. horse X donkey in which mule or lunney is produced.. The hybrids produced from these matings are normally sterile. erroneously that kittens have been born to bitches or puppies to queen cats.
 - **Ectopic pregnancy-** fetal development outside the uterus which is common in humans.. The placentation of the domestic animals makes true ectopic pregnancy extremely unlikely, although periodic claims with no scientific basis that it has occurred
 - **Death of the conceptus-** is vulnerable, especially in its early life, to various adverse factors that might kill it, inflict serious damage, or cause minor but non-life-threatening injury. There is evidence that, following service, 98% of cows actually conceive and yet few herds achieve a conception rate (evidenced by positive pregnancy diagnosis at 6 weeks) of greater than 50%. The remaining embryos do not survive.
- **Adverse factors affecting the conceptus**
 - Genetic abnormalities involving either the autosomes or the sex chromosomes.
 - Failure of hormonal support - especially progesterone.
 - Failure of the maternal body to recognize the presence of the embryo.
 - Environmental stress, for example extremes of temperature, starvation, radiation.

- Infection affecting the conceptus, its placenta or the uterus.
- Chemical factors, for example poisons and drugs (e.g. methallibure).
- Immunologic factors.

Note-The incidence of all these adverse factors in animals has not been fully investigated. In humans, fetal loss is believed to be caused by genetic abnormalities in 75% of cases. In animals, the incidence of genetic problems has received relatively little attention. The incidence of infectious abortion in the farm animals is documented in the reports of the Veterinary Laboratory Agency. In sheep, for example, approximately 55% of abortion cases are caused by infection.

- The fate of the conceptus when exposed to adverse factors depends on the severity and nature of the challenge and on the age of the conceptus.

		Adverse factors)	
		Embryo	Fetus
<ul style="list-style-type: none"> • Early or late embryonic death • (In early embryonic death there may be no sign that conception actually occurred. In the cow later 	<ul style="list-style-type: none"> • Fetus unaffected 	<ul style="list-style-type: none"> • Fetus unaffected 	
	<ul style="list-style-type: none"> • Fetus survives 	<ul style="list-style-type: none"> • Abortion • Fetal 	

Abortion- is removal the fetus before the end of delivery in form of bleeding. The fetus and its environment are so damaged that survival is impossible and the contents of the uterus pass outthrough the cervix.

Fetal anomalies-involve minor or major abnormalities in the fetus. They are usually not incompatible with fetal life. The term 'fetal monster' or 'monstrosity' is used to describe a fetus that has suffered severe physical damage usually affecting its appearance but not causing its death in the uterus.

- In cattle breeding, where artificial insemination can produce thousands of calves from one bull, any evidence of monsters sired by a bull should be reported to the owner of the bull in case hereditary factors are involved.
- Some monsters result in dystocia and examples of these and methods for their delivery will be discussed in subsequent chapters.
- Minor abnormalities - like polydactyly in cats - are relatively unimportant and are not life threatening. A large number of anomalies have been described and some of the more common ones are listed below:
- *Achondroplasia*: short-limbed 'dwarf' offspring, for example bulldog calves in Dexter cattle. Assistance with delivery is often required.
- *Anasarca*: fetal skin and subcutis are edematous. Serious problems at birth may be encountered.
- *Cleft palate*: seen in all species, especially puppies and calves.
- *Conjoined fetuses*: usually monozygotic twins ('Siamese twins') that have partially or completely failed to separate. The fetus may have two faces (diprosopus) or twoheads (dicephalus). Many other partial divisions have been described. One of the worst in terms of dystocia is when the fetuses are joined at their hindquarters (pygodidymus). The fetus in anterior presentation may appear normal but cannot be delivered because the co-twin is attached behind. An abnormal monozygotic twin is the fetal mole (*Amorphusglobosus*), which has an umbilical cord supplying a small structure of mixed fetal tissue surrounded by skin. It is usually an incidental finding at the birth of its normal co-twin and does not cause dystocia.
- *Entropion*: especially lambs. This is not life threatening but causes severe

eyedamage.

- *Imperforate anus*: especially piglets.
- *Muscular hypertrophy*: 'double muscling', for example in Belgian Blue cattle. This abnormality is selected on purpose in some countries because of the high value of such calves, which also have a very high rate of dystocia.

4.2 Fetal mummification

- One possible fate of the fetus that dies in utero is that it will remain in the closed uterus. Its fetal and body fluids will be resorbed and it will become mummified. The corpus luteum normally remains active and the dam does not return to estrus. In most cases the mummified fetus becomes dry and paper-like (papyraceous mummification). In cattle, another form of mummification, possibly of genetic origin, has been seen in Channel Island breeds. Hemorrhage occurs between the chorion and the endometrium, possibly as a consequence of fetal death and the dead fetus becomes surrounded by sticky fluid. This is sometimes known as hematic mummification.
- Fetal mummification occurs in all species. In the polytocous dog, cat, and pig a number of fetuses may become mummified but the rest of the litter remains normal. A number of small mummified fetuses may be delivered along with the normal living fetuses at term. In the mare, one member of a pair of (undesirable) twins may die and become mummified as the fetuses compete for uterine space. Eventually - often at 7 months into pregnancy - both twins may be aborted, one alive but unviable through prematurity and the other mummified. In the ewe, mummified fetuses are occasionally diagnosed when those members of the

flock that have not lambed are checked after lambing.

Fetal maceration-This occurs if fetal death is accompanied by loss of the corpus luteum, opening of the cervix and entry of autolytic and other bacteria into the uterus. The fetus decays in the uterus and its soft tissues break down and are passed as vaginal discharge with foul-smelling

- **Hydrops uteri**-The term implies excessive amounts of fetal fluids within the pregnant uterus. The fetus itself may or may not be edematous and may show anasarca, hydrothorax or ascites. Two forms of hydrops uteri have been described (depending on the site of excessive fluids): hydrops amnion and hydrops allantois.

Characteristics of hydrops amnion and hydrops allantois

	<u>Hydrops amnion</u>	<u>Hydrops allantois</u>
• Incide	• <i>n</i>	• 15n
• Onset	• Insidious	• Rapid
•	• 5-6 months	• 7-8 months
•	• Gestation	• gestate
• Calf	• Abnormal	• Normal
• Place	• Normal	• Abnormal
• Progn	• Guarded	• Poor
• Fluid	• Mucoid	• Watery
• Specif	• 1.08	• 1.02
• Nat-	• 120	• 50
• CI-	• 90	• 20

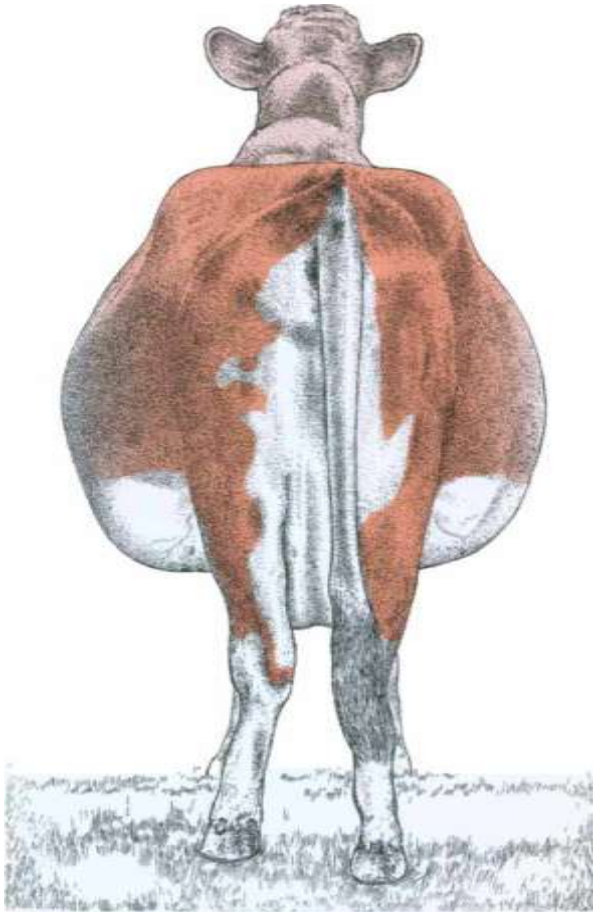
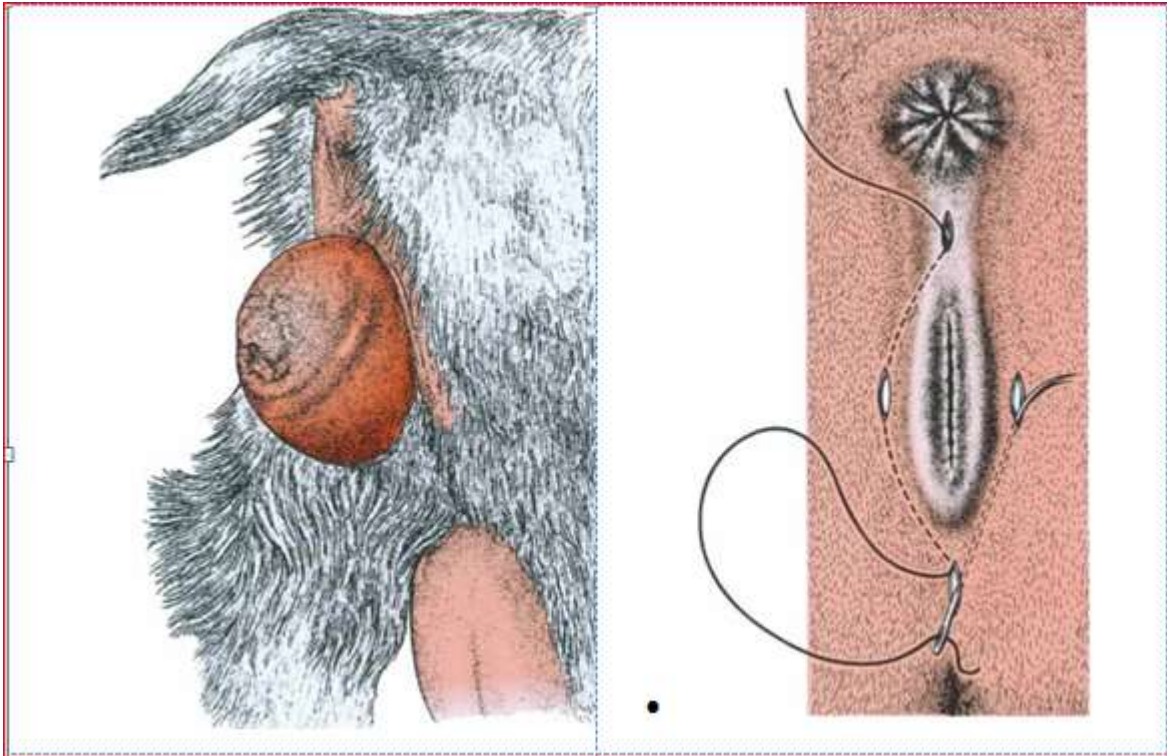


Figure-Hydrops allantois in the cow, showing gross abdominal distension.

Rupture of the uterus during pregnancy- need laparotomy and surgical correction

Herniation of pregnant uterus-abdominal hernia is common and need surgical correction

Prolepses of the vagina:-it is protrusion of vagina to outside and is an important and common condition requiring careful management. It is seen chiefly in cow, ewe, and sow; less commonly in mare, doe, bitch, and queen.



4.2 Vaginal bleeding

This may occur in all species and is of considerable concern to owners. The problem is seen most frequently in sows and bitches. In all species a vaginal discharge may indicate a pathological process in the vagina or uterus but it may also be present during a normal pregnancy. The obstetrician should always carry out a full investigation whenever possible to ensure that all is well with the pregnancy and to reassure the owner.

- A vaginal discharge may indicate a threatened or a progressing abortion. The discharge in such cases may be blood stained and may contain fresh or macerated fetal tissues together with placental remnants. The dam may show signs of general illness including pyrexia in cases where the abortion has been caused by infectious agents.
- A bloody discharge during pregnancy in the mare may arise from varicose veins in the vaginal wall. If blood loss is heavy the veins may be cauterized or ligated.

pyrexia. If the problem of vaginal discharge affects many sows in the herd bacterial cultures should be taken from a number of affected animals to identify the organism involved.

Early ultrasonographic pregnancy diagnosis will determine whether fetal life is affected, or indeed if it is present. A blood-stained vaginal discharge within a few days of service may be seen in some cases of pyelonephritis. Affected animals may show hematuria, pyuria and, if untreated, rapidly become toxemic.

- Some bitches produce small quantities of a clear mucoidal discharge throughout pregnancy; this is non-pathological. A foul discharge may indicate a complete or partial abortion and must be fully investigated (see above and also Chapter 9).
- A mucopurulent discharge in older pregnant bitches may occasionally be caused by local vaginal infection associated with crops of leiomyomata in the anterior vagina. Such infection is normally harmless but the pregnancy should be monitored ultrasonographically to ensure that fetal life is normal and the surrounding amniotic fluid is clear. Similar discharges may also be seen in cases of pyometra and the possibility of this
- developing about 3 weeks post service should be investigated. Ultrasonographic evaluation of the uterus will clearly distinguish whether the uterus contains pus as in pyometra or a normal pregnancy.
- A dark green vaginal discharge in pregnant bitches or a brown discharge in the queen cat may suggest fetal death and must be investigated urgently. In late pregnancy such a discharge often indicates fetal compromise following placental separation from the endometrium. Such animals must be submitted to a full obstetric examination as described in Chapter 9. Very occasionally only one puppy - that situated nearest to the cervix - has died and ultrasonographic scanning reveals that the rest are normal. Careful monitoring of such cases including regular checking of blood progesterone levels is mandatory.

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are birthing abnormalities (4 points)

2. What is the difference between hydrops amnion and hydrops allantois (4 points)

3. What is the difference between vaginal bleeding and abortion? (4points)

Note: Satisfactory rating - 6 points

Unsatisfactory - below 6 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

Information sheet-5	Identifying birthing abnormality
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4.1 Identifying birthing abnormalities

4.1.1 Taking case history

In cases of serious emergency, time may not permit the taking of a full case history but whenever possible this should be done. Much information can be quickly obtained even in emergency cases. The following points should be ascertained:

1. Is the birth premature or overdue? If there is any doubt, check the service dates personally.
2. Has the patient given birth before? Is this her first litter (i.e. primiparous) or has she had several previous litters (i.e. pluriparous)?
3. Were there any previous problems at birth? If so what were they, how were they resolved and what was the outcome?
4. What is known about the sire of the present litter? Was he used last time? Is there a large disparity in body size between sire and dam? Have any other animals pregnant to the same sire suffered dystocia recently?
5. Has the patient suffered any illness or accident during pregnancy? If so what were the details?
6. Has the animal been off color during the past few days?
7. Has the patient been straining and if so when did it start and how vigorous has the straining been?
8. Has there been any vaginal discharge and what was its nature?
9. Have any fetal membranes, fetal fluids, or fetal parts been seen at the vulva?
10. Has anyone already attempted to assist with the patient? The possibility of lay interference and resultant damage must always be borne in mind.

4.1.2 General Examination of the mother

This should be performed whenever possible. In an emergency the examination may initially have to be cursory but if there is any reason to believe the mother is unwell a full clinical examination must be carried out. Failure to perform this examination may have very serious consequences. In cattle, for example, acute life-threatening environmental mastitis may already be present and possibly contributing to the causes of a case of dystocia. Failure to diagnose and treat this problem may result in the death of the patient despite successful fetal delivery. The examination may influence the program of treatment.

The clinical examination should include the following:

General appearance and condition of the patient including:

- Is she bright and well or dull and dejected?
- Does she appear ready to give birth - are the normal preparatory signs of the species present?
- What is her bodily condition?
- Is she overweight, in good condition or emaciated?
- Is she able to stand and walk?
- Is she recumbent and immobile?
- Can any fetal parts be seen at the vulva?
- Are they exposed or covered by chorioallantois and amnion or only by amnion?
- Are the parts moist (possibly indicating recent exposure) or are they dry (possibly suggesting a protracted case)?
- What is the identity and condition of any visible fetal membranes?
- Is there any vaginal discharge?
- What is the degree of abdominal distension?

- Is there any evidence of fetal life?
- Can any exposed fetal parts be seen to be moving spontaneously or can unborn fetuses be seen or felt moving through the flanks of the mother?

4.1.3 Obstetric Examination.

The case history and the general clinical examination may influence the treatment of the case and its prognosis. Wherever possible, veterinary obstetricians should seek to deal with their patient in the most suitable environment for both parties. In many cases when the animal cannot be moved there may be no choice other than to deal with the animal where it is. If possible, obstetric cases should be examined, diagnosed and treated in a clean, warm and well-lit environment.

4.1.4 Restraint of the patient

The restraint and detailed description of the internal examination of each species will be dealt with in chapters devoted to the individual species. A number of general points may be dealt with here. Animals may be particularly aggressive and potentially very dangerous at parturition and obstetricians must ensure their own safety and that of the owners, attendants, and assistants while the patient is being examined and treated. The larger species are usually secured either by a halter or head collar or (in the case of cattle) in a crush or similar mechanical head restraint. Sows are currently normally restrained in farrowing crates but if loose the obstetrician should be protected by an attendant with a pig board standing by the sow's head. The other species are usually held manually by their owners or attendants. In all cases at least one but preferably two helpers are required but, especially on farms, assistance is often very limited.

In the case of violent or particularly aggressive animals possibly being handled or restrained for the first time, sedation may be required and for some manipulations in the mare general anesthesia may be advantageous.

4.1.6 Vaginal examination

Vaginal examination must be performed with gentleness, care, and with the

strictest cleanliness. It is essential that veterinarians set a good example for others to follow in these matters. The perineum and adjacent areas should be washed with soap and water to which may be added a little disinfectant such as chlorhexidine. Obstetricians must ensure that their hands have been carefully washed, their fingernails are short, and rings removed. Proper protective clothing is required and in the larger farm species waterproof trousers and a parturition overall are essential. A long overall is not suitable for use with the foaling mare. In the smaller species normal surgery clothing is suitable. Gloves may be worn (latex hand gloves for small animals and long plastic arm-length gloves for the farm species) but may in some cases reduce the sensitivity required for obstetric work. If the birth canal is believed to be infected or if there is a zoonotic risk, gloves are essential. Pregnant women should not work with sheep at lambing time. The two species share a number of common pathogens that can cause abortion.

Instrumentation should be available but the obstetrician's fingers, hands, and arms are the most important aids. Small fingers and long arms are very useful in veterinary obstetrics but not all colleagues are fortunate enough to have them. Details of specialist instrumentation will be discussed in subsequent chapters.

Before examining the birth canal and its contents the obstetrician's hands should be lubricated either by soap and water or preferably by using a proprietary obstetric lubricant. In the larger species the hand and parts of the arms may be inserted with relative ease into the dilated, parturient birth canal. In the dog the forefinger is mostly used but in the toy breeds and in cats it may only be possible to insert the lubricated little finger. In very small animals such as guinea pigs and mice digital vaginal examination is often not possible.

The aim of the vaginal examination is to explore the accessible parts of the birth canal to determine:

1. Whether the caudal parts of the canal are dilated and also the diameter of the cervix. (*Note: the cervix is not normally directly palpable in the dog or cat.*)
2. The state of natural lubrication or dryness of the birth canal and whether

the birth canal has sustained any damage or is obstructed for any reason.

3. Whether any fetuses are present, their location within the birth canal and if possible their living state. (*Note:* it may not be possible to be sure whether the fetuses are alive or dead at this stage and further tests such as ultrasonographic assessment may be required.) The obstetrician must always be careful not to predict fetal viability or survival until the case is fully assessed.
4. Whether the presentation, position, and posture (see below for definitions) of such fetuses is normal and if abnormal to determine the exact nature of any palpable abnormality.
5. The presence of any fetal membranes and, if possible, whether their uterine connections are intact or detached.
6. The relative size of the soft tissue and bony components of the palpable parts of the birth canal, and the likelihood of fetuses being able to pass through it; the presence of any obvious bony damage such as a pelvic fracture or sacral displacement; the presence of any soft tissue damage and its likely effect upon birth.
7. The tonic state of the uterus if palpable (not normally directly palpable in small animals).
8. Whether dystocia is present; to diagnose its cause and enable a tentative plan of treatment to be formulated.
9. Whether vaginal delivery is likely to be possible.

4.2 Normal birth in Presentation, Position and posture of the fetus

These terms enable orientation of the fetus to be accurately described in cases of normal and abnormal birth. They are defined as follows:

Presentation: the relationship between the long axis of the fetus and the long axis of the maternal birth canal. Mostly longitudinal (anterior or posterior) but can occasionally be transverse or vertical.

Position: that surface of the maternal birth canal to which the fetal vertebral column is applied. Mostly dorsal but may be ventral (fetus 'upside down') or lateral (right or left).

Posture: the disposition of the head and limbs of the fetus.

Thus a calf during normal birth would be in anterior longitudinal presentation, dorsal position, and with a posture in which the extended head and neck were resting on the extended forelimbs. A puppy during normal birth would be in anterior longitudinal presentation and dorsal position. It has a posture in which the head and neck are extended, the forelimbs, with shoulders flexed, are held by the side. The hindlimbs are extended behind. Examples of presentation, position and posture are shown in the following figures.

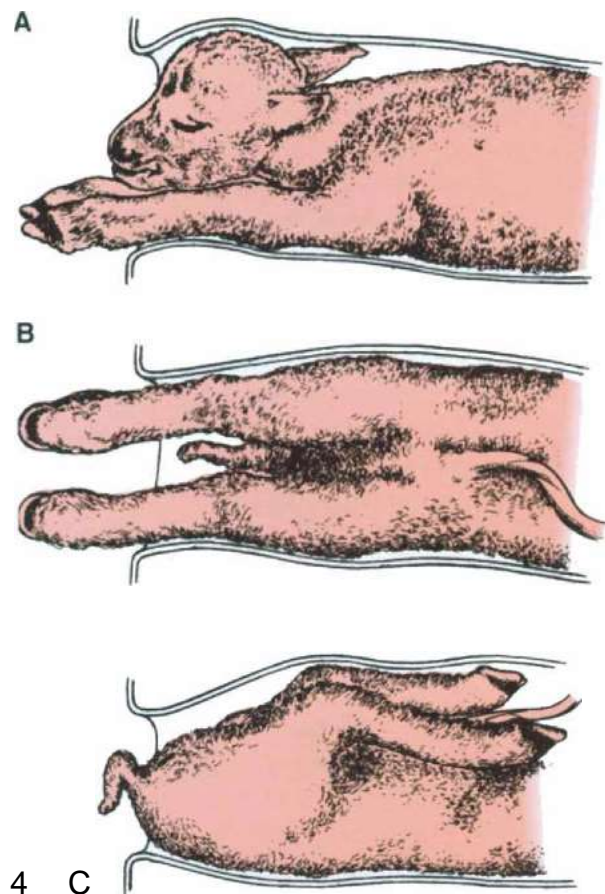


Fig. Examples of presentation, position and posture. (A) Lamb in anterior presentation, dorsal position, head resting on extended forelimbs. (B) Posterior presentation, left lateral position, hindlimbs extended. (C) Posterior presentation, ventral position, bilateral hip flexion (breech presentation).

4.2 Difficulty of giving birth (Dystocia)

The causes of dystocia are divided into maternal or fetal causes, depending on whether the mother or her offspring were 'responsible' for the problem. In many cases both maternal and fetal factors are involved and the classification of causes becomes less exact. Our greater knowledge of the endocrine control of the birth process has shown that although in many species the fetus initiates the process, a cascade of hormone changes follows in the mother.

The maternal components of birth are the provision of expulsive forces and a bony and soft tissue birth canal through which the fetus can pass.

The fetal components of birth include initiation of the birth process; the assumption of correct presentation, position, and posture; and being sufficiently small to pass through the birth canal.

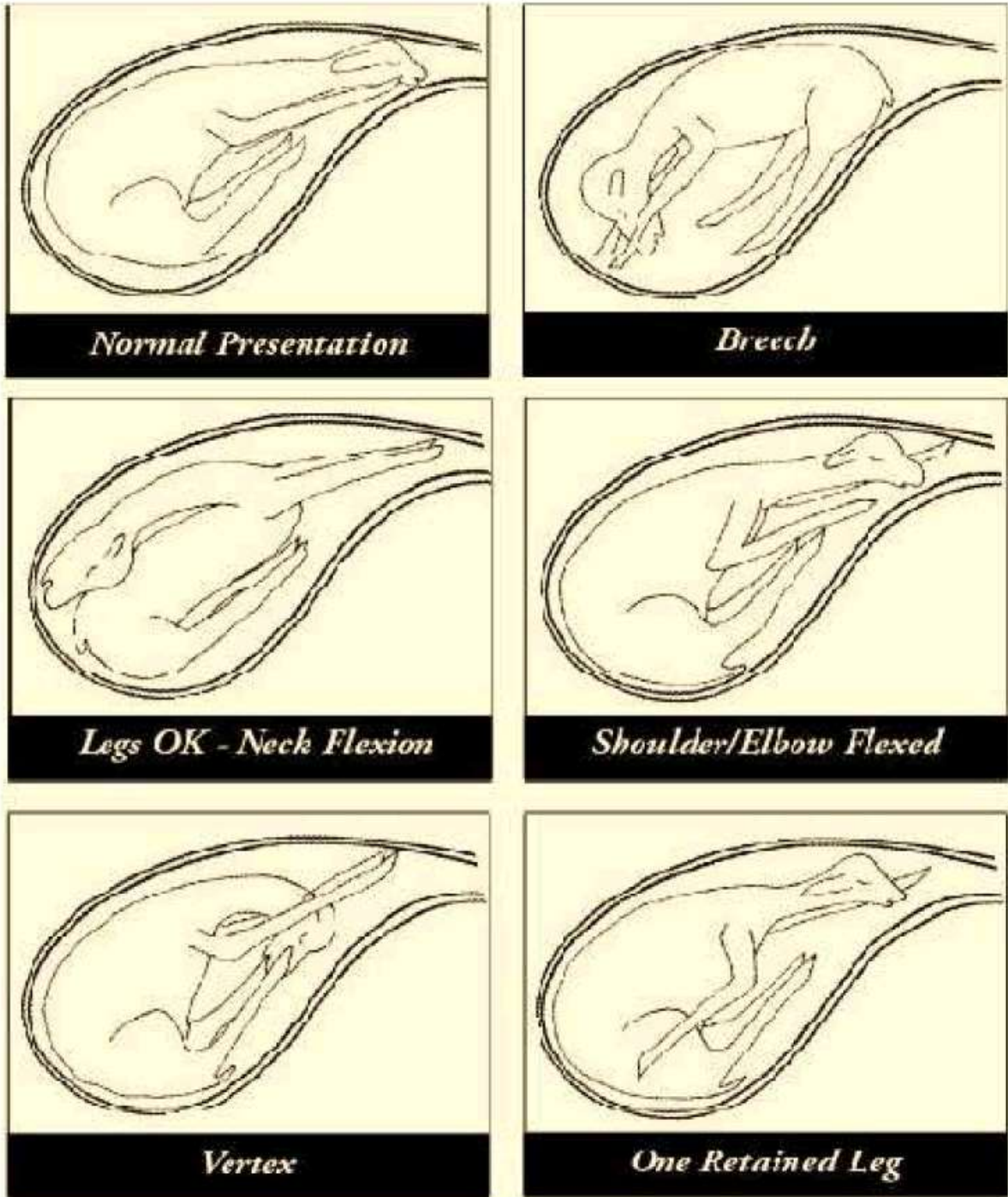
CAUSES OF DYSTOCIA

➤ Maternal causes

- *Failure of expulsive forces*
- *Uterine*
- Primary uterine inertia *Myometrial defects*: overstretching, degeneration (senility, toxic, etc.), uterine infection, systemic illness, small litter size,

heredity

- *Biochemical deficiencies*: estrogen/progesterone ratio, oxytocin, prostaglandin F1 α , relaxin, calcium, glucose
- *Hysteria/environmental disturbance*
- *Oligoamnion*(deficiency of amniotic fluid)
- *Premature birth*
- Secondary uterine inertia (the consequence of another cause of dystocia)
- Uterine damage including rupture
- Uterine torsion (may also cause obstruction of birth canal)
- *Abdominal*
- Inability to strain (because of age, pain, debility, diaphragmatic rupture, tracheal/laryngeal damage)
- *Obstruction of the birth canal*
- *Bony pelvis*: fracture, breed, diet, immaturity, neoplasia, disease
- Soft tissue:
- Vulva congenital defect, fibrosis, immaturity
- Vagina congenital defect, fibrosis, prolapse, neoplasia, perivaginal abscess, hymen Cervix congenital defect, fibrosis, failure to dilate
- Uterus torsion, deviation, herniation, adhesion, stenosis
 - **Fetal causes**
 - *Hormone deficiency* ACTH/cortisol: initiation of birth
 - *Fetopelvic disproportion* fetal oversize \pm defect fetal monisters



Diagnosis and treatment plan

As a result of the general clinical examination, the detailed obstetric examination, and any useful back-ground information provided by the patient's history, the obstetrician will normally be able to arrive at a diagnosis of the cause of dystocia and formulate a plan for the resolution of the case. Such a plan should initially be tentative because, if the first attempt at treatment is unsuccessful, alternative treatments may have to be employed and must always

be kept in mind.

The welfare of the patient must be paramount when planning and carrying out treatment. The wishes of the owner - sometimes quite forcibly expressed - must be carefully considered but the final course of action is decided by the obstetrician. In practice, economic considerations have to be taken into account to ensure that the cost of the proposed treatment can be met and is realistic.

Possible treatments are:

1. *Conservative treatment:* the obstetrician may consider the case to be not quite ready for assistance and decide to allow the patient a finite period of time before taking further action.
2. *Manipulative treatment:* assisted vaginal delivery after correction of any fetal maldisposition.
3. *Drug therapy to increase myometrial activity:* the use of specific ecbolic drugs such as oxytocin. Calcium or glucose therapy may be required in cases where a deficiency is suspected.
4. *Surgical treatment:* at cesarean section the uterus is opened surgically to allow removal of the offspring via laparotomy. On occasion the uterus may be found to be so damaged at surgery that hysterectomy is necessary.
5. Fetotomy (sometimes termed 'embryotomy') is the division - by the obstetrician working per vaginam - of the fetus into small portions that can more easily be delivered through the birth canal.
6. Regrettably, and fortunately very occasionally, the mother may be in such a poor state or its economic value is so low when presented for treatment that euthanasia is necessary.

➤ **CESAREAN SECTION IN THE COW**

➤ **Indications**

- *Resolution of existing dystocia*
- Fetopelvic disproportion including cases of misalliance and postmaturity.
- Fetal maldisposition, which cannot be corrected by manipulation.
- Irreducible uterine torsion.
- Incomplete dilation of cervix or other parts of birth canal.
- Fetal monsters that cannot be delivered by other means.
- Uterine rupture or severe uterine hemorrhage.
- Damaged and severe vaginal prolapse where further damage might accompany vaginal delivery.

- *Elective cesarean section*
- Surgical termination of prolonged gestation.
- To avoid existing or suspected fetopelvic disproportion.

1. Termination of pregnancy in cases of life-threatening disease in the dam: for example, some cases of hydrops allantois and

traumatic reticulitis or pericarditis. Induction of birth might be used as an alternative in such cases but the time required for the drugs to work may not be compatible with maternal life.

- **Prognosis**
- *Resolution of existing dystocia*
- This should be discussed with the owner before surgery and depends on a number of factors. The prognosis for a successful outcome is proportional to the duration of existing dystocia. The bovine fetus may not survive more than 8 hours of second-stage labor. The mortality rate in the dam rises if surgery is not performed until more than 24 hours after the commencement of dystocia or if the fetus is dead and emphysematous. Prolonged attempts at delivery by traction will also reduce the chances of fetal and maternal survival. The availability of skilled assistance and the ability to maintain reasonable asepsis during surgery are also important factors. A maternal survival rate of 80-90% should be expected. Fetal survival should be good in cases of elective cesarean section but decreases with increasing duration of second-stage labor.
- In some cases, fetotomy may be an alternative to cesarean section (see discussion in Chapter 12). Occasionally, if the fetus is dead and the cow is already suffering from toxemia, humane slaughter may be advisable.
- *Elective cesarean section*
- An elective cesarean section is more easily and safely performed in first-stage labor than during late pregnancy. The risks of an inadequate milk supply or retention of the placenta are smaller at this stage. Ideally, elective cesarean section should be performed

when the cow's cervix is fully dilated. At this stage the calf has been subjected to some of the beneficial stresses of labor. As a result of the release of catecholamines that occurs in labor, the calf is better prepared for postnatal respiratory and metabolic adaptation. The release of adrenaline (epinephrine) by the mildly stressed calf produces more effective removal of lung fluids and better release of surfactant. Better gas exchange is promoted and better energy release helps to maintain body temperature in the neonate.

➤ **The location chosen for surgery**

➤ There is often little choice on farms, but a clean, well-lit location should be selected. A major sweeping and cleaning up of the location likely to stir up clouds of dust immediately prior to surgery is inadvisable.

➤ **Examination of the cow prior to surgery**

➤ The obstetrician will normally already have a good knowledge of the condition of both dam and fetus as a result of the examinations made before and during attempts at vaginal delivery. Further examination should determine, if possible, in which uterine horn the fetus is located, because this may influence the laparotomy site selected. The ability of the dam to remain standing if necessary during surgery, and her current state of well-being - including the need for fluid and other supportive therapy before or during surgery - should also be assessed. If the fetus is hyper-active or its residual amniotic fluid is stained green with meconium it may be becoming hypoxic. Surgery should be commenced with all possible speed to ensure delivery of a living calf.

➤ **Assistance required**

➤ If the operation is to be carried out on the standing cow, one attendant will be required to restrain the patient, but if a recumbent position is chosen at least two experienced assistants are necessary. Although cesarean section can be carried out single handed, skilled surgical assistance in the form of a colleague or veterinary nurse makes the procedure both simpler and safer. An additional assistant to help with removal of the calf and its care after delivery is advisable. If an emergency arises with either the cow or calf during surgery, the presence of skilled help will make resolution of the problem and maintenance of asepsis much easier.

➤ **Preparations for surgery**

➤ The obstetrician should ensure that everything necessary for surgery is to hand, make sure the patient is well prepared and that facilities are as good as possible. The obstetrician should also ensure that assistants - skilled or otherwise - are briefed on what to do in emergencies either involving the cow or calf. Once the operation is

- underway there should be no unnecessary delay - the longer the peritoneal cavity remains open on the farm, the greater the risk of

infection.

- Equipment should include:
 - Appropriate drugs for sedation, local anesthesia, and analgesia.
 - Electric clippers for removing hair from the surgical site.
 - A portable halogen light if local illumination is poor.
 - Resuscitation facilities, including arrangements to dry and warm the calf. Doxapram hydrochloride (50 mg) can be placed in a syringe with suitable needle prior to surgery in case it is needed urgently when the calf is delivered.
 - Sterilized calving ropes or chains, which may be needed during removal of the calf.
 - Solutions for skin preparation: severe contamination should be removed using soap and water. Skin disinfection prior to surgery can be achieved the aid of a surgical scrub solution of chlorhexidene, povidone-iodine, or 4% chlorhexidene gluconate followed by application of surgical spirit. Application of 10% povidone-iodine alcoholic tincture to the skin will enable a one-stage disinfection to be performed.
 - Sterile drape, e.g. disposable paper type: useful to maintain asepsis but may frighten a nervous standing heifer.
 - Surgical kit: scalpel, rat-toothed forceps, scissors, six hemostats, heavy-duty needle holders, suture scissors, selection of round bodied and cutting suture needles. A Robert's embryotomy knife should be included in case it is necessary to open the uterus deep in the abdomen.
 - Suture material: an absorbable suture for closure of peritoneum, muscles, and subcutis. Monofilament or braided nylon for the skin.
 - Antibiotics: antibiotic cover is given

prophylactically, penicillin/streptomycin combination or ampicillin being useful. Treatment is preferably commenced prior to surgery. If infection of the peritoneum is likely, a water-soluble form of these drugs may be instilled into the peritoneal cavity before wound closure.

- advantages and disadvantages of the various sites are summarized as follows.
- **Flank laparotomy**
- **Advantages** Only local anesthesia is required, the incision may be easily extended if necessary, the risk of postoperative soiling of the wound or herniation is small.
- **Disadvantages** The uterus is often difficult to exteriorize prior to opening, the peritoneum is readily contaminated with uterine contents especially if the calf is dead and emphysematous.
- In left-flank laparotomy the rumen may occasionally make access to the uterus difficult but the risk of the small intestine falling out of the wound is normally small.
- Right-flank laparotomy allows good access to a calf in the right uterine horn but the risk of loops of small intestine tending to slip out of the laparotomy incision is higher.
- Flank laparotomy can be performed on the standing or laterally recumbent cow. Surgery on the standing patient is preferred by most obstetricians if the patient is likely to remain standing and not go down suddenly during surgery. Opening and closure of the peritoneal cavity is often a more straightforward procedure in the standing patient. There is less intra-abdominal pressure but exteriorization of the uterus can be difficult in some cases. If the cow is thought likely to go down during surgery it is probably better to sedate, cast, and restrain her in sternal or lateral recumbency with the upper hindleg pulled back.
- **Ventrolateral or midline laparotomy**
- **Advantages** The uterus (even one containing an emphysematous calf) can more readily be exteriorized with less risk of peritoneal

contamination. **Disadvantages** Heavy sedation or general anesthesia is required, the risk of postoperative soiling of the incision or herniation is higher.

- **Position of the cow and selection of operation site**
- In most cases, a left-flank laparotomy is performed on the standing cow. Alternative sites include a right-flank, a ventrolateral, or a midline laparotomy. The
- **Left-flank cesarean section in the standing cow**
- *Restraint*
- The head should be secured with a halter, which should be fixed to a wall or other solid point but will

- permit the cow to lie down if she wishes. A length of rope should be attached to the patient's right hindleg so that it can be pulled

forward - should the animal decide to lie down during the operation - thus ensuring continued access to the left flank.

- *Sedation*

- This may not be required in a quiet cow but is useful in nervous or aggressive animals. Xylazine is very useful. Dose: 2.5 mg/50 kg body weight by intramuscular injection or 0.05 mg/kg by intravenous injection - the latter is not a licensed route of administration for cattle in some countries. Xylazine may increase the tone of the uterine musculature, making exteriorization of the uterus more difficult during surgery.

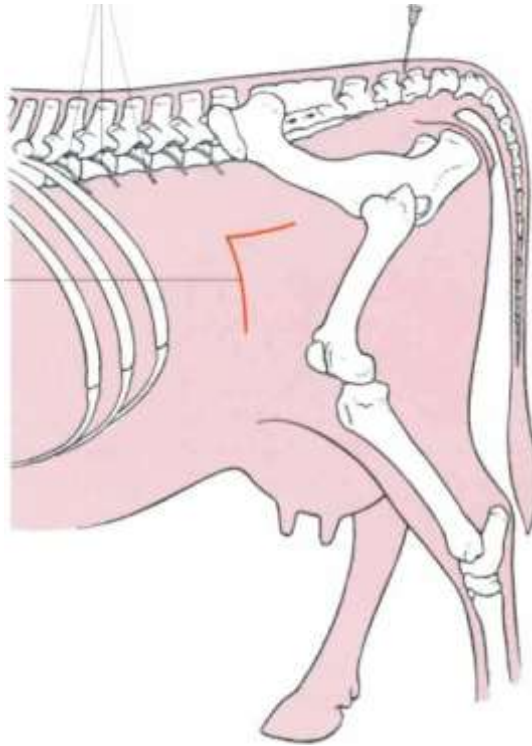
- *Myometrial relaxation*

- Clenbuterol (300 µg) given by intramuscular or slow intravenous injection just prior to surgery will help to counteract the myometrial action of xylazine and may facilitate manipulation of the uterus during surgery.

- splitting ('grid iron') approach to the abdomen is used. Approximately 80-100 mL of local anesthetic is needed for local infiltration. Paravertebral anesthesia is achieved by blocking the outflow from spinal nerves T13-L3. The nerves are found just behind the last rib and the first three lumbar vertebrae respectively; 20 mL local anesthetic is injected over each nerve. Figure 11.1 illustrates the sites of local infiltration, epidural, and paravertebral anesthesia. For further detailed discussion of anesthetic techniques, see Hall, Clarke & Trim (2003).
- **Surgical technique**
- *Entry into the peritoneal cavity*
- **Skin incision** A vertical incision is made through the skin 25-30 cm in length commencing approximately 10 cm below the transverse processes of the lumbar vertebrae and halfway between the last rib and the tuber coxae. In fat animals, layers of adipose tissue

i. A

- *Preparation of the surgical site*
- Hair is clipped from an area of the left flank extending laterally from the last rib to the tuber coxae and dorsoventrally from the spines of the vertebrae down to the lowest part of the flank. If the patient is soiled the clipped site should be initially washed and scrubbed using liquid soap and water. The skin is then thoroughly scrubbed with a surgical scrub solution. Finally, surgical spirit is applied. (Alternatively, a 10% povidone iodine alcoholic tincture can be used for one-stage disinfection.)
- If local infiltration anesthesia is used the site should be prepared before the anesthetic is instilled, with a final preparation immediately prior to surgery.
- *Anesthesia*
- Epidural anesthesia is not essential but useful to prevent straining and tail movements during surgery; 5-8 mL 2% lidocaine (lignocaine) hydrochloride without adrenaline (epinephrine) is given epidurally into the first or second intercoccygeal space. A larger dose may cause the patient to become recumbent and is contraindicated.
- Local anesthesia may be local infiltration, an inverted L block, or by paravertebral injection. Local infiltration anesthesia has the advantage of speed. It may occasionally interfere with wound healing and may be less effective than either of the other techniques if a muscle



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- **Figure 11.1** Bovine cesarean section - sites for anesthesia. (A) Epidural, (B) local infiltration, (C) paravertebral (see text for details).
- FETOTOMY
- `Fetotomy' (often termed 'embryotomy') is the term used to describe methods of dividing a fetus, which cannot be delivered, into small pieces that will more readily pass through the birth canal, The technique should be used only when the fetus is known to be dead. Fetotomy is used most commonly in cattle, occasionally in horses, rarely in sheep and goats, and almost never in pigs and small animals. Fetotomy can be complete, when a whole fetus is divided into smaller pieces, or partial, when a small part of the fetus, such as a leg, is removed.
- Two techniques of fetotomy are available - percutaneous and subcutaneous:
- In *percutaneous fetotomy* a tubular embryotome is used, through which a flexible wire saw is passed. The wire saw is used to cut through the fetus while the embryotome protects the maternal tissues from damage.
- In *subcutaneous fetotomy* parts of the fetus are dissected out from within

its skin, thus reducing fetalbulk(and allowing delivery of the remainder through the birth canal.

- Percutaneous fetotomy is the preferred method unless the fetus is in a very decomposed state and can readily be broken up by hand.

- **INDICATIONS**

- The relief of dystocia caused by fetal maldisposition that cannot be corrected by manipulative means.
- The relief of dystocia caused by fetopelvic disproportion in which the fetus is dead and cannot be removed by traction. The fetus may be normal butoversized or it may be abnormal as a fetal monster.
- The relief of dystocia caused by the fetus becoming stuck during delivery - for example in the cow when

- stifle lock (sometimes termed `hip lock') occurs after the head and part of the fetal thorax have been delivered.
- During cesarean section when the dead fetus is either too large to remove from the uterus in the normal way, is deformed, or is in a maldisposition that cannot be corrected.

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➤ **THE**

FETOTOMY/CESAREAN SECTION DEBATE

- The obstetrician must decide which of these two techniques to use:
 1. Fetotomy should be considered only when the fetus is known to be dead.
- Cesarean section *must* be used when the fetus is known or believed to be alive.
- The extent of the fetotomy likely to be required is another very important factor, as is the accessibility of the fetus to the obstetrician. If a moderately sized dead fetus has a lateral deviation of the head that cannot be corrected manually and the birth canal is sufficiently dilated for the obstetrician to gain easy access to the base of the fetal neck, then fetotomy is indicated. The fetal neck is sectioned to allow delivery of the deviated head followed by the remainder of the fetus. If the fetus is in the same maldisposition but the cervix is only partially dilated - making access to the fetus extremely difficult - fetotomy may be impossible. In such circumstances cesarean section, even though the fetus is dead, may be the best or even the only solution.
- Other considerations include the experience of the obstetrician and the availability of equipment. A complete fetotomy in a restricted space can be an extremely demanding and time-consuming procedure for even the experienced obstetrician. The longer and

- more complicated the fetotomy, the greater the risk of maternal damage and infection. It has been suggested that, ideally, a fetotomy should involve no more than six cuts with the embryotome and should not take more than an hour to complete. If it is thought that these limits cannot be observed then cesarean section may provide the best course of action.
- The inexperienced obstetrician may feel happier to embark on the more familiar technique of cesarean section, although the prognosis of this technique is poorer when the fetus is dead. If the obstetrician is unsure of his or her competence to embark on either technique, further professional assistance should be sought. A partial fetotomy is normally quite a simple procedure and having successfully completed a number of such cases the obstetrician may feel happier to take on more complicated cases.
- A good tubular embryotome with all its accessories is essential for successful fetotomy. Although in an emergency fetotomy can be performed without an embryotome, the risk of damage to the mother is much greater.
- In some circumstances there may be no alternative to fetotomy. An example of this - which is probably the most common indication for bovine fetotomy - is when the obstetrician must deliver a bovine fetus stuck in stifle lock. In most cases the calving has been unattended and the dead fetus is found with its head and part of the thorax protruding from the cow's vagina (see Fig. 4.22). It cannot be delivered by traction and it

- cannot be repelled into the uterus so that cesarean section could be performed. Fetotomy provides the only answer and, in most examples of this problem, can be completed without difficulty even by the inexperienced but well-equipped obstetrician.
- In all cases the condition of the mother is of paramount importance. In both fetotomy and cesarean section the prognosis of a successful outcome is closely related to the duration of the dystocia. The longer an animal suffers from dystocia before treatment is commenced, the poorer the prognosis.
- A number of surveys have compared the success of fetotomy and cesarean section, with somewhat conflicting results in terms both of recovery from the procedure and future fertility. The best results are likely to be achieved by a skilled obstetrician who has made an early decision to proceed with either technique in a healthy patient in a clean environment.

- 5 Still birth (3)
- 6 Prolapse (uterine or vaginal) (3)
- Retained fetal membrane) (3)
- 7 Bleeding (3)
- 8 Abortion (3)
- 9 Extended gestation period (3)
- 10 Dystocia (3)

**Note: Satisfactory rating –11 points
points**

Unsatisfactory – 11 below 6

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

➤ **REFERENCES**

1. Schuijt G, Taverne MAM
1994 The interval between
birth and sternal

➤ Schuijt G, Ball L 1980 In: Morrow DA (ed) Current therapy in
theriogenol recumbency as an objective
measure of the viability of new born calves.

➤ ogy. WB Saunders, London, p. 247-257 Veterinary Record
135:111-115

Knottenbelt DC 1988 Vaginal rupture associated with herniation of the
abdominal viscera in pregnant ewes. Veterinary Record 122:453-456

➤ Long SE 2001 Abnormal development of the fetus and its
consequences. Arthur's Veterinary Reproduction and Obstetrics, 8th
edn. WB Saunders, London, p 139-140

➤ **REFERENCE**

➤ Schott HC 1992 In: McKinnan AO, Voss JL (eds) Equine
reproduction. Lea &Febiger, Philadelphia, p 964-975

