

OBSTETRICS

Normal and Abnormal Parturition in Farm animals



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Lecture Overview

Parturition

- Theories of the initiation of parturition
- Possible factors responsible for initiation of parturition
- Signs approaching parturition
- Stages of parturition
- Calving management
- Calving assistance

Dystocia

- Factors affecting dystocia
- Causes of dystocia
- How can you deal with a case of dystocia
- Obstetrical prognosis
- Preparations necessary in cases of eutocia and dystocia:





Calving

Parturition

Parturition –Labor -Delivery



Foaling



Whelping



Farrowing

Average length of gestation

Species	Length in Days	Avg. in Months*
Cattle	279-292	9 mo, 9 days
Buffalo	282-310	10 mo, 10 days
Goats	145-155	5 mo
Sheep	144-151	5 mo
Swine	112-115	3 mo. 3 wks. 3 days
Horse	330-342	11 mo

*Average varies with animals and breeds.



Theories responsible for initiation of parturition

The **fetus** exerts an overriding control on the length of gestation and that the **mother** can influence the time of birth only within narrow limits.

Theories responsible for initiation of parturition

1. Placental Aging Theory
2. Failing Nutrient Theory
3. Fetal Foreign Body Theory
4. Uterine Limitation Theory
5. Oxytocin Stimulation Theory
6. Lunar Theory
7. Natural Selection Theory
8. Hormonal Theory
9. Adrenal Fetal Axis Theory

Theories responsible for initiation of parturition

1. Placental Aging Theory

- Every placenta has a certain life span
- The placenta begins to die toward the last few weeks of pregnancy
- Fatty degeneration of placenta loss their function
- As it dies the progesterone level decreases.
- The uterus becomes more irritable and reacts to the messages to contract.



Theories responsible for initiation of parturition

2. Failing Nutrient Theory

- Inadequate nutrition stimulate the fetus to secrete hormone of unknown nature resemble to oxytocin

3. Fetal Foreign Body Theory

- The fetus in late stages act as foreign body

Theories responsible for initiation of parturition

4. Uterine Limitation Theory (Set Limit of placenta)

- The uterine muscles are unable to expand any more.

5. Oxytocin Stimulation Theory

- Uterine distention stimulates release of oxytocin which stimulates the uterus to contract

Theories responsible for initiation of parturition

6. Lunar Theory

- Most **mare** give birth when the moon is full.

7. Natural Selection Theory

- The feti born before or after a normal gestation period are liable to die

Theories responsible for initiation of parturition

8. Hormonal Theory

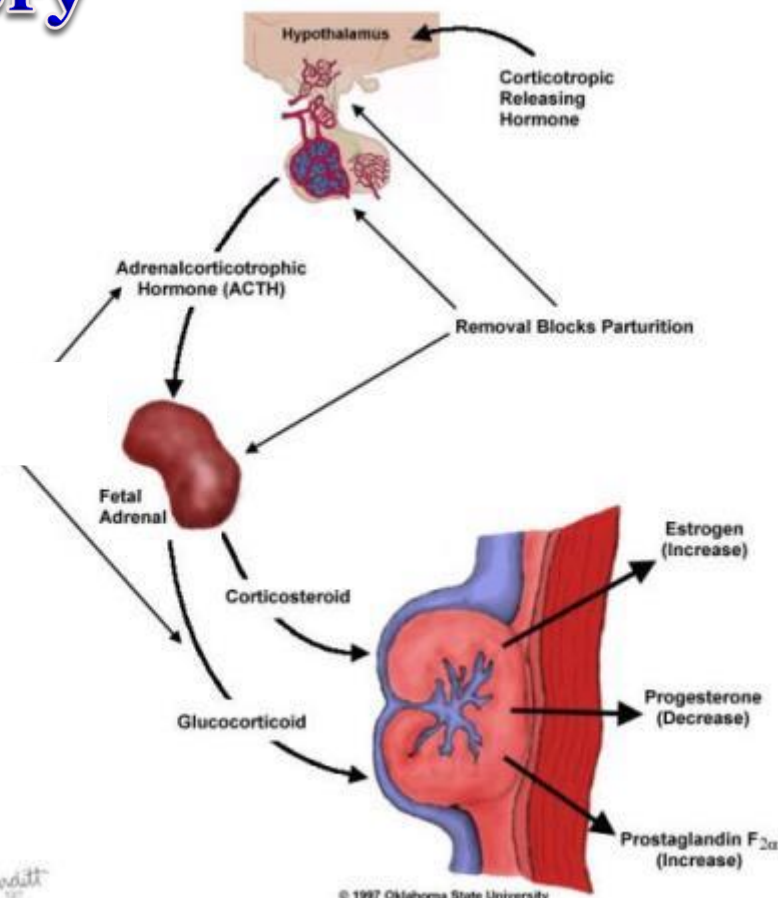
- The increased level of estrogen before parturition
 - 1) help in cervical dilatation.
 - 2) Liquefaction of cervical plug.
 - 2) Prepare the uterus for the action of oxytocin and relaxin.

Theories responsible for initiation of parturition

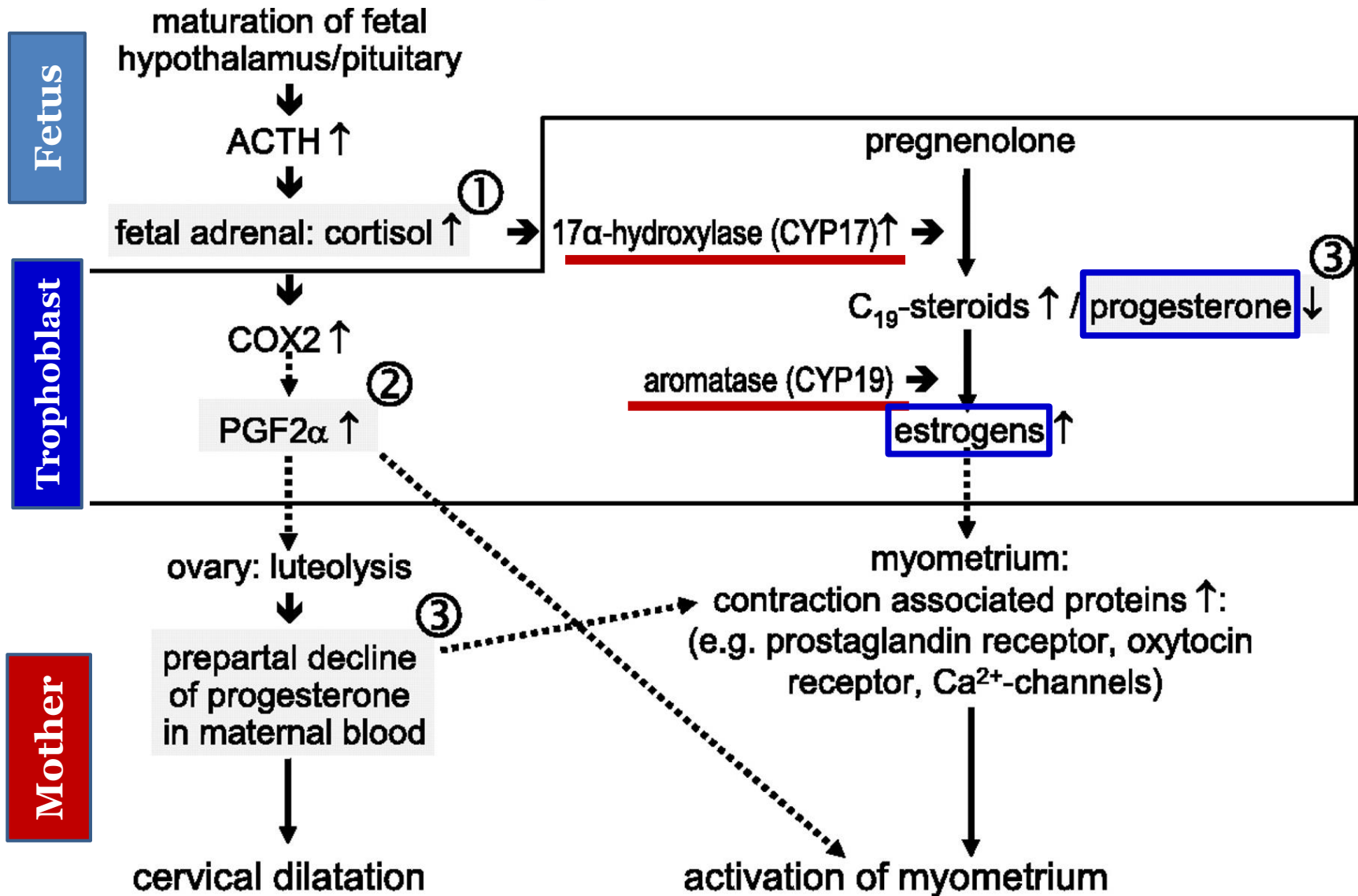
9. Fetal Adrenal Axis Theory

Fetal *ACTH* stimulates the growth of the fetal adrenals resulting in *an increase of fetal Corticosteroids* causes:

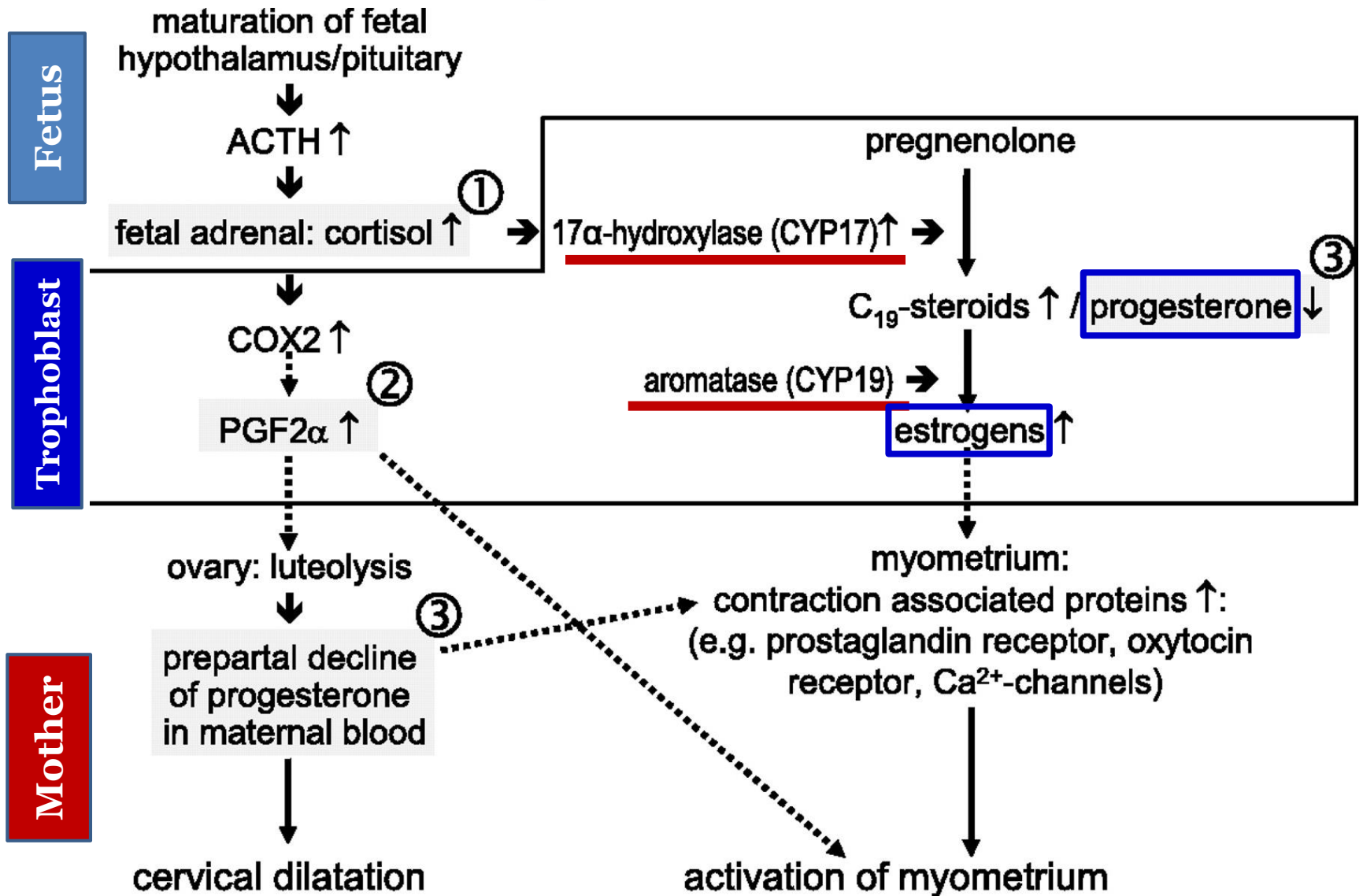
- Decreases **progesterone** levels (placental production or CL regression)
- Increase the production of **estrogens** by placenta
- Increase **PGF_{2a}** production by uterus which initiates uterine contractions.

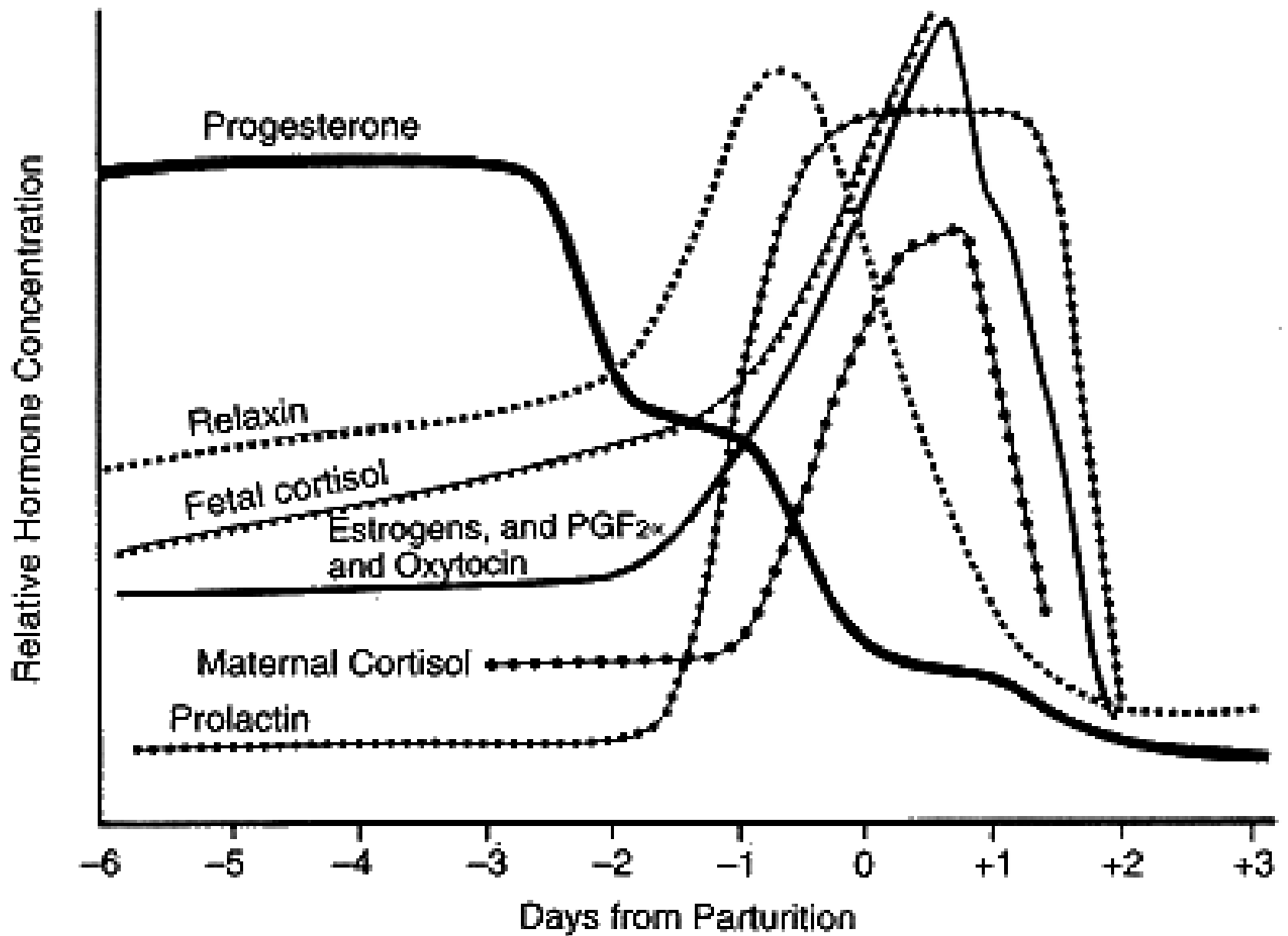


Hormonal Changes that Control Parturition



Hormonal Changes that Control Parturition





Possible factors responsible for initiation of parturition

Physical factors

- Increase in fetal size
- Uterine distension
- Fatty degeneration of placenta & presence of infarcts
- Reversal of progesterone block
- Increase in uterine irritability

Biochemical factors

- Increase in CO₂ tension in maternal blood due to increased fetal activity
- Release of fetal antigens serotonin
- Release of collagenase and stoppage of blood supply to cotyledons

Neuro-endocrine factors

Fetal maturation

i.e. a variety of maturational changes which enable the newborn animal to survive.

- Physical changes: such as closure of the ductus arteriosus and foramen ovale.
- Functional changes: such as
 - The development of glucose homeostatic mechanisms
 - Changes in the structure of haemoglobin from the fetal to the adult form
 - Maturation of the fetal lungs

Signs approaching parturition

- The symptoms are inconsistent between individual animals, and between consecutive parturitions.
- The symptoms therefore, do not permit an accurate prediction as to the exact time of parturition in a certain animal **but are only useful indications as to the approximate time parturition can be expected.**
- Clinicians must therefore refrain from too positive statements concerning the exact time of parturition.
- The most important external changes of approaching parturition are seen in the **udder, vulva and pelvic ligaments** and to some extent in the **behavior**.

Signs approaching parturition

Behavior

- Nervousness and restless
- Nesting behavior.
- Off feed
- Isolation from the herd

Udder

- Swollen udder.
- Fluid in udder changes from a water solution to a thick, milky colostrum.
- Dripping milk

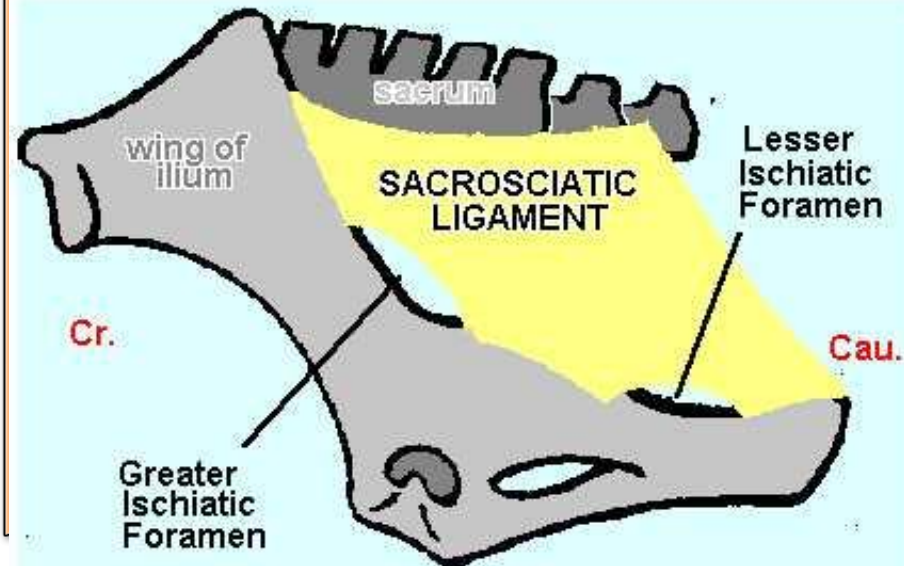
Signs approaching parturition

Pelvis

- Expansion of the pelvis.
- Sinking of crop around tail head.
- Raising of the tail head

Vulva

Noticeable signs of swelling and enlargement of the



Stages of parturition

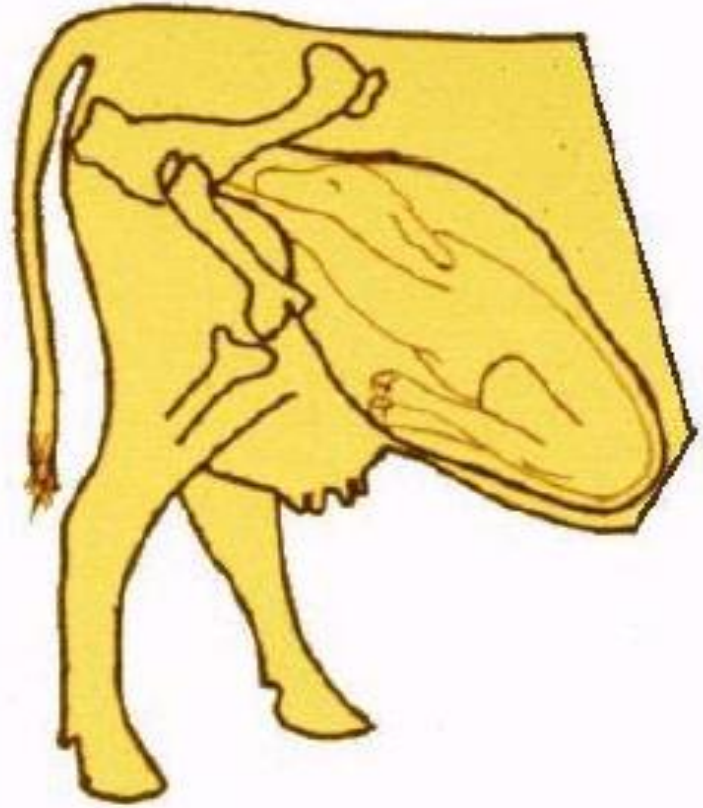
Opening stage

1st stage characterization

Not visible externally

Important for preparing **birth way** for expansion

Important for preparing **fetus** for expulsion



Stages of parturition

Opening stage

1st stage characterization

Not visible externally

Important for preparing birth way for expansion

Important for preparing fetus for expulsion

Changes include

Changes in structure of cervix

Initiation of myometrium contractions

Fetal disposition for expulsion

Signs on cows during 1st stage of parturition

- During stage 1, cows typically show signs of discomfort due to the contractions.
- You may notice restlessness, arching the back, straining slightly and kicking at the belly.
- Cows may separate themselves from the rest of the herd, and also urinate frequently.
- However, cows are still alert and fully aware of their surroundings, and may eat, drink, and behave normally.
- **The end of stage 1 is typically marked by expulsion of the water bag, which is the most external of the fetal membranes.**



Stages of parturition

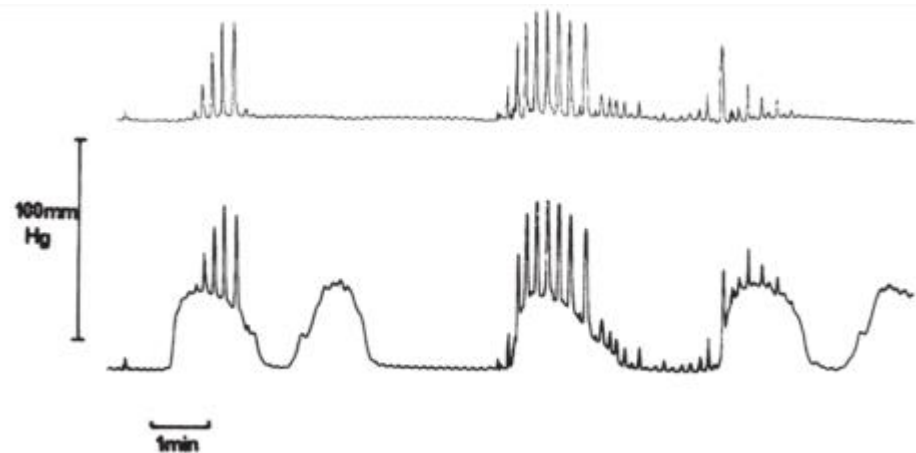
Expulsive stage

2nd stage characterization

Duration: 4-6 hours.

Start from exposure of first fetal sac until expulsion of fetus

Uterine contractility increases in frequency and strength



Stages of parturition

Stage of placental drop



Stages of parturition

Stage of placental drop

3rd stage characterization

Duration: 3-8 hours.

Start from expulsion of fetus until placental drop

Starts few days before parturition by degenerative changes in the cells lining the fetal and maternal sides of the placenta.

Strong Newborn Calves



- Attempt to stand in 15 min.
- Usually nursing in 30 – 60 min.



Weaker newborn calves

- They need assistance in cleaning airway & body of calf.
- Takes longer for weak calf to nurse.
- Calf may need human assistance to start nursing.





INDUCTION OF PARTURITION



Indications

- To prevent dystocias due to feto-pelvic disproportion.
- When programming calving and pasture availability.
- In the management of medical problems, such as hydrops allantois.
- Abortion of small heifers under feedlot conditions
- When damaged to an engorged pendulous udder is likely.



Contraindications of Induction of Parturition in Cows

- Should not be used in animals that are more than 2-3 weeks away from calving, as such, the breeding date should be known.
- Corticosteroids should not be used to induce parturition when there is a dead fetus in utero, e.g. fetal mummification.
- Corticosteroids should not be used in animals with known or latent infections because of their immunosuppressive properties.



Side effects of induction of parturition in cows

- The most common problem associated with the induction of parturition in cows is retention of the fetal membranes

Induction of parturition in mare

Induction should not be attempted before 320 days

Oxytocin:

- **If the cervix showed evidence of ‘ripening’**, i.e. was soft on palpation and able to allow the insertion of one or two fingers in the external os, and the foal was in normal PPP:
oxytocin was given at a dose of 120 IU to mares between 360 and 600 kg B.Wt.. Foaling occurred 15–60 minutes later.
- **If the cervix was ‘unripe’**
30 mg of stilboestrol dipropionate in oil was given intramuscularly, followed by oxytocin 12–24 hours later, provided that the cervix had responded.

Induction of parturition in mare

Induction should not be attempted before 320 days

Dexamethasone:

A dose rate of 100 mg every day for 4 days resulted in parturition 6–7 days after the start of treatment.

Prostaglandins

Dinoprost: 1.5–2.5 mg every 12 h

Fluprostenol: a single dose of 250 µg to ponies and 1000 µg to thoroughbred mares

Induction of parturition in cow

Induction should not be attempted before 270 days

Dexamethasone:

A dose rate of up to 35 mg

Prostaglandins

Dinoprost 25-35 mg

Dexamethasone and Prostaglandins protocol

- Beal et al. (1976) injected $PGF_{2\alpha}$ if no effect had occurred 40 hours after treatment with dexamethasone.
- Day (1978) obtained good results using a prostaglandin analogue, cloprostenol, administered 8 or 12 days after pretreatment with dexamethasone trimethylacetate; all the cows calved within 72 hours.

Induction of parturition in ewe and goat

Induction should not be attempted before 5 days before term

Dexamethasone:

a single intramuscular injection within 5 days of term, normal parturition occurs in 2–3 days.

Estrogen: induction is also possible with

- Two intramuscular injections of 1–2 mg of estradiol benzoate 5–6 days before term
- A single injection of 15 mg of estradiol benzoate 5 days before term.



Delaying of parturition

Clenbuterol hydrochloride:

In cows, provided that the cervix is not fully dilated and second stage has not commenced:

- an injection of 0.3 mg of clenbuterol hydrochloride (10 ml) followed by a second injection of 0.21 mg (7 ml) 4 hours later will inhibit calving for 8 hours after the second injection.



Post- calving problems

- Haemorrhage
- Uterus rupture
- Uterine prolapse
- Milk fever
- Ketosis
- Retained placenta
- Metritis
- Downer's cow syndrome



Haemorrhage

- Birth canal
- Rupture of tissue
- Broad ligament rupture

TX:

- Depended on degree
- Oxytocin

Uterus rupture

- High incidence in cattle and goat
- Fetopelvic disproportion

Diag: serosa, intestine, rumen

Tx: oxytocin

ABO

Uterine prolapse

- Post calving 2-3 days
- Old- cattle, calcium, ...

Diag: prolapsed of uterus

TX: decrease size

purse string fixation



Milk fever

- Calcium → 3-7 %
- Vit D
- Depress, anorexia, low temp, recumbency

Tx: slow calcium IV



Ketosis

- 2 wks PP
- Ketone bodies
- Milk drop.
- Feed drop.

TX: Dexamethasone, Propylene glycol

BCS management before calving

Retained placenta

- Retained fetal membrane
- Low Vit E, Se, D

TX: oxytocin within 24 hrs

Manual removal??

ABC=> OTC

Prevent: ADE, Se supplement 2 wks before calving



Metritis

- From retained fetal membrane
- Dystocia
- Vaginal discharge

Tx: OTC 1 g. infuse



Downer's cow syndrome

- Low mineral (calcium)
- Acute mastitis
- Obturator damage

Tx: Calcium

Supportive

Metric Conversion Table:

Tape Centimeters	Male Kilograms	Female Kilograms
15	21	23
15.5	24	25
16	27	28
16.5	29	30
17	32	33
17.5	35	35
18	38	38
18.5	40	40
19	43	43
19.5	46	45
20	49	48
20.5	52	50
21	54	53
21.5	57	55
22	60	58
22.5	63	60

could estimate the weight of calf during parturition by feeling its hoof and that the foot circumference size increased proportionately with birth weight.



Calfscale®

Table 2. Duration of different stages of labor in domestic animals

Species	First Stage	Second Stage	Third Stage (Placental expulsion)	Reference
Cow	4-24 hours (Bluish vascular semitransparent chorio allantois appears & rupture)	0.5-3 hrs (Amnion appears with the fetus. Fetus is delivered)	12-16 hours (After birth is expelled)	Duffy, 1973 Norman and Youngquist, 2007
Buffalo	1-12 hours	45-90 min	7-12 hrs	Dobson and Kamonpatana, 1986; Jainudeen and Hafez, 2000
Mare	1-12 hours	30 min	Within 3 hours	Haluska and Wilkins, 1989; Das and Tomer, 1997; Jainudeen and Hafez, 2000; Threlfall, 2007
Ewe/Doe	6-12 hours	0.5-1 hours	Within 3-6 hours	Braun, 2007; Greyling and van Niekerk, 1991; Menzies, 2007
Sow	12-24 hours	0.5-4 hours	After 2-3 piglets or 4 hrs post farrowing	Bazer and First, 1983; Cowart, 2007
Bitch	4-24 hours	1 st puppy within 2 hours of 2 nd stage of labor 5-60 min between puppies total time up to 24 hrs	After each puppy or within 2 hrs of last puppy	Long, 2006a; Jackson, 2004
Cat	2-12 hrs	1 st kitten within 5-60 min of labor subsequent kittens every 5-60 min.	Within 2 hrs of last kitten	Griffin, 2001; Long, 2006b
Dromedary Camel	3-48 hrs	5-80 min	Within 4 hrs	Elias and Cohen, 1986; Sharma, 1968; Musa, 1983

Thank you





Short-acting Corticosteroids

- Dexamethasone (20 mg) or flumethasone (10 mg) IM
- is about 80% - 90% effective when administered to cows within 2 weeks of full term.
- The interval from injection to parturition is about 48 hours (24-72 hours).
- The incidence of retention of the fetal membranes is estimated to be about 75%.



Long-acting Corticosteroids

- Dexamethasone trimethylacetate (20 mg) or Betamethasone suspension 20 mg) I.M.
- 30 days before term
- Parturition occurs about 15+8 days after injection and is associated with a lower incidence (9 to 22%) of retained fetal membranes .

Long-acting Corticosteroids

- high incidence of calf mortality (17 to 45%) that is thought to be associated with premature placental separation and/or uterine inertia, and the colostrums immunoglobulin concentration is reduced.
- Shorter calving patterns can be attained by injecting a short acting corticosteroid or prostaglandin 7 to 12 days after the long-acting injection. Most cows tend to calve 2 to 3 days later.



Prostaglandins

- PGF₂ alpha (Lutalyse[®]) (25 mg), Cloprostenol (Estrumate[®]) (500 ug) and other synthetic analogs I.M. injection.
- Calving occurs 24 to 72 hours later in 90-100% of cows treated.
- are effective even when the fetus/placenta is not viable. Calf viability is good if given less than 2 weeks prior to term.
- The incidence of retained fetal membrane is similar to the short acting corticosteroids.
- Higher incidence of dystocia than with the corticosteroids.

Corticosteroid-Prostaglandin Combination

- With this combination, calving occurs sooner than for either drug alone (34.6±1.4 hours).
- The incidence of retained fetal membranes is equally as high as when each drug is used alone.
- 500 ug cloprostenol I.M. or 25 mg PGF₂ alpha (lutalyse[®]) I.M. and 25 mg. dexamethasone I.M.
- The advantages may be outweighed by the cost.

Table 1: Interval from induction to calving, calving to placental release and incidence of retained placenta

Group	n	Induction to calving (hours)	Placental release (hours)	Retained placenta (%)
I OPT	45	–	23.2 ± 8.7 ^{ab}	11
II OPT-DEX	8	34.1 ± 2.6	57.6 ± 33.9 ^{bc}	25 ^a
III OPT-DEX + CLO	8	28.3 ± 0.8 ^a	30.2 ± 23.4 ^{ab}	13 ^a
IV DEX + CLO	24	38.1 ± 2.2 ^b	105.8 ± 19.9 ^c	79 ^b
V Control	36	–	13.6 ± 5.9 ^a	6 ^a

Values within columns with different superscripts are significantly different (p<0.05)

OPT = opticortenol, dexamethasone trimethyl acetate

DEX = dexamethasone

CLO = cloprostenol

Table 3: The effect of the day of dexamethasone plus cloprostenol (DEX+CLO) treatment following triamcinolone (TRI) pretreatment (1 mg/60 kg BW) on day 270 on the intervals (h) from DEX+CLO to calving, calving to placental release, and the incidence of retained placenta

Group	n	Day of DEX + CLO	DEX + CLO to calving (h)	Placental release (h)	RP (%)
Ia*	24	275	30.4 ± 0.9	43.4 ± 13.4 ^{bc}	29 ^b
Ib**	1	–	–	6.0	0
IIa*	21	276	30.8 ± 1.0	68.4 ± 19.4 ^c	33 ^b
IIb**	6	–	–	7.7 ± 1.2	0
IIIa*	19	277	29.3 ± 1.0	22.2 ± 9.8 ^{ab}	11 ^{ab}
IIIb**	7	–	–	9.8 ± 1.8	0
Control	24	–	–	6.1 ± 0.8 ^a	0 ^a

Means and percentages within a column with different superscripts are significantly different (P<0.05)

* Cows that calved 24 to 48 h after DEX+CLO

** Cows that calved early (prior to or < 24h after DEX+CLO)

h = hours BW = body weight RP = retained placenta



Short-acting Corticosteroids and Estrogens Combinations.

- 20-25 mg estradiol I.M. and 25 mg dexamethasone I.M. tends to shorten the average interval to calving
- reduces the incidence of induction failures.
- procedure decreased the incidence of retained fetal membranes.???
- Estrogens produces residues in milk which limits the use of this method in dairy cattle.

Induction of Parturition in Ewes

- Dystocia due to feto-pelvic disproportion is not common.
- may be used in the management of ewes with pregnancy toxemia.
- 16 mg dexamethasone I.M. injection within 5 days of term, result in normal parturition in 2 to 3 days.
- two I.M. injections of 1-2 mg of estradiol benzoate (EB) 5 to 6 days before term or single injection of 15 mg EB 5 days before term. - dystocia, poor lamb survival.



Advantages

- Improved kid survival, especially in severe weather
- Reduced kid and doe mortality because of better observation by the owner and earlier intervention in cases of dystocia.
- increased predictability of the time of parturition.
- Increased ability to obtain kids free of colostrum and with minimal contact with the mother.
- This is important in disease control e.g. caprine arthritis encephalitis and mycoplasma.



Induction of Parturition in Goats

Disadvantages

- Owner reluctance to interfere with the normal process.
- Increased responsibility on the owner to keep accurate breeding records and to guarantee no subsequent breedings, accidental or otherwise.

Induction of Parturition in Goats

Procedure

- Prostaglandin (5 to 10 mg PGF₂ alpha or 62.5 to 125 ug cloprostenol) at 144 days of gestation results in delivery between 27-35 hours after injection.
- 20 mg dexamethasone produces delivery in 1-2 days

Possible factors responsible for initiation of parturition

Physical factors

- Increase in fetal size
- Uterine distension
- Fatty degeneration of placenta & presence of infarcts

Uterine stretch theory

(Theory of limited capacity of the uterus)

Placental aging theory

Biochemical factors

- Increase in CO₂ tension in maternal blood due to increased fetal activity
- Release of fetal antigens serotonin

Utero-placental insufficiency

Neuro-endocrine factors

- FETAL factors
- Maternal Factors