

Fig.42 The changes of reproductive tracts in normal estrus cycle

Estrus Stage	Day 0	2	4	6-7	9-10
Ovary					
Uterus					
Size	1.5 - 2.5	1.5 - 2.5	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Shape	Circle - Semi Circle	Circle - Semi Circle	Circle - Semi Circle	Circle - Semi Circle	Circle - Semi Circle
Contraction	# - ##	+ - #	+	+	+
Thickness	# - ##	+ - #	+	+	+
Inner Feeling	-	-	-	-	-
Cervix	Swelled, Open	Open	Closed	Tightly Closed	Tightly Closed
Vagina	Congested, Glossy	Mucous, Bleeding	Dried Mucosa	Dried Mucosa	Little Wet
Vulva	Swelled, Deep Wrinkle	Deep Wrinkle	Shriveld, Small Wrinkle	Small Wrinkle, Shriveld	Small Wrinkle, Shriveld
	12-14	16-17	19-20	21 (0)	
Ovary					
Uterus					
Size	1.5 - 2.0	1.5 - 2.0	1.5 - 2.5	1.5 - 2.5	
Shape	Circle - Semi Circle	Circle - Semi Circle	Circle - Semi Circle	Circle - Semi Circle	
Contraction	+	+ - #	+ - #	# - ##	
Thickness	+	+ - #	+ - #	# - ##	
Inner Feeling	-	-	-	-	
Cervix	Tightly Closed	Little Swelled	Swelled, Open	Swelled, Open	
Vagina	Dried	Dried	Congested, Clear Mucous	Congested, Glossy	
Vulva	Small Wrinkle, Shriveld	Deep Wrinkle	Swelled, Deep Wrinkle	Swelled, Deep Wrinkle	

6. Pregnancy Diagnosis

6-1 Anatomy of Pregnancy

After the fertilization, the embryo will enter to the uterus from the oviduct (Day5).

After the development (Ref. to Fig. 16), at Day9-10 the blasocyst will hatch as Fig.43.

Fig.43 Hatching Blastocyst

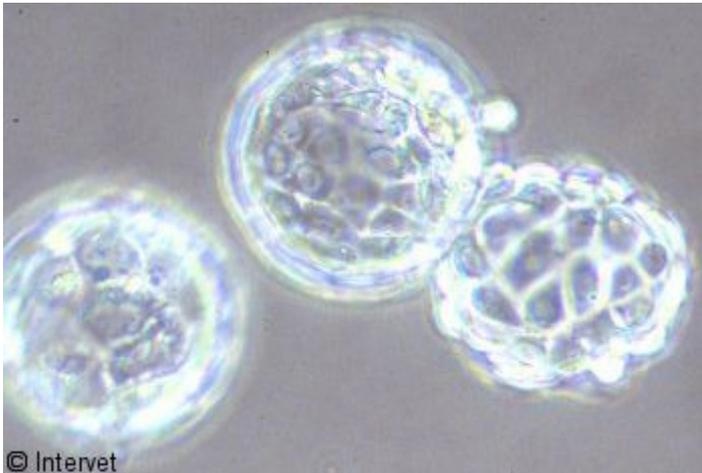
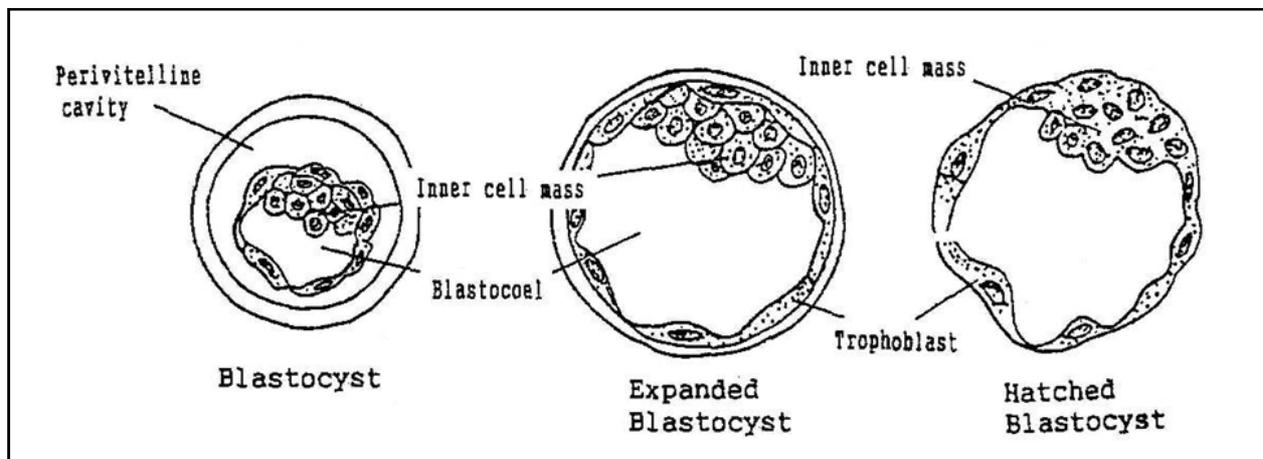


Fig. 44 Anatomy of Embryo



In blastocyst stage, the differentiation of the embryonic cells has already started. The Inner Cell Mass will become fetus, and the Trophoblast will be placenta. After the hatching the embryo will have a longer shape (elongation), and at about Day30 the implantation will occur. However the formation of placenta will start about Day40. After the implantation the amnion is formed around the fetus, then the fetus is protected by the double bags.

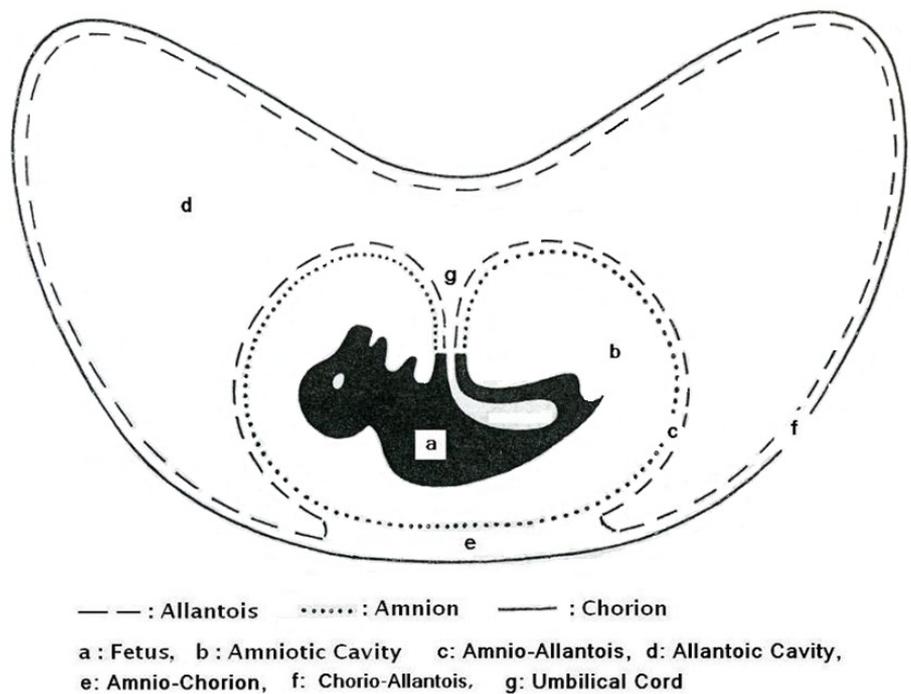
Fig. 45 (Elongated embryo: Day 14)

Day 30 Fetus

Placenta not yet formed.



Fig. 46 Anatomy of the Fetus



The structure and type of the placenta is different among animal species as follows

Type of Placenta	Animal
Diffuse, epitheliochorial	Horses and pigs
Cotyledonary, epitheliochorial	Ruminants (cattle, sheep, goats, deer)
Zonary, endotheliochorial	Carnivores (dog, cat, ferret)

Discoid, hemochorial

Humans, apes, monkeys and rodents

Fig. 47 Different types of Placenta

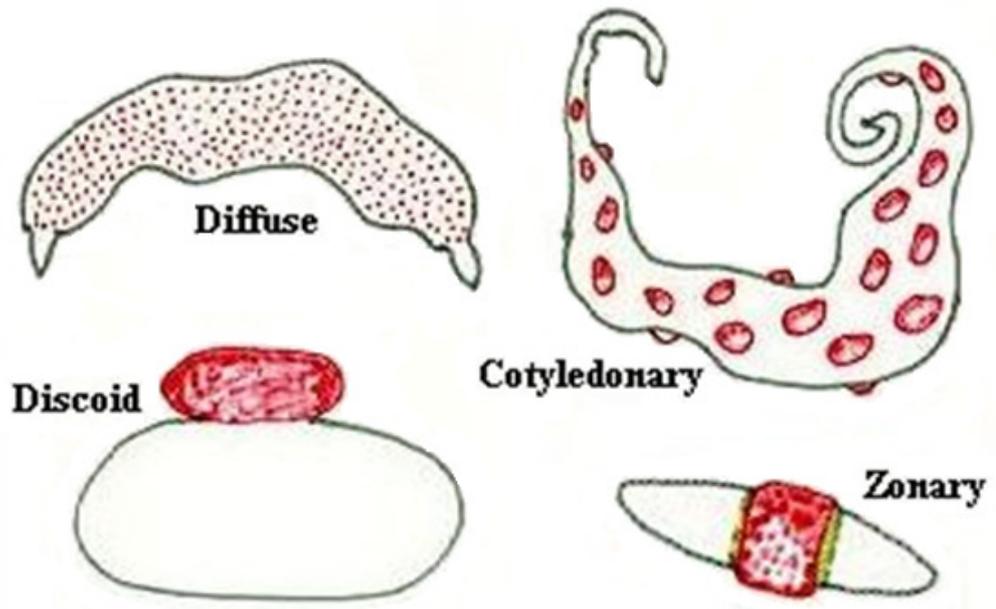
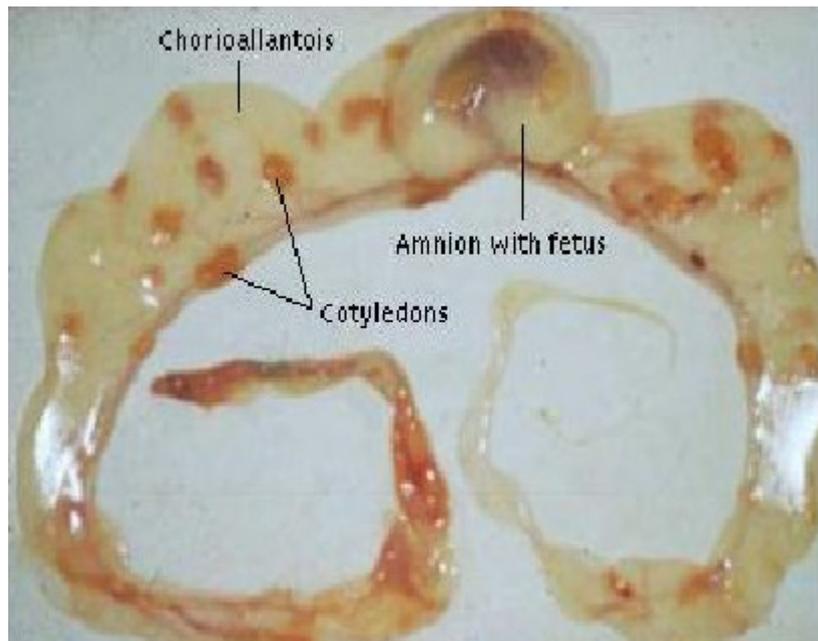


Fig. 48 Day 40 Fetus

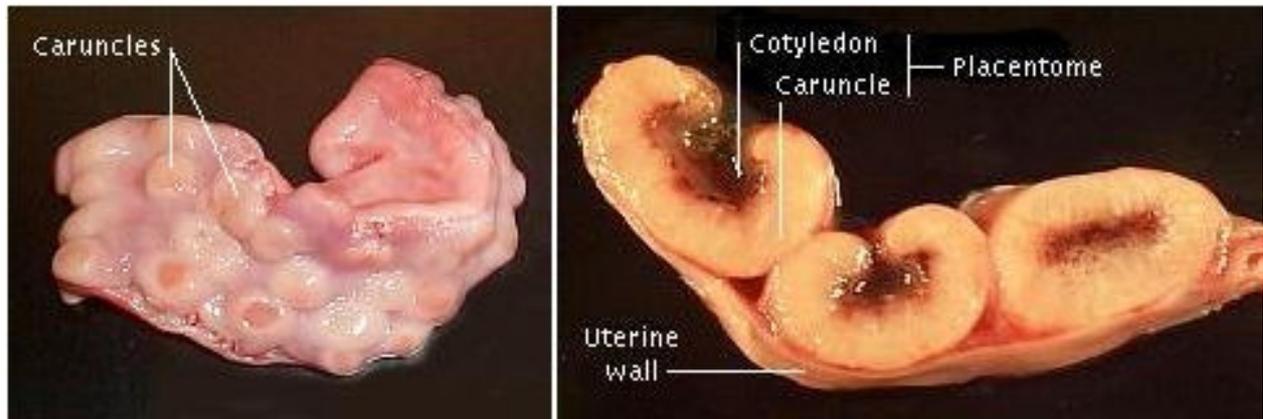
Placenta started to form.



As we can see in Fig. 49, Cattle's placenta, the placentome is a combination of mother-side placenta (caruncle) and fetus-side placenta. The palpation of placentome become possible from Day75.

Caruncle: Maternal side } Placentome
Cotyledon: Fetus side }

Fig.49 Ruminant Placentome (sheep)



6-2. Importance of Early Pregnancy Diagnosis

The early pregnancy diagnosis is important because of the following reasons

- More calving number during the life-time of cows
- More Milk Production
- Too long drying period causes pre- & post- calving disease
- “Early Diagnosis, Early Treatment”

Optimum Calving Interval = 365 days

To achieve this, cows should be mated and become pregnant at 85 days after calving.

6-3 Methods for Pregnancy Diagnosis

There are several methods to diagnose pregnancy of cattle. However, still the rectal palpation is the choice of the method because of its cost and practicality.

Estrus Detection “Non-Return”(estimation only)

Rectal Palpation

Ultrasonography

Milk or Plasma Progesterone

The following table shows the comparison of these methods, how early the method can be conducted, diagnosis accuracy and cost. We can realize that the accuracy of the rectal palpation especially for positive cattle is very high.

Comparison of Early Pregnancy Diagnosis Techniques

Technique	Early testing	Diagnosis Accuracy		Cost
		-ve	+ve	
Rectal palpation	+	+++	++++	+
Transrectal ultrasound	++	++++	++++	++++
Milk progesterone	+++	++	+++	+++
Early Conception Factor	++++	+	+	?

As the fetus is growing everyday, the examining points also changed depending on the fetus's age. The following changes should be kept in mind when you check the female.

Changes of Uterine Position, Size and Palpable structures

Days of Gestation	Uterine Position	Uterine Diameter	Palpable Structures
35-40	Pelvic floor	Slightly enlarged	Uterine asymmetry /fetal membrane slip
45-50	Pelvic floor	5.0 - 6.5 cm	Uterine asymmetry /fetal membrane slip
60	Pelvis	6.5 - 7.0 cm	Fetal membrane slip /abdomen
90	Abdomen	8.0 - 10.0 cm	Small placentomes /fetus (10-15 cm long)
120	Abdomen	12 cm	Placentomes /fetus (25-30 com long) /fremitis
150	Abdomen	18 cm	Placentomes /fetus (35-40 cm long) /fremitis

Also the following is a simple calculation method of fetus body length. In case there were aborted fetus, we can know when the fetus was dead.

<u>Estimation method of Fetus Body Length</u>	
Gestation period (mth.)	Fetus Body Length (cm)
A	$A \times (A + 1-2)$ cm
2	$2 \times (2 + 1-2) = 6 - 8$ cm
3	$3 \times (3 + 1-2) = 12 - 15$
4	$4 \times (4 + 1-2) = 20 - 24$
5	$5 \times (5 + 1-2) = 30 - 35$

6-4 Diagnosis by Fetal Membrane Slip

Fetal Membrane Slip is the diagnosis method used for more than Day30 of pregnancy. To conduct this method for early pregnancy diagnosis (Day30-40), The uterus should be lifted-up and reversed (Fig.51)(Ref. to 4. Rectal Palpation Method).

Fig.50 Fetal Membrane Slip

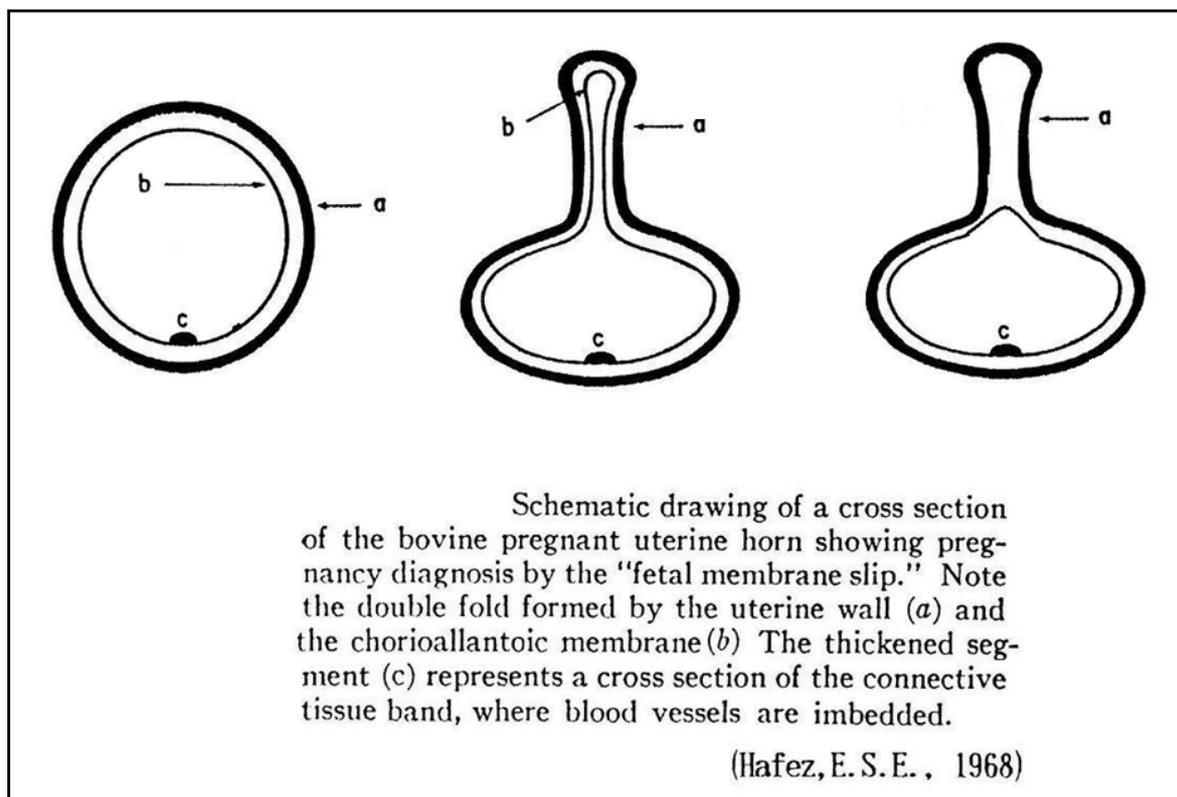
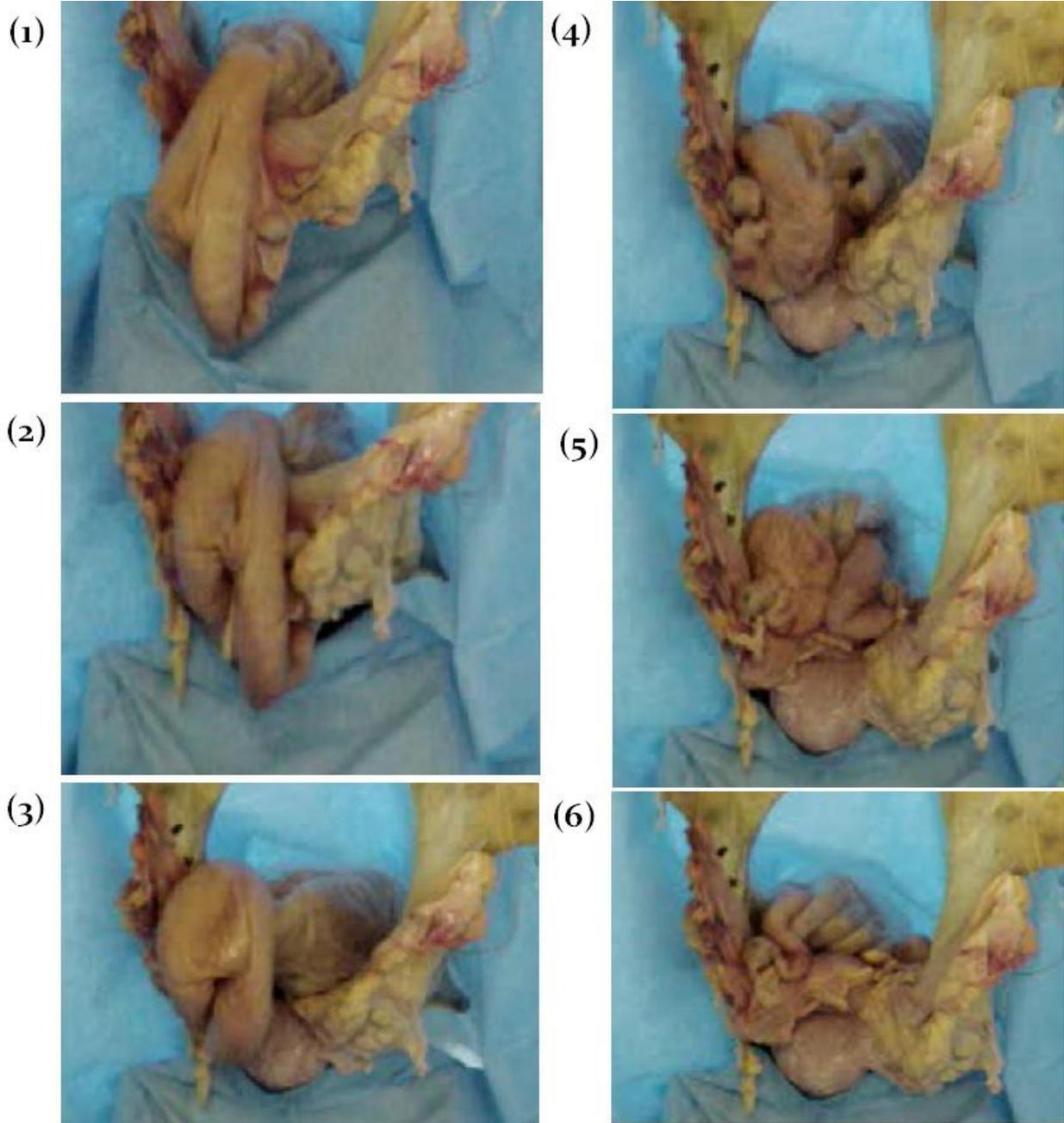


Fig. 51 Lift-up & Reversion of Uterus



- (1)-(3): Lift-up of the uterus from abdominal cavity to pelvic cavity
- (4): Reversion of Uterus (the forefinger is inserted into the bifurcation)
- (5): Reversion of Uterus (both horn are lifted-up and reversed)
- (6): Now easily palpated at the tip of horn.

Fig. 52 Fetal Membrane Slip

(1) The thumb and forefinger are surrounded around the horn.

(2)-(3) Slowly move the fingers across the horn

(4) Fetal membrane (Amnio-Chorion) was slipped out from the fingers.



Slipped-out membrane

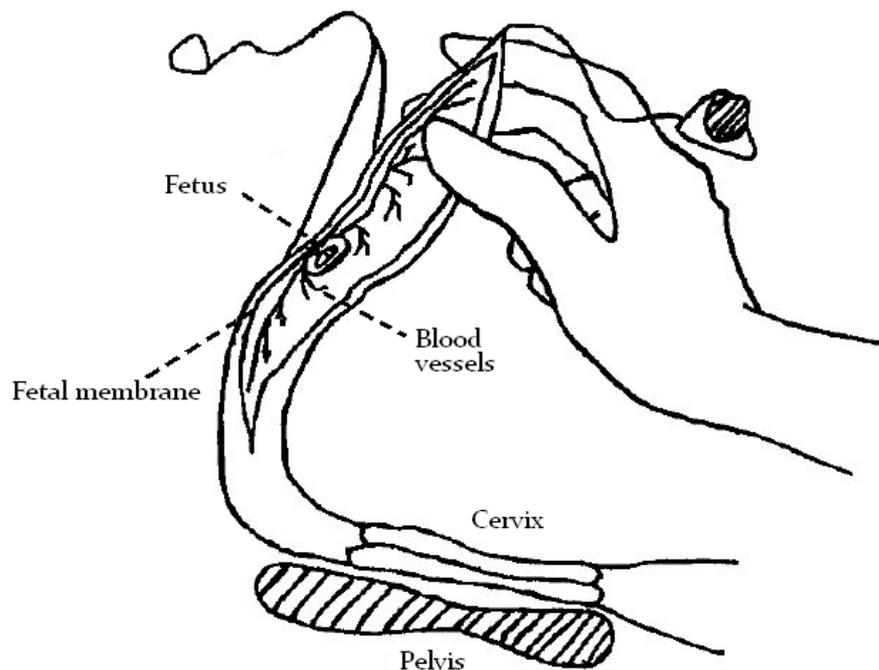
(Palpating sites for fetal membrane slip in early pregnancy diagnosis)

The palpation site for the fetal mambrane slip is different according to the fetus's age. In less than 40 days the membrane slip can be felt only in the pregnant horn, but after 40-45 days theslip can be felt in non-pregnant horn. For a skilled technician, the pregnant diagnosis is possible at 30 days, if the uterus can be fully lifted-up and reversed.

Palpation site

30-40 days	The tip of the pregnant horn
>40-45 days	Just after the bi-furcation in the un-pregnant horn

Fig.53 Palpation site for Fetal Membrane Slip (Day 30-40 days)



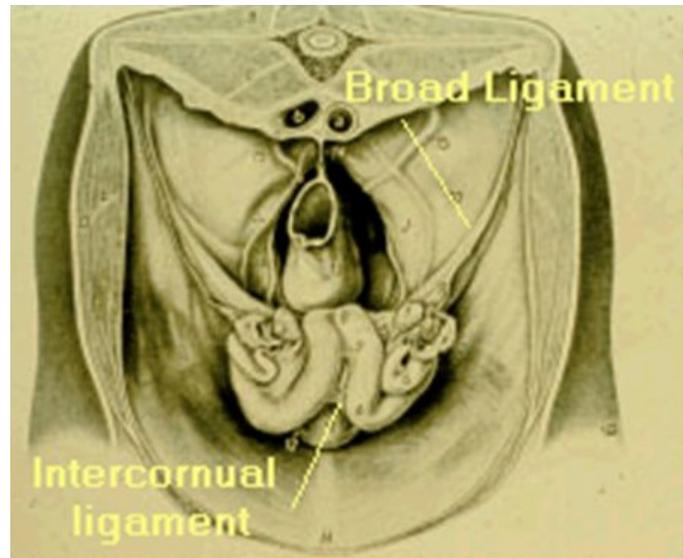
6-5 Fremitus

There is also a symptom in pregnant cattle, called “Fremitus”. Fremitus can be felt because of the hypertrophy of Middle Uterine Artery. There is a fluid turbulence that gives a 'buzz' feeling, or a kind of vibration to the artery. Middle Uterine Artery is located in the broad ligament (Fig.54). Because the symptom appears in Day120 pregnancy, there is no

use for the early pregnancy diagnosis. However, the fremitus can be used for the checking of the viability of fetus. When the fetus died in the uterus, the fremitus become very weak.

Fig. 54

The location of Broad Ligament



6-6 Checking order of Pregnancy Diagnosis

(1) Palpate the whole uterus (except the tip of the horns).

Is there any difference of their sizes? (Asymmetry, Fig.55)

(2) Check the ovary

Is there CL? and which side?

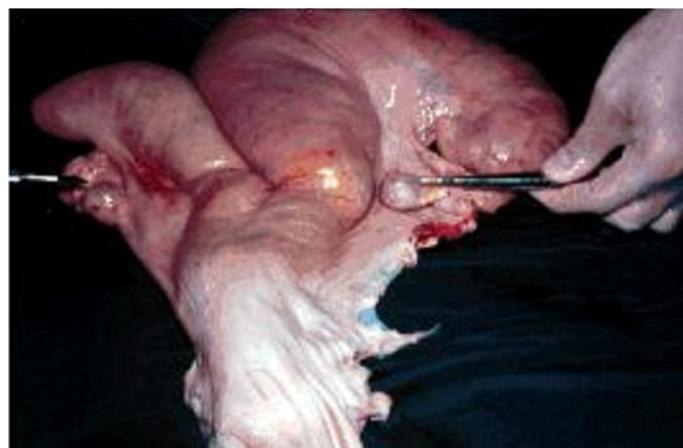
(3) (Day 30-40) The uterus is lifted-up and reversed, & check Fetal Membrane Slip in supposedly pregnant horn

(Day 40-90) Check Fetal Membrane Slip in supposedly un-pregnant horn.
After Day75 the placentomes can be felt

(Day 90-120) Fetus can be felt. Check the placentomes

(>Day 150) Because the fetus will drop down deeply to abdominal cavity, the Fetal Membrane Slip or checking of the fetus and placentomes become difficult.
Check the fremitus.

Fig.55 Asymmetry of Uterus



Usually the pregnant horn and CL are the same side, but very rarely the inconsistency might happen as Fig.55. This is considered that the migration (movement) of early embryo had happened.

Fig.56 Inconsistent sites of CL and Pregnant horn



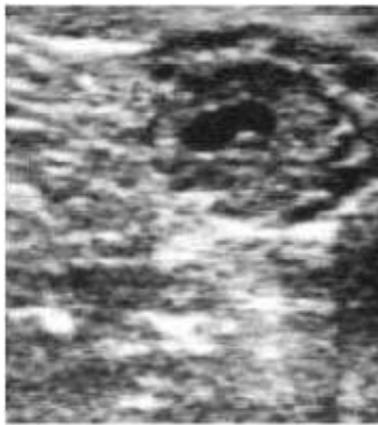
6-7 Pregnancy Diagnosis by Ultrasound

The ultrasound machine is a very useful tool as reviewed in Chap.2.4. The following table shows what kind of characteristics (signs) can be seen by ultrasonography according to the gestation period.

Characteristic	First day detected	
	mean	range
Embryo proper	20.3	19 to 24
Heart beat	20.9	19 to 24
Allantois	23.2	22 to 25
Spinal cords	29.1	26 to 33
Forelimb buds	29.1	28 to 31
Amnion	29.5	28 to 33
Eye orbit	30.2	29 to 33
Hindlimb buds	31.2	30 to 33

Placentomes	35.2	33 to 38
Split hooves	44.6	42 to 49
Foetal movements	44.8	42 to 50
Ribs	52.8	51 to 55

Fig.57 Pregnancy Diagnosis by Ultrasonography



25 Day Pregnancy



30 Day Pregnancy



35 Day Pregnancy



43 Day Pregnancy



50 Day Pregnancy



100 Day Pregnancy

7. Peri-parturient Disease

There are many diseases in dairy cattle pre- and post- parturition stage. Because during the gestation and calving the cow has to have a large hormonal change inside her body and in some period suffer a low immunity condition. Also, in dairy cattle, the calving means the start of lactation. The lactation causes a large amount of energy requirement, then most of the dairy cattle fell in “Negative Energy Balance”(Fig.58). These conditions will be the direct or indirect causes of many peri-parturient diseases.

These diseases are important not only for the immediate milk production but also for the later reproduction.

The following peri-parturient diseases can happen around the calving.

Related to Gestation and Calving

Uterine Torsion

Uterine Prolapse, Vaginal Prolapse, Calving Injuries

Retained Placenta,

Metabolic Disease

Milk Fever, Downer syndrome

Ketosis, Acidosis

Abomasum Displacement

Infectious Disease

Puerperal Fever, Endometritis, Mastitis

Fig.58

Changes in energy balance (in MJ/d) in early and mid-lactation. (Source: Ferguson 1991)

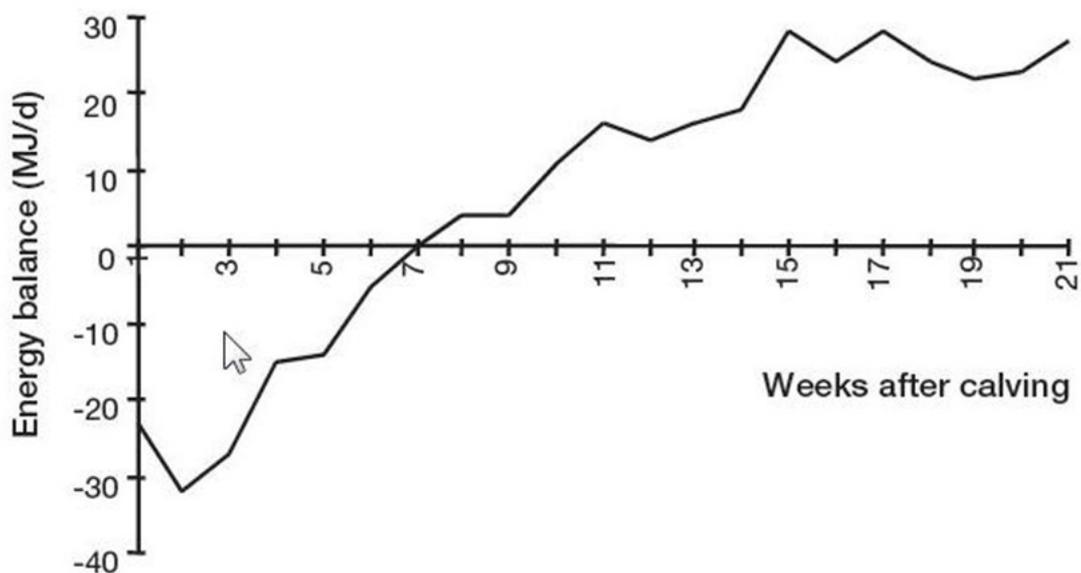
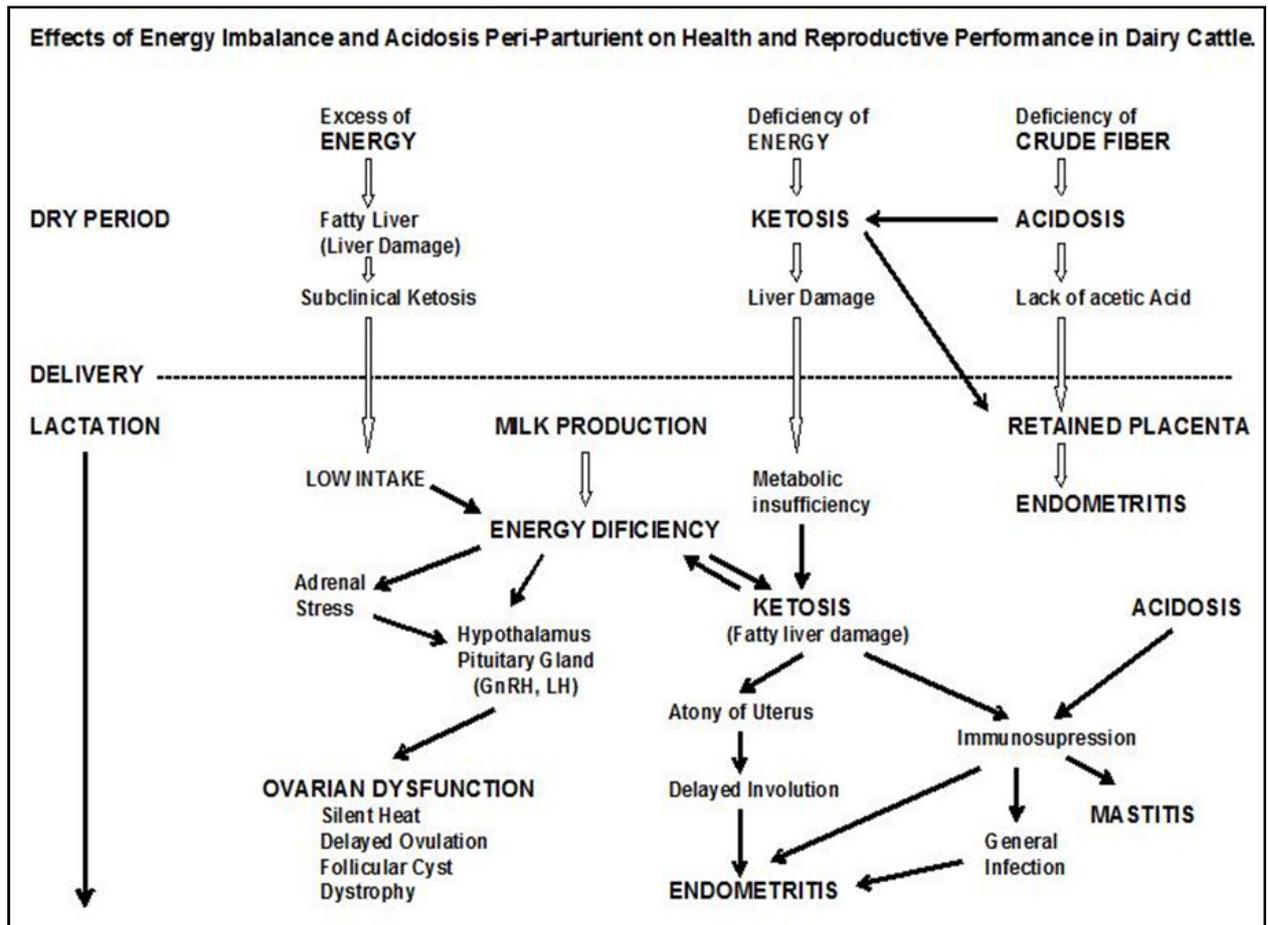


Fig.59



7-1 Negative Energy Balance and Reproductive Disorders after Calving

Fig.59 shows that the energy imbalance (deficiency and excess) and the deficiency of crude fiber from dry period to after calving will cause not only the metabolic diseases (Milk Fever, Ketosis, Mastitis, Acidosis, etc.) but also many kinds of reproductive disorders (Ovarian Dysfunction, Follicular Cyst, Silent Heat, Endometritis etc.) .

7-2 Major peri-parturient diseases

7-2-1 Uterine Torsion

Uterine torsion usually occurs near term and is found at start of parturition. If the cow shows very restless behavior or abdominal pain, you'd better suspect this disease. This condition is assumed to be occurred because of loosening of uterine attachment or the manner that the cow rise and sit.

(Clinical signs) • Delayed calving

- Restless behavior at calving
- Abdominal pain

(Diagnosis) • Check of the cervix by palpation or vagina scope

(In case of uterine torsion, we cannot touch or see the cervix and the vagina wall near the cervix is also twisted)

- By rectal palpation we can find out the twisted uterus and crossed broad ligaments.
- Sometimes the vulva is also slightly twisted.

* During the diagnosis it is important to determine the direction of the torsion.

- (Treatment)
- Manual correction of the fetus position
(in case the torsioned angle is less than 90 degree and the fetus can be reached.)
 - Rotation of the cow's body
(Make the cow's body lie down making torsioned side below, and rotate the body to same direction of the torsion.)
 - Caesarian section
(in case the torsion angle is 180 to 270 degree, and the cervix cannot be reached at all.)

7-2-2 Prolapse of Vagina or Uterine

Prolapse of vagina or uterine can occur usually after calving maybe because of excessive labouring for the delivery. Some factors may affect as predisposition of the diseases. These are uterine atony, hypocalcemia, lack of exercise before calving, sitting position with lower hindquarters, and the heredity.

Hinh 61. Vaginal prolapse



Hinh 62. Uterine Prolapse



(Treatment)

- Manual correction

The prolapsed tissue should be carefully cleaned before the correction, because they are often dry, necrotic and fragile.

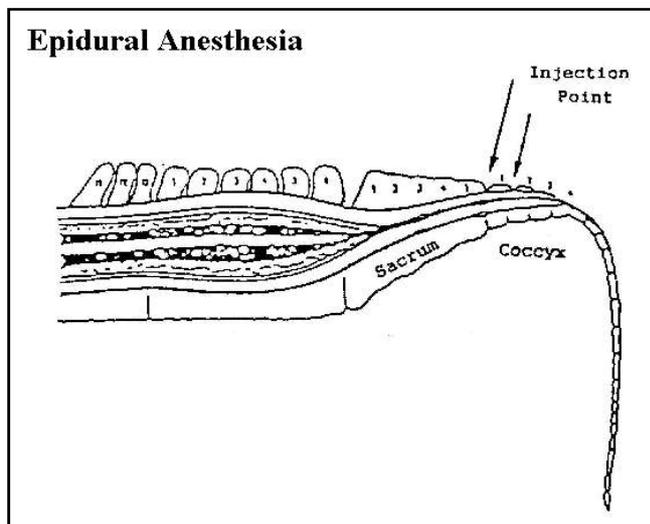
In case the labouring is too strong, applied the epidural anesthesia. (Hinh 63, 5ml of Novocaine)

After the correction, putting 5-10 liter of normal saline inside uterus will be helpful.

- Suturing of Vulva

When the prolapse was easily recurred, the suturing of vulva using a kind of tape is recommended (Hinh 62). The tape should be removed as soon as possible after it become sure that the prolapse will not be repeated.

Hinh. 63



* Epidural Anesthesia can be widely applied as a local anesthesia for reproductive organ and hind part of the body. The injection needle should be put between the vertebral bones.

Hinh 64. Suturing of Vulva by tape



7-2-3 Retained Placenta

Although there are many factors to cause Retained Placenta, the real cause has not yet been cleared. These factors include, the local infection at the placenta, the deficiency of Vitamine (possibly vitamine A), lower contraction of uterus at calving, not-enough exercise of cow during dry period etc.

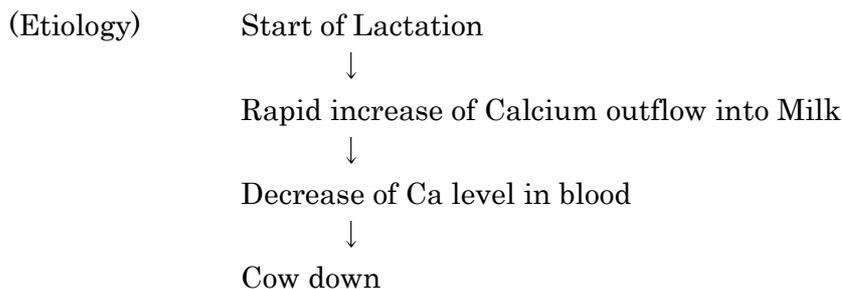
(Treatment)

- Manual removal is not recommended, because this operation causes injuries of endometrium of uterus and always Endometritis will occur. If there is no other abnormality, no treatment is necessary.
- Some part of the outside placenta can be cut, but don't cut too much, some part of the placenta should be outside.
- Be careful for the general condition of the cow, such as her appetite, milk quality and body temperature. In case the cow shows high body temperature, Puerperal Fever, Endometritis or Mastitis might be the cause. Intra-uterine infusion of antibiotics is helpful together with intra muscular injection of antibiotics, if it is considered that the infection occurs in uterus.

7-3 Major metabolic diseases

7-3-1 Milk Fever (hypocalcemia)

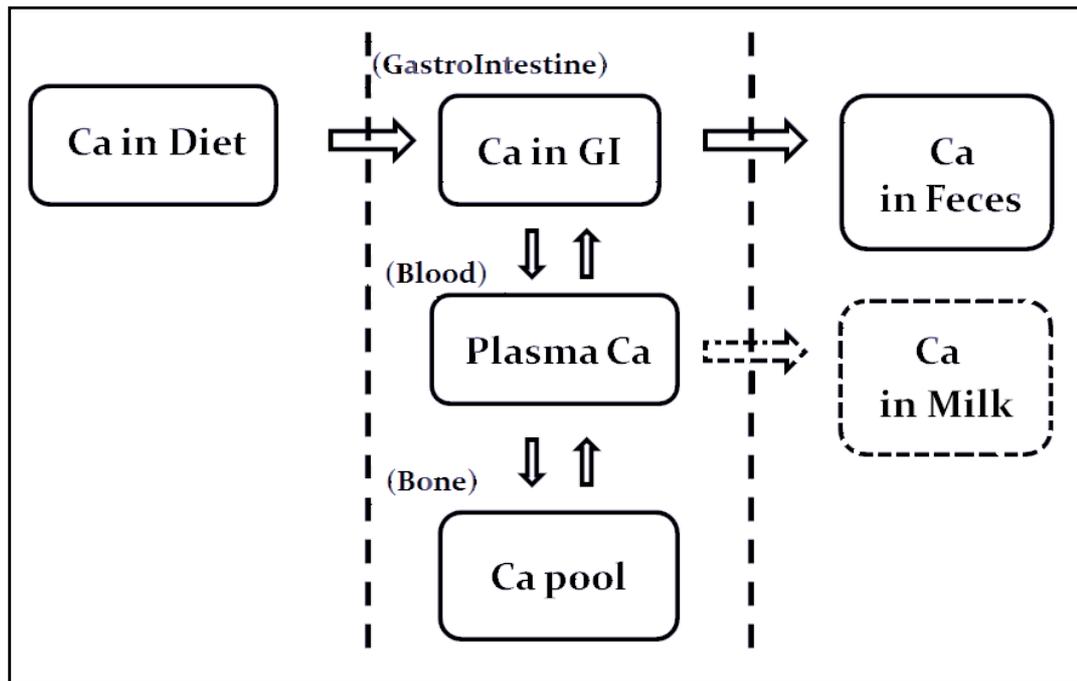
- (Clinical signs)
- Cow lie down (cannot stand up)
 - Low body temperature
 - Cold skin
 - Flaccid muscle



* Ca has an important role for contraction of muscle.

Ca metabolism inside the cattle body is considered as Fig.60. Usually cattle food contains enough amount of Ca, and the excess will be discharged into feces. If the deficiency of Ca occurred, Ca will be mobilized from bone, which will work as Ca reservoir. When milk fever occurs, this Ca mobilization system might not work well.

Fig.65 Ca Metabolism in Cattle



(Prevention)

- Low Calcium Diet for Dry Cows
 - High Ca \Rightarrow decrease Ca mobilization from bone
 - Low Ca \Rightarrow promote Ca mobilization from bone
 - * Low Ca diet before calving makes more efficient absorption of Ca from intestine possible
- Vitamin D injection before calving
(promote the Ca absorption from intestine)
- Ca administration at calving
- DCAD (dietary cation-anion difference)
It is necessary to know the mineral levels in all foods.
- Low potassium (K) level food before calving

(Treatment)

- Ca gluconate (iv) 500 ml x 2-3 times
- Vitamin D (supportive)

In case no good result is obtained by Ca injection, other diseases such as below should be checked.

- Downer syndrome
- Injuries at calving ?
- Mastitis ?
- Skeletal Muscle disorders ?

7-3-2 Ketosis

(Clinical Signs)

- occurs from calving to 6-8 weeks
- Low Appetite (esp. concentrate)
- Milk Production decrease
- Firm dry feces
- Odor of ketones on breath
- Neurologic signs
depression, salivation, gnash, ataxia, disturbed vision

(Etiology)

- Rapid increase of Milk Production



Negative Energy Balance



Mobilization of Body Fat



Production of Ketone bodies

- Too high protein diet
too much production of butyric acid in rumen
↓
Ketone bodies
- Secondary onset
after Mastitis, Abomasal Displacement, Milk Fever,
Retained Placenta etc.

(Diagnosis)

- Detection of ketone bodies in urine (by urine check paper stick, Fig.61)
- Diagnosis is easy. But, sometimes the ketosis might be the secondary case. Careful check is necessary whether another disease exists.

(Treatment)

- 30-50% glucose, 500 ml, (iv)
- Dexamethadone 10 ml, (im)
(in case of mastitis, together with antibiotics)
- Glucose precursor (oral)
Glycerol
Propylene glycol
Sodium propionate

Magnesium propionate

(Prevention)

- Keep good feeding management during dry period.
- Early reproduction
(late reproduction \Rightarrow long dry period)
- Smooth transition from dry cow ration to lactating ration.
- Prevention of other periparturient diseases
(hypocalcemia, retained placenta, metritis, displaced abomasum etc.)

Fig. 66 Urine examination
paper stick



7-3-2 Abomasum Displacement

“Abomasum Displacement” is abnormal movement of Abomasum (the fourth stomach). The abomasum move either left-side or right-side upward (Fig. 62). Usually the right-side displacement is more severe.

(Clinical Signs)

- Usually occur within one month after calving
- low appetite
- body temperature - normal or low

- passage of feedstuffs become difficult ⇒ "putty-like" feces
- Ketosis as a secondary disease

(Etiology)

- Abdominal space after calving
- Low fiber, high grain intake
- Too long dry period ⇒ high BCS

(Diagnosis)

- "pinging" sound using a stethoscope

(Treatment)

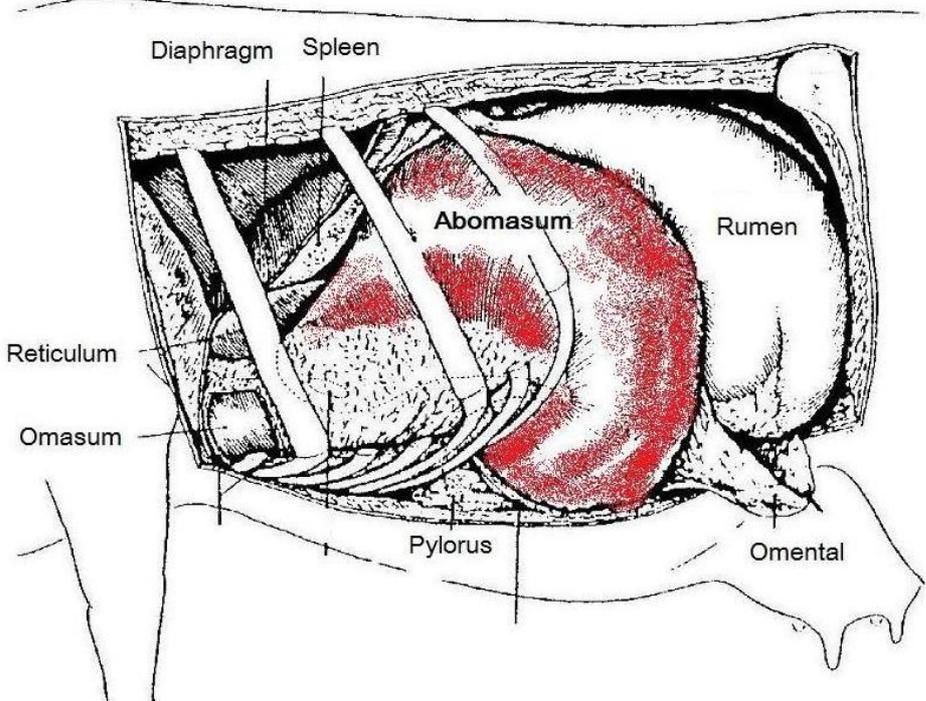
- Rolling the body (left-side displacement)
- Surgical operation

(Prevention)

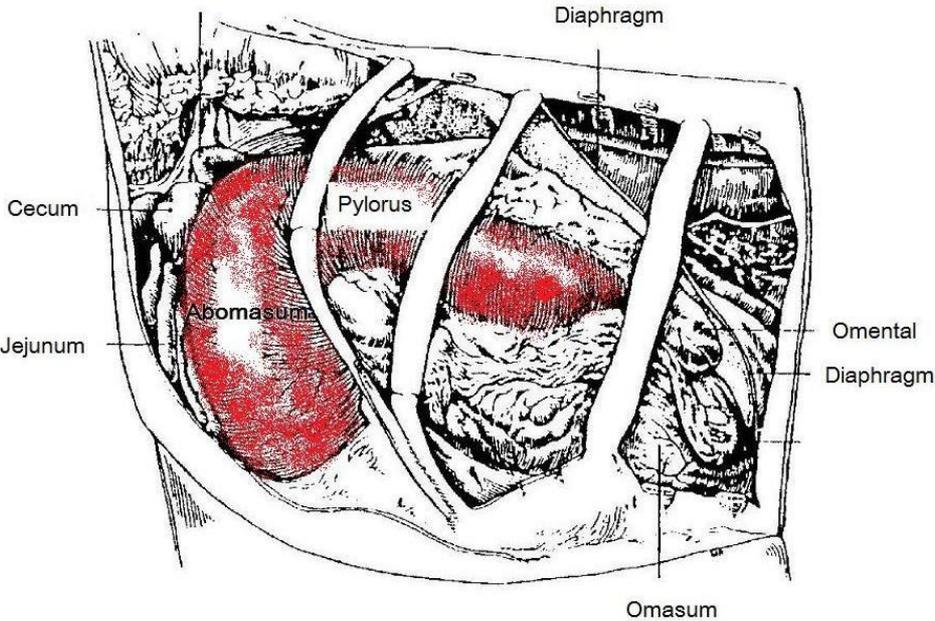
- Same as Ketosis prevention
- Enough Dry Matter Intake before and after calving

Fig.67 Abomasum Displacement

Abomasum Displacement (left)



Abomasum Displacement (right)



8. Calving Process & Assistance

8-1 Calving Process

To obtain a healthy calf is the final target of the reproduction. Therefore the special attention is necessary for mother and born calf. At first we have to learn about the normal calving process, then we can know if there is abnormality in the calving.

(1) Pre-symptoms of Calving

As the time of calving come near, the mother cow will show pre-symptoms for the calving as follows:

- Swelling of Udder
- Enlargement & Relaxation of Vulva
- Relaxation of Sacro-sciatic ligament
- Start of Cervix Dilation
- Body Temperature Change

Fig.68 Body Temperature Change and Calving Time

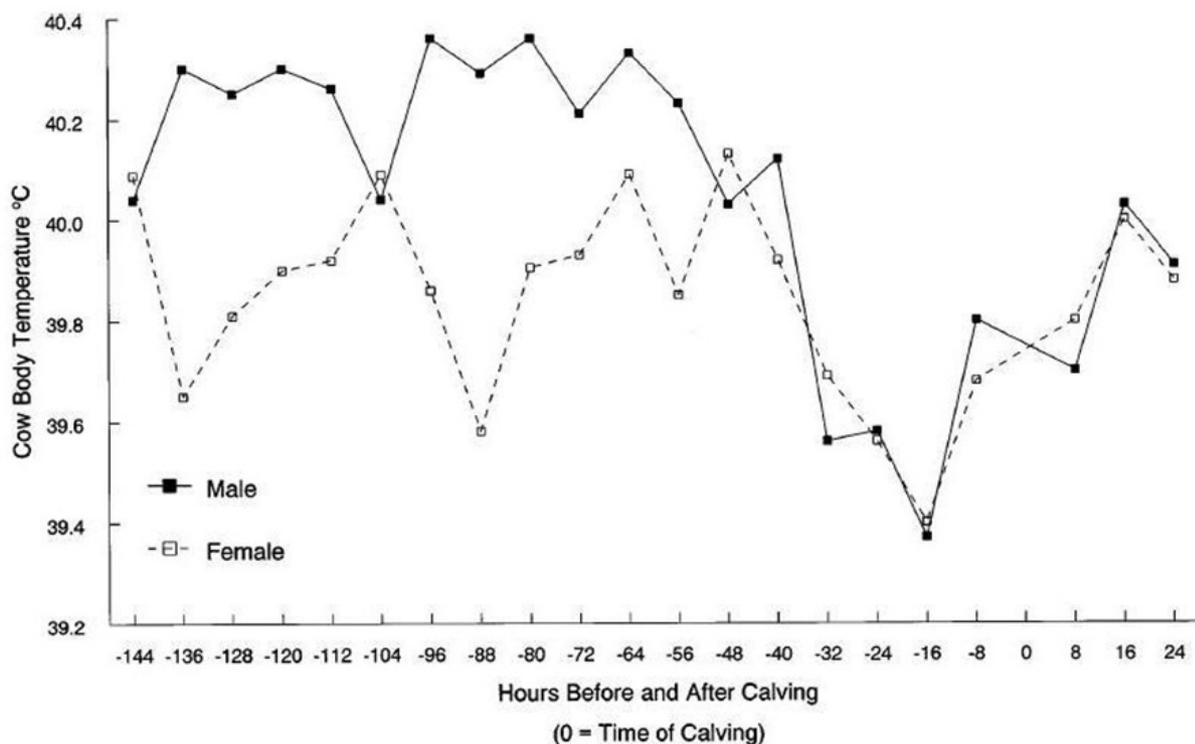


Figure 4. Least squares means of body temperature before calving (SEM = .21) as affected ($P < .01$) by sex of calf from 144 to 56 h before calving (females, $n = 4$; males, $n = 3$).

M. A. Lammoglia et al., J. Anim. Sci. 1997. 75:2526-2534

Especially, the body temperature change will be a good tool to predict the exact time of calving. Fig.63 shows the relation of the calving time and the body temperature

change. We can see that the temperature starts to drop down from 36 hr. before calving and becomes the lowest at 16 hr. before. Therefore if the temperature increases again from the lowest, the calving will be several hours later. We need to check the body temperature for 8hr. interval (shorter interval is better). As this change is according to the Progesterone level change, we can predict the calving time with quite accuracy.

(2) Normal Calving Process

The calving process is divided to three stages until the placenta is expelled as below:

Stage 1: 2 to 6 hours (longer in heifer)

- Labor starts (clearer in heifer) (Fig.64)
- Watery discharge from vagina increases (water sac expelled) (Fig.65)
- Uterine contraction starts (15 min. → 3 min interval)
- Fetus rotates to upright position
- Cervix starts to open.

Stage 2: 1 to 2 hours (longer in heifer)

- Starts after the cervix is fully opened.
- Fetus enters the birth canal. (Fig.66)
- Second water sac (amniotic sac) can be seen. (Fig.67)
- Abdominal press accompanies the uterine contraction.
- Cow usually lie down.
- Calf's head and both forelegs coming out together.
- During the expulsion, the umbilical Cord will broken.
- The calf starts to breath.
- Calf delivery completed.

Stage 3: Normally 2 to 8 hours after calving,

- Placenta is expelled. If not expelled, it is considered as "Retained Placenta".

(Be careful for the cow not to eat it.)

Fig. 69 Labor Starts



Fig.70 Water Sac Expelled



Fig.71 Calf at Stage 1

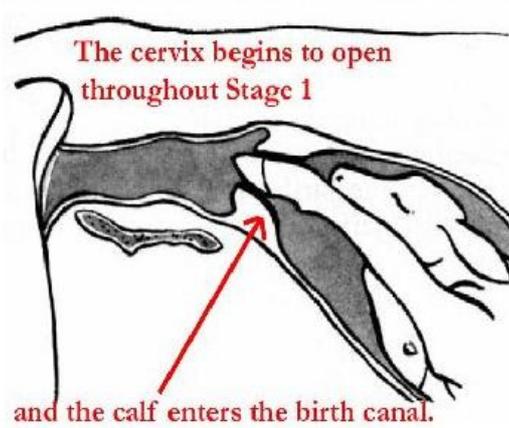
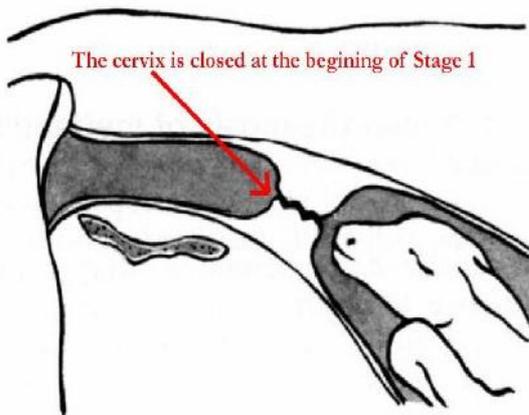


Fig.72 Second water sac (amniotic sac) expelled

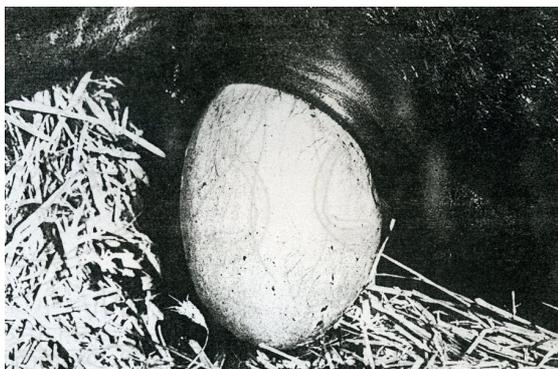
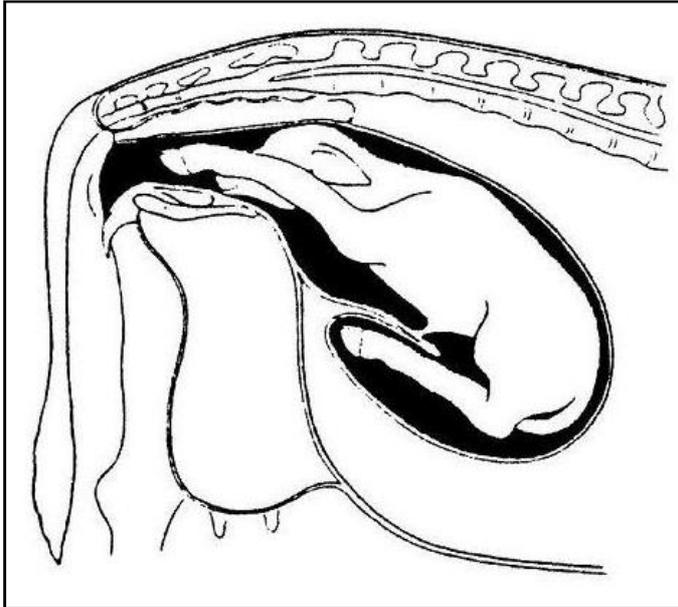


Fig.73 Normal Fatal Position



In normal fatal position, calf's head and both forelegs will come out together.

8-2 Dystocia

The cause of dystocia is usually due to the body size of mother and calf, in short "smaller mother or/and larger baby". There are some factors affecting their body sizes as below:

(Maternal Effect)

Age (too early breeding)

Body Size (immaturity)

Narrow Pelvic Area (sometimes hereditary defect)

(Fetal Effect)

Body Size (sire's breed, dam's nutrition, sex)

Abnormal Position

Multiplet

8-3 Three Points to describe Fetus's condition

In case of dystocia we have to know the exact condition of the calf. There are 3 points to describe calf's condition. These are Presentation, Position and Posture.

(1) Presentation

Is calf coming Frontward, Backward or Transverse ?

(2) Position

Right side up or Upside-down

(3) Posture

Relationship of the calf's legs and head to its body

Fig.74 Presentation

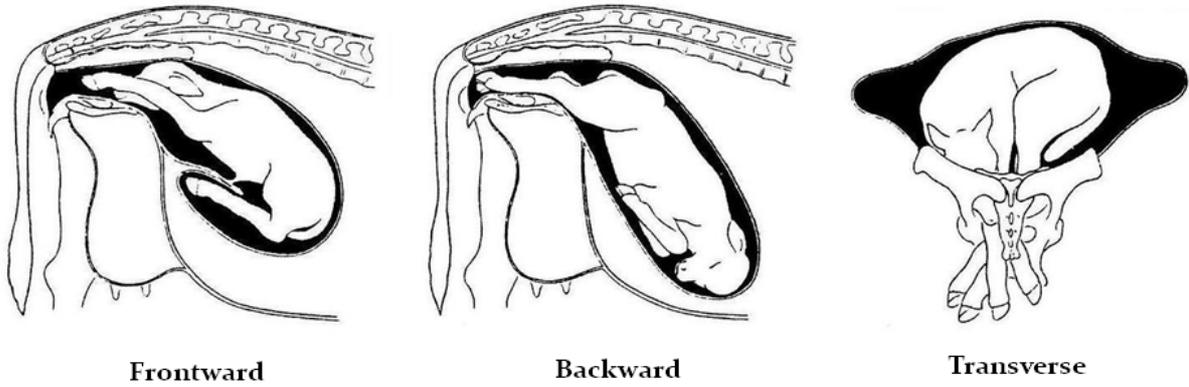


Fig.75 Position

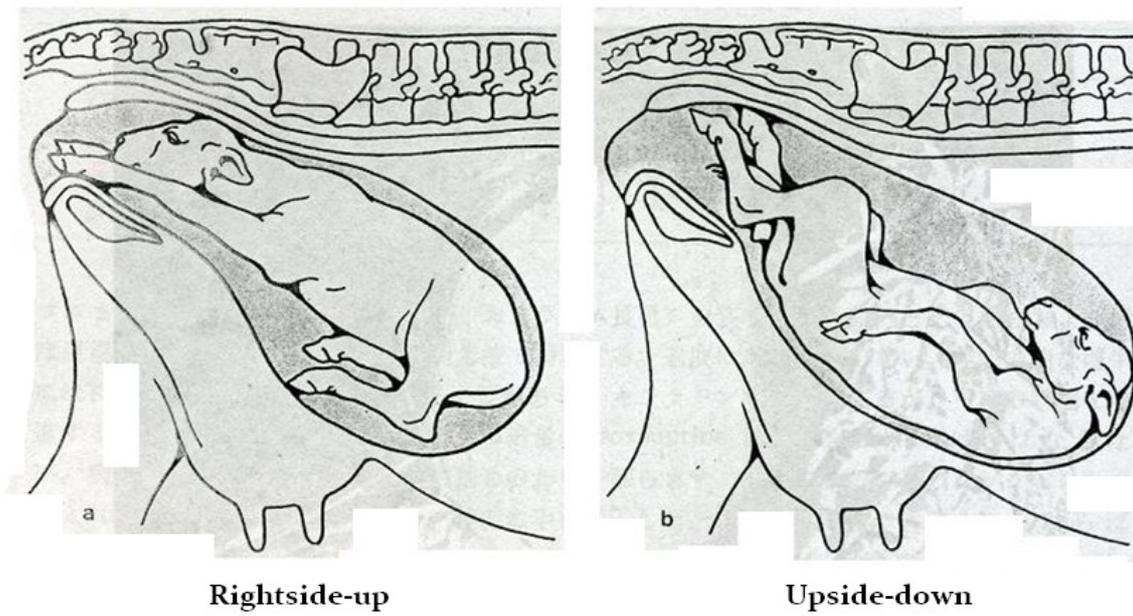
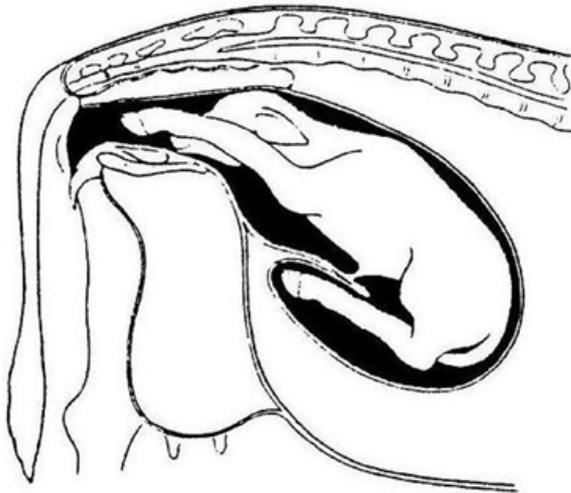
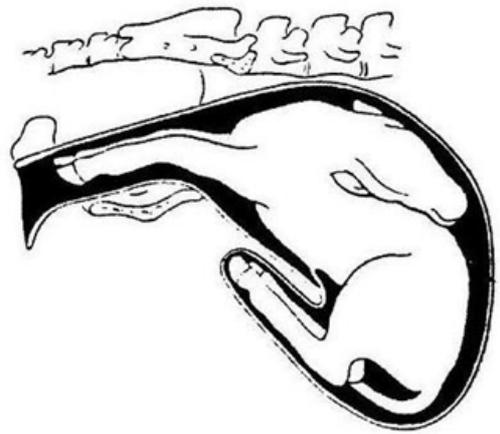


Fig.76 Posture



Head and legs are straightly extended, & parellel to body



Legs are straightly extended, but Head is bended backwards

There are many types of abnormal conditions in case of dystocia.

Fig.76-1 Many types of calf's condition at calving (1)

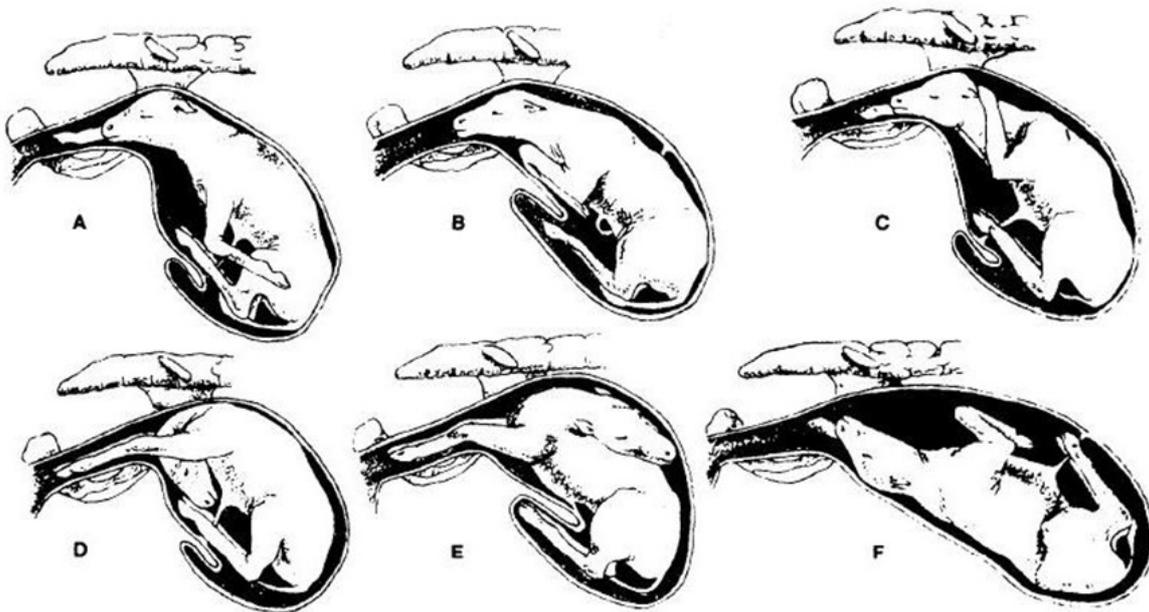
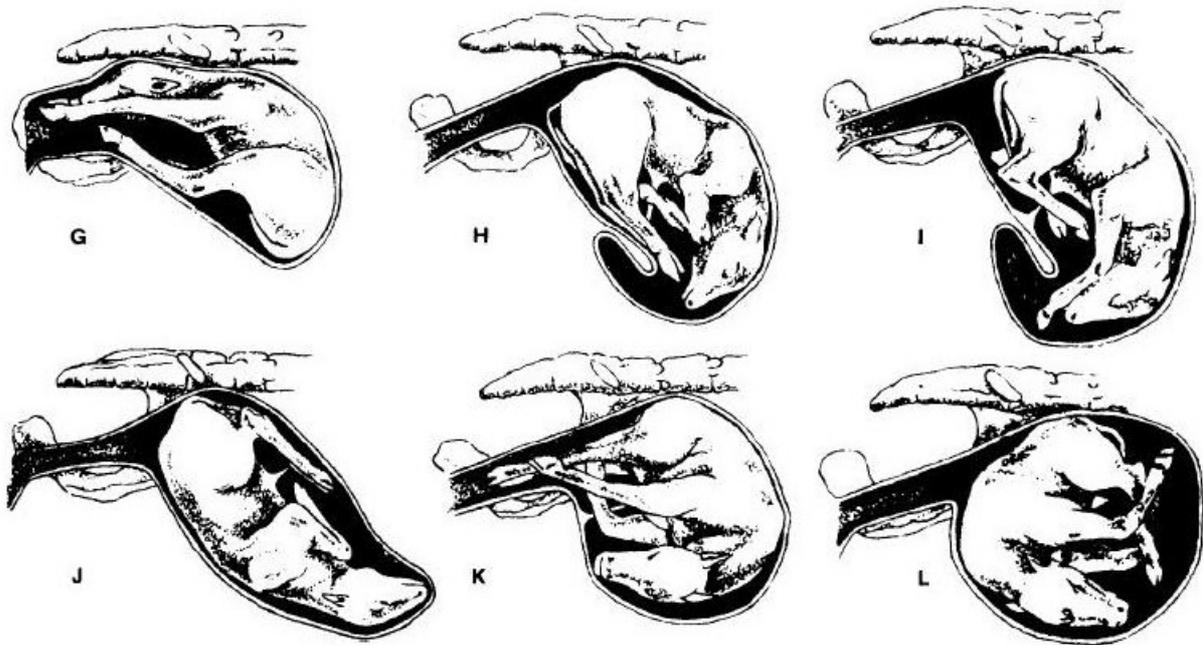


Fig. Abnormal presentations of the calf for delivery.

- A. Anterior presentation—one foreleg retained.
- B. Anterior presentation—forelegs bent at knee.
- C. Anterior presentation—forelegs crossed over neck.
- D. Anterior presentation—downward deviation of head.
- E. Anterior presentation—upward deviation of head.
- F. Anterior presentation—with back down.

Fig.76-2 Many types of calf's condition at calving (2)



G. Anterior presentation—with hind feet in pelvis. H. Croup and thigh presentation.
I. Croup and hock presentation. J. Posterior presentation—the fetus on its back.
K. All feet presented. L. Dorsolumbar presentation.

(From *Diseases of Cattle*, USDA Special Report, 1942.)

8-4 Calving Assistance

Calving assistance is necessary depending on the condition. Unnecessary intervention is harmful to both Mother Cow and Calf. The important thing is to carefully observe the calving process. If the interval of each stage is too extended or the mother shows uneasiness or has seemingly a stomach pain, we have to give an assistance for the delivery.

At least the followings should be prepared before we start to assist the delivery.

(Preparation)

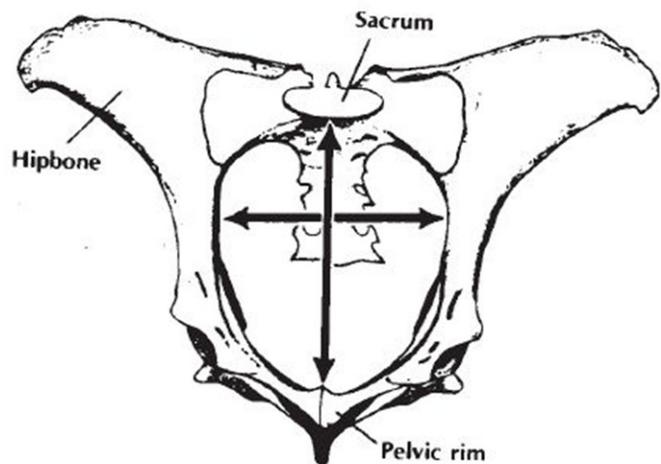
- Disinfectant
- Plastic glove
- Lubricant
- Ropes for pulling calf & constraining cow
- Scissors to cut Umbilical cord

First of all we have to define the condition of the calf if the calf is alive, how about the Presentation, Position and Posture of the calf. The point of the correction of calf is to correct as normal calving, in case the calf is coming forward

presentation. The both legs should be extended and the head should be on the legs. In case of backward presentation, if the position is rightside-up and the legs are straightly extended, it's not so difficult. Just pull backward by the ropes tied to hind legs.

For an efficient assis, the shape of the pelvic opening (Fig.72) should be kept in mind. We can recognized that the shape of the pelvic opening is accorded with the calf's body shape when the calf passes the opening in normal position.

Fig.77 Shape of Pelvic Opening



A typical pelvic opening of the female

8-5 Nursing of Newborn Calf

After the calf is expelled from the mother, the nursing as below is necessary for the new=born calf.

(1) Make sure that the calf is breathing

During the expulsion, the Umbilical Cord will be broken, then the calf starts to breath. Or in another word, the calf need to breath after the Umbilical Cord was broken. If the mucous or fractured membrane covers the nasal part of the calf, they should be removed as soon as possible. Sometimes we make some stimulation to nose to induce a sneezing (Fig.73), or hang the calf upside-down holding hind legs (Fig.74), or give an artificial respiration (Fig.75).

(2) Make sure the calf drink Colostrum

If calf can't or don't drink colostrum, give them 2 litter of colostrum within 1-2 hours after birth. This is important because the calf doesn't receive any immunity during gestation, and the absorbing ability of the immunogloblin in the colostrum is time limited (Fig.76).

(3) Sterilization of the Umbilical Cord (Put 10 % iodine solution or antibiotics inside the umbilical cord immediately after born.)

This is very important to prevent Naval Infection, if not treated, which can cause Septicemia, then Poly Arthritis. Poly Arthritis is the very difficult disease to treat (Fig.77,78).

Fig.78 Make a sneezing



Fig.79 Hang Upside-down



Fig.80 Artificially Respiration



Fig.81 Efficiency of Immunoglobulin absorption of calf

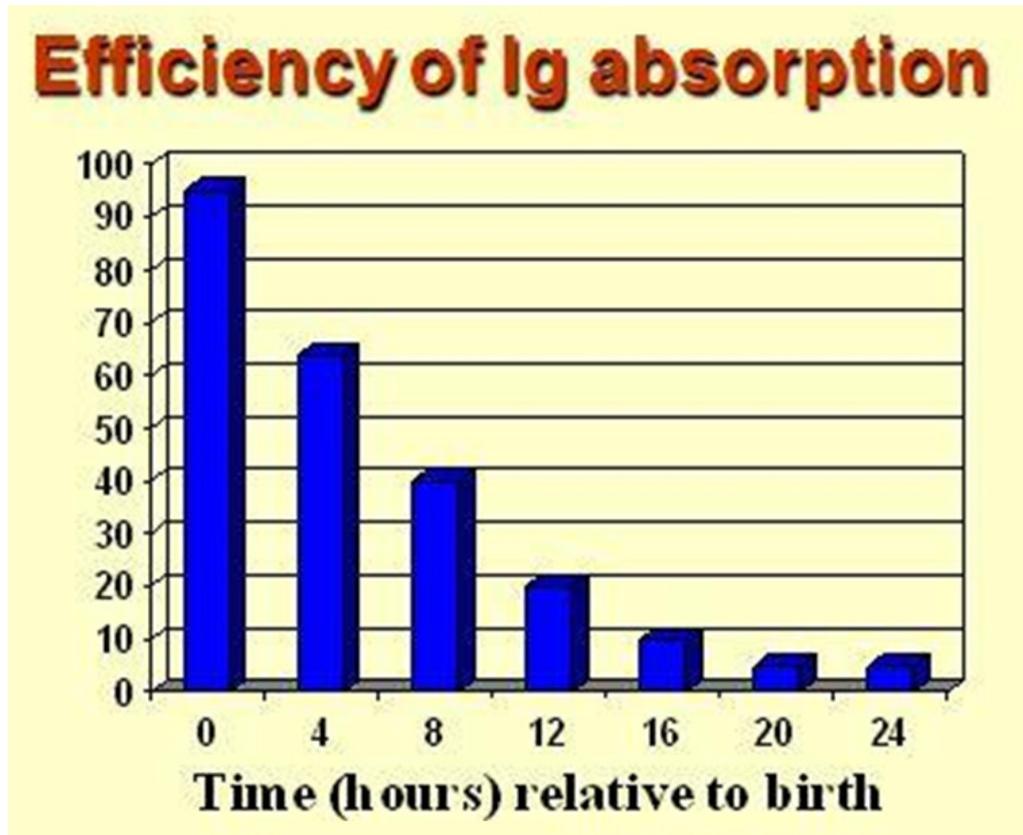


Fig.82 Poly Arthritis



Fig.83 Inside the joint of Poly Arthritis

