



# INFERTILITY IN CATTLE

**Dr. Hatem Atalla**  
**An Najah National University**  
**Faculty of Veterinary Medicine**  
**24\4\2014**

**Dr.Hatem Atalla**

# INFERTILITY IN CATTLE

- ▶ **FERTILITY:** It means the ability of the animal to produce offspring.
- ▶ **INFERTILITY:** Inability of the animal to produce living offspring due to temporary causes.
- ▶ **STERILITY:** Inability of the animal to produce living offspring **at all**.

# CAUSES LEADING TO INFERTILITY AND STERILITY

A– Congenital and hereditary causes

B– Hormonal causes

C– Pathological causes

D– Environmental and nutritional causes

E– Infectious causes

# Congenital and hereditary causes

## I. INTERSEX OR HERMAPHRODISM:

( الخنثى او الخنوثة )

| True hermaphrodites  | Pseudo-hermaphrodites  |
|--|--|
| Presence of gonads of both sexes (ovaries and testicles) in the same individual. | This means the presence of one set of gonads (testicles) or ovaries        |
| The external genitalia of an intermediate type                                   | Secondary sexual characters and external genitalia are of the opposite sex |

Dr.Hatem Atalla



Gilt, (lateral) true hermaphrodite

Gilt, (unilateral) true hermaphrodite.  
**Ovotestis** on the left, testis on the right;  
well developed uterus, cervix, and vagina



**Dr.Hatem Atalla**



### **True Hermaphrodite.**

The left gonad is a combination of testicular and ovarian tissue. The right gonad consists primarily of testicular tissue. Both ovotestes are accompanied by a uterus

**Dr.Hatem Atalla**

## II. FREEMARTINISM

- ▶ It occurs in 90% of heifers born co-twin to a bulls.
- ▶ **Causes:** during the uterine life.

### **Hormonal theory:**

- ▶ The male gonads differentiate earlier than those of the female and secrete androgens.
- ▶ This androgen will reach the female circulation (through the anastomosis between the chorion of both placentae) and suppress the differentiation and growth of the female genital organ





(c) 2012, Richard M. Jakowski, DVM, PhD, DACVP

**Dr.Hatem Atalla**

## II. FREEMARTINISM

**Clinically:** the animal is anestrus; steer like with high limbs, small pelvis, narrow vulva and prominent clitoris, the vulver hair is coarse, prominent and resemble the preputial tuft.

**Rectally:** the ovaries and genitalia are rudimentary.

**Vaginal examination:** the vagina is narrow leading to blind vestibule.

**Fincher pencil test:** when a pencil or tube is inserted into the vagina it does not proceed the external urinary meatus. The animal should not be bred



**Bovine (calf) Ovaries, Uterus & Vagina – freemartinism**

**Dr.Hatem Atalla**



**Normal (left) vs.  
Freemartin (right) External Genitalia**

**Dr.Hatem Atalla**



**Normal (left) vs. Freemartin (right) Internal Genitalia**

**Dr.Hatem Atalla**

# III- HYPOPLASIA OF THE OVARIES

## Definition:

- ▶ It means the ovary fails to grow to its normal size and part or the whole ovary lacks normal germinal epithelium

## Types:

- ▶ a. Partial or complete
- ▶ b. Unilateral or bilateral



# III- HYPOPLASIA OF THE OVARIES

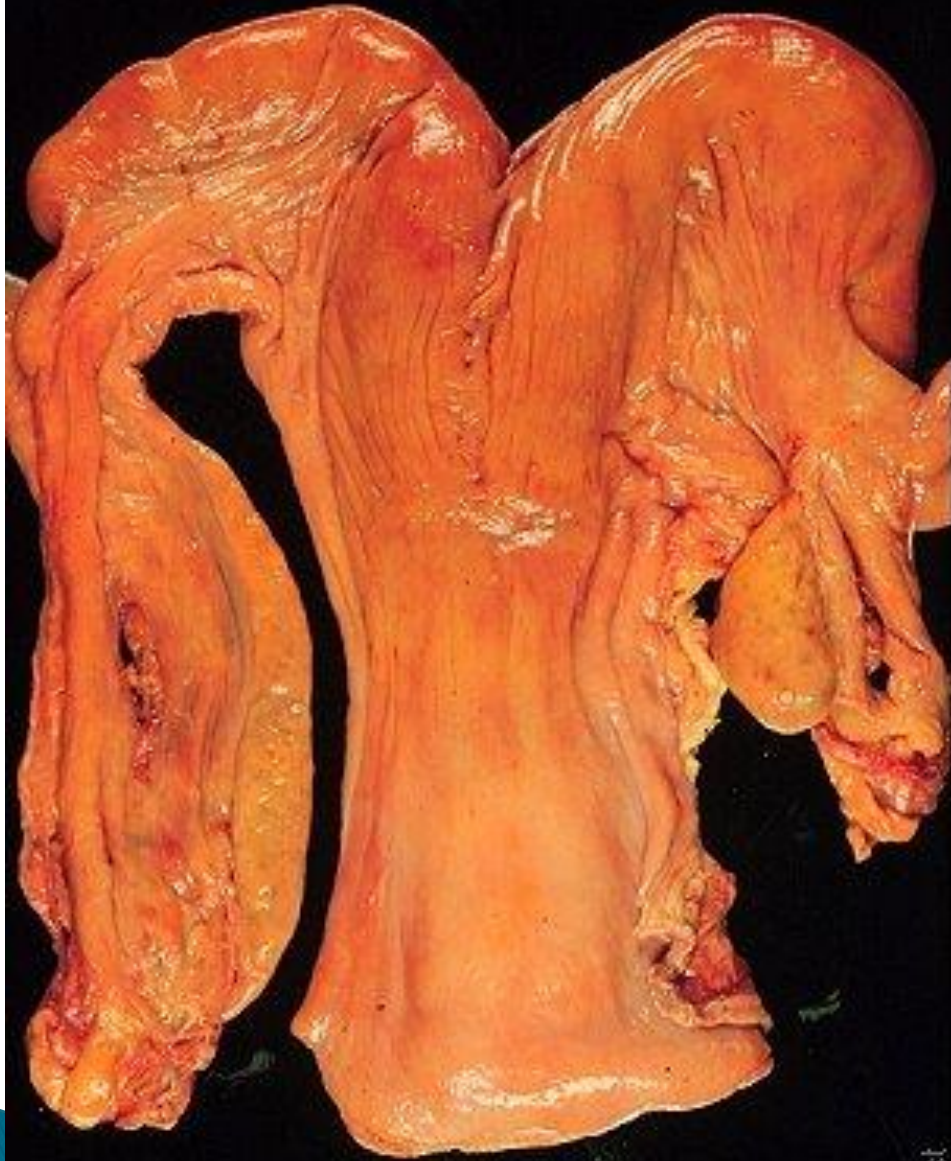
## Diagnosis:

- ▶ **1. History:** depends on the type of Hypoplasia
  - a. **Bilateral complete:** the animal is anestrus
  - b. **Bilateral partial or unilateral (partial or complete):** the animal is repeat breeder and its fertility is greatly reduced
- ▶ **2. Rectal examination:**
  - a. **Ovaries:** in case of complete Hypoplasia, the ovary is a cord-like thickening on the cranial border of the broad ligament
  - b. in **partial Hypoplasia** the ovary is pear shaped and it may contain follicle in the healthy part,
  - c. **Uterus:** in bilateral complete Hypoplasia the uterus is very small (infantile). In the other types the uterus is nearly normal.



Hypoplasia of the uterus and the ovaries of an intact 2-year old Holstein heifer.





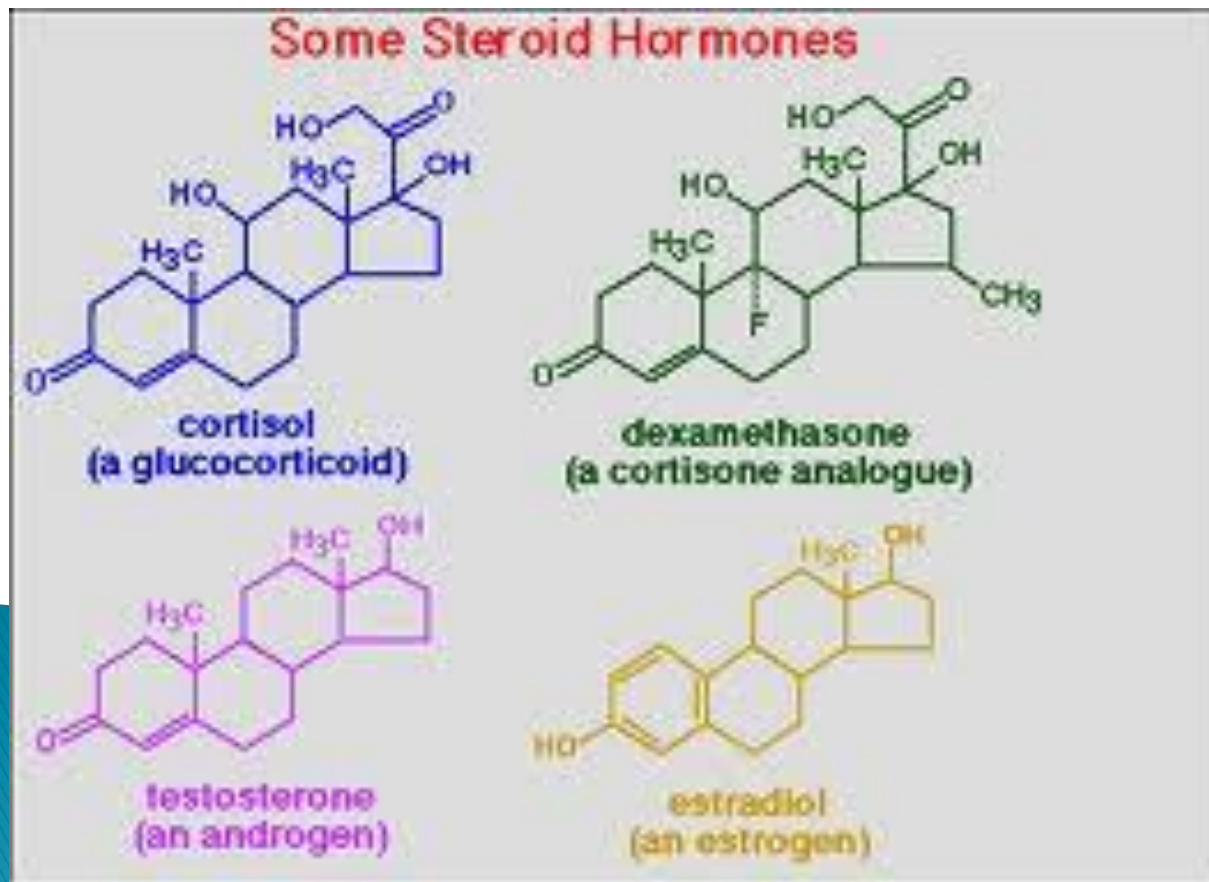
UF/drost

**Ovarian Hypoplasia.**  
Complete congenital hypoplasia of the **left ovary.**

The right ovary is normal judging by the fact that the cow has been pregnant in the right horn.

**Dr.Hatem Atalla**

# HORMONAL CAUSES OF INFERTILITY



# HORMONAL CAUSES OF INFERTILITY

- ▶ 1. Ovarian cyst.
- ▶ 2. Delayed ovulation.
- ▶ 3. Anestrus (failure of estrus).

# 1. Ovarian cyst

- ▶ Veterinary pathologists generally recognize three types of ovarian cysts:
  - a. Follicular cyst
  - b. Luteal cyst
  - c. Cystic corpus luteum

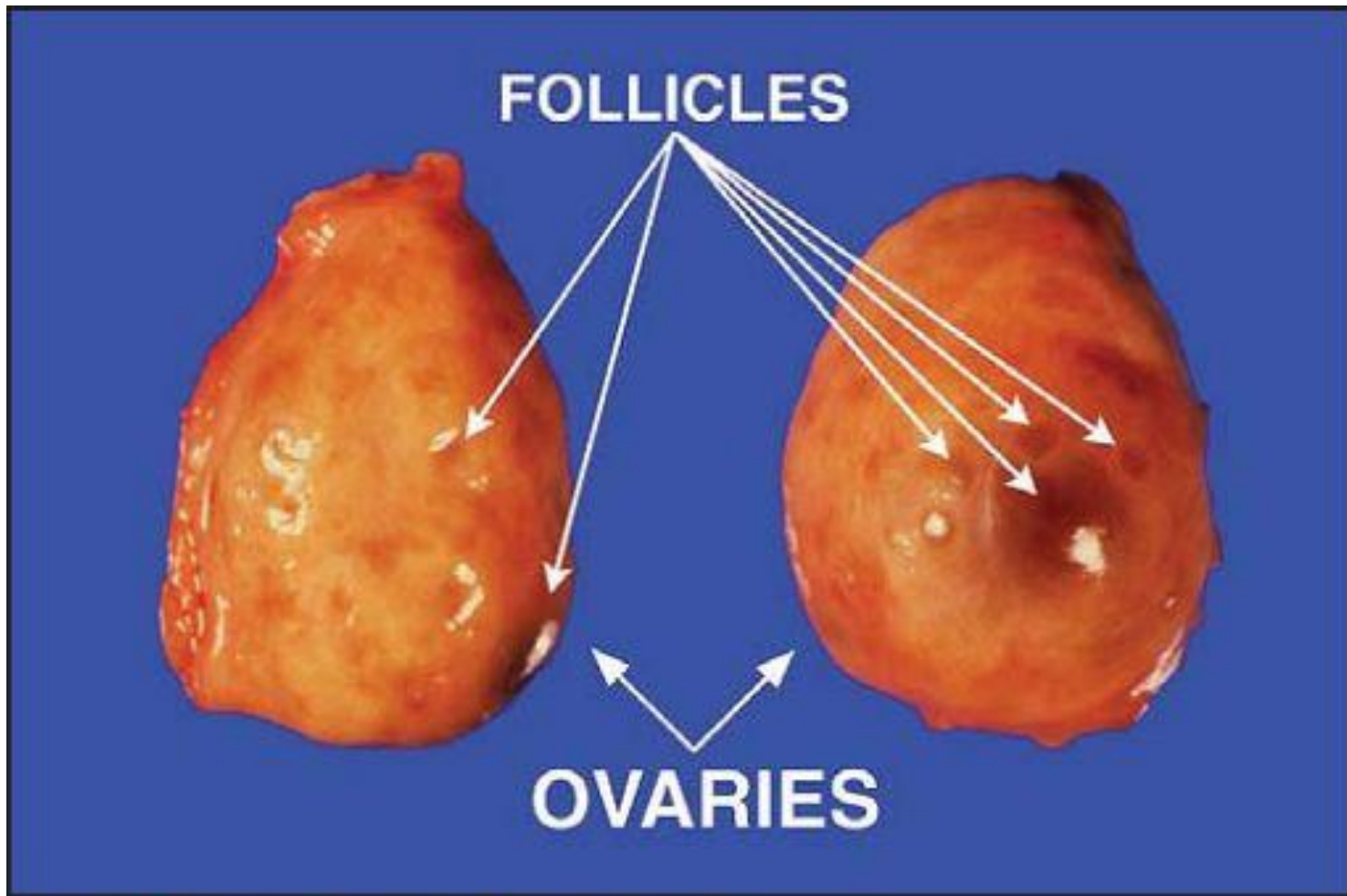
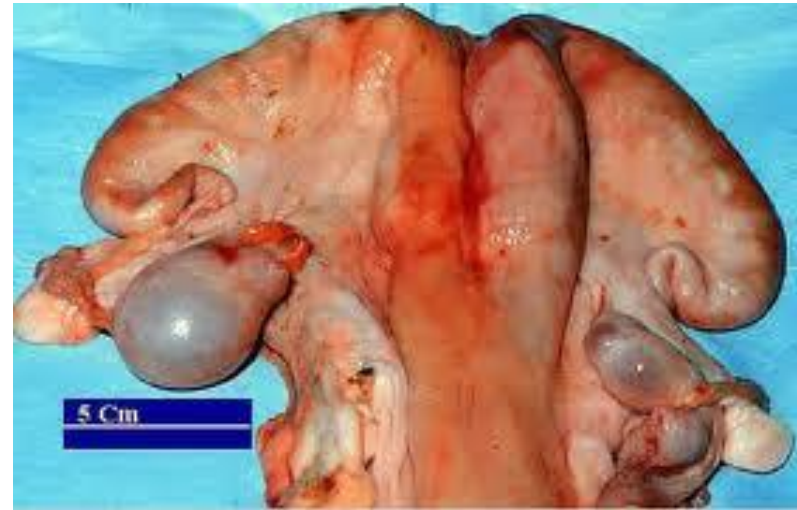
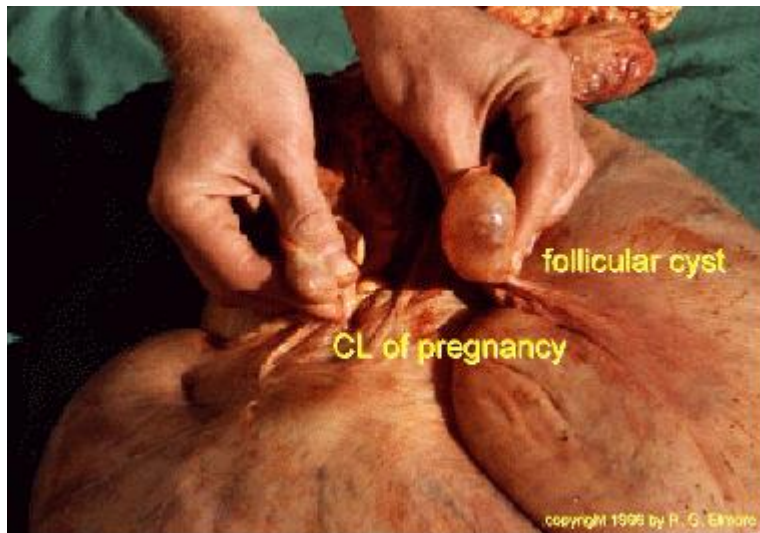
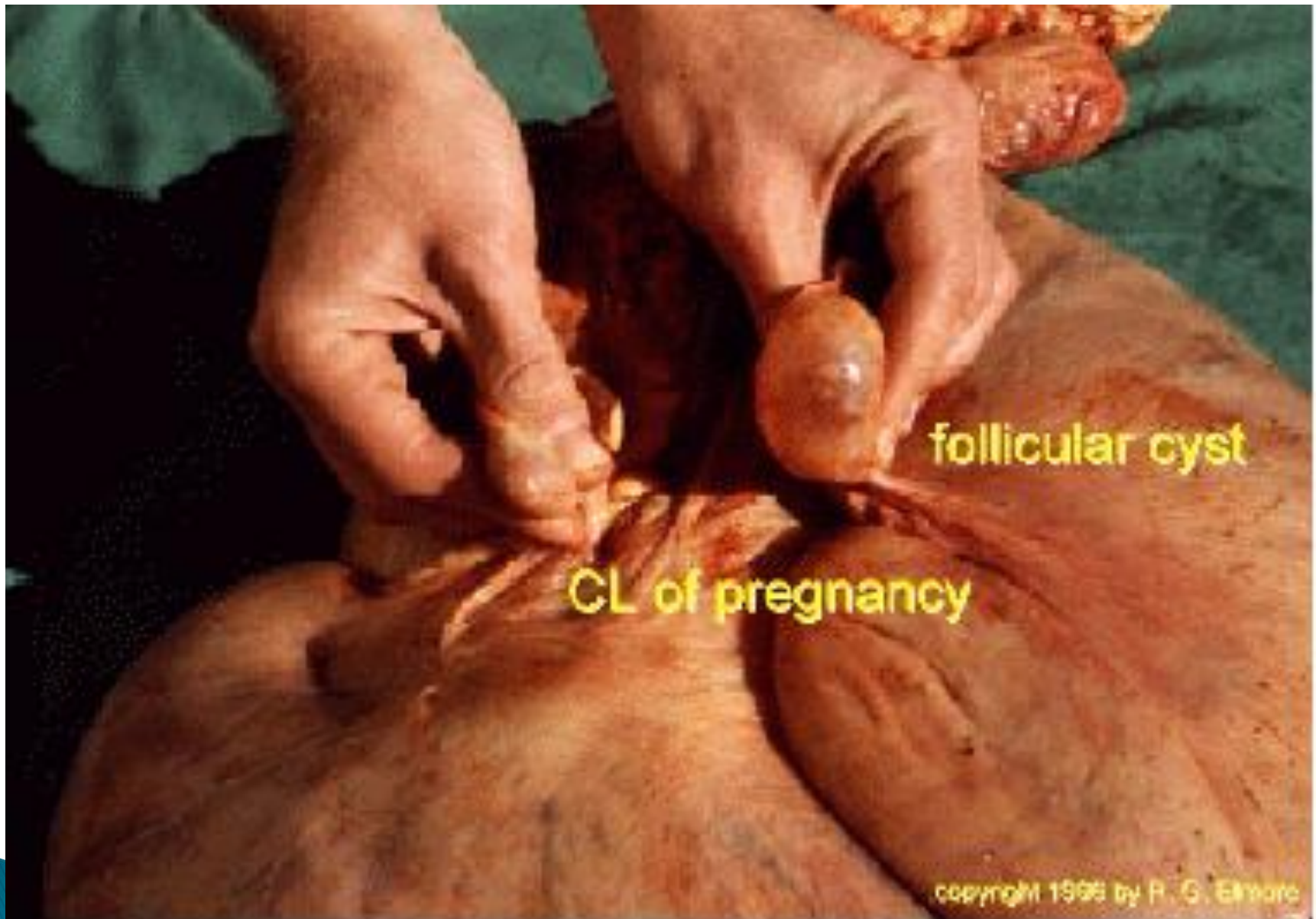


Figure 8. Blister like follicles on the ovaries.



Cystic ovarian disease, cow

Dr.Hatem Atalla



follicular cyst

CL of pregnancy

copyright 1995 by R. G. Ellmore

Dr.Hatem Atalla

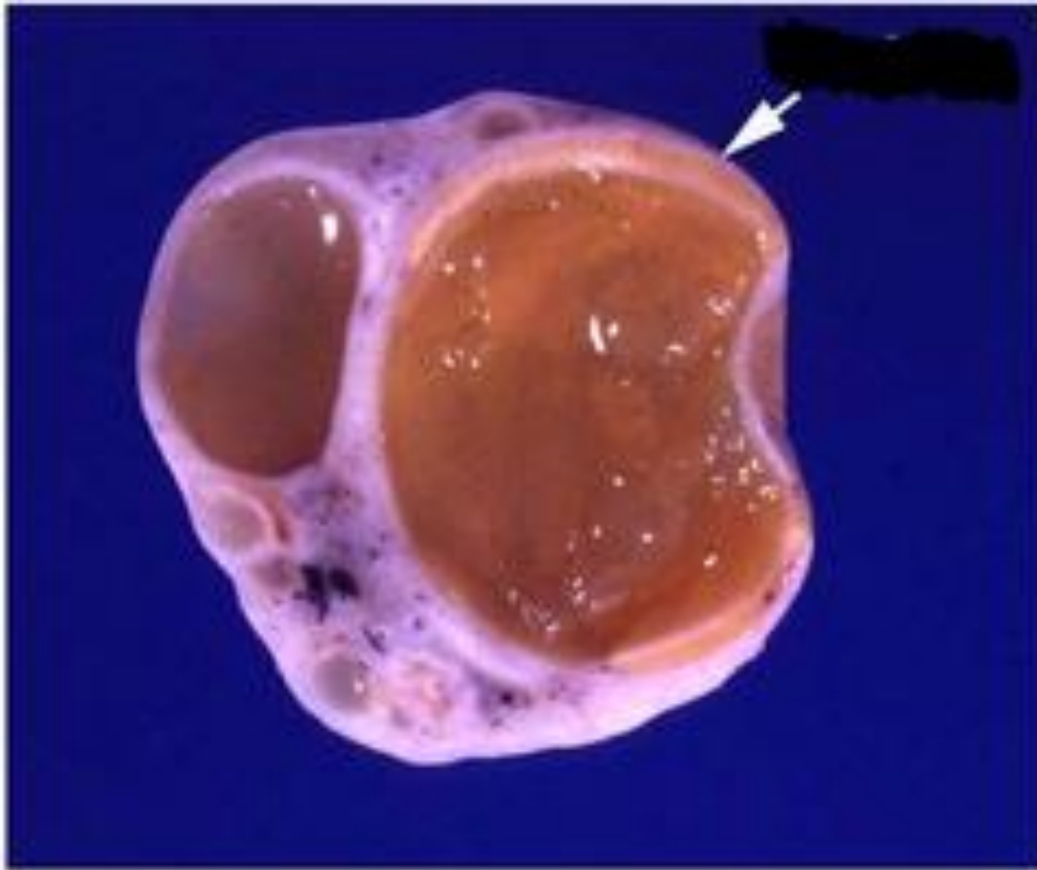


Dr.Hatem Atalla





**Dr.Hatem Atalla**

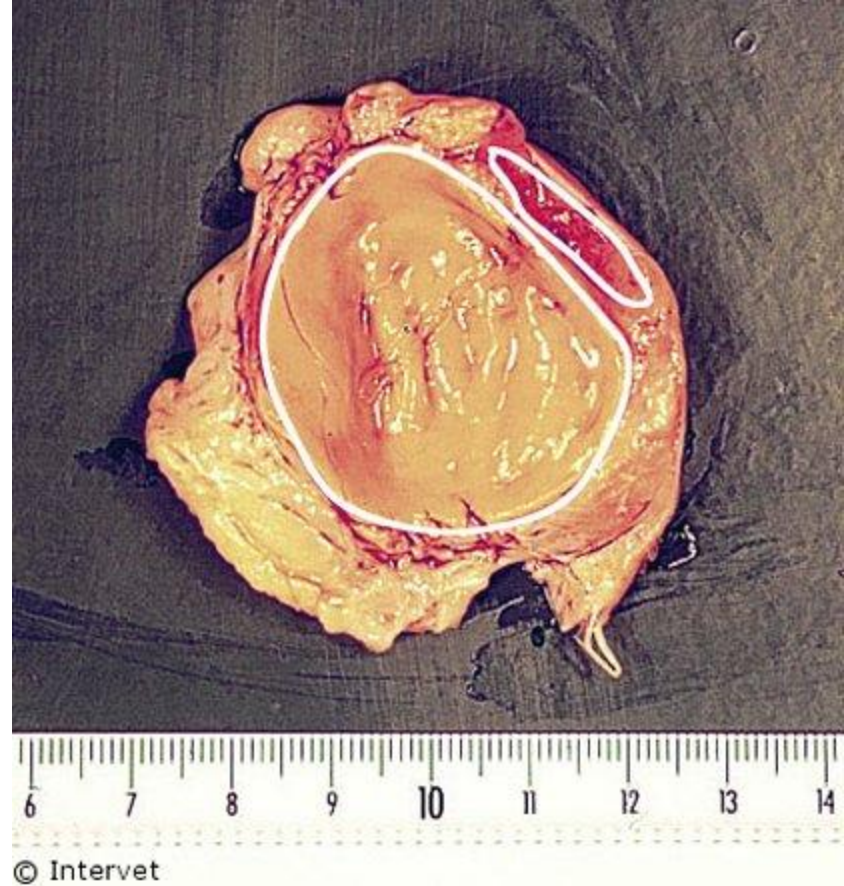


## Luteal cyst

this ovary has structures that are filled with yellow luteal tissue

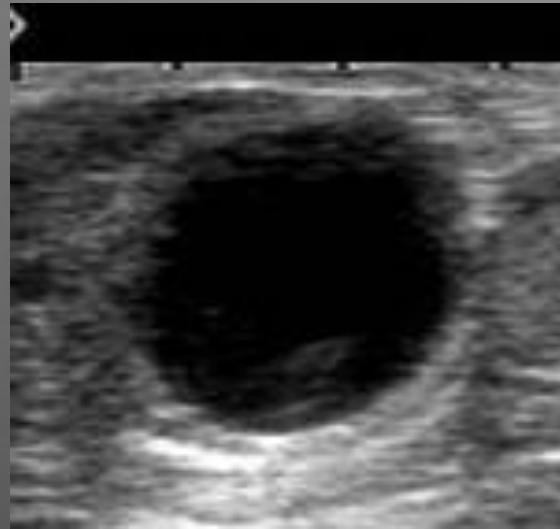


Luteal cyst on the ovary of a cow



Section of a luteal cyst

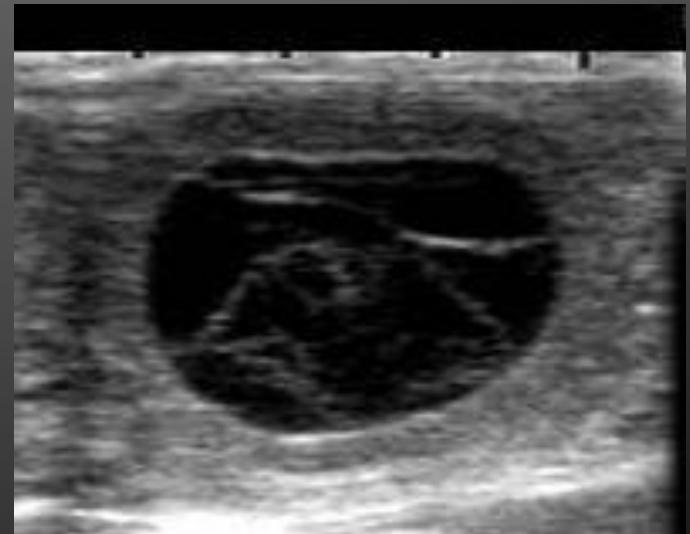
# Ultrasound



Normal  
Follicle



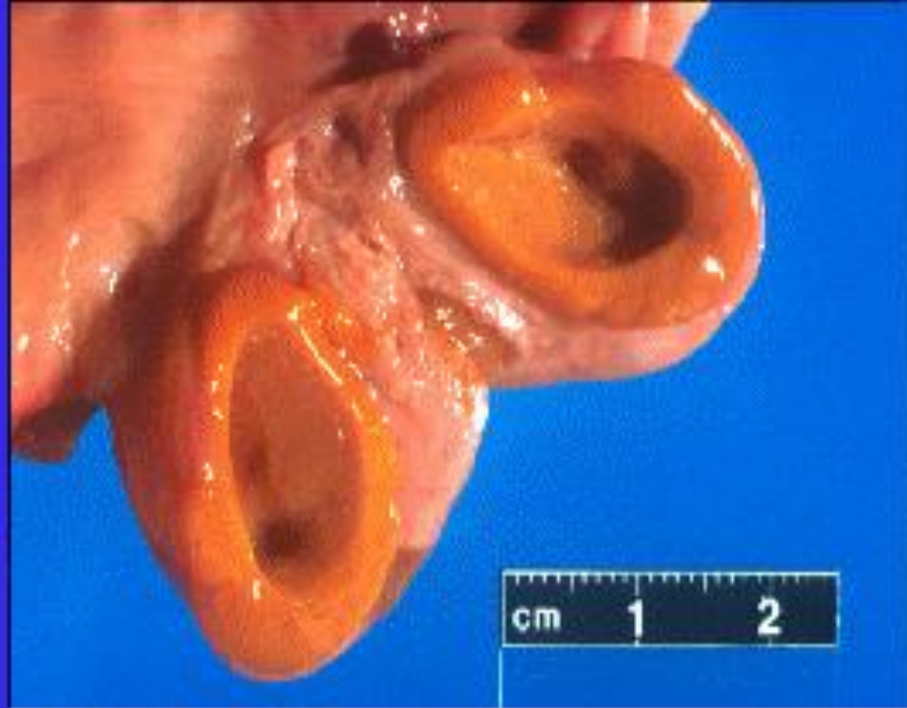
Follicular Cyst



Luteal Cyst

Luteal cyst on a cow's ovary (usg)





## CYSTIC CORPUS LUTEUM

BREEDING LIVESTOCK

<http://breedinglivestock.blogspot.com>



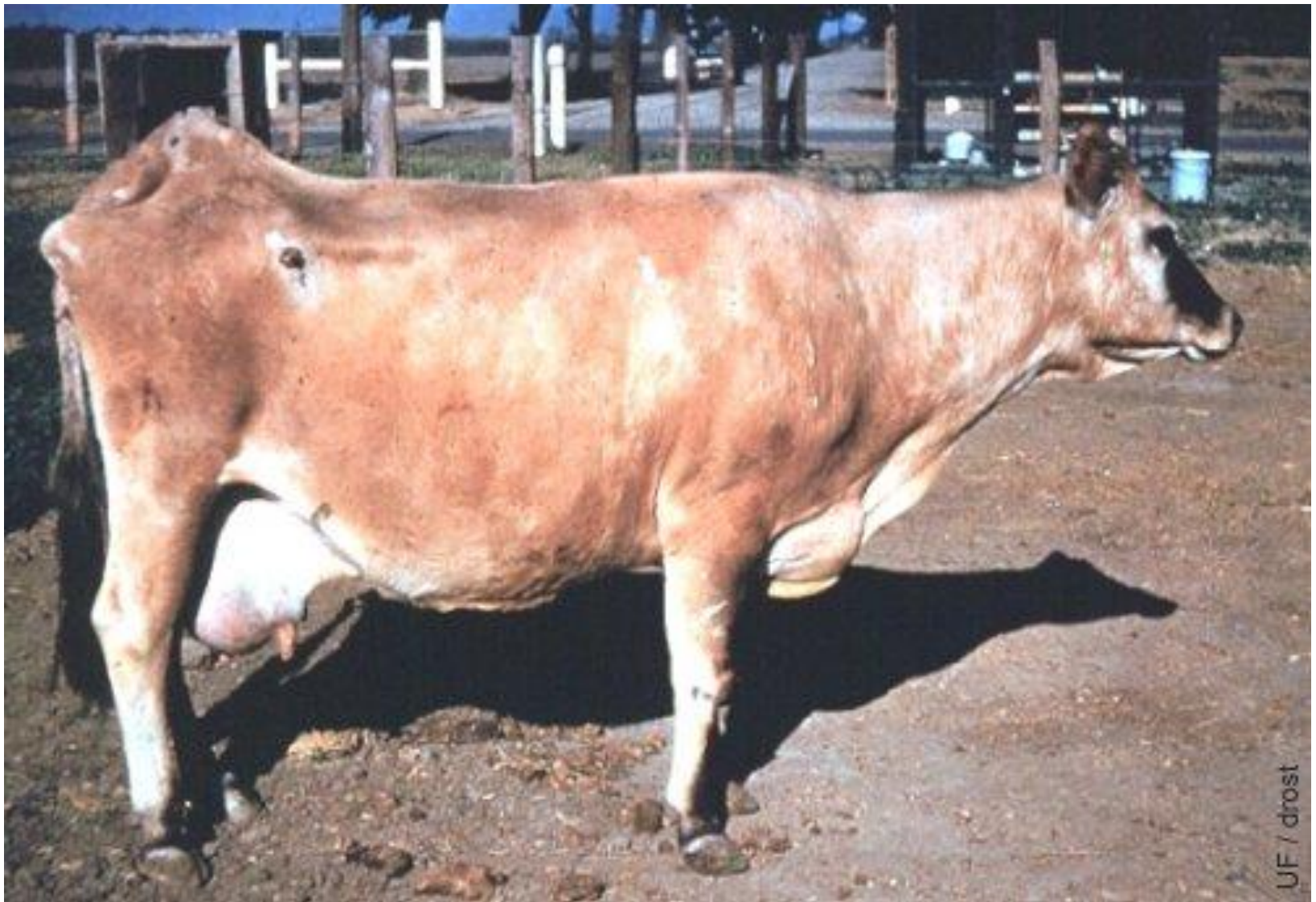
cystic corpus luteum

copyright 1996 by R. G. Elmore

# Ovarian Cysts

|                          | Follicular Cyst    | Luteal Cyst     | Cystic C.L |
|--------------------------|--------------------|-----------------|------------|
| Wall                     | Thin               | Thick           | Very Thick |
| Ovulation                | Anovulatory        | Anovulatory     | Ovulatory  |
| Clinical Signs           | Nymphomania        | Mostly Anestrus | Anestrus   |
| Numbers                  | Single or Multiple | Single          | Single     |
| Treatment                | The same way       |                 |            |
| Clinical Differentiation | Very Difficult     |                 |            |

**N.B.** The estrus cycle is not affected by cystic corpora lutea, which are entirely normal structures.



### **Nymphomaniac Cow.**

This Jersey cow is a nymphomaniac. She suffers from chronic cystic follicular degeneration and displays a sterility hump, an elevated tailhead, due to chronic relaxation of the pelvic ligaments.

**Dr.Hatem Atalla**



cow with chronic ovarian cysts  
sterility hump



copyright 1996 by R. G. Elmore

# Etiology and Associated Factors

It is generally believed that **ovarian cyst** result from:

- ▶ 1. Failure of production and / or release of adequate **amounts of LH**.
- ▶ 2. In some cows the ovaries may be **unable to respond to LH**, which would explain why a small percentage of cows do not benefit from LH therapy.
- ▶ 3. Also **hereditary** influence is involved in ovarian cysts in dairy cattle.
- ▶ 4. Ovarian cysts are more common in closely confined stabled animals during the **winter months**.
- ▶ 5. The condition is most common following **the second to fifth** parturition and is seen more often in **high producing cows**.
- ▶ 6. Also increased feeding especially with rations **high in protein** stimulates lactation and the development of cystic ovaries.
- ▶ 7. Also it is associated with **adrenal hyperfunction**, postpartum uterine infections and postpartum diseases.
- ▶ 8. Cows with **high selenium levels** have a higher risk of developing cystic ovaries.

# Treatment

- ▶ There are currently **three approaches** to treating ovarian cysts in dairy cattle:
- ▶ 1. Allowing spontaneous regression.
- ▶ 2. Manual rupture.
- ▶ 3. Administration of therapeutic drugs.

# Treatment

## 1 – Spontaneous Regression

- ▶ **Before 50 days postpartum**, approximately 50% of ovarian cysts will regress spontaneously **without any treatment.**
- ▶ **After 50 days postpartum** approximately 20% of these cysts will regress without treatment.
  - Waiting for self-recovery usually lengthens the interval from calving to first breeding and conception.

# 2- Manual Rupture

- ▶ Rectal palpation and manual rupture of ovarian cysts can result in **injury** to the tissue of the ovary and its surrounding structures, prompting **adhesions** of the ovary to its bursa and thus causing infertility or even sterility clearly this form of treatment should **not be used**.

# 3- Drug therapy

- ▶ Three forms of acceptable therapeutic products are currently marks in the USA for treating follicular and luteal ovarian cysts in cattle. These are:
  - a- Anterior pituitary extracts (APE)
  - b- Human chorionic gonadotrophin (HCG)
  - c- Gonadotrophin releasing hormone (GnRH)

# 3- Drug therapy

- ▶ The (APE) and (HCG) contain high levels of LH and provide the treated animal with (**exogenous**) source of this hormone.
- ▶ (GnRH) causes the treated animal to release its (**own endogenous**) luteinizing hormone from the anterior pituitary gland.
- ▶ It was found that exogenous APE and HCG and endogenous LH GnRH are equally effective in treating cows with ovarian cysts.

# 3- Drug therapy cont.

- ▶ One of the following drugs could be used for the treatment:
  - GnRH (cystorelin) 100 µg i.m or i.v
  - GnRH (buserelin) 10 µg im or i.v
  - GnRH (GonasyI) 100 µg i.m
- ▶ If no response give
  - HCG 1000 I.U i.v or 10,000 I.U i.m





# Gonasyl

## Injectable GnRH



### Pharmaceutical Form

Injectable solution.

### Composition per ml

Gonadorelin (as Gonadorelin acetate) 50 mcg.

### Indications

Cows: treatment of follicular ovarian cysts. Improvement of the pregnancy rate after AI.

### Administration Route

Intramuscular injection.

### Dosage and administration

Treatment of follicular ovarian cysts: 2-3 ml/cow. If necessary treatment can be repeated in intervals of 1 or 2 weeks.

Improvement of the pregnancy rate after AI: administer 2 ml/ cow just after AI and/or 12 days later.

### Withdrawal period

Meat: 1 day.

Milk: not required.

### Shelf-life period

2 years.

### Storage

Store in a cool place (below 25°C) and protected from light.

### Supply

Vials of 20 ml.

LICENSE NUMBER: 1384-ESP (AEM SPAIN)







Dr.Hatem Atalla



# 3- Drug therapy

There are several advantages to using GnRH.

- ▶ GnRH (Its small molecular weight) is not likely to stimulate an immune response as occasionally occurs when exogenous form of LH are given.
- ▶ HCG and APE contain fairly large protein molecules against which antibodies can readily be built. Thus, it has been demonstrated that anaphylaxis and or refractoriness to repeated treatments with these substances may occur.
- ▶ N.B. GnRH or HCG given to pregnant cow should not cause any harmful effects.

# Treatment Responses

- ▶ **Two weeks** after treatment (either with GnRH, HCG or APE), the cow should be **re-examined**.
  - If the cow is going to respond, changes in the ovaries (**the cyst becomes firm and smaller**) should be detectable by this time.
  - If no changes are found the cow should be retreated.
- ▶ Approximately 80% of cows with ovarian cysts respond to initial treatment. Cows not responding to two or three treatments of GnRH should be treated with exogenous source of LH (HCG or APE).
- ▶ Cows that respond to treatment usually have a fertile estrus an average of 22 days after treatment.

# Prostaglandin therapy.

- ▶ Since most cows with ovarian cysts have very low levels of systemically circulating progesterone, indicating the absence of luteal tissue, it would seem likely that they would not respond to prostaglandin injection. The exception would be the cow with **luteal cysts**.
- ▶ So the use of prostaglandin (PGF2 $\alpha$ ) in combination with GnRH, HCG or APE would be the logical approach to incorporating (PGF2  $\alpha$ ) into the treatment regimen for ovarian cysts.

# Prostaglandin therapy cont..

- ▶ So if LH products cause lutenization of the cystic structure **by days 10 to 14** after treatment PGF2  $\alpha$  could then be used to cause regression of the luteal tissue, in which case the cow should be in estrus within 2–3 days after PGF2  $\alpha$  injection.
- ▶ This practice shortens the interval from initial treatment to first estrus from 23 to 12–15 days approximately.
- ▶ **N.B.** The disadvantage of using PGF2 $\alpha$  in treatment of ovarian cysts is that it causes cows to abort.
- ▶ The use of GnRH or, LH products should not endanger the pregnancy.

## 2– Delayed Ovulation

- ▶ Delayed ovulation means prolongation of the internal changes related to estrus.
- ▶ In affected cows, **the external symptoms of estrus are normal.**
- ▶ 1– On rectal examination, there is no ovulation within the normal limit 10 –18 hours after the end of heat.
- ▶ 2– Ovulation occurs 24–72 hours after heat and 50% give normal ova.



- ▶ By applying insemination or service, the fertilizing capacity of the semen will be lowered due to this late ovulation.

# 2- Delayed Ovulation

## Treatment:

- ▶ 1. Apply a second insemination 72 hours after heat.
- ▶ 2. Injection of hCG 5000 i.u. i.v.
- ▶ N.B: When the G.F. is squeezed, the ovum has a higher chance to drop in the abdominal cavity and not in the funnel of the fallopian tube.

# 3. Anestrus (Failure of Estrus)

## ▶ Definition

- Failure of estrus in cattle is only a symptom of one of the many conditions that may affect the oestrous cycle.
- ▶ Following this essential examination, the cows or heifers that fail to show estrus may be divided into 2 classes:
  - **Class 1**: Cows shown on rectal examination to have a corpus luteum present in one of the ovaries.
  - **Class 2**: cows having smooth inactive ovaries with no functional C.L palpable per rectum

# Class 1:

Cows shown on rectal examination to have a corpus luteum present in one of the ovaries.

## 1. **Anestrus due to pregnancy:**

- ▶ Many animals are brought to the clinic for treatment of anoestrus but after careful rectal examination they are found to be pregnant.

## 2. **Anestrus due to retained or persistent Corpus luteum:**

- ▶ The corpus luteum of pregnancy or a subsequent C.L. may be abnormally persistent the first few months following calving.
  - a. Retained C.L. associated with early embryonic death:
  - b. Retained C.L. associated with gross uterine pathology
  - c. Retained C.L. *not* associated with gross uterine pathology

## 3. Anestrus due to subestrus or “silent” heat

## 4. Anestrus due to unobserved heat

## 5. Anestrus due to a cystic C.L

## **Class II.**

**Cows having smooth inactive ovaries with no functional C.L. palpable per rectum**

- ▶ **a. Anestrus Due To Smooth Inactive Ovaries**
- ▶ **b. Cystic Ovaries**
- ▶ **c. Miscellaneous Conditions**

# a. Anestrus Due To Smooth Inactive Ovaries

## **Rectal examination reveals:**

- 1 – small atrophied or normal sized inactive ovaries.
- 2– no palpable corpora lutea.
- 3– small uterus which usually lacks tone and is flaccid.

## **Vaginal examination:**

- ▶ The cervix is closed, pale and dry.
- ▶ Repeated examination after 7–10 days reveals no changes.

# a. Anestrus Due To Smooth Inactive Ovaries

- ▶ The condition may arise from :
  - **Low plane of nutrition** or
  - **Insufficient supply of minerals** as, cobalt, iron, copper and phosphorus.
  - As a sequel to chronic diseases (e.g. severe mange, leucosis, Jones disease, T.B. etc.).
  - Vitamin A deficiency,
  - Stomach and intestinal worm infestation in heifers
  - Senility.
  - Seasonal influences:
  - Hard work, as well as transport of animals from one part to another as well as high milk production.

Dr.Hatem Atalla

# Treatment of Anestrus

- ▶ It should be based on a careful and differential diagnosis because
- ▶ this disease is a **symptom** of many conditions that may affected the genital organs, ovaries, pituitary gland, or the animal's body as a whole.



# Treatment of Anestrus

- ▶ 1. Treatment of cystic ovaries and cystic C.L. is as mentioned before.
- ▶ 2. Treatment of the freemartin, ovarian hypoplasia, or lesions of the pituitary is **useless**.
- ▶ 3. Treatment of persistent C.L: If it is associated with uterine pathology, treat the primary cause.
- ▶ 4. **Treatment of inactive ovaries**

# Treatment of Anestrus

## 4. Treatment of inactive ovaries

- ▶ a. If it is associated with low level of nutrition, the condition is treated by adequate feeding.
- ▶ b. In deficient areas, the supplement of phosphates in the ration improves the condition.  
**10 g dibasic sodium phosphate daily + 2 kg of wheat bran for 8 days.**
- ▶ c. **P.M.S.G** 1000—1500 i.u. is much better to cure the condition (72%) in cows.

## 4. Treatment of inactive ovaries

- ▶ d. **Estradiol Benzoate** (Folone): (5–10 mg I.M) may produce false unovulatory heat without conception. **Massage** of the ovaries to increase the blood supply may sometimes be effective.
- ▶ e. **Vit. A and Vit.. E** (1 – 2 millions i.u.)
- ▶ f. Uterine infusion with **Lugol's iodine solution** in dilution of 1:200 also stimulates the initiation of estrous cycle through the activation of the endometrium.
- ▶ g. **GnRH.**