Peurperium in domestic animals

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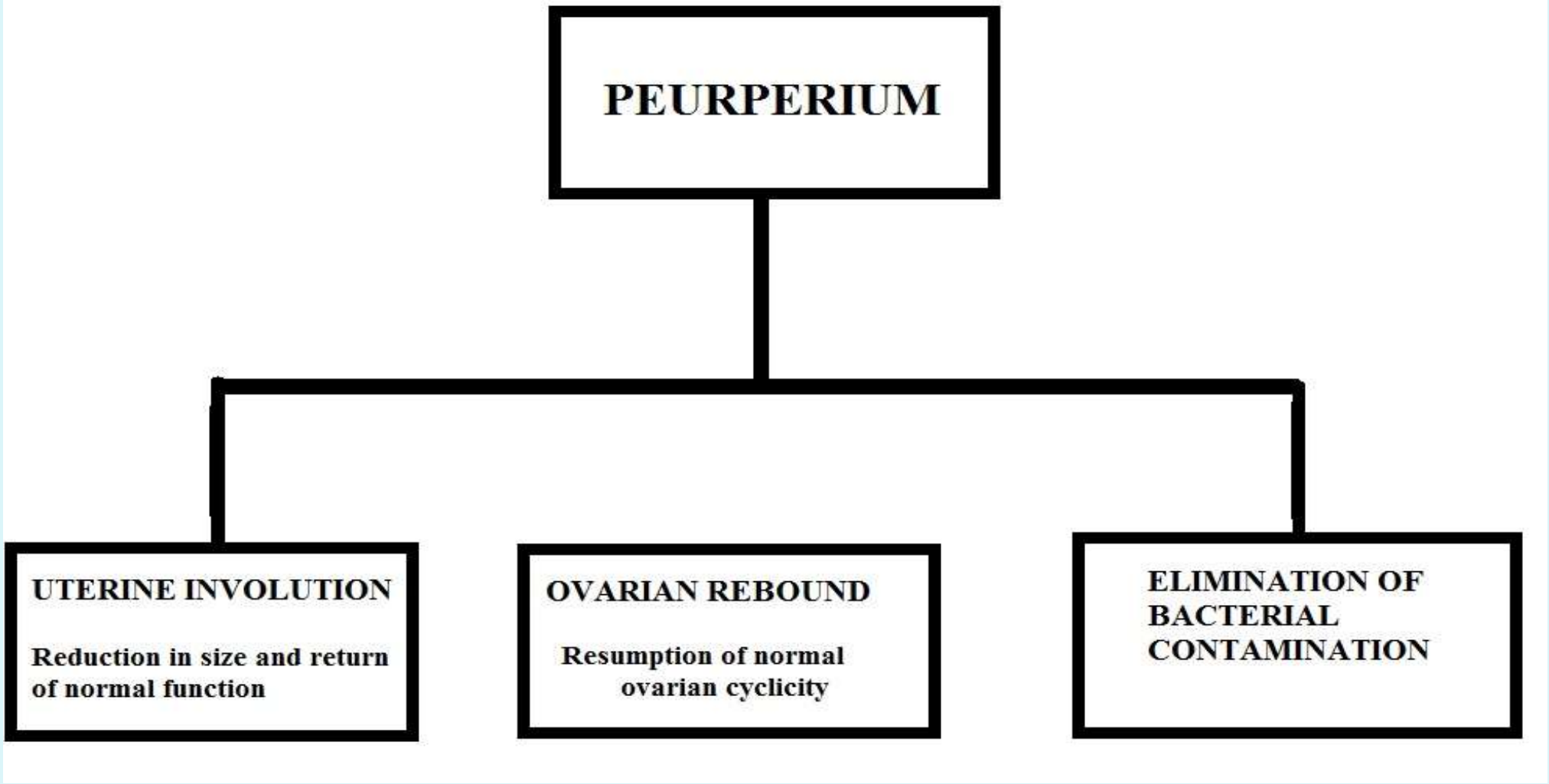
Post-partum period- Peuperium

- Peurperal period- From calving till pituitary regains responsiveness to GnRH 7-14 days
- Intermediate period-begins with increased pituitary sensitivity to GnRH and continues until the first post partum ovulation
- Post ovulatory period-begins at the time of first ovulation and lasts until involution is complete, at about 45 days

- Peurperium: is the period after completion of parturition including the 3rd stage of parturition when genital organs are returning to the normal non-pregnant state

Factors affecting peurperium

- Age: Uterine involution is known to be rapid in primiparous compared to pluriparous animals.
- Season: Involution is considered to be faster in spring and summer season.
- Nutrition: A high plane of nutrition favors faster uterine involution
- Periparturient abnormalities: Metabolic disorders, difficult births and uterine infections occurring post partum delay the uterine involution and return to normal cyclicity
- Suckling: Uterine involution is more rapid in suckled beef cows than in milking dairy cows


PEURPERIUM
UTERINE INVOLUTION
Reduction in size and return of normal function
OVARIAN REBOUND
Resumption of normal ovarian cyclicity
ELIMINATION OF BACTERIAL CONTAMINATION

Post partum endocrinology

- Progesterone levels decline 48 h before parturition to remain low throughout post partum period.
- Plasma estrogens are high at parturition but decrease within 24-48 h
- Prostaglandin metabolites are high at parturition and up to 4 days post partum but then they decline by 20 days postpartum
- Oxytocin levels decline sharply within 24 h
- FSH surges occur by Day 15 post partum but LH
- surges occur later i.e by Day 25-40 postpartum

Genital tract involution

Involution

The reduction in the size of the genital tract post partum is called *involution*.

Shortly after parturition, the uterus is a large organ measuring roughly one meter in length and weighing 8 to 10 kg. The uterine contractions continue for several days, although decreasing in regularity, frequency, amplitude and duration. The most profound involution occurs between the time of calving and day 3 post partum. The rapid decrease in size is due to vasoconstriction and peristaltic contractions which occur at 3-4 minute intervals and gradually diminish by day 4 post partum. The size of the uterus then decreases slowly between days 4 and 9 post partum. The uterus is within the pelvic cavity within 8-10 days.

Uterine Involution is completed by 26-40 days in cattle and buffalo.

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Involution involves degenerative changes, loss of fluids, caruncle shrinkage and liquefaction.

There is discharge of fluids which are known as lochia. The lochial discharge is high for 2-3 days and yellowish brown in color. The volume of fluid varies from up to 2000 mL in pleuriparous cows but in primiparous cows it is rarely more than 500 mL.
The discharge is reduced at 9-10 days and is bloody (red in color). By 14-15 days the lochia disappears. Some cows do not show lochial discharges probably because of absorption. The endometrial regeneration

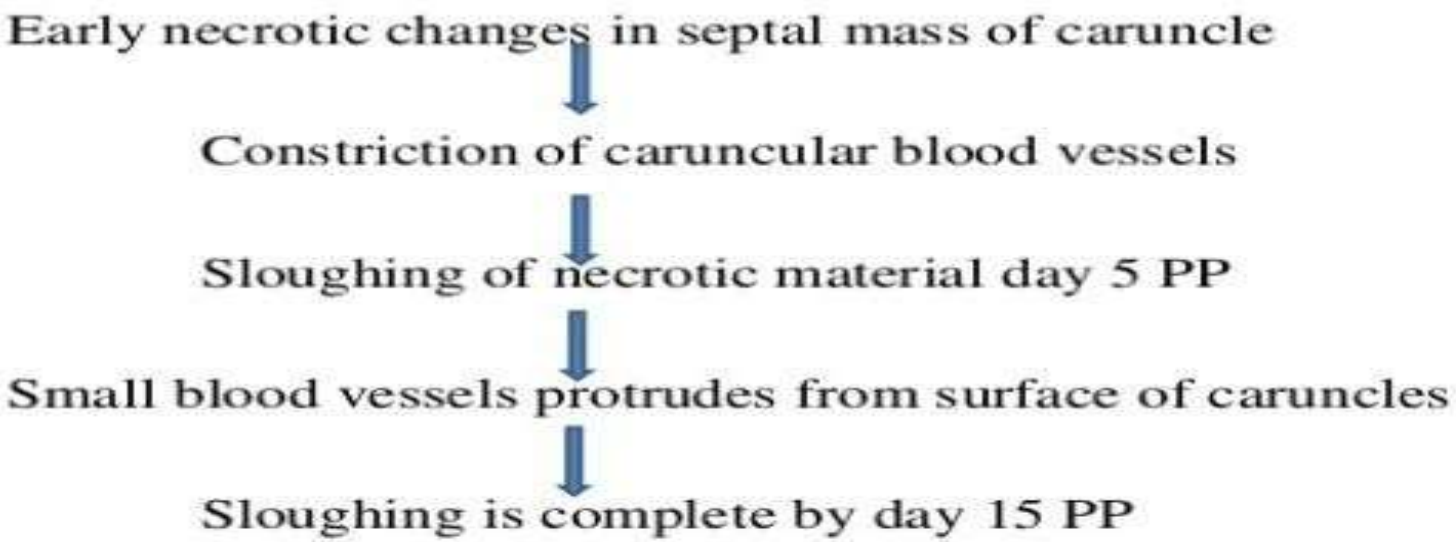
is completed by 25 days. Rughae of involution

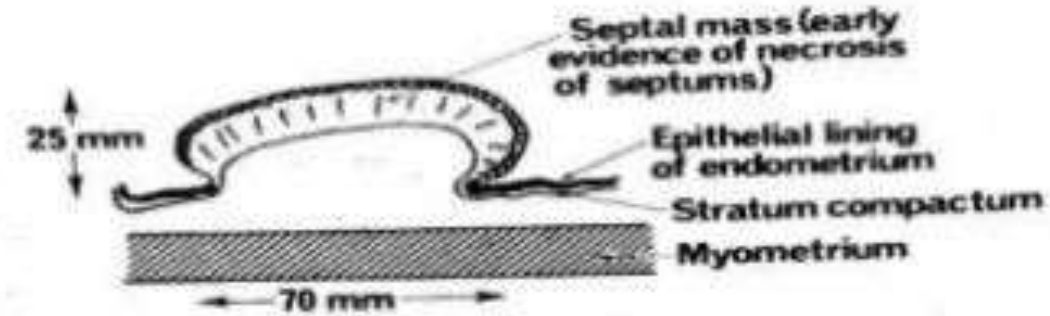
are palpable.

- A systemic response is observed post partum due to tissue damage at calving.
- Acute phase proteins increase rapidly following calving peak at 1-3 days before return to basal levels by 2-4 weeks post partum.
- Acute phase proteins limit tissue damage and promote tissue repair.

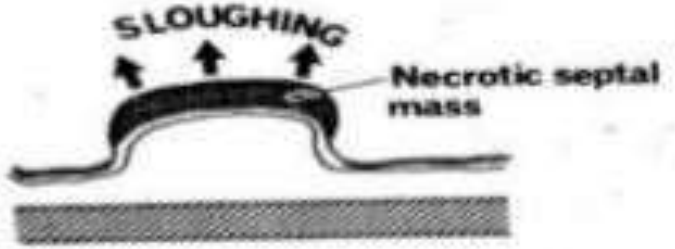
- Cervix: involutes fast, it is contracted within 10-24 hrs. In dairy cattle the cervix contracts rapidly post partum. Within 10-12 hours of a normal calving it becomes impossible to insert a hand through it into the uterus, and by 96 hours it will admit just two fingers.
  and at 25 days of parturition the cervical diameter is greater than the uterine diameter

Involution of cotyledons

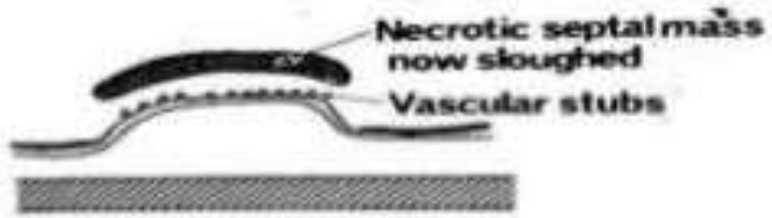




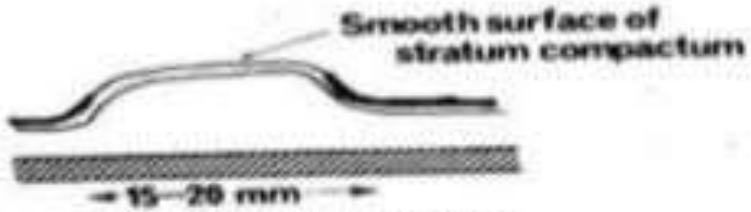
48 HOURS POST-PARTUM



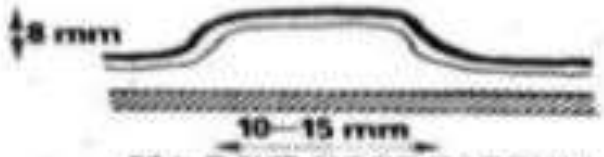
5 DAYS POST-PARTUM



10—15 DAYS POST-PARTUM



19 DAYS POST-PARTUM



25+ DAYS POST-PARTUM

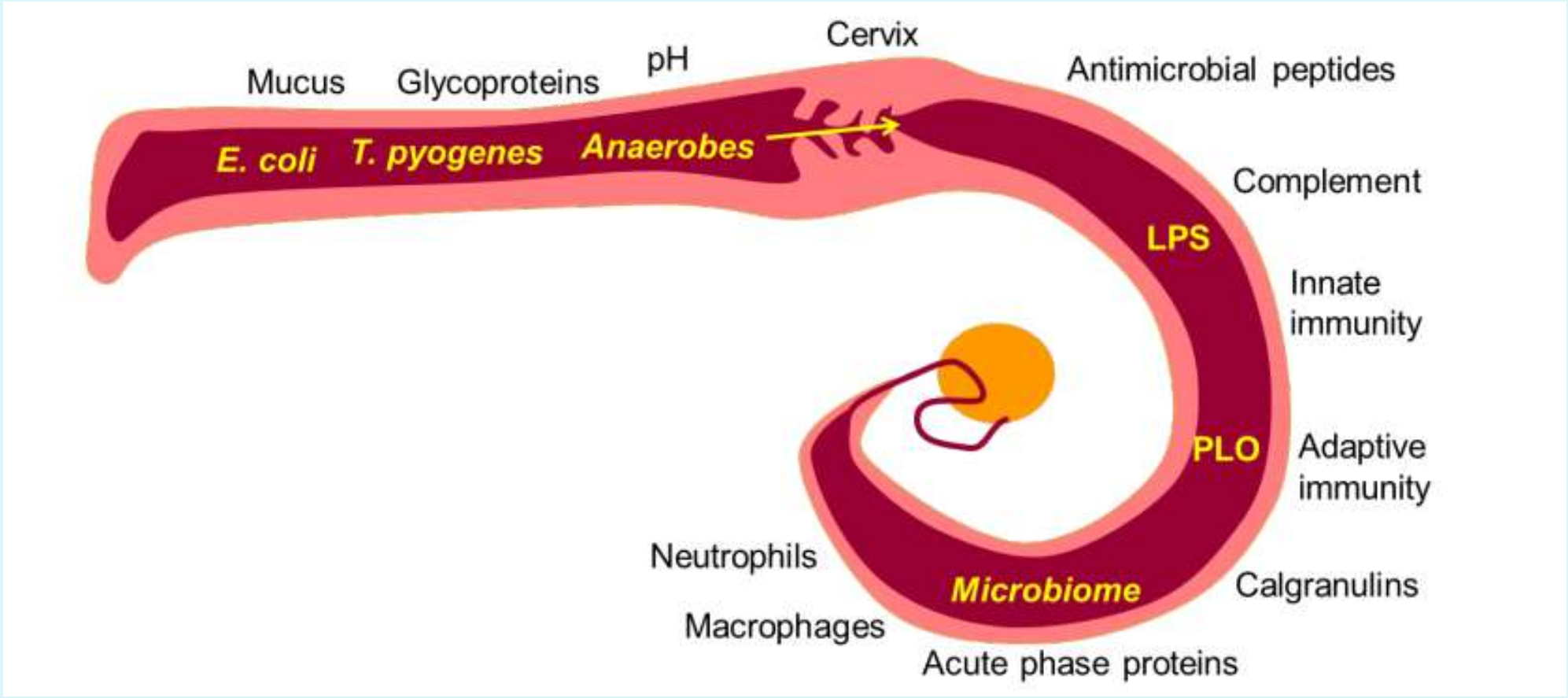
Bacterial elimination

Since the birth canal is open at parturition and for some time post partum the uterus is continuously charged and cleared of bacterial contamination. The commonly found bacteria include *Actinomyces pyogenes, E.Coli, Psuedomonas, Streptococci* and *Staphylococci,* and many anaerobic microbes like *Fusiformis necrophorous* and *Bacteroides* species.

The bacterial flora fluctuates as a result of spontaneous contamination, clearance and re-contamination during the first seven weeks post partum.

The presence of bacteria is sporadic on 28-35 days after calving, and the uterine cavity should be sterile thereafter

The Bacteria are eliminated by phagocytosis, uterine secretions and uterine contractions. Phogocytes also release interleukins.


Cervix
Mucus
Glycoproteins
pH
Antimicrobial peptides
E. coli
T. pyogenes
Anaerobes
Complement
LPS
Innate immunity
PLO
Adaptive immunity
Neutrophils
Microbiome
Calgranulins
Macrophages
Acute phase proteins

Ovarian rebound: The resumption of ovarian cyclicity post partum is called ovarian rebound.

During pregnancy, the pituitary is refractory to the GnRH due to negative feedback exerted by the high levels of progesterone secreted by the corpus luteum and placenta resulting in low output of gonadotrophins and thus, the ovaries are in a quiescent state during pregnancy except in the mare in which some ovarian activity resumes a few days post partum. Following parturition this phenomenon is reversed due to the removal of the progesterone block and thus the ovaries regain their normal activity. This is known as ovarian rebound.

The first follicular wave emerges between Day 9-14 post partum but this follicle ovulates only in 30-80% of the cows due to lack of LH receptors and IGF binding proteases. The dominant follicle becomes attretic in 15-60% of cows and cystic in 1-5% of cows.

Factors affecting resumption of ovarian cyclicity in cows

Resumption of ovarian cyclicity is dependent on the season in seasonally breeding species like buffaloes, ewe, mares and goat. There is reversal of progesterone block and reversal of pituitary responsiveness to GnRH

FSH rises transiently 15 days postpartum resulting into follicular growth, however LH rise occurs later because of lack of estrogen receptors at hypothalamus and pituitary and thus the first estrus is anovulatory. The first ovulation usually occurs in the contra lateral ovary.

An important aspect of ovarian cyclicity during the early post partum period is the high incidence of short estrous cycles of 10-11 days.

Suckling leads to increased cortisol which decreases LH, thus cows that are suckled have a delayed first post partum estrus.

High producer cows have a high prolactin which also decrease LH and thus a delayed first post partum estrus.

The first post partum estrus occurs between 30-85 days in cows but the overt signs of estrus are less

prominent or absent at this estrus. The first ovulation is many times unaccompanied by overt sings of estrus

Periparturient disease and the presence

of bulls in the herd also affect the resumption

of ovarian cyclicity in cows.

Peurperium in buffaloes

- Uterus is within the pelvic cavity by Day 14
- Involution completed within 22-52 days.
- Lochial discharges are similar to cows.
- Ovarian rebound: depends on season of calving. Only 30-40% buffaloes evidence estrus within 90 days postpartum. The resumption of
- ovarian cyclicity is dependent on the
- season of calving.

Peurperium in ewes, does and camels

- Involution completed within 25-35 days
- Ovarian rebound is season dependent

Peurperium in mares

The lochial discharge is scanty and cease by 24-48 h post foaling.

The involution is fast completed by 20 days postpartum.

The ovarian rebound is very fast and foal heat occurs within 7-10 days. In fact follicles start developing during few days before parturition and FSH surges peak on the day of foaling.

Peurperium in sows Rapid weight loss occurs during 1st 5 days post partum. Involution completed by 28 days post partum. The ovarian rebound is dependent on weaning.

Peurperium in the bitch

- Involution is slow in the bitch. Involution may be completed by 9-15 weeks post whelping.
- Uterine horns return to pre-gravid size by 4 weeks post whelping.
- The lochial discharge immediately post partum is very noticeable because of its green to grey color due to the presence of *uteroverdin* initially but changes to a bloodstained mucoid discharge within 12 hours post partum
- Continuous (up to day 84 post partum) presence of prominent placental sites should be considered a normal feature of canine uterine post partum involution
- Ovarian rebound. Due to high prolactin levels the bitch
- remains anestrus for 125-153 days

Peurperium in the cat

- Involution within 28 days of kittening
- Lactation suppresses estrus
- Cats which have no kittens or
- only 1-2 return to estrus within 7-10 days.

Thank You

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