

PHYSIOLOGY OF THE GESTATION PERIOD

Shape and location of the pregnant uterus:

1. In all domestic animals the uterus with its contents is drawn forward and downward in the abdominal cavity as pregnancy progresses.
2. In the cow and mare the uterus rests on the abdominal floor beneath the intestines after the fourth or fifth month of gestation.
3. In the ruminant the uterus is usually located in the right side of the abdomen because the left side contains the rumen.
4. In advanced pregnancy in cows and mare the length of the foetus may exceed the distance from the diaphragm to pelvis.
 - i. In the mare this often results in the uterus and foetus assuming a diagonal position in the abdominal cavity.
 - ii. In the cow, in the last month of gestation, the nose and the forefeet of the foetus, together with the enveloping uterine wall and foetal membranes, may enter the pelvic cavity and extend caudally over the cervix.
5. The mesometrium, or broad ligament, attaching the lesser curvature of the uterus of the cow to the caudal lateral flank and pelvic regions, is stretched and pulled forward by the weight of the gravid uterus.
 - i. However the ovary is never farther than 20 to 25 cm from the pelvic brim.
 - ii. The uterus of the cow is cornuate in shape and conical, with its greatest diameter from the cervix through the middle of the horn containing the foetus.
 - iii. The distal third of this horn narrows rapidly towards the apex.
 - iv. The opposite horn in both the cow and mare remains relatively small even though foetal membranes extend into it.
 - v. These characteristics of the uterus in the cow facilitate torsion of the uterus.
6. In the mare the mesometrium is attached to the dorso-lateral aspect of the uterus and dorsally to the sublumbar and dorsal pelvic regions.
7. As the uterine weight increases the ovary is pulled ventrally, but seldom more than 25 cm from the lumbar vertebrae, the ovary can frequently be felt per rectum for much of the gestation period.
 - i. The apices of the horns are directed dorsally by the traction of the broad ligament.
 - ii. The body and the horn containing the foetus are tubular and about the same diameter from the cervix to near the apex of the horn.
8. In the ewe the shape and location of the pregnant uterus is similar to that of the cow.
9. The frequent incidence of bicornual twin pregnancy and the relatively smaller abdominal cavity in the ewe may be a factor in preventing uterine torsion.
10. In multiparous animals, as the dog, cat and sow, the gravid horn is tubular and about the same diameter its entire length.
11. The foetuses are usually nearly equally distributed between each horn.
12. The horn become very long in the sow.

13. Each pregnant horn may be 1.8 meters or 6 feet in length.
14. They rest on the floor of the abdominal cavity in a folded manner, similar to intestines.
15. In the cow twinning usually results in bicornual twins one foetus developing in each horn.
 - i. In about 10 percent of twin pregnancies, both twins develop the same horn, unicornual twins.
 - ii. In these cases the horn containing both foetuses is very long and is bent at an 180 degree angle at the diaphragm, with one foetus lying parallel to the other.
 - iii. The foetus in the apex of the horn may be delayed in its expulsion at parturition or be overlooked.
16. Rectal examination of the cow during gestation often reveals a rotation of the uterus of from 20 to 90 degrees.
17. This amount of rotation is apparently corrected spontaneously before or at the time of parturition.
18. It seems probable that some of the 180 degree torsions of the uterus causing dystocia at the time of parturition may have their onset at some earlier period of gestation.
19. If circulatory embarrassment of the uterus does not develop, no symptoms of torsion will be observed until the onset of parturition when the foetus cannot be expelled due to the narrow or twisted birth canal.
20. In 1 in 1000 equine pregnancies, a single foetus may develop in both horns, bicornual pregnancy, instead of the body and one horn.
 - i. With this unusual type of development the uterus and foetus must lie diagonally in the abdominal cavity, since the length of the foetus is longer than the transverse diameter of the cavity.
 - ii. Bicornual pregnancy in other species of domestic animals rarely occurs because of the acute angle at which the horns leave the body of the uterus.
 - iii. In the mare a bicornual pregnancy may in rare cases become rotated ventrally so that the two horns and the foetus come to rest under the body of the uterus.
21. At the time of parturition this condition produces a long birth passage and severe, often fatal dystocia.

POSITION OF THE FOETUS IN THE UTERUS

1. In domestic animals the tubular uterus that lies more or less parallel to the long axis of the dam requires the developing foetus the last third of gestation to assume a longitudinal position in relation to long axis of the dam.
2. During the first half of gestation the small foetus could lie in any direction.
3. The length of the bovine and equine foetus after 5 months of gestation is greater than the diameter of the gravid horn.
4. The umbilicus of the foetus, in the cow and ewe opposes the lesser curvature of the uterus with the dorsum of the foetus lying against the greater curvature or dorsal surface of the uterus.
5. This relationship of the dorsum of the foetus to the unattached portion of the horn occurs in the cow and ewe but not the horse, sow, dog and cat.
6. In advanced pregnancy in the mare, sow, dog and cat, the foetus rests with its dorsum or dorso-lateral side against the abdominal wall and ventral portion of the uterine horn in a dorso-pubic or dorso-iliac position.
 - i. This is said to account for the rolling tactics of the mare at the time of parturition.

- ii. At birth the foetus of the mare, sow, cat and dog normally passes through the birth canal with its dorsum against the sacrum of the dam. This is brought about by a rotation of the foetus.
7. In the mare the lack of space for foetal development in bicornual pregnancy often results in flexion of the foetal head and neck alongside the body, and because movement is thereby limited wry neck often results.
8. In the cow 95 % of the foetuses were in anterior presentation, with the cranial extremities toward the pelvis, by the sixth month of gestation.
9. At 7 months of gestation in the mare only about 60% of the foetuses were in anterior presentation but by the 9th month 99 percent were in anterior presentation. These late rotation of the equine foetus probably are made possible by a rotation of the amnion and foetus within the allantoic cavity.
10. In late gestation in the cow 95 percent of the foetuses are in anterior presentation with their cephalic poles facing the cervix.
11. In 5 % of the foetuses the caudal poles face the cervix in the posterior presentation.
12. During the early months of gestation the incidence of anterior and posterior presentations is about 50 % each.
13. In the ewe about 95 % of the foetuses are in anterior presentation at parturition.
14. In swine 54 % were anterior and
15. That in dogs 70 percent were anterior presentation.
16. In twins, particularly unicornual twins, in uniparous animals it is not unusual to find one foetus in anterior and the other in posterior presentation.
17. The reason for the very high incidence of anterior presentation late in gestation and at birth in the cow and mare is not known.
18. Two thoughts about posterior presentation in cows and mares.
 - i. One thought held posterior presentation in cow and mare as pathological,
 - ii. Another thought held it a normal.
19. Those who consider it as pathological they say that since in the cow and mare the percentage of anterior presentations is so much higher than that of posterior presentations and the incidence of dystocia or difficult birth is so much higher in posterior presentations than in anterior, posterior presentation in these two species is pathological.
20. Other authors indicated that since birth can and often does proceed without incident in posterior presentation in the cow and mare, posterior presentations in uniparous may be normal.
21. The evidences, however, tends to support it to be pathological.
22. In posterior presentation, compression of the foetal abdomen as it enters the pelvis expands the rib and costal arch, while in anterior presentation the foetus is wedge shaped thus tending to dilate the birth canal during parturition.
 - i. In dog foetuses, the occiput, often the broadest bony structure of the foetus, makes a sudden engagement in the pelvis in posterior presentation.
 - ii. The passage of the foetus in posterior presentation is against the direction of its hair creating more friction and resistance.
 - iii. Lastly, more space is required in uniparous animals to extend flexed hind limbs in posterior presentation.

