DOWNLOAD PDF THERIOGENOLOGY IN CAMELIDAE

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Emergencies in theriogenology practice go beyond just saving the life of the patient, but also preserving its reproductive abilities. Camelid emergency medicine is a relatively new field.

How to cite this article: Journal of Biological Sciences, 7: Therefore, if ovulation is prevented by the absence of mating, mature follicle s will regress and a new wave of follicles will start to grow again El Wishy, Therefore, it is more appropriate to use the term follicular wave or follicular wave pattern rather than estrous cycle to describe this type of cycle Cockrill, ; Skidmore et al. The onset of sexual activities in the female camel marks the beginning of puberty and it has been found to start as early as years of age Molash, ; Arthur et al. Factors such as adequate nutrition, body weight, photoperiod, temperature and water availability can influence the onset of sexual activity Wilson, Camels breed only during certain times of the year and, therefore, are considered as seasonally polyestrous animals Musa and Abusineina, ; Arthur, ; Shalash, The natural mating season and most conceptions occur in all areas at time of the year when the follicular wave is longest Wilson, Contradictory reports has been reported concerning the beginning and duration of the seasonal activity in the female dromedary camel. However, in the United Arab Emirates, well nourished and watered female camels show ovarian activities throughout the year Tibary and Anouassi, In spontaneous ovulators sheep goat and cattle , the estrous cycle consist of four distinct phases known as pro-estrus follicular growth period , estrus when female accept coitus , met-estrus when the corpus luteum is developing and di-estrus when the corpus luteum is developed, activated and finally degenerated Allen, ; Hafez, In another classification, these four phases were divided into two main phases: However, in induced ovulators such as the camel, there are three phases of the follicular wave which could be categorized as the growth phase A fourth phase was suggested to precede the growth phase: The duration of each phase and the total length of the follicular wave were found to vary considerably. The total duration of the follicular wave was found to be The duration of the follicular wave was also found to be longer days at the start December and end of the breeding season April compared to the middle end of January to mid of March of the breeding season days Yagil and Etzion, Folliculogenesis and hormones secretion: The ovaries of the non-pregnant camels are oval, flattened and relatively small mm Novoa, Each ovary weighs g El Wishy, , while ovaries containing graffian follicles may weigh 5. All follicles grow peripherally and randomly distributed over the surface of the ovary and therefore, can be detected easily when they are 3 mm or more in diameter Tinson and McKinnon, The dominant follicle continues to enlarge and can ovulate after reaching mm in diameter Tinson and McKinnon, If ovulation does not occur, the dominant follicle starts to regress. These non-ovulatory cyst-like follicles do not appear to affect fertility and other smaller follicles may continue to grow normally Tinson and McKinnon, Luteinizing hormone LH secretion: The concentrations of Luteinizing Hormone LH were found to be higher during the breeding season compared to the non-breeding season Bono et al. These variations in LH concentration levels throughout the year may explain why female dromedary camel in Egypt was found to conceive at any time of the year with a considerable variation between seasons Nawito, Similar results were also found in Sudan confirming that maximum ovarian activities and conception occurred from January-August and minimum activity occurred from October-December Khalil, Another reason for these variations could be the higher sensitivity of the pituitary to Gonadotrophin Releasing Hormone GnRH and consequently their higher secretion of LH during the breeding season compared to the non-breeding season Bono et al. As induced ovulators, mating in camels is the stimulus for an LH surge needed for the completion of the final stages of follicular maturation and subsequent ovulation. In the dromedary female camel plasma LH concentrations were found to increase gradually to reach a maximum concentrations of ng mL-1 at about h after mating and then start to decrease h later Marie and Anouassi, , Follicle stimulating hormone FSH secretion: The main role of FSH in the estrous cycle of female farm animals is to stimulate the early stages of follicular development. Along with low levels of estradiol, FSH plays a part in the development of follicular LH receptors allowing follicles to become more responsive to the follicular increase in tonic LH secretion and thereby preparing them for ovulation and luteinization Haresign, Follicle stimulating hormone in the female dromedary camel tend to increase days after mating compared to pre-mating values. However, this increase is not significant Anouassi et al. It is possible that this little rise in FSH secretion maybe needed for the development of the next wave of follicles if the previous mating did not end up with conception. Estradiol and testosterone secretion: Both testosterone and estradiol are synthesized from cholesterol. In both, sheep and cattle, ovarian follicles thecal cells are believed to provide granulosa cells with an androgen precursor androstenedione and testosterone for aromatization since granulosa cells can not synthesize androgens due to their lack of the specific enzymes involved in this process Baird, ; Armstrong et al. Evidence supports the presence of a local feedback loop within ovarian follicles, where androgens produced by thecal cells are used as a substrate for granulosa cell aromatization into estrogen, which in turn may feedback to stimulate thecal cell production of more androgens Fortune, ; Roberts and Skinner, Gonadotrophins LH and FSH exert their major effects on steroidogenesis in both granulosa and thecal cells at least in part through the activation of membrane-bound adenylate cyclase, thereby increasing the rate of synthesis of cAMP Weiss et al. Furthermore, as the follicles increase in size, cAMP content and estradiol production increases McNatty et al. High serum estrogen and testosterone concentrations during the 5 days follicular development is probably the stimulus to behavioral estrus Homeida et al. The concentration of these two hormones when follicles can be palpated was found to be 20 pg mL-1 for estrogen and 50 pg mL-1 for testosterone. Regression of the follicles on the other hand was followed by low estrogen and testosterone concentrations Khalil, Measurement of estradiol concentrations in the follicular fluids also revealed that estradiol levels were found to be higher in large follicles and minimal in small sized, cystic and atretic follicles Salem et al. However, follicular fluids estrogen and testosterone concentrations alone may be not a reliable indicator of the follicles estrogenic activity. It is the ability of granulosa cells to convert testosterone to estradiol under the aromatase system which determine whether such follicles is estrogenic active or non-estrogenic non-active. A bi-modal distribution of follicles was observed when frequency number of follicles were plotted against estradiol: On this basis, individual follicles were classified as estrogenic or non-estrogenic if they had follicular estradiol: As a result of this classification, no significant differences were found in the diameter of estrogenic and non-estrogenic follicles. These results indicate that the rate of converting testosterone to estradiol is more indicative of follicles estrogenic activity rather than the concentrations of these two hormones. Insulin-like growth factor-1 secretion: Insulin-like growth factor IGF system has already been shown to play a key role in ovarian function Giudice, ; Poretsky et al. In farm animals, insulin like growth factor-1 IGF-1 has been found to be important at the antral stages of follicle development where it is involved in the regulation of follicle growth, stimulation of somatic cell proliferation and the stimulation of granulosa cells production of both estrogen and progesterone Adashi et al. However, unlike spontaneous ovulators, very limited information is available, at present, regarding intra-ovarian regulation of granulosa cell function in induced ovulators such as the dromedary camel. In a study conducted to examine the relationship between concentrations of ovarian steroids and IGF-1 in the follicular fluid of the female camel, Basiouni found no significant differences in the follicular fluid IGF-1 concentrations between estrogenic and non-estrogenic follicles. These results do not necessarily mean that IGF-1 has no role in the follicular development in camels since IGF-1 bioactivity is determined by its binding proteins. Unlike spontaneous ovulators, the camel being an induced ovulator requires a relatively very short period of time for a follicle to shift from non-ovulatory to ovulatory stage. An active role for IGF-1 in the camel may be perceived in this respect, in the ovulatory follicle during the period just before ovulation. However, after mating, progesterone concentrations start to rise reaching 3 ng mL-1 by day after mating Skidmore et al. Follicular fluids progesterone concentration was also found to be low in follicles ranging from 0. However, these concentrations were higher in atretic follicles ranging from cm in diameter 1. The first preovulatory LH surge as a result of mating leading to 1st ovulation puberty in the female dromedary camel was found to occur at years of age Williamson and Payne, ; Evans and Powys, ; Shwartz, ; Musa et al. Ovulation can be induced by the deposition of whole semen or sperm-free seminal plasma into the vagina of the bactrian camel Chen et al. It can also be induced in the dromedary camel by mating with either intact or vasectomized male Marie and Anouassi, However, mechanical stimulation of the cervix, intrauterine injections of whole semen, seminal plasma, water, prostaglandin F analogue, cloprostenol, was not successful in stimulating sufficient release of preovulatory LH surge to induce ovulation Musa and Abusineina, ; Musa et al. An ovulation-inducing factor in the seminal plasma of the bactrian camel was isolated Pan et al. Blood plasma LH was found to increase significantly from 6. Moreover, the insemination of the female bactrian camel with an ovulation inducing bioactive protein from the seminal plasma of a male was found to induce a preovulatory LH peak Pan et al. These researchers also found that the main site for active absorption of the ovulation inducing factor was in the anterior vagina. As in the bactrian camel, further studies are also needed in the dromedary camel to obtain the full characterization of the pure ovulation-inducing factor. However, twin births are only 0. Even though it is accepted that there is substantial differences in the activity between the right and left ovaries Musa, Both ovaries appears to be equally capable of producing normal preovulatory follicles Basiouni, However, in twin ovulation cases, the embryo in the right horn of the uterus dies during early pregnancy Musa, Assisted reproductive techniques in the female dromedary camel: The recent knowledge acquired in regard to follicular wave pattern in the female dromedary camel has led to the improvement of Assisted Reproductive Techniques ART such as follicular wave synchronization, induction of ovulation and superovulation. The recent wide use of ultrasonography techniques has made it easier to monitor ovarian follicular wave development and hence to use hormonal treatments at an appropriate stage of development to induce ovulation. As in farm animals, progesterone impregnated devices has been used to inhibit follicular growth, estrus behavior and ovulation in the female dromedary camels. However, PRID alone did not seem to be a reliable method of synchronization in the dromedary camel since the presence of the spring-loaded PRID in the vagina close up against the cervix for a period of 7 days may have initiated the release of LH triggering the necessary steps required for ovulation Cooper et al. The improvement of reproductive efficiency in the female dromedary camel are limited by the short breeding season, long gestation period and the continuous use of traditional reproductive management systems. The regular palpation of the ovaries Musa, and the use of the ovarian ultrasonography techniques Skidmore et al. Treatment of the dromedary female camels with 20 ug of buserelin or i. These results concluded that the optimum time for natural breeding or induced ovulation in the female camel is when follicles are 0. Techniques such as superovulation can also be used to stimulate the growth of a large number of follicles so they could be used for embryo transfer to produce multiple progeny of desirable genetic merits for both production and the high monetary value of racing camel. To stimulate the growth of multiple follicles, equine chorionic gonadotrophin eCG , follicle stimulating hormone FSH and gonadotrophin releasing hormone GnRH has been used in camels at various doses which may or may not, be given after a period of progesterone priming. A single dose of eCG iu injected in a single dose either one day before, or on the day of ending a days of progesterone priming was found to be reasonably successful Cooper, et al. Follicle stimulating hormone of porcine or ovine origin has been also used with a total dose of 18 mg of ovine FSH or mg of porcine FSH given over a period of 4 days was also successful Cooper et al.

Chapter 2 : Dystocia in camelids: The causes and approaches of management

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Effect of different mating stimuli on induction of ovulation in the alpaca. Alpaca Alpaca semen characteristics previous to a mating period. Alpaca Superstimulatory response and oocyte collection in alpacas. January 2, ; 57 1: Alpaca Growth of the conceptus in alpacas Bravo, P. Am J Vet Res. American Veterinary Medical Association. Australian Veterinary Association, Alpaca Hydronephrosis and ureteral duplication in a young alpaca. The British Veterinary Association. Alpaca Reproduction Biological activity of the seminal plasma of alpacas: Alpaca Plasma progesterone in alpaca Lama pacos during pregnancy, parturition and early postpartum. Alpaca Collection of semen and artificial insemination of alpacas. Alpaca Effect of repeated collection on semen characteristics of alpacas. Society for the Study of Reproduction. Universidad Nacional Mayor de San Marcos. Instituto Veterinario de Investigaciones Tropicales y de Altura. Centro de Investigacion ; no. J Am Vet Med Assoc. Alpaca Sexual receptivity and time of ovulation in alpacas Sumar, J. Alpaca Note on vicuna x alpaca hybrids crossbreeding, Peru Macedo H. Z Tierz Zuchtungsbiol, Mar , 90 4: IVITA, [] 43 p.: Alpaca Embryonic mortality in the alpaca. Biol Reprod, Oct , 3 2: Alpaca Corpus luteum function in the alpaca. Novoa Biol Reprod, Oct , 3 2: Alpaca Effect of different mating stimuli on induction of ovulation in the alpaca. J Reprod Fertil, July , 22 2: Alpaca Luteal function and the nature of reproductive failures in the alpaca.

Chapter 3 : Anatomy and Physiology of Reproduction in the Female Llama and Alpaca | Veterian Key

Theriogenology in Camelidae by A. Tibary, , Actes Ã©ditions, Institut agronomique et vÃ©tÃ©rinaire Hassan II edition, in English - 1st ed.

Ovulation in spontaneous species e. However, in induced ovulators e. In the later, various factors have been proposed to trigger ovulation, including auditory, visual, olfactory, and mechanic stimuli. However, other studies have identified a biochemical component in the semen of induced ovulators responsible for the induction of ovulation and named accordingly ovulation-inducing factor OIF. In camelids, intramuscular or intrauterine administration of seminal plasma SP was shown to induce the preovulatory luteinizing hormone LH surge followed by ovulation and subsequent formation of corpus luteum. Introduction Ovulation is a critical event in the reproductive function in all female mammals. Gonadotropin-releasing hormone GnRH is the key regulatory neuroendocrine pathway implicated in the regulation of ovulation. Based on the biological process that triggers the release of GnRH, two categories of species are classified as follows: In animals considered as spontaneous ovulators e. The ovarian follicular dynamic leads to the emergence of one or more dominant follicles depending of species been monoparous or multiparous , which increases the systemic concentration of estradiol. High estradiol concentration switches its negative to a positive feedback, which is permissive for the activation of GnRH release into the portal blood. Recent studies have demonstrated that hypothalamic neurons expressing kisspeptin Kp are critical to integrate the negative-to-positive switching effect of estradiol and to activate GnRH release 1. GnRH in turn triggers a strong and transitory release of luteinizing hormone LH LH surge from the gonadotrophs of the pituitary gland 2. This marked increase in circulating LH activates a whole cascade of inflammatory and proteolytic responses leading to the rupture of the dominant follicular boundary wall and the extrusion of the oocyte with its cumulus oophorus 3 â€” 5. In induced also called reflex ovulators e. It has been suggested that genital-somatosensory signals generated by penile intromission during copulation activate neural circuitries, mainly noradrenergic neurons, in the midbrain and brainstem to promote GnRH release 6. Several other stimuli including emotional, olfactory, auditory, visual, and tactile signals have also been assumed to facilitate ovulation 8 , 9. The existence of this OIF was then confirmed in several other studies 12 â€” 16 and recently identified by Ratto et al. OIF in the SP of Camelids Breaks Old Dogma The understanding of the mechanism by which ovulation is initiated in induced ovulators was the purpose of different studies since the s. The first evidence of the existence of an induced process of ovulation in camelids was reported in alpacas where authors documented that mounting accompanied by intromission was necessary to provide adequate stimulation of LH release and the subsequent ovulation 8 , 18 , Later on, Shalash and Nawito 20 observed that ovulation also required mating in dromedary and Bactrian camels and suggested that coitus, mechanical or electrical stimuli of the cervix would be essential for ovulation. From these early studies, it was believed that physical stimulation of the genitalia during copulation is the primary trigger for inducing ovulation in camelids species. This dogma lasted until when two remarkable studies published in the same Journal of Reproduction and Fertility 10 , 11 reported the ovulation-inducing effect of semen in Bactrian camel. Both studies showed that the single intramuscular or intravaginal administration of male SP induced a surge in LH followed by ovulation. In their study, Chen et al. Contrastingly, none of the female inseminated with washed spermatozoa ovulated. In all case, the timing of ovulation was similar to that observed following natural mating 36â€”48 h later. In the other study, Xu et al. Further studies, especially in Chile and Canada, confirmed the robust ovulatory effect of SP in llamas and alpacas. In a recent work, Berland et al. A comparative study performed by Adams et al. Interestingly, the increase in plasma LH concentration observed in SP treated female was faster but more prolonged as compared to the ones treated by GnRH: Furthermore, the corpus luteum CL showed a greater diameter, regressed later, and produced more than two times progesterone in SP treated group as compared to the GnRH injected group Figure 1 B. Interestingly, the pattern of SP-induced LH surge 13 is very similar to that described in response to natural mating 28 , A careful reading of figures of another study comparing the effect of purified OIF to a GnRH analog Buserelin in dromedary females 30 showed that progesterone secretion subsequent to ovulation is prolonged in OIF-treated group as compared to GnRH analog group. This seems to indicate that in female camel also, the luteotrophic activity of OIF is more important than that of GnRH. Effect of intramuscular treatment of female llamas with llama seminal plasma, gonadotropin-releasing hormone GnRH , or phosphate-buffered saline PBS. The effect was studied on A plasma luteinizing hormone concentrations and B corpus luteum diameter and plasma progesterone concentrations. Different studies 31 â€" 33 demonstrated that as for GnRH, the OIF shows a doseâ€"response effect on circulating concentration of LH and the incidence of ovulation in llamas and alpaca. Indeed, it was reported that its administration induces an important angiogenesis with a high blood flow, promoting the formation of the CL 34 â€" A preliminary study carried out in Bactrian camel reported that OIF bioactivity disappears when SP is subjected to trypsin digestion, indicating its proteic nature Further studies were performed to purify and characterize OIF in Bactrian camel 12 , 38 , 39 , llamas 16 , 40 , and recently in dromedary camel In the exhaustive study conducted by Pan et al. The smallest difference regarding the protein molecular weights was observed for a pair of proteins of camel and cattle SPs, with, respectively, Of all fractions injected in the muscle of female camels only the L2 fraction induced ovulation. Further L then L subfractions were identified according to their ability to induce ovulation following its intravenous injection in female camel and mice. This later L fraction of 8. Using similar approaches, Zhao et al. Effect of different protein fractions separated from camel seminal plasma on luteinizing hormone LH and FSH concentrations in pre-culture and culture of rat pituitary tissue. In another series of experiments, Ratto et al. The treatment effect was challenged by testing intramuscular injections of resulting fractions in female llama. In a follow-up study, Ratto et al. Furthermore, the CL attained a greater diameter and secreted more progesterone in C2- than in SP-treated animals Figure 3. Altogether, these results suggest that OIF is a large proteic complex made of different subunits with only a part being bioactive. Bioactivity of llama seminal plasma SP under different treatments in female llamas [modified from Ref. Corpus luteum CL diameter A and plasma progesterone concentrations B in llama females, which received different protein fractions separated from llama seminal plasma SP. Administration concerned, whole SP positive control , fractions A or B isolated by hydroxylapatite column chromatography , fraction C2 isolated by gel filtration chromatography , or phosphate-buffered saline PBS, negative control. Biochemical Nature of the OIF: They observed that the bioactive C2 fraction has an exact molecular mass of Altogether, this decisive study of Ratto et al. Additional studies confirmed this observation. Furthermore, in this later species, recent purification of SP showed two protein peaks, P1 and P2. In female alpaca, the ovulation rate depends on the dose and site of deposition of SP 14 , Endometrial curettage effect on the ovulation rate and the formation of follicle and corpus luteum CL in female alpacas after intrauterine infusion with alpaca seminal plasma SP. Tx, treatment [from Ref. The obtained effect seems to be not mediated by GnRH receptors since the LH secretion from rat pituitary cells was not impaired by an anti-GnRH antibody in the media In llama also, Adams et al. The study conducted by Silva et al. It is now well established that the main hypothalamic sites of action of estradiol are Kp neurons. Since the discovery in that human 71 and mice 72 lacking functional Kp receptor Kiss1r are infertile, numerous studies have demonstrated the critical role of this neuropeptide in pubertal development and adult reproduction [see Ref. Kp neurons have been found in the hypothalamus of all mammals investigated so far, and they project their fibers mainly to the GnRH cell bodies, in the POA, and nerve terminals, in the median eminence 73 â€" All Kp neurons express estradiol receptors, and they are now considered as the main central sites for both the positive and negative according the hypothalamic nuclei where Kp neurons are located feedback effects of estradiol. Kp is extremely potent to trigger GnRH release and the downstream LH and FSH secretion, and it is now accepted that Kp is responsible for the induction of the preovulatory LH surge in female mammals Recent studies have investigated the putative role of Kp in induced ovulators. In the musk shrew, the number of Kp expressing neurons is regulated by estradiol, and injection of exogenous suncus Kp sKp was found to induce follicular maturation and ovulation similarly than matting [Figure 6 ; 79]. Effects of kisspeptin sKp and sKp injections on development and formation of follicular and CL in an induced ovulator, the musk shrew. A slit-like FC arrowheads in ovarian follicles at 10 h and fungiform corpora lutea in the ovary at 3 days were observed in mated and sKpinjected females. Insets show the boxed area in each panel at higher magnification. The ovulation rate in musk shrews, an induced ovulator, under the effect of various kisspeptins and GPR54 agonists. A Females mated or injected with saline or sKp 0. B Effect of cetrorelix, a gonadotropin-releasing hormone antagonist, on sKpinduced ovulation. Number of animals treated are shown over each column [from Ref. Indeed, in the musk shrew, mating induces a large increase in c-Fos expression marker of neuronal activation in hypothalamic Kp neurons Indeed, Loy et al. The GnRH on the other hand stimulates the release of a pulse of LH, which leads to the rupture of the dominant follicle and thus induced the ovulation. In such seasonal breeders, Kp would be also responsible, as for other species, for the seasonal stimulating of the neuroendocrine reproductive axis. The known steroids positive feedback responsible of ovulation in spontaneous ovulators is lacking in reflex ovulators, However, estradiol seems to play an important role for inducing ovulation in such species as discussed before in the musk shrew and llama. However, its site and mechanism of actions are far from being understood. In this regard, the Kp hypothalamic neurons appear as an interesting putative target, an hypothesis that now required further investigation in induced ovulators, especially camelids. Conflict of Interest Statement The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. Acknowledgments The authors are grateful to the publishers, BioMed Central Figures 3 and 4 ; Tables 1 and 2 , PNAS Figures 6 and 7 , and Wiley Figure 2 for graciously granting the permission for the reuse of the respective figures and tables. The permission of the reuse of Figures 1 and 5 is obtained from Oxford University Press under the license number, respectively, and Physiol Rev 92 3:

Chapter 4 : Comparative Placentation

Jacobo S. Rodriguez, Ahmed Tibary, in Llama and Alpaca Care, Breeding soundness examination of the camelid female is most likely the single most important aspect of camelid clinical theriogenology in practice.

Uterine Torsion The more commonly known name for this condition is "Twisted Uterus". At some point the uterus has rotated and created a twisted area in the birth canal. This halts any stages of labor and prevents the cria from passing through the birth canal. One possible way of correction. Anderson Reproductive problems in Camelids are a source of great stress for both the animal and the owner. We hope to help decrease some anxiety associated with reproductive problems by increasing knowledge and awareness of some common peri-parturient near the time of birthing problems. This article will focus on uterine torsions. A uterine torsion is a condition where the pregnant uterine horns rotate from their normal position. The rotation can be described as either clockwise or counter-clockwise. This refers to the direction of rotation of the uterine horns about each other similar to the hands of a clock. If you are looking at the rear of the llama, visualize a clock face. If the left horn flips over top of the right horn, then the horn has moves clockwise similar to the hands of the clock. To state this another way remember that Camelids have bi-cornate two horned uteruses. If you think about your arms as the two horns and place them in front of you in the shape of a "Y" you would be a normal uterus. In a clockwise uterine torsion your left arm would go over top of your right. In a counter-clockwise torsion your right arm would go over top of your left. The torsion can be anywhere from 90 degrees to degrees and beyond. The place where it twists is normally near the cervix. This prevents the cervix from dilating and will prevent birth if it is not corrected. Uterine torsions are generally painful and can cause colic-like signs increased heart rate and respiratory rate, anorexia, rolling, thrashing and straining. It is still unknown why uterine torsions occur. It is known that there are some conditions which make a torsion more likely to occur. Uterine torsion should be suspected when a dam is close to parturition within 3 months and shows signs of colic or distress. Uterine torsions can be corrected with medical or surgical intervention. Medical intervention generally entails rolling the female while stabilizing the uterus to "untwist" the trosion. Sedation may be needed to roll the dam. The dam is placed on her side and rolled over her back to her other side. The dam in placed on the side "with" the torsion or toward the twist: A plank or manual pressure on the outside of the abdomen helps keep the uterus in place while the dam is "rolled off of her uterus". This procedure may need to be repeated multiple times. Our rule of thumb is "three times and your out" meaning that if we can not correct the twist in three attempts, we perform surgical correction. A vaginal exam should be performed after each attempt. If it is not successful, your veterinarian should make a decision about when or if, depending on the severity of the torsion and health of the fetus to go to surgery. Surgical correction of uterine torsion uses the same approach as a c-section. The surgeon then corrects the torsion. If the fetus is near term or determined to be dead, a c-section can be performed at the same time. In some cases the uterus cannot be untwisted without removal of the fetus. This is a judgment call that the surgeon makes during surgery. The possible complications of uterine torsion are fetal death or compromise, death of the dam, uterine compromise twisting can cut off the blood supply to the uterus and fetus , uterine rupture and subsequent peritonitis, and, if surgical correction is necessary, all of the complications associated with c-section. We reviewed thirteen camelids presented for uterine torsion; 10 were alpacas and 3 were llamas. In one case, the dam died 14 days post-operatively due to peritonitis. In all of the cases where time of gestation was known, uterine torsions happened in the last 2 months of gestation. We can recommend, based on these findings, that dams should not be stressed in the last several months of gestation. This would include moving them to a birthing pasture at least 30 to 60 days before birthing to minimize the risk of excessive rolling e. Close observation of late-term dams can also help to catch dystocias before harm occurs to the fetus or dam. Any dam that shows signs of colic or a prolongation of stage 2 labor for instance, a foot is out and nothing else for 20 to 30 min should be evaluated by a veterinarian as soon as possible. Early detection of problems can help increase the number of healthy fetuses born to healthy dams. In conclusion, when your animal has a reproductive problem, the most important questions an owner or barn manager should ask themselves are: Your experience and expertise should allow you to make a decision on the second question. And finally, the sooner the better is almost always the answer to the third question. We would much rather see your camelid too soon than too late.

Chapter 5 : tcanis | eBay Stores

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Acknowledgment Key Points South American camelid breeders often note subtle behavior changes e. Fetal malposition and malposture are the most common causes of dystocia in all camelids. Knowledge about the various presentations of embryonic death, abortion, dystocia, and other reproductive tract anomalies allows the veterinary technician to accurately triage emergency calls while communicating with the client. After obtaining necessary information from the client, the technician can prepare the hospital or ambulatory vehicle to receive, diagnose, and treat the dam. As many as In addition, dystocia is the leading cause of acquired infertility or even complete loss of reproductive ability in SACs Tibrary A: Personal communication, Washington State university, Taking the Case History Obtaining a complete history from the client is very important when trying to ascertain the overall health of the dam, length of gestation, and viability of the fetus and whether the dam is aborting or in labor. Camelids are induced ovulators with a variable gestation period. Although the average pregnancy length is days in SACs, gestation can range from to days. SAC owners are generally well-read, avid seekers of new information on the Internet and at conferences. This can lead to an increase in the number of calls from cautious or new clients, especially after they have attended a seminar on dystocia. Breeding dates are very important when it comes to determining the prognosis for viability of the fetus; however, factors such as season, nutrition, genetics, and management may affect pregnancy length. The time of year the dam was bred can also affect pregnancy length, with mating in the spring resulting in longer pregnancies. Embryonic death may occur up until implantation. This event may or may not be noted by the breeder. Abortions can occur any time after implantation and can result in serious complications such as retained placenta, uterine infection, and subsequent infertility. A second serum sample from the dam should be submitted with convalescent titers 2 to 3 weeks after the abortion to determine if any infectious disease may have caused the abortion. All stillbirths should be treated as abortions and submitted for the same diagnostic work-up. To reduce transmission of zoonotic diseases, gloves should always be worn when handling abortus, placenta, and stillborn fetuses. In cases of abortion, the risk of contagious or zoonotic diseases on the farm, such as chlamydiosis, toxoplasmosis, listeriosis, brucellosis, or leptospirosis, should be discussed with the breeder, and steps should be taken to prevent the spread of disease. Most established SAC breeders are well educated about the biology of their animals and will give a beneficial and detailed history of the dam with reasons why they think there is a problem. However, new breeders may lack experience in assessing their animals. Regardless of experience level, the breeder is the most reliable source for the subtle behavioral changes noted in the first stage of labor. Restlessness is one of the most common signs owners report. Other behaviors include inappetence, frequent urination, frequent visits to the dung pile, and rolling. If the answer is "yes," the next step is to learn whether the visible tissue is part of the fetus or placenta. A vaginal prolapse may be mistaken for the beginning of stage two labor. Rupture of the allantochorion first water bag and passage of fetal fluid without progression of visible fetal parts within a reasonable time is a sign of dystocia. It is important to ascertain that the female has indeed ruptured the first water bag because fetal fluid passage may have been missed. Therefore, additional questions are necessary to determine if the female is in labor. Does the perineal area appear loose? Is the dam excessively wet in the perineal area? Is she excessively wet on her hind legs? It is important to note that wetness in the perineal area or hind legs may be misleading if urine is mistaken for fetal fluid or if the female is in a wet environment. It is imperative that all veterinary health care professionals involved in the care of SACs be knowledgeable about the normal birthing process in order to determine abnormalities. SACs are not very predictable with regard to signs of impending parturition. Although mammary gland development, lengthening of the vulva, and relaxation of the sacropelvic ligaments are all part of preparation for birth in SACs, these signs are extremely variable and often difficult to assess. Initial Physical Assessment If possible, the dam should be brought into a safe and clean area for assisted vaginal delivery. The environment should be kept warm to assist the compromised dam and neonate with thermoregulation. A complete physical examination of the dam should be performed, including measurement of temperature, pulse, and respiration. If an ultrasonograph is available, transrectal ultrasonography to evaluate the placenta and transabdominal ultrasonography to evaluate the health of the fetus should be implemented. Rectal palpation should be conducted to help determine the position of the fetus and uterus. A vaginal examination should be performed to visualize the cervix and may help in determining whether the uterus has rotated. Until it is proven otherwise, the health care team should always assume that the fetus is alive and viable. However, the team should be prepared for the possibility of a compromised dam in need of a cesarian section or fetotomy. The cascade of events leading to initiation has not been fully investigated in camelids. The working hypothesis is similar to what has been described in small ruminants in that at the end of gestation, the uterus can no longer support the fully developed fetus. This is thought to induce hypoxic stress in the fetus, causing it to release adrenocorticotropin. This in turn stimulates the fetal adrenal cortex to produce corticoids and particularly cortisol. Cortisol produces several changes in the steroidogenic activity of the placenta, promoting synthesis of more estrogens. This combined with placental production of prostaglandin F2a increases contraction of the myometrium of the uterus. Prostaglandin F2a increase also leads to luteolysis corpus luteum regression , causing a further drop in the progesterone levels needed to maintain the pregnancy. Stage Two See Normal Stage Two Labor This stage of labor is defined as the time from the rupture of the first water bag allantochorionic sac until expulsion of the fetus. It should be completed in less than 1 hour. It is important to note that the first water bag is not visible at the vulva but ruptures inside the uterus. The second water bag straw or white in color is the amnionic sac. It is seen after the second stage of labor has been initiated. This sac must rupture before any fetal part will be visible at the vulva. In normal parturition, the first fetal parts visible at the vulva are the feet, followed by the nose in an anterior-dorsosacral position. SACs usually give birth standing, which allows gravity to assist in draining fetal fluid from the respiratory tract of the cria. Stage Three This stage consists of expulsion of the placenta. It should not take longer than 3 hours and is usually completed within 30 to 45 minutes. It is important to examine the placenta to make sure it was passed in its entirety and to detect possible infectious processes that may affect the fetus. Dystocia The following should be considered signs of a difficult birth in SACs: Stage one labor lasts more than 6 hours. The first water bag breaks and nothing is visible within 10 minutes. The amniotic sac is seen, but the birth does not progress within 10 minutes. The cria is visible, but the birthing progress stalls for more than 10 minutes. Other signs of dystocia may include excessive straining or acting colicky without any progress. SACs commonly give birth from midmorning to midafternoon. Giving birth in late evening or during the night may be a sign of a prolonged birthing process and dystocia. Anomalies include the transverse sideways presentations, both dorsal and ventral. Abnormal positions include dorsopubic upside down or dorsoiliac tilted left or right. Posture refers to the position of the fetal head, neck, and limbs with respect to the birth canal. The normal posture of the head and neck is extended. The limbs should be extended. Lateral, ventral, or dorsal deviation of the head and neck is abnormal. The abnormal postures for the limbs include various degrees of flexion over or under the fetus. Intrauterine manipulation by the veterinarian is generally required to correct fetal malposition and malposture. When fetal orientation cannot be corrected to allow assisted vaginal delivery, cesarian section may be necessary. This usually occurs when the fetus does not engage in the pelvis correctly and, therefore, does not exert enough pressure on the cervix to assist in dilation. Uterine torsion is also a cause of dystocia in SACs. SACs are almost always pregnant in the left horn of the uterus, and in the last few months of gestation, the uterus may rotate to the right clockwise if looking at the dam from the rear. Uterine torsion is painful, and these animals are restless and act colicky. They may get up and down, pace, kick at their abdomen, or roll, sometimes violently. In some llamas, a dead cria may be removed vaginally via fetotomy if there is enough room for the fetotome. SACs with uterine inertia require assisted vaginal delivery or cesarian section. Since the dam is not assisting with contractions, the assisted vaginal delivery technique will be more difficult than normal. Items needed to stimulate or resuscitate the cria should also be included. If the birth will take place on the farm, manual and chemical restraints may be necessary. If surgery will be performed in a hospital, general anesthesia should be an option. Because of the small diameter of the pelvic inlet in these animals, fetotomy should only be performed on larger llamas. Incomplete vulvar or cervical dilation can be corrected nonsurgically. Both the vulva and the cervix can be slowly dilated with a lubricated, gloved hand. Nonsurgical correction of uterine torsion requires rolling the dam. One person places the board on the abdomen of the animal and applies pressure to it as the others roll the dam in the opposite direction of the torsion. In alpacas, one person kneeling on the abdomen of the dam is usually sufficient. It may take several attempts to correct the torsion.

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