25|26|October|2019

POLYTECHNIC OF VISEU

Papers in Conference Proceedings

VI Congresso Internacional de Enfermagem Veterinária (VI CIEV)

VI International Congress of Veterinary Nursing

Viseu

Datas: 25 e 26 de Outubro (Aula Magna)

PROGRAMME/PROGRAMA

Friday morning/6ª Feira Manhã (25.10.2019)

9:00-9:30 – Registration/Abertura do secretariado.

Moderador: Prof. Fernando Esteves. ESAV

9:30-10:00 – Welcome Session/Sessão de Abertura.

Moderador: Prof. Helder Quintas. ESAB

10:00-10:30 – Capnography: more than a ventilation parameter.

Capnografia: mais que um parâmetro de ventilação.

VN Stephanie Buraco (CHV- Centro Hospitalar Veterinário)

10:30-11:15 – Search dogs: Who wants and who doesn't want to be found!

Cães de busca: Quem quer e quem não quer ser encontrado!

DVM Nuno Paixão (HVCentral)

11:15-11:45 – Coffee Break

Moderadora: Prof. Teresa Mateus. ESAPL

11:45-12:15 – Nutritional management in intensive care and hospitalization of cats and dogs.

Maneio nutricional na hospitalização e cuidados intensivos em gatos e cães.

DVM Joana Pereira (Royal Canin)

12:15-12:45 – Relational marketing in veterinary clinics: technological implementation.

O marketing relacional nas clínicas veterinárias: Implementação tecnológica.

VN MSc Ana Sêco (Clínica Veterinária Planeta Animal)

13:30-15:00 – Lunch/Almoço (Cantina ESTGV).

Friday evening/6ª Feira Tarde (25.10.2019)

Moderadora: Prof. Laura Hurtado. ESAE

15:00-15:45 – Brachycephalic breeds. More than fashion, the consequences.

Raças braquicéfalas. Mais do que a moda, as consequências.

DVM Sónia Miranda (HVA- Hospital Veterinário do Atlântico)

15:45-16:30 – A walk on the wild side - by a Vet Nurse.

Um olhar do lado selvagem - por uma Enfermeira Veterinária.

VN Sara Cuco (Zoo Sto. Inácio)

16:30-17:00 – Coffee Break

Moderador: Prof. João Mesquita. UP

17:00-17:45 – Avian Veterinary Nursing. New challenges and opportunities.

Enfermagem Veterinária em aves. Novos horizontes e oportunidades.

DVM Mário Nóbrega (Exoticvets)

17:45-18:30 – Traumatic shell injuries in turtles.

Trauma da carapaça em tartarugas

DVM Joel Ferraz (Centro de Exóticos do Porto)

18:30-19:00 – Debate/Mesa Redonda

Moderadora: Prof. Helena Vala. ESAV

Polytechnics role in the sustainability of Veterinary Nursing study cycles.

O papel dos Politécnicos na sustentabilidade dos ciclos de estudos em Enfermagem Veterinária.

Professor Doutor João Monney Paiva, Presidente do IPV

Professor Doutor João Sobrinho Teixeira, Secretário de Estado da Ciência, Tecnologia e Ensino Superior

Assessment and accreditation of higher education institutions and their study programmes. What are the benefits for the profession?

O papel da avaliação dos cursos na afirmação das profissões.

DVM PhD Artur Varejão

CPD and its importance in the evolution of veterinary care.

O papel da formação contínua na evolução dos cuidados veterinários.

DVM Luís Montenegro

Students associations: an added value for the study cycles.

O papel do associativismo na afirmação de um ciclo de estudos.

VN André Fonseca

20:00 – Congress Dinner/Jantar do Congresso.

Saturday morning/Sábado manhã (26.10.2019)

Moderadora: Prof. Ana Matos. ESACB

9:30-10:15 – Veterinary nursing for dummies 2.0 - UK version.

Enfermagem veterinária for dummies 2.0 - UK Version.

VN Ana Rita Vicente

10:15-11:00 – Low stress clinic strategies for cats.

Estratégias para reduzir o stresse dos gatos na clínica veterinária.

DVM Marta Vieira

11:00-11:30 – Coffee Break

Moderador: Prof. Carmen Nóbrega. ESAV

11:30-12:15 – Canine Body Language: learning its subtleties in order to improve welfare and safety at the hospital.

Linguagem Corporal Canina: conhecer as subtilezas para melhorar o bem-estar e a segurança na clínica.

Bióloga MSc Carla Cruz

12:15-13:00 – Dominance in dogs: Myth or truth?

Dominância em cães: Mito ou Verdade?

DVM PhD Gonçalo da Graça Pereira

13:00-14:30 – Lunch/Almoço (Cantina ESTGV)

Saturday evening/Sábado tarde (26.10.2019)

14:30-16:00 –Workshop/Seminário:
Behavioral needs of cats: preventing problems through environmental enrichment.
Necessidades comportamentais dos gatos: prevenir problemas através do enriquecimento ambiental.
DVM PhD Gonçalo da Graça Pereira

Aula Magna do IPV

14:30-16:00 – Workshop/Seminário:
Veterinary tactical and disaster medicine simulation.
Cenários em medicina tática e de catástrofe.
DVM Nuno Paixão (HVCentral)

Auditório Pequeno do IPV

16:00-16:15 – Closing session/Encerramento.

Caesarean section and neonatal care in the dog

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Abstract

Caesarean section in breeding bitches is an increasingly common practice not only to ensure their future fertility but also the health and safety of offspring. Bitches with high genetic value are often submitted to this procedure.

Following the bitch from the moment of mating to the moment of delivery and adequate nursing care of the newborn increases the neonatal survival rates.

Keywords: veterinary nurse, cesarean section, dog, neonate, care.

1- Introduction

Parturition is a fascinating biological process that involves various physical changes, such as endocrine and behavioral, so that the dog can adapt to motherhood. The eutocic delivery corresponds to a normal parturition with all phases that allow the birth of the newborn without added difficulties for both of them. In contrast, dystocic parturition represents the inability to expel fetuses because of difficulty in passing them through the birth canal. One approach to consider is surgical cesarean section (C-section) resolution. There are two types

of C-sections, the elective that is scheduled by the tutors and the veterinarian, and the emergency, which has major implications for the mother and fetuses (Noakes, 2001).

After a C-section, newborns need specialized care, including a resuscitation plan.

2- Elective Caesarean vs. Emergency Caesarean

Elective C-section is a common procedure in breeds described as predisposed to dystocia, a clinical history of previous C-sections or family history of dystocia, large litter or large fetuses, single puppy syndrome and cases where the bitch's owner does not have easy access to a veterinary hospital, which can result in lack of assistance if complications occur. In elective C-section there must be a prevision of the day of parturition to determine the critical time for C-section. For this reason, progesterone plasma levels should be measured (bitches are at term when progesterone levels are under 2 nmol / L). Progesterone is a thermogenic hormone, so its decreased concentrations are followed by a decrease in rectal temperature (Smith, 2007; Concannon, 2009; Cramer, 2019).

It is also useful to determine the luteinizing hormone (LH) peak, because planned C-sections can be safely performed after day 63 after the LH peak (Angulo, 2011).

Fetal parameters should also be used to monitor pregnancy and thus predict the day of parturition. Late radiography is the best modality for accurate assessment of fetal size, revelation of emphysematous fetuses, fetal death or obstruction. At ultrasound exam some fetal measurements can be performed at the beginning and end of pregnancy (Ayers, 2012).

Emergency C-section is an situation that aims to remove fetuses from the uterus as quickly as possible, to increase their chances of survival. It is associated with dystocia, due to bad positioning or fetal development, excessive fetal size, narrowing of the female pelvic canal, uterine inertia or fetal rot (Wirthmann, 2014).

Table 1. Relationship between decrease of temperature and hours before parturition (Adapted from Concannon, 2009).

Breeds	Temperature	Hours before parturition
Big	37ºC	8-24h
Small	36ºC	

Table 2. Relationship between decrease of progesterone levels and hours before cervical dilation (Adapted from Cramer, 2019).

Progesterone level	Hours before cervical dilation
< 8,7nmol/L	48h
<3,18 nmol/L	24h

3- Surgical technique and anesthesia

There are many anesthetic protocols that can be used, so the veterinarian should study the risks and benefits of using each of them, knowing maternal and fetal morbidity and mortality, always opting for drugs that cause low cardiovascular and respiratory depression or that can be easily reversed. Pre-anesthetic medication may be used in more agitated females using benzodiazepine drugs such as diazepam. Fetuses have more difficulties metabolizing anesthetics, so the veterinarian needs to pay attention to the use of short term drugs that are fast metabolized by the mother. An example of a drug that fulfills these requirements is propofol at a dose of 2 mg / kg IV (6 to 8 mg / kg if preanesthetic drugs are not used), being the most commonly used inducing agent in C-sections, and is associated with reduced neonatal mortality in canine species. Propofol has no analgesic properties, so in order to maintain a balanced and safe anesthesia it must be combined with a potent opioid analgesic such as methadone. It also causes some muscle stiffness and tremor, supporting the use

of a muscle relaxant, such as a α2 adrenergic agonist anesthetic such as medetomidine, administered at a minimal dose and intravenously. As an alternative to fixed anesthetic induction method, a mask with volatile anesthetics such as isoflurane combined with oxygen can be used, however, balanced induction with propofol and other intravenous anesthetics is preferable (Welsh, 2009; Kustritz, 2010; Cramer *et al*., 2017; Vilar *et al*., 2018).

Anesthesia is maintained with volatile agents, usually isoflurane, after endotracheal intubation. Volatile anesthetics cross the placental barrier easily, so it is recommended that fetal exposure be as short as possible. As these drugs are airway eliminated, apneic newborns will have difficulty eliminating them and should be promptly and conveniently resurrected (Timperman, 2017).

During the surgery, the veterinary nurse assists the Veterinary Surgeon by holding some structures, under the direction of the veterinarian. The nurse can be also responsible for anesthetic monitoring of the patient during surgery.

The classic C-section is performed through a ventral midline incision, with the female positioned in the supine position. However, there are already surgeons who prefer to perform cesarean section through flank access (Gendler *et al*., 2007).

3- Neonatal Resuscitation

Neonatal resuscitation is based on the ABC rule of standard resuscitation. First, clear the airways (A = airways) and for this the oral cavity, nasal cavities and pharynx must be cleared of fetal secretions. This release and cleaning of liquids can be done by suctioning, using swabs that absorb the liquids and by shaking the newborn to expel unwanted liquids that prevent it from breathing (Smith, 2007).

The next step is the breath stimulation (B = breathing), which is done by vigorously drying the newborn with a warm towel to maintain its temperature which will later be ensured by heating mechanisms such as the incubator. The areas that should be most stimulated are the abdomen region and the perineal region as they lead to the respiratory reflex. After these procedures it is normal

for a few minutes after resuscitation to occur spontaneous breathing and crying, however, if this does not occur after all previous attempts, artificial ventilation should be started (Noakes *et al.*, 2001; Greer, 2016).

The third step is cardiac stimulation (C = circulation). The newborn's heartbeat is accounted for by precordial shock, using the thumb and applying light pressure. If bradycardia exists, chest compressions should be performed with one finger on each side of the chest (Ludders, 2017).

The fourth point is the use of drugs, sublingual naloxone or atipamezole may be used to reverse anesthesia, increasing the sucking reflex of the newborn and thus promoting respiration. If the animal is cyanotic, oxygen should be administered by mask (Ramsey, 2017).

4- Physical examination of neonates

The most common assessment method of neonatal viability is the Apgar method. In this system, 5 criteria are evaluated: heart rate, respiratory rate and effort, irritability reflex, movement strength and mucosal color. These parameters are evaluated from 0 to 2 and summed. After the sum of quotations, newborns are associated in groups (Table 3) (Jackson, 2004). On the base of the final sum, dogs with less than 3 exposure points a clinical condition, needing immediate medical assistance. Between 4 and 6 years of age, the general condition is low and therefore should be supervised or assisted by medical care, rubbed with towels and ventilated with oxygen. Greater than 7, the newborn has a normal condition and should be given to normal general care (Noakes, 2001).

In addition to assessing Apgar, it is also important to understand if puppies exhibit any congenital changes, as many of these conditions are incompatible with life and measures need to be taken to prevent the suffering of newborns.

Table 3. Apgar Evaluation Method (Adapted from Greer, 2014).

	Score		
Parameters	0 Weak	1 Moderate	2 Normal
Heartbeat (bpm)	<180	180-220	>220
Breathing effort	<6	6-15	>15
Irritability reflex	Absent	Weak Moderate	Strong
Mobility	Weak	Pale	Present
Mucous membranes	Cyanotic		Pink

5- Importance of physical examination in deciding which neonates to save

The detailed physical examination should be performed after neonatal resuscitation as it is through it that serious birth defects are detected. Starting at the head, the Veterinary Nurse should evaluate movements, shape and size, in order to rule out congenital problems such as hydrocephalus (accumulation of CSF within the cranial cavity). During examination of the oral cavity it is important to observe the lips, soft and hard palate, to rule out the presence of cleft palate. The cleft palate is a communication between the oral and nasal cavities and occurs in 25% of neonates. In addition to the dietary causes (excess vitamin A and vitamin 12 deficiency), it can be caused by chromosomal changes mainly *in Shih-Tzu, Pointer, English and French Bulldog and Boxer.* This defect prevents the newborn from eating properly, as milk crosses the nasal cavity and risks aspiration pneumonia (Lopate, 2012; Vannucchi, 2017).

During the body examination, body symmetries, umbilical cord inspection, from cutting to cleaning and possible suture should be evaluated. Presence of hernias, fractures or more severe defects such as anasarca, characterized by generalized subcutaneous edema, predisposing to obstructive dystocia should also be discarded. It is believed that this condition originates from a prenatal

cardiovascular disorder and may be genetic, traumatic and viral (canine parvovirus) (Angulo, 2011).

To decide which of these dogs should have rescue priority, we should use the Apgar scales and evaluate the physical examination of the newborns. For example, dogs with anasarca or cleft palate have little chance of survival, so healthy dogs with no birth defects should be given priority. Neonates with Apgar scores of 1-3 are severely distressed and therefore the chance of survival is reduced, compared to dogs with Apgar scores of over 7 (Lopate, 2012).

Animals that have a good birth weight should be preferred to low weight dogs if all puppies cannot be saved. Agitated puppies require greater attention from the nurse rather than lethargic dogs (Smith, 2011). When there is no possibility of saving all, resuscitation should be performed as long as possible and these puppies should be placed in the incubator.

6- Clinical cases

Case 1:

A two-and-a-half-year-old Beagle presents for an emergency cesarean section because she shows contractions for more than three hours without any evolution of parturition. After an abdominal radiograph, it was found that the cause of dystocia was the size of the fetuses, which presented a large maternal fetal disproportion. After neonatal resuscitation and physical examination all newborns were healthy with Apgar scores greater than 7.

Case 2:

A one-and-a-half year old German Spitz dog presented for an emergency C-section for presenting an externalized fetal pouch without contractions. Fetal traction was not possible due to poor fetal positioning for vaginal delivery. Only one fetus was removed by C-section and was healthy after resuscitation and physical examination.

Case 3:

A four year old Jack Russel Terrier dog presented for urgent C- section because of signs of labor without contractions for more than three hours. The

bitch had an obstructive dystocia and signs of infection confirmed by blood analysis. Three newborns were removed, two stillbirths and one very weak with Apgar values in the order of 2, that eventually dying. For a better prognosis of the mother was advised to perform ovariohysterectomy, however the tutor did not authorize. This surgery was performed two days after the first surgery an attempt to save the life of the bitch, which was no longer possible since she had a severe uterine infection and peritonitis.

Case 4:

A Pug female dog presented for an elective C-section because she had a history of previous dystocia deliveries. C-section was performed at 62 days of gestation, at which time progesterone levels dropped to 2nmol / L. All newborns had excellent health with Apgar scores of 10.

Case 5:

A female French Bulldog presented for an emergency C-section because she had contractions without parturition evolution. She had an obstructive dystocia because the fetus in the birth canal had anasarch. Another neonate had cleft palate and was euthanized. After resuscitation and oxygen therapy the other puppy's were able to recover.

8-Discussion

Patients in clinical cases 1 and 5 had an obstructive dystocia, that is, a fetal dystocia that prevents the normal delivery, either due to excessive size or fetal position. In these cases, after physical examination of the dog, a digital vaginal palpation is performed in order to understand whether or not there is obstruction and, if so, to perceive the fetal position. Digital palpation is often difficult, not only because of the small size of the structures, but also enough palpation experience. For an assertive diagnosis, it is common practice to perform a lateral-lateral radiograph that usually confirms the cause of the obstruction. With regard to neonates from this type of dystocia, they usually present signs of fetal stress, characterized by hypoxia and consequently cyanotic mucous membranes, as was the case in case two neonates.

The approach in these cases is respiratory stimulation and oxygen administration. The newborns are placed in the incubator where the oxygen concentrator is turned on, thus preserving not only temperature but also fetal respiration. In case 5, cleft palate neonates can be fed through a gastric tube up to 3 to 4 months of age, however, these are breeders who cannot pay much attention to the newborns because there are several litters and also because there is a probability not being sold, the best option for the breeder and the newborns is euthanasia. Anasarch fetuses are usually stillborn or die within minutes of birth, as was the case in case 5, since subcutaneous edema may become widespread and impede the normal functioning of vital organs.

Another reason for dystocia is uterine inertia, whether primary in which the female dog exhibits signs of childbirth, including visible fetal membranes, through the vestibule and vulva, but does not exhibit secondary uterine contractions in which contractions initially exist, however these cease due to fatigue in the myometrium.

In case 2 the patient had primary uterine inertia, and it was not possible to perform fetal traction, choosing a cesarean section. Sometimes when this kind of inertia happens there is a high level of fetal stress, which was not the case in the case 2 neonate, who had a good Apgar score. It is also believed that in cases where there is only one fetus, it may not be able to induce labor and thus not stimulate uterine contraction (Johnston *et al*., 2001).

In case 3, the bitch showed secondary uterine inertia as contractions initially existed but ceased to exist due to existing obstruction. After physical examination a blood analysis was performed, showing clear signs of infection. The newborns were either already dead or very weak and died just after. The stillbirths already showed fetal decomposition, which caused severe uterine infection. Hypothetically there was a failure regarding fetal stimulation for parturition that caused the neonates to die once they were well formed. Being a champion dog of the Jack Russel Terrier breed the breeder did not want to lose her reproductive ability so did not authorize the ovariohysterectomy. The therapeutic approach after surgery was the administration of enrofloxacin and carprofen, fluid therapy and metronidazole. The infection that was initially only in the womb became

widespread leading to a peritonitis which given its severity could not be resolved with antibiotics. At this stage the patient presented all symptoms of septicemia: anorexia, tachycardia, leukocytosis, decreased urinary output, hyperthermia, altered renal and hepatic indicators.

Case 4 was an elective caesarean section, scheduled in advance because the patient previously had dystocic deliveries. The Pug breed can rarely have a eutocic delivery, more than 50% of females of this breed require surgical intervention during delivery. Being also a brachycephalic race, many breeders opt for elective caesarean section to spare the fetus and the mother. Daily ultrasound scans were performed for 1 week to predict the ideal day for surgery.

7- Conclusions

Clinical follow-up of pregnant bitch, from the moment of mating to the moment of delivery, and adequate nursing care of the newborn seems increases the neonatal survival rates. Observational studies should be designed to better understand the role of veterinary nursing care in neonatal survival and scores.

10- References

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