

UTERINE CONTRACTION MONITORING IN DOGS USING TOCODYNAMOMETER

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Early recognition of dystocia and fetal distress are crucial to successful management of labor and the optimal neonatal health. This envisages both maternal monitoring and assessment of the newborn for its viability status. The study aimed at tocodynamometric evaluation of uterine contraction pattern in normal whelping and obstetrical emergencies in dogs. Tocodynamometric recordings were found to be extremely useful in maternal monitoring, identifying normal and abnormal patterns of uterine contractions and planning the future course of action. It offered objective data on the frequency, duration and strength of uterine contractions and allowing definitive diagnosis of uterine inertia and uterine obstructive patterns.

Keywords: Dystocia, Tocodynamometric study, Uterine contractions.

A very high neonatal mortality rate have been reported in dogs ranging from 9% to 26% even following normal delivery and 30 to 40% following complicated whelping (Davidson, 2014). At present, canine parturition monitoring relies on temperature changes, progesterone decline, and individual whelping signs which are highly variable parameters and frustrate early recognition of labour and possible dystocia, leading to fetal distress. Early recognition of dystocia and fetal distress are crucial to successful management of labor and the optimal neonatal health. This envisages both maternal monitoring and assessment of the newborn for its viability status. Tocodynamometry attempts to characterize the frequency and amplitude of uterine contractions. Its wide spread use in obstetrics has enabled human obstetricians to identify patients with poor or abnormal uterine contractions early during the course of onset of labor and plan the appropriate course of action so that the birth of a baby in distress is prevented. Tocodynamometry is a novel approach in canine whelping management to monitor parturition and obstetrical manipulations with the aim of reducing neonatal death (Davidson, 2001). This study aimed at tocodynamometric evaluation of uterine

contraction pattern in normal whelping and obstetrical emergencies in dogs.

Materials and Methods

Tocodynamometric studies were carried out to record the frequency and amplitude of uterine contractions during the course of eutotic and dystocic deliveries in dogs presented to obstetrical unit of the Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary and Animal Sciences, Mannuthy. The frequency and strength of uterine contraction in each animal was monitored using a tocodynamometer (AMIGO) designed for human patients since similar veterinary dedicated machines were not available. The tocodynamometer consisted of a uterine sensor and a recorder. The lateral abdomen of the animal was clipped, and the animal was placed on an animal examination table in the lateral recumbancy. The uterine sensor was placed and kept pressed on the abdominal skin and was secured with abdominal belts (Fig. 1). During the course of uterine monitoring, the bitches were kept quite avoiding any movements as far as possible. The frequency, duration, amplitude and baseline shifts in uterine contraction were recorded for a minimum of thirty minutes.



Fig. 1. Toco Trace (1 cm / minute)

Results and Discussion

In eutocic dogs, interpretation of the contractile pattern in strips produced by the uterine monitor showed an escalating and regular type of active labor pattern of uterine contractions followed and coupled with abdominal pressure spikes (Fig. 2). In these dogs, frequent and regular uterine contractions with duration of two to five

minutes and uterine contractile tone of 30 to 40 per cent followed and coupled with abdominal pressure increase in the form of spikes of 80 to 99 per cent at expulsive phase were recorded. The number of spikes representing abdominal activity along with uterine contractions at physiological births varied between two to four in a period of thirty minutes.

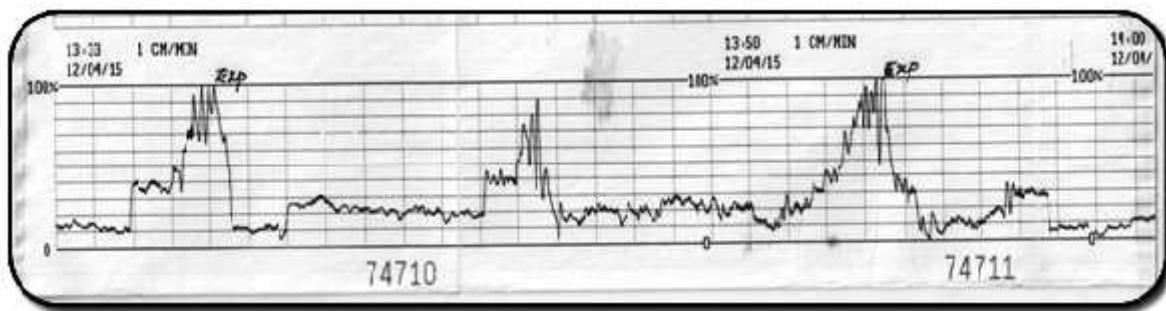


Fig. 2. Spontaneous whelping

In animals diagnosed with fetal dystocia due to obstructive cause, uterine hyperstimulation indicated by abnormally high uterine resting tone (more than 20 to 30

%) for an extended period was noticed. This was followed by increase in abdominal pressure spikes of prolonged duration without fetal expulsion (Fig. 3).

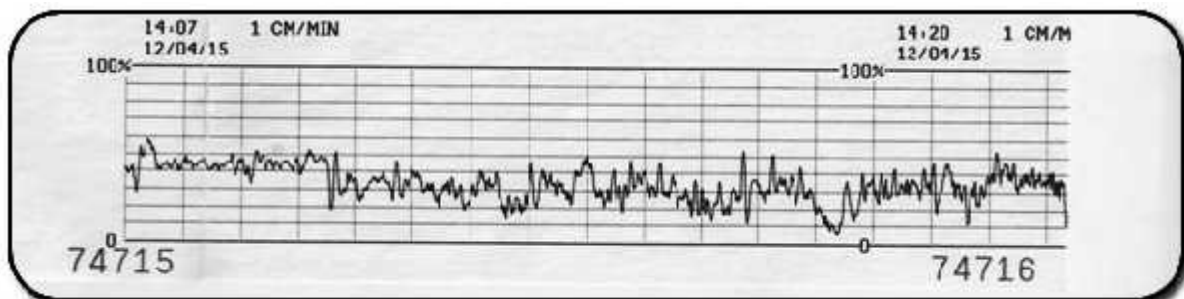


Fig. 3. Dystocia from obstructive cause

The uterine contraction pattern in animals diagnosed with complete primary uterine inertia showed a baseline contraction strength of only 10 per cent without any

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augmentation from the baseline. Also, spikes indicative of abdominal contractile activity were not recorded throughout the monitoring period (Fig. 4). Dogs with partial primary

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uterine inertia also exhibited the same type of uterine contractility pattern with baseline

contraction strength of only 10 per cent and no augmentation from the baseline.

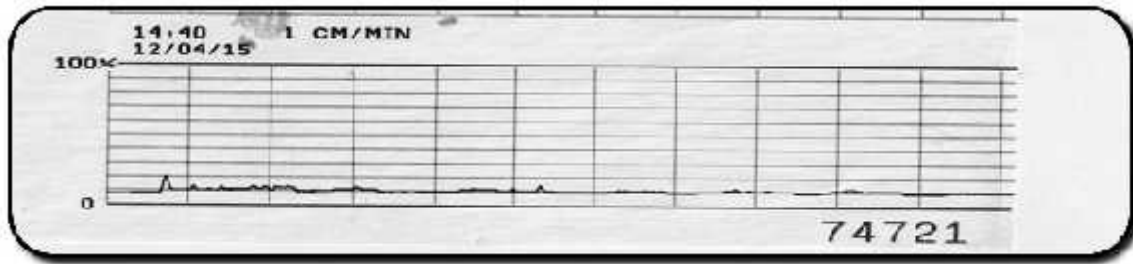


Fig. 4. Complete primary uterine inertia

In dogs with uterine inertia responding to medical management, an increase in strength and overall frequency as well as duration of contraction was noticed following administration of calcium and oxytocin. In these cases, augmentation of uterine contraction strength to 30 per cent to 50 per cent followed and coupled with

abdominal pressure increase spikes upto 70 to 95 per cent during the expulsion phase was noticed. Frequency of two to five close coupled uterine contractions per 30 min, each with duration of two to three minutes followed and coupled with abdominal pressure increase spikes of three to four was also noticed (Fig. 5).

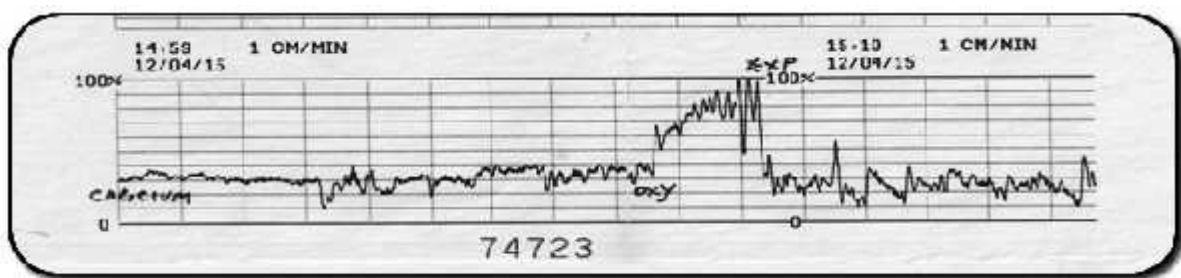


Fig. 5. Successful medical management in primary uterine inertia

But in dogs, unresponsive to medical management, baseline strength showed no improvement and in contractility pattern also; no progress was noticed even after

treatment, whereas in few dogs, close coupled tetanic contractions without fetal expulsion was noticed (Fig. 6).

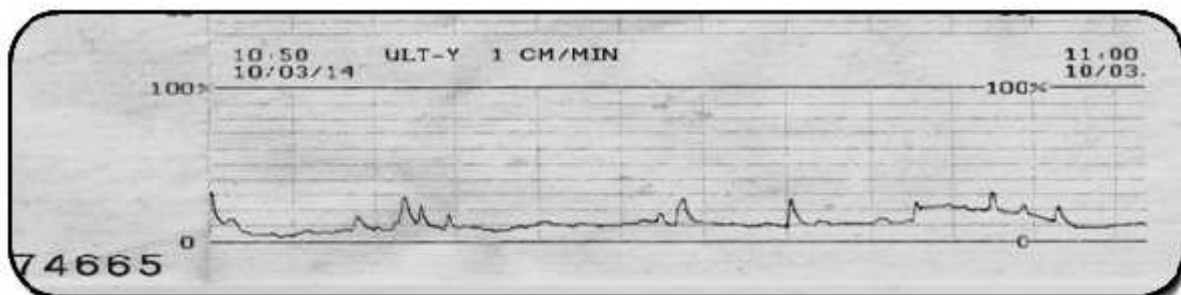


Fig. 6. Unsuccessful medical management in primary uterine inertia

Labor is the presence of an organized pattern of uterine contractions. Studies on uterine contractions in spontaneously whelping dogs in the present investigation

were characterized by an escalating and regular type of active labor pattern. This pattern was consistently recorded in all the seven animals which whelped spontaneously.

Similarly, Groppetti *et al.* (2010) considered uterine contraction strength of 10 mm of Hg or more and frequency of three to seven contractions per 30 min and each contraction lasting for two to five minute duration during physiological labor in dogs.

Davidson (2010) also recorded similar uterine contraction pattern in cases of obstructive dystocia which was associated by uterine hyperstimulation indicated by abnormally high uterine resting tone for an extended period of time with spikes noticed whenever there was an abdominal contraction, but without any fetal expulsion. The uterine contraction pattern recorded in animals with primary uterine inertia, complete or partial were similar to the reports of Groppetti *et al.* (2010) who stated that after the onset of labor, the intrapartum detection of 0 to 3 mild contractions per 30 min without parturition, constituted recommendation for medical management of uterine inertia. The pattern of uterine and abdominal contractions in dogs responding to medical therapy was similar to those recorded following spontaneous Whelping. The results of the present study are also in agreement with the tocodynamometric studies of Davidson (2012) who also recorded increase in strength of uterine contractions following calcium administration and increase in frequency of uterine contractions following oxytocin therapy for uterine inertia in dogs. But, in dogs unresponsive to medical management, no improvement in the contractility pattern or in few cases, slight variations in base line strength of uterine tone to 10 to 15 per cent, unaccompanied with abdominal pressure spikes even after treatment for a period not less than 30 min of recording was noticed.

The best whelping outcomes could be achieved when decisions are based on objective data, and whelping issues are detected early, with the interventions based on objective rather than subjective data. Tocodynamometry, a non-invasive of maternal monitoring offered good opportunity to inspect and manage labor medically or surgically with insight, instead of guesswork and improve quality of labor and neonatal survival. Guesswork was taken out of

management of parturition by providing objective data on the frequency and strength of uterine contractions. Aberrations in uterine contractility were detected during monitoring and definitive diagnosis of uterine inertia and uterine obstructive patterns could be accomplished. Medical treatments using oxytocin and calcium gluconate could be used more accurately, because the effects of these drugs on uterus were directly measurable. The decision to proceed to surgery was made in a more timely fashion when medical management failed to induce effective uterine contractions, a uterine obstructive pattern developed, or evidence of fetal distress was noted by decelerations of fetal heart rate on trans-abdominal ultrasound.

In conclusion, serial non- invasive uterine activity monitoring using tocodynamometer allows assessment of labour progression and also deserves a prominent role in daily canine obstetric practice to verify aberrations in uterine contractility. Tocodynamometric recordings of adequate to increased uterine contractility and evidence of foetal distress following medical management as well as detection of aberrant contractile patterns could prevent the erroneous use of ecbolics and thereby considerably improve the live birth rate in canines.

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