CASE REPORT

Successful Surgical Management of Haemodynamically Evaluated Uterine Torsion in a Bitch

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Uterine torsion is defined as the twisting of the uterus or uterine horn perpendicular to its long axis and is more commonly observed in multiparous animals (Thilagar *et al.,* 2011). Predisposing factors for uterine torsion are excessive fetal movements, lack of fetal fluids, premature uterine contractions, usage of ecbolic therapy, hereditary weakness of uterine ligament, hyperactivity of the pregnant animal like jumping, rolling, running in late gestation period etc (Gupta *et al.,* 2020). The clinical signs and haemodynamic changes of the middle uterine artery are directly proportional to the torsion degree, which can vary between 180° and 90° both clockwise and counter clockwise, hence, these parameters are considered as prognostic indicators (Thilagar *et al.,* 2011). Doppler ultrasound evaluation of uterine blood flow is a non-invasive technique for early diagnosis of uterine torsion in canines. Further, velocimetric indices could be useful to differentiate the side of torsion (Sudha *et al*., 2019). This document represents successful surgical management of haemodynamically evaluated uterine torsion in a bitch.

Case History and Observations

A two-year-old primiparous pregnant Rajapalayam bitch weighing 29.4 kg was presented to SAC-OP-OG, a Unit of Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli (Tamil Nadu, India) with a clinical history of anorexia since past 1 week. The owner reported that the animal had a fertile mating 60 days back. The animal was apparently healthy thereafter and pregnancy was confirmed by ultrasonography on day 33 of gestation. A general examination of the animal revealed pyrexia (39.8°C), and congested conjunctival mucous membrane. Gynaeco-clinical examination revealed greenish vaginal discharge, congested vaginal mucous membrane, and edematous vulva, without any palpable fetal parts in the birth canal. Abdominal palpation revealed a hard mass on the ventrolateral abdomen and no pain signs evinced on palpation. All mammary glands had viscous colorless secretion.

Transabdominal ultrasonography revealed a viable (HR≈235 bpm) hyperechoic fetal skeleton with a head diameter of 2.57 cm (AGA≈57 days) and multiple hyperechoic speculations in the uterine lumen along with detached placenta. A plain radiograph of the right lateral abdominal view revealed not less than seven fetal skeletons. The serum progesterone level was 13.11 ng/mL. Haemato-biochemistry indicated azotemia, hyperkalemia, hyponatremia, neutrophilia, and haemoconcentration. Pulse wave Doppler ultrasonography revealed reduced placental perfusion with resistance index (RI) 0.96 on the umblical artery, early reverse diastolic notches in the spectral wave form of the right middle uterine artery with RI 1.78, the left uterine artery had a normal spectral wave form with multiple indistinct incisurae having RI 1.74 (Fig.1, 2). Moreover, the pulsatility index of the right and left middle uterine arteries were negative 11.38 and positive 3.85, respectively. Based on the findings of the Pulse wave Doppler the case was tentatively diagnosed as right-side uterine torsion.

Treatment and Discussion

Emergency Cesarean section was done under propofol anaesthetic protocol which revealed ruptured perimetrium and omentum along with a twist of >360° of the right uterine horn (Fig. 3, 4). Further, milking out of five live fetuses from left uterine horn and three live fetuses from right uterine horn was done followed by detorsion (Fig. 5, 6). Postoperatively animal was treated with Cefpodoxime clavulanate @ 10 mg/kg PO, Relaxyme tablets, Leptaden tablets, and haematinics for 10 consecutive days. On the 7th post-operative day, skin sutures were removed and the animal had an uneventful recovery.

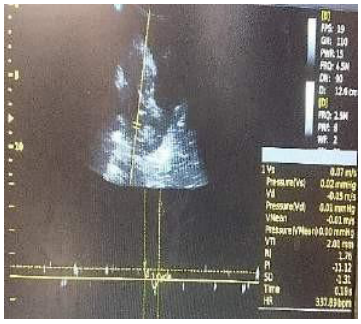

Fig.1: Pulse wave Doppler spectral waves of Right middle Uterine artery

Fig. 2: Pulse wave Doppler spectral waves of left middle Uterine artery

Fig. 3: Intra-operative procedures

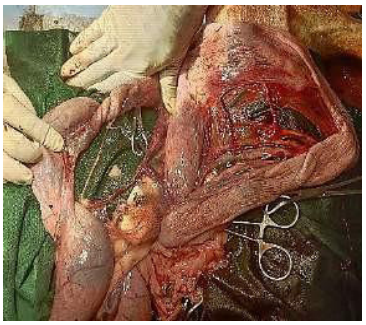

Fig. 4: Twisted right uterine horn post-fetal surgical delivery

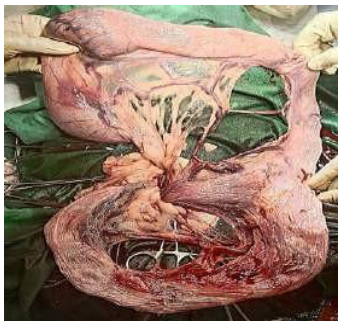

Fig. 5: Post-detorsion uterine horns

Fig. 6: Live puppies surgically delivered

Torsion is a rare, but life-threatening obstetrical complication in the bitches and queens (Johnston *et al.,* 2001; Kumru *et al.,* 2011). The increase in uterine weight, uneven distribution of fetuses in uterine horns, excessive fetal motility, and contractions during late gestation predispose to uterine torsion. In dogs, uterine torsion is also caused due to lack of fetal fluid or sudden physical movements, *i.e.* falling from height or sudden rolling (Roberts, 1982; Johnston *et al.,* 2001). In the present case, excessive fetal movement due to large litter size and its uneven distribution could be the probable predisposing factor to uterine torsion.

According to Barbosada *et al.* (2013), Pulse wave Doppler spectral wave monitoring of the uterine artery in addition to regular B-mode ultrasonography during pregnancy evaluates the blood flow velocities in maternal and fetal vessels, assesses the changes in pressure across the blood flow loop, fluid dynamics in supplying blood vessels. This case study used the resistance index and pulsatility index of blood flow on the middle uterine artery as the diagnostic indicator for uterine torsion in bitches.

Canine pregnancy can be divided into three stages, *viz.,* Stage 1: Fertilization to implantation (days 20 to 22 from LH peak), Stage 2: Implantation to fetal skeletal ossification (40-42 days), Stage 3: Fetal skeleton ossification to parturition (42-65 days) (Thangamani *et al.,* 2018). In Stage I due to incomplete trophoblastic invasion at placental sites there exists an increased resistance index (0.7-0.6), high systolic velocity, low diastolic velocity, and post-systolic notches in the spectral wave. In stage II due to trophoblastic origin growth factor- mediated remodeling of collateral blood vessels in the uterus, there is low vascular resistance (0.42-0.45) and absence of diastolic notches. In Stage III there is increased intrauterine pressure resulting in increased end-diastolic velocity and a further decrease in vascular resistance (≤ 0.32) (Arun *et al.,* 2016; Lasune, 2017).

In this case study the resistance index of blood blow in middle uterine arteries in late pregnancy was very high indicative of fetal stress and high-risk pregnancy status. Further, Sudha *et al.* (2019) reported that in the case of torsion, there is the presence of high vascular resistance and absence or reverse diastolic notches on the middle uterine artery ipsilateral to the twisted horn which is in agreement with our case study.

It is concluded that in addition to regular B-mode ultrasonography Pulse wave Doppler spectral analysis can act as an excellent prognostic tool for pregnancy monitoring. Further, it acts as a non-invasive early diagnostic tool for uterine torsion in dogs.

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