Aspects of Ultrasonographic Diagnostics of Pregnancy in Bitches depending on the first mating

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Abstract

The aim of the present study was to follow up the potential of routine ultrasonographic diagnostics of pregnancy in bitches depending on the first mating. The experiments were performed on 32 bitches. Pregnancy was detected using transabdominal ultrasonography with Siemens sonoline adara equipment and a covex 5 MHz probe. Subsequent serial examinations were made to sonographically characterize normal canine prenatal development based about the first mating. An enlarged uterus, gestational sacs and fetal poles were recognized as the features of early bitchs pregnancy and were first seen at 16 and 21 days, respectively. Cardiac activity was detected earliest on gestational day 22 and recognizable canine fetal morphology appeared at day 28. Generalized fetal movements were first noted at day 28.
Key words: pregnancy, bitch, ultrasound, mating

Introduction

Currently ultrasound is the best method for determining and staging pregnancy in the bitch and is becoming routinely used by many breeders (England et al; 1993, Aissi et al(a); 2008). There are many reasons why bitches may be examined by ultrasound to confirm pregnancy. It may be important to diagnose pregnancy relatively early to allow adjustments to be made in feeding and routine medication regimes and is an important consideration if therapeutic drugs are to be used. Ultrasound examination may be undertaken in mid-pregnancy in bitches that were not examined earlier or where there is concern over foetal resorption. Ultrasound may be used when it is necessary to differentiate between pregnancy and pyometra since in mid-pregnancy bitches frequently have a vaginal discharge and refuse their food.

Materials and Methods

The study was performed on a total number of 32 bitches. The age of animals was from 15 months to 7 years and the weight from 17.8 to 30 kg. The bitches were housed in Batna area; all bitches were clinically healthy, without history of previous gynecological diseases. The pregnancy was detected using a transabdominal echography performed 15 days after the first mating with a SIEMENS Sonoline adara, Germen equipment and convex 5 MHz transducer. The pregnancy was detected after visualization of gestation sacs and embryos and detection of cardiac function.

Ultrasonographic examination : Serial ultrasonographic examinations were performed every tow days from day 15 post mating. All the dogs were examined using real-time B-mode ultrasonography in dorsal recumbency. The gestational age at the time of the initial detection and the appearance of the following features of pregnancy were recorded: gestational sac, zonary placenta, fetal membrane, embryo, heartbeat, limb buds, skeleton, fetal movement, and abdominal viscera.

Results

The Ultrasonography performed between 16 and 21 days after the first copulation, detected pregnancy in all bitches. During this period the uterine vesicle (gestation sac) appearance: a spherical anechoic cavity. At this stage the embryo is no visible. The ultrasound monitoring of the embryo could be followed as from 22 days post mating.

20 days post mating (PM), no ultrasound image of the embryo could be obtained on the 32 bitches.

22 days post mating, the embryonic mass is visible within the vesicle attached to the periphery, and is measured as 4 mm long. In the real-time images, the embryonic heartbeat was visible as an hyperechoic flickering element within the embryo. The diameter of the gestational sac is 9 mm .

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25 days post mating, the embryo appears as an echogenic bipolar. The embryo is 1 cm long. The yolk sac membrane appears as an obvious echoic irregular line .

28 days post mating, during this period the embryo form two loops of number 8, size and density the same.

30 days post mating, showing the fetus in dorsal section the neck does not appear in this section and an anechoic space is seen between the head and the top of the thoracic limb buds.

32 days post mating, sonogram of the posterior limbs; at this stage the embryo has acquired the phenotypic characteristics of the species.

Ultrasound Evolution of the fetus: The ultrasound monitoring of pregnancy in bitches is marked by observation, vitality and mobility, and the visualization of the anatomical regions. The first movements observed 28 days and at the 32 days post mating, we are seeing movement of limbs.

Observations of extra-fetal structures: Fig. 1 show the time of the initial detection and presence of extra-fetal structures, and Fig. 2 show the time of the initial detection and presence of fetal structures.

The gestational sac was first detected on day 17.88±1.13 (range: 16-21), compared with the hyperechoic uterus (Fig. 1, Day 16). The echogenic inner layers (Fig. 1, Day 21) surrounding the gestational sac was developed into a zonary placenta. The yolk sac membrane was first detected as an echogenic U-shape fetal membrane (Fig. 1, Day 23). In the longitudinal plane on day 24.8±0.78 (range 24-26). The amnionic membrane was detected on day 26.81±0.60 (26-28), which encompassed the embryo (Fig. 1, Day 26).

Observations of abdominal organs : On day 22.80±1.03 (21-24), the embryo Fig. 1, Day 21) was first detected as an oblong structure apposed the uterine wall. The heartbeat, which is one of fetal vital signs, was detected on day 23.0±094 (22-24). The limb buds were first detected on day 29.70±0.82 (28-31) (fig 2 day 28), and fetal movement was detected on day 30.40±1.64 (28-32). The first abdominal viscera detected were the stomach and urinary bladder on day 33.40±1.07 (32-35) and 34.90±1.19 (33-37), respectively (fig2 day 32-34-36).

The lung became hyperechoic, compared with the liver parenchyma, on day 35.10±073 (range 34-36) (fig2 day 36). At this time, the abdomen and thorax were distinct. The liver was observed to be hypoechoic, compared with the rest of the embryo (Fig. 1, Day 26).

Discussion

In this present experiment study the detection of pregnancy in bitches observed an 16 and 21 days after the first copulation. Concannon et al (2001) and Yeager et al (1990), indicate that the initial diagnosis of pregnancies bitches is possible at 19-20 days after the LH surge, also specify that this result is a discovery uterine vesicle between 13-21 days after the first mating, this study according the observations of *Aissi, et .al.,* (2008) on pregnancies bitches of various breeds in consultation submitted by the owner, a diagnosis of pregnancy is positive after 16 days of the first mating.

The uterine wall surrounding the gestational sac, an apparently hyperechoic inner layer was differentiated to the zonary placenta on day 23.70±0.78 (23-25), which is similar to day 24-28 after ovulation (Ko et; 2004) and day 27-30 after the preovulatory LH surge (Yeager et al; 1992). The embryo and the heartbeat were first detected on day 22.80±1.03 (21-24) and day 23.0±094 (22-24), respectively. Days 21 to 26 and days 21 to 27 were characterized by the finding of an embryo and heartbeat, respectively (*Holst, et. al*; 1974, *Kang, et al*; 1997, *Ko, et al*; 2004, *Yeager, et al*; 1992). *Yeager, et. al*; 1992 reported little anatomic differentiation within the embryo before day 30. Before day 30, the only distinguishable features of the bipolar embryo were the flickering motion of the heartbeat. In this study, embryo, heartbeat and limb bud were first detected before day 30 post mating.

Most fetal anatomic structures were detected between days 30 to 50 (*Yeager, et. al*; 1992). At this time, there was a similar time when the fetal structures were first detected (fetal movement, skeleton, stomach, urinary bladder) in the present and other studies (*Holst, et. al*; 1974, *Kang, et. al*; 1997, *Ko, et. al*; 2004, *Yeager, et. al*; 1992). For these reasons, the time the extra-fetal and fetal structures are first detected is useful for estimating the gestational age (*Luvoni, et. al*; 2000; *Aissi, et. al* (b); 2008).
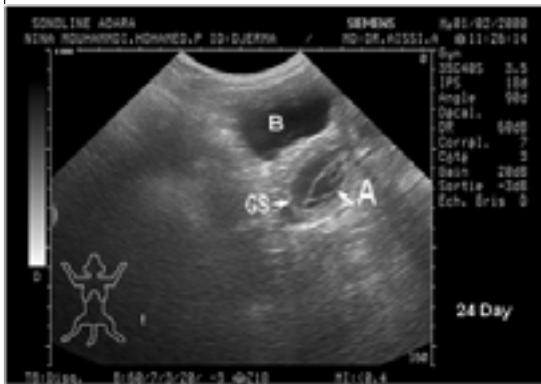
Coclusion

Ultrasonography examination is a rapidly advancing diagnostic technology that has much to offer to the theriogenologists and practitioners specializing in canine reproduction. Ultrasound imaging has a major role in the documentation of normal physiological events as well as the diagnosis and staging of pregnancy. In addition, it is particularly suitable for the detection of pathological changes within the reproductive tract that may be demonstrated by changes in the size, shape, margination or internal architecture of the reproductive organs.

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Fig. 1. Ultrasonograms of the extra-fetal structures in pregnant bitches.

Day 16: Transverse image of the first detection of an gestational sac (**GS**: gestational sac).

Day 21: Longitudinal image of the gestational sac. An echogenic inner placental layer was detected (**ZP**:

Fig. 2. Ultrasonograms of the fetal structures in pregnant bitches.

zonary placenta) in the uterine wall (B: bladder, **EB**: embryo).

Day 23: Longitudinal image of the gestational sac contained an embryo and heart (**B**: bladder, H: heart, **GS**: gestational sac).

Day24 Longitudinal image of the gestational sac contained an embryo the tubular shape of the yolk sac membrane (**A**: amnios, B: bladder, GS: gestational sac).

Day 32: Longitudinal image of embryo (**H**: head, AB, abdomen, ZP: zonary placenta).

Day 34: Longitudinal image of a fetus with three anechoic area (H: heart, GB: gall bladder, S: stomach).

Day 36: Longitudinal image of a fetus (**B**: bladder, **F**: liver, **L**: lung, **H**: heart).

Day 45: image of a fetal head (**H**: head, OB: orbit, ZP: zonary placenta).

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