

A one-foetus pregnancy monitored by ultrasonography and progesterone blood levels in a German Shepherd bitch: a case report

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ABSTRACT: This case study describes the pregnancy of a German Shepherd bitch with a singleton (one puppy) litter as a result of early embryo resorption. Resorption was confirmed by ultrasonography and the pregnancy was regularly monitored by USG and measurements of progesterone levels until parturition. These levels stayed within the physiological range. One healthy puppy was delivered within the timeframe of a physiological pregnancy although the inner chorionic cavity diameter (ICCD) protocol used for predicting the time of parturition showed divergence from the real time of whelping.

Keywords: singleton litter; ultrasonography; pregnancy; hypoluteoidism; dog

A singleton litter is usually considered to be a high-risk pregnancy and should be monitored if possible. There are many factors influencing pregnancy that contribute to its classification as high risk. In addition to infectious factors (bacterial, viral and others), they include advanced age of the female and the male used for breeding, previous pregnancy loss, brachycephalic dogs and singleton litters (England and Russo, 2006; Givens and Marley, 2008; Johnson 2008a,b). A one-foetus pregnancy can occur in any breed. Toy breeds like Chihuahuas or Yorkshire terriers are more predisposed to this phenomenon, but it does not put their puppies at risk of any abnormalities. However, singleton litters in giant breeds are rare and such a pregnancy can be considered high-risk, especially if there is a suspicion of resorption of the other embryos (Goerlinger et al., 2005; England and Russo, 2006; Johnson, 2008a; Pretzer, 2008). The aim of this study was to monitor a one-foetus pregnancy during and after the early resorption of the second foetus both by ultrasonography, and by measurements of progesterone blood levels as an indicator of corpus luteum function (hypoluteoidism).

Case description

An 18-month-old German Shepherd bitch was mated once with a two-year-old male 17 days after the owner first noticed signs of heat. It was the bitch's first pregnancy. During the first transabdominal ultrasound examination (Mindray 3300) 25 days after mating, one physiologically developing embryo, and a second one in the process of resorption were detected. As a result of this diagnosis, subsequent ultrasound examinations were made on the 28th, 33rd, 40th, 47th, 54th and 62nd days of pregnancy. On the same days blood samples were collected from the cephalic vein for progesterone assays by radioimmunoassay with extraction. Additionally, the inner chorionic cavity diameter protocol (ICCD) was performed on days 25 and 28 after mating to predict the parturition date.

DISCUSSION AND CONCLUSIONS

During the regular USG examinations performed during the course of this pregnancy only one live

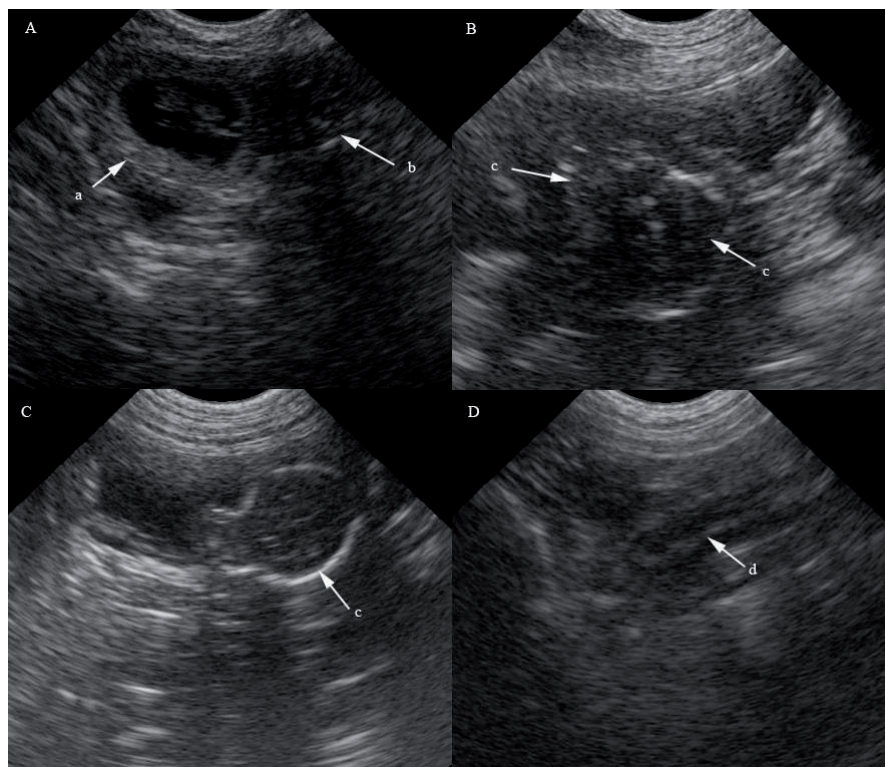


Figure 1. Ultrasound imaging. A – 28th day of pregnancy: one live embryo (a) and one in the process of resorption (b). B and C – 47th day of pregnancy: structures of the foetus (c). D – 10th day after parturition: uterus in the course of physiological involution (d)

foetus was found (Figure 1). Although establishing the number of foetuses by ultrasonography is difficult (Kutzler et al., 2003b; Lopate, 2008), a singleton litter was confirmed by the delivery of one healthy puppy. Moreover, during the first two USG examinations performed in the middle of the pregnancy signs of embryonic/foetal resorption were observed (Figure 1). This disorder can be caused by many factors (Goerlinger et al., 2005; England and Russo, 2006; Givens and Marley, 2008; Johnson, 2008a; Pretzer, 2008), but very often it is related to low or insufficient progesterone production by the corpus luteum (hypoluteoidism). Progesterone is the most important factor regulating endometrial development, inhibition of uterus motility and promotion of placental integrity.

Hypoluteoidism during pregnancy can be detected by frequent progesterone measurements (Goerlinger et al., 2005; Johnson, 2008a). If hypoluteoidism is confirmed, adequate procedures to support the pregnancy can be initiated (Goerlinger et al., 2005; Johnson, 2008a). The progesterone level we measured as an indicator of corpus luteum function were within the physiological range (39.7–10.4 ng/ml) (Figure 2). German Shepherds

are often affected by hypoluteoidism (Guenzel-Apel, 2006), but in our case this was not confirmed. We can only speculate regarding the reason for the singleton litter in this bitch, because there are many factors affecting embryonic and foetal mortality, and we were unable to perform a full diagnostic procedure.

Singleton litters in giant breeds, including German Shepherds, are rare and considered high-risk. This problem is mainly related to the extended duration of the pregnancy and dystocia. Also, it is not easy to predict the time of parturition. Ultrasonography is recognized as a useful tool for this purpose when the ICCD protocol is used (Kutzler et al., 2003a,b; Johnson, 2008b; Lopate, 2008). On the basis of this protocol we calculated the time of parturition to be on the 62nd day after mating, but the progesterone level on that day was still high (10.4 ng/ml) and there were no indications for a cesarean section. The divergence between the real time of parturition and the prediction based on the ICCD protocol could be related to the often larger size of a singleton litter (Kutzler et al., 2003b; Lopate, 2008). Moreover, information about the use of ICCD in the giant breeds is very limited. Spontaneous

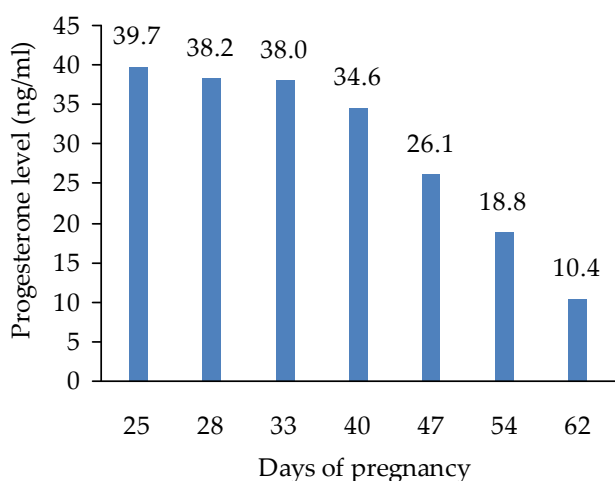


Figure 2. Levels of progesterone (ng/ml) during pregnancy

delivery took place on the 65th day after mating. A drop in body temperature was observed eight hours earlier and one correctly developed puppy was born via a physiological delivery. It should be stressed that in our case the length of pregnancy was physiological despite a singleton litter caused by embryonic mortality. Our study is one of only a few case studies that presents the results of follow-up examinations of a German Shepherd bitch that was diagnosed with embryonic resorption.

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Received: 2010–04–16

Accepted after corrections: 2011–01–24

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