



EARLY PREGNANCY DIAGNOSIS AND FETAL DEVELOPMENT OF ONE-HUMPED CAMELS (*Camelus dromedaries*) IN IRAQ BY B-MODE ULTRASONOGRAPHY

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ABSTRACT

A total of 12 adult, primiparous, and non-lactating one-humped she-camels (*Camelus dromedaries*) belonged to the herd of the College of Veterinary Medicine-Fallujah, Iraq were included in the present study, only eight of them were mated with virile studs. The female genital tract of these camels was examined per rectum to detect early pregnancy and the growth and anatomical features of the fetus by real-time ultrasonography at 20, 25, 30, 35, 40 and 50 days postmating. Results show that the early embryonic death between day 25 to 50 post mating is 33.3%, and the fertility rate 33.3%. The concept was recognized at day 20 postmating. The embryo proper visible at day 25 post mating, the head, trunk, limb bud and also the eye bole were clearly visible between the days 40 and 45, and the fetal membranes were clearly visible on day 50 after mating. In all cases conceptus was found in the left horn.

KEYWORDS: Camelus dromedarius, ultrasound, pregnancy diagnosis, Iraq.

INTRODUCTION

During the last couple of the years, ultrasonography has gained popularity in veterinary medicine and has become the method of choice for diagnostic imaging of the various organs of the body, including reproductive organs. Real time B-mode ultrasonography has been used recently to detect early pregnancy and the growth of various organs and different structures in cattle (Hunnam *et al.*, 2009), mare (Kotoyor *et al.*, 2012) sheep (Trapp and Slyter, 1983) and goat (Koker *et al.*, 2012). The female camels are breed in one season. Calve in the subsequent breeding season and then remain sexually quiescent until the following breeding season, leading to long intercalving periods and significant economic losses (Wilson, 1989). Early detection of embryo play an important role in camel breeding because return to service are difficult to detect due to lack of definite estrus cycle and less obvious external signs of estrus (Van Lennep, 1961), so that if camel is not pregnant she can be re-mated, re-inseminated or returned to an embryo transfer program (Skidmore, 2000). Cocking of the tail is an effective visual method of pregnancy diagnosis in she-camel (Agarwal *et al.*, 1996), but many false positives can be obtained from the cocking of the tail in agitated females if the observer is untrained (Tibary & Anouassi, 1997). Diagnosis of pregnancy using rectal palpation can represent some risks to the females such as rectal tears, and because the membrane slip test, described in cattle pregnancy diagnosis is not possible in *camelidae* because of the diffuse type of placentation (Van Lennep, 1961), transectal palpation of the reproductive tract of the female camels-especially the ovaries-is relatively difficult than that of other large domestic animals like cows and mares (Tibary & Anouassi, 1997; Ali, 2010). Therefore, a noninvasive method of early

pregnancy diagnosis with ultrasound would greatly help to identify non pregnant she-camels as early day 20. (Vyas *et al.*, 2002), and as camels are generally used in less well-developed countries, and there are only a few reports in the literature regarding the use of ultrasound for early pregnancy diagnosis in she -camel and no reports about Iraqi she camel regarded with this field, so the objective of the current study was to assess the use of linear array real-time B-mode ultrasound for the detection of early pregnancy and the growth and anatomical features between day 20-50 post mating of the one-humped camels in Iraq.

MATERIAL AND METHODS

A total of 12 adult, primiparous, and non-lactating one-humped she-camels (*Camelus dromedaries*) belonged to the herd of the College of Veterinary Medicine-Fallujah, Iraq were included in the present study. The period of study was from December 2012 to April 2013. The experimental female camels were kept in loose, and they were maintained in fenced pens of 1000m² area. The camels were clinically healthy and they were fed a diet of mixed concentrates and hay once a day and were given water *ad libitum*. Camels were kept in which virile stud was allowed to run freely for 12h each day. They were observed constantly for signs of estrus and matings that occurred were recorded and timed. These estrus signs like strading of the hind legs, raising of the hind legs, raising the tail, frequent urination and submissive behavior towards an approaching male. (Vyas & Sahani, 2000). The camels were restrained in sternal recumbent posture with all the four legs correctly fastened with ropes. Xylazene (kepro Holland) 80-120 mg was administered intravenously for sedation. The ultrasound scanner used

for the study was My Lab Five VET esaote equipped with 5-7.5MHz linear-array intrarectal transducer. The machine was placed on a suitable table at appropriate level for easy visibility of the operator and to make controls of machine approachable to the operator during scanning. (Vyas & Sahani, 2000). The rectum was evacuated of all feces before insertion of the transducer which was lubricated with gel and inserted through anal ring. The urinary bladder was recognized as homogenous nonechoic, and taken as land mark for genital tract. As the transducer face was moved cranially beyond the urinary bladder, the uterus was imaged and by changing the angle of the probe, the uterine horns were imaged. The female genital tract of these camels were scanned ultrasonographically for the detection of early pregnancy and the growth and anatomical features (the embryonic vesicle, embryo proper, heartbeats, fetal membrane, the head, eye bole, neck, trunk, and limb bad)at 20,25,30,35,40 and 50 days postmating.

RESULTS

Estrus behavior was observed in eight out of 12 of she-camels (66.6%) and they were mated with virile studs (tab. 1). The first examination of the uterus for the she-camel by ultrasonography in this experiment was done at day 20 after mating. One she camel (12.5%) manifests estrus and was mated but none conceived the concepts in all other cases (7 she-camels, 87.5%) were recognized at the left uterine horn. The ultrasonography on 25 and 30 day post mating revealed 50% (6/12) and 41.7% (5/12) of camels to be pregnant respectively, and 33.3% (4/12) on 35,40 and 50 day post mating revealed of camels to be pregnant and the pregnancy continued to term (table 1). The numbers of alive embryos proper recognized by ultrasonography are 6 and 4 on day 25 and 50 after mating respectively (table1), so the embryonic mortality is 33.3%. On day 20 after mating the concepts appeared as an accumulation of non-echoic of embryonic fluid, regular and round in shape in cross section with a diameter of 15-18mm (Fig. 1), or appeared elongated and irregular when the ultrasound beam translated the uterine horn laterally (Fig. 2).

TABLE 1: Detection of estrus and pregnancy diagnosis by ultrasonography post mating on she- camels

Camel no	Estrous	Detection of pregnancy by ultrasonography (Days post mating)					
		20	25	30	35	40	50
1	+	+	+	+	+	+	+
2	+	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND
5	+	+	+	+	+	+	+
6	+	+	+	ND	ND	ND	ND
7	+	+	+	+	+	+	+
8	+	+	+	+	+	+	+
9	ND	ND	ND	ND	ND	ND	ND
10	+	+	ND	ND	ND	ND	ND
11	+	+	+	+	ND	ND	ND
12	ND	ND	ND	ND	ND	ND	ND

ND: not detected

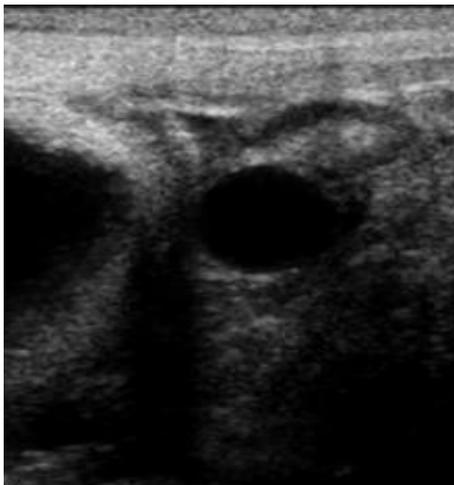


FIGURE 1: Ultrasongram of day20 postmating of the uterus showing the embryonic vesicle (Cross section).



FIGURE 2: Ultrasongram of day 20 postmating of the left uterine horn showing the elongated of no echoic

The second examination was done on day 25 postmating. At this stage the embryo proper visible in seven she camels as a small echogenic mass inside the concept, the diameter of the embryonic vesicle about 25-35mm (Fig. 3). The third examination of the uterus by ultrasonography

in this experiment was done on day 30 postmating, the diameter of nonechogenic embryonic vesicle about 38mm, lying ventrally and attached closely to the uterine wall, The cardiac region appear as an echoic spot within the embryo(Fig. 4).

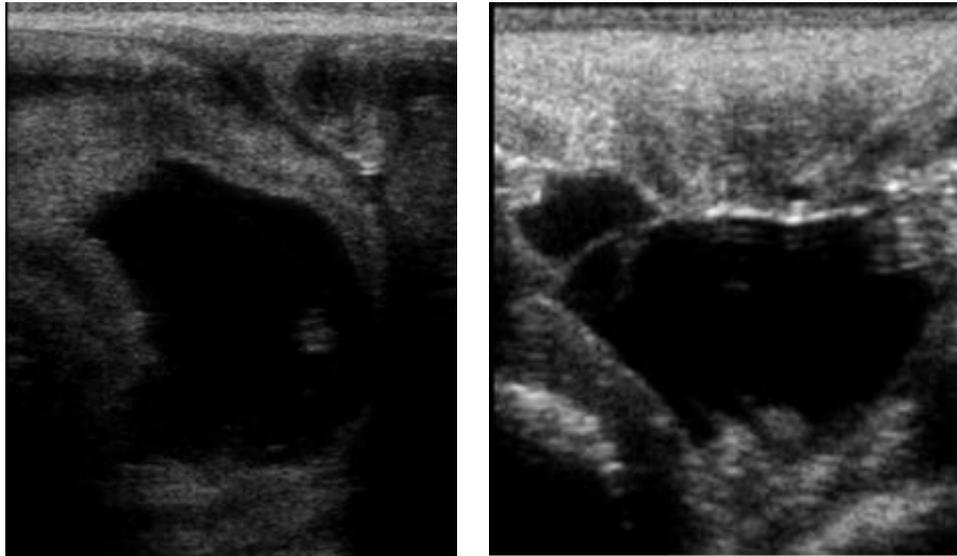


FIGURE 3(A, B): Ultrasonogram of day25 postmating of the uterus showing the elongated of embryonic vesicle The embryo proper visible.

At day 35 postmating the fourth examination of the uterus by ultrasonography was done, at this stage the diameter of concepts increased more rapidly due to more accumulation of fetal fluids, the diameter of nonechogenic fluid about 42mm. The embryo detached itself progressively from the uterine wall and laying in the center of the anechoic embryonic vesicle, the diameter of the embryo about 10mm (Fig. 5).The fifth and sixth examination was done on days 40 and 45, at this stage the head, trunk, limb bad were clearly visible, and also the eye bole which is appear as anechoic spot within the head, the crown rump length

about 27mm, and head length about 8mm (Fig. 6,7). The last examination of the uterus of she-camel in this examination was done on day 50 after mating by ultrasonography. At this stage the fetal membrane were clearly visible, the endometrium was found raised in irregular manner (folds) throughout its length and fetal parts identification and measurement was difficult and this is due to the movement of fetus within the embryonic vesicle, high amount of uterine fluid and the positioning of the probe and the plane of the ultrasound wave cutting across the uterus (Fig. 8).

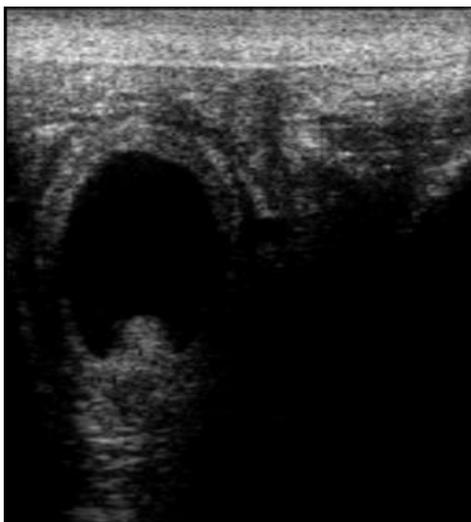


FIGURE 4: Ultrasonographic images of the left uterine horn, day30 postmating, the conceptus fluids are round and nonechogenic and the echogenic fetus.

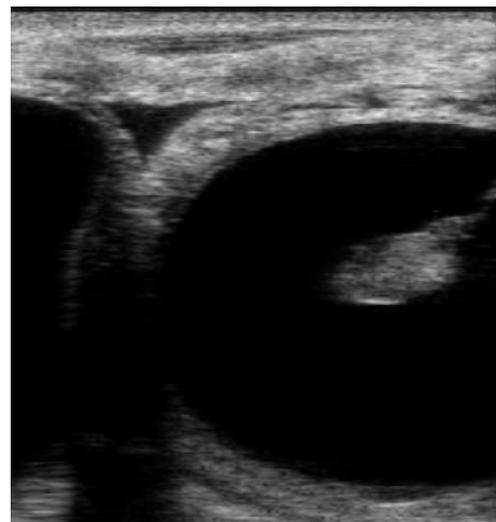


FIGURE 5. Ultrasonographic images of the left uterine horn, Day 35 aftermating.

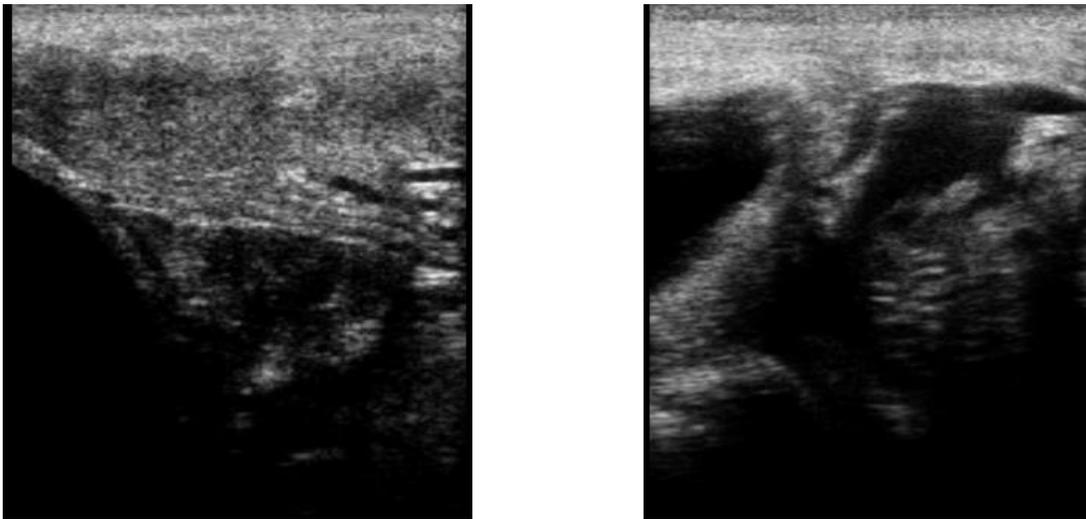


FIGURE 6, 7: Ultrasonogram images of pregnant she-camel at day 40,45 after mating, the head, neck, abdomen and the limb buds of the fetus can be easily identified



FIGURE 8: Ultrasonogram images of pregnant she-camel at day 50 after mating, The endometrium raised in irregular manner (fold)

DISCUSSION

The breeding season of camels in the region (Saudi Arabia) extends from October to February *i.e.* the period of short day length (Abdel Rahim *et al.*, 1994 and Ali *et al.*, 2010). Similar short day breeding season have also been reported in Iran (Islamy, 1950), Somaliland (Mares, 1954), Egypt (Shalash, 1965), India (Matharu, 1966), Sudan (Musa & Abusineina, 1978) and Pakistan (Ali *et al.*, 2011). She-camels were mated when they were showing a clinical evidence of estrus or sexual receptive behavior, these signs of estrus, like frequent urination, striding of hind leg, mounting other females and submissive behavior towards an approaching male. Signs of estrus in this study were observed to be highly variable; this result is in agreement with findings observed by Vyas & Sahani (2000). A single pregnancy diagnosis in she camel is not sufficient to guarantee a birth, especially if done at a very early stage, this is due to in part to errors in diagnosis, but is also due to the high incidence of early

embryo loss seen in these species (Skidmore, 2000). The female genital tract of she-camels in this experiment were scanned ultrasonographically at 20,25,30,35,40 and 50 days postmating, for the detection of early pregnancy and monitor the growth and anatomical features of the embryo between day 20-50 post mating. She-camels are considered as induced ovulators and ovulation occurs after mating (Nawito *et al.*, 1967) In this study 1 of 8 (12.5%) of camels manifest estrus and was mated but non conceived, this result is in agreement with findings observed by Skidmore *et al.* (1996) which reported that natural mating could induce ovulation in only 70% to 85% of camels. Pregnancy was found exclusively in all other cases (7 of 8 she-camel 87.5%) in the left horn. The high incidence of left horn pregnancy has been attributed to many causes like embryo migration (Ghoneim, 1985), inability of the right horn to support the conceptus after day 50 of pregnancy (Arthur *et al.*, 1989), death of the embryos developing in the right horn as they reach 2-3 cm (Arthur

et al., 1985), the normal relatively weakly developed right horn that makes the uterus as one room (Arthur *et al.*, 1989 and Abd-Elnaem, 1998). The concepts in this experiment appeared on day 20 after mating as an accumulation of non-echogenic of embryonic fluid, regular and round in shape in cross section or appeared elongated and irregular when the ultrasound beam translated the uterine horn laterally, and the embryo proper visible as a small echogenic mass inside the concept on day 25 postmating. These findings supported by many authors (Tibary, & Anouassi, 1997, Skidmore, 2000 and Vyas *et al.*, 2002), although they diagnosed the embryo proper on 20-23 day postmating, there was not much difference in days of first detection of the embryo proper in the present study compared to the previous report since she camels in this study were mated when they showing clinical evidence of estrus or sexual receptive behavior, while mating of she-camel in the previous study done depended on the diameter of growth follicle, this is due to the time elapsed between mating and ovulation in camel is 24 to 36 hours (Marie & Anouassi, 1986). The present result recorded that the incidence of early embryonic death is 33.3%, these findings supported by Tibary *et al.* (2006), they reported that the early embryonic death is usually ranged from 8 and 32%. The reason for such a high incidence of embryonic mortality is not clear, but earlier reports have suggested that the side of ovulation may have an effect since all pregnancies are carried on the left horn (Tibary & Anouassi, 1997), and both ovarian sides are equally functioning, but ovulation followed by successful pregnancy is more probable to be from the left ovary (Ali, 2010).

The reproductive efficiency of camels under natural conditions is generally regarded to be low, for example, Djellouli & Saint-Martin (1992) reported an overall calving rate of approximately 40% for 30 herds in Tunisia. The present results recorded that the fertility rate is 33.3% (4 of 12); this result is lower than that recorded by other authors which recorded 39.1% in Libya (El-Azab *et al.*, 1997), 41% in Egyptian (Zeidan, 1999). Tinson *et al.* (2001) mentioned some pathological causes which lead to infertility in camels, and uterine infections were considered to be the most common cause of reproductive failure in female camels (Ali *et al.*, 2012). The present findings add to the above findings in showing that the one humped camel (*Camelus dromedaries*) in Iraq like that in other rejoin characterized by low reproductive efficiency, and use of real-time ultrasonography for early pregnancy diagnosis and rebreeding, re-inseminated or returned to an embryo transfer program for females which failed to conceive, this can be a step towards increasing the reproductive efficiency.

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