A comparison of gravid uterine parameters of local breed ewes between single and twin pregnancies in different gestational stages

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Abstract

The study was carried out from the period of September 2012 to March 2013 in An Najaf province. Thirty gravid uteri (15 single and 15 twins) were collected from An Najaf and Al-Kufa slaughter houses. The results showed that in single pregnancies the mean of measurements of fetal weight, uterus weight, allantoic fluid and numbers of cotyledon in first trimester were 26.75 gm, 331.75 gm, 250.25 ml and 74.5 respectively. In second trimester it were 226 gm, 1002.66 gm, 545 ml and 90.75, while in third trimester it were reach 815 gm, 2168 gm, 621.42 ml and 89.75 respectively. In twin pregnancies the mean of measurements of fetal weight, uterus weight, allantoic fluid and numbers of cotyledon in first trimester were 13.5 gm 432.25 gm, 275.5 ml and 105.25 respectively. In second trimester it were 105 gm, 1316.5 gm, 786 ml and 100, while in third trimester it were reach 450 gm, 3470 gm, 1158 ml and 129 respectively.

Key words: gravid uterus, single pregnancy, twin pregnancy, gestation stage, ewe.

مقارنة بعض معايير الارحام الحوامل في النعاج المحلية في حالتي الجنين المفرد والتوائم

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الخلاصة

اجريت الدراسة للفترة من ايلول 2012 ولغاية اذار 2013 في محافظة النجف حيث تم جمع 30 رحم حامل (15 حمل مفرد و15 توائم) من مجزرتي النجف والكوفة. اظهرت النتائج ان معدلات قياس كل من وزن الجنين ، وزن الرحم ، حجم السائل الالنتوي وعدد الفلقات الجنينية للحمل المفرد في الثلث الاول من الحمل كان 26,75 غم ، 331,75 غم ، 250,25 غم و 74,5 على التوالي. اما في الثلث الثاني من الحمل المفرد فكانت معدلاتها 226 غم ، 1002,66 غم ، 545 مل و 90,75 . اما في الثلث الاخير من الحمل المفرد فكانت 815 غم ، 2168 غم ، 621,42 مل و89,75 على التوالي . في الحمل للتوائم كانت معدلات وزن الجنين ، وزن الرحم ، حجم السائل الالنتوي وعدد الفلقات في الثلث الاول من الحمل 13,5 غم ، 432,25 غم ، 275,5 مل و 105,25 على التوالي ، في الثلث الثاني من الحمل كانت المعدلات 105 غم ، 1316,5 غم ، 786 مل و 100 فلقة على التوالي ، اما في الثلث الاخير من الحمل التوأم وصلت تلك المعدلات الى 450 غم ، 3470 غم ، 1158 مل و 129 فلقة على التوالي.

الكلمات المفتاحية: النعاج ، الرحم الحامل ، الحمل المفرد ، الحمل التوأم ، فترة الحمل.

Introduction

Sheep are considered as seasonally polyestrous animals in their breeding behavior (1). The certain reproductive processes in the ewes such as embryo transfer, superovulation and in vitro fertilization can be altered to the advantage of the farmer (2). The ewe has a cotyledonary placenta, with fetomaternal exchange taking place at 88–100 discrete sites known as placentomes (3). The placenta is the organ that transports nutrients, respiratory gases, and wastes between the maternal and fetal systems. Consequently, placental blood flow and vascular development are essential components of normal placental function and are critical to fetal growth and

development(4). The gravid uterine parameters are not affected by the method of embryo production but are affected by the number of fetuses present; multiple fetuses are known to have a lower birth weight, increased neonatal mortality, reduced growth rate and poor performance in subsequent stages of life (5). The importance of the placental circulation to successful pregnancy is exemplified by the close relationships among fetal weight, placental size, and uterine and umbilical blood flows during normal pregnancies in many mammalian species (6). In other hand the placental size may be indicative of fetal growth, as placental restriction has been shown to decrease fetal size (7). The present study was designed to compare between parameters of gravid uteri of local breed ewes in single and twin pregnancies.

Materials and methods

The study was carried out from September 2012 to March 2013 in An Najaf province. Thirty gravid uteri of culled ewes (15 single and 15 twins) were collected from An Najaf and Al-Kufa slaughterhouse immediately after slaughtering. Samples were transported to theriogenology laboratory of veterinary medicine college in Kufa University by using ice box. According to the crown rump (CR) formula, samples were classified into three groups, first, second and third trimester as mentioned by (8). The parameters that dependent in this study including, number and weight of fetus, weight of whole uterus, weight and number of placentomes, volume of fluids and diameter of placentomes. The weight of the samples were taken by using sensitive balance, the volume of allantoic fluid were measured by using graduated cylinders, while the diameters of placentomes were taken by using vernier caliper.

Results

The results were showed that the means of fetuses weight and gravid uteri of single pregnancies in first trimester were 26.75 gm ± 0.77 and 331.75 gm ± 0.69 respectively, while in twin pregnancies they were 13.5 gm ± 0.82 and 432.25 gm ± 0.06, respectively. The allantoic fluid in single fetus was measured 250.25 ± 1.35 ml while it was measured 275.5 ml ± 0.22 in twin fetus. In single fetus the number, diameter and weight of cotyledon were 74.5 ±0.83, 1.15cm ±0.78 and 1.35gm ±1.01 respectively. While in twin fetus were measured 105.25±0.95, 3cm ±0.03 and 3.375gm ±0.06 respectively. The results were presented in table 2 revealed that the mains of weight of fetuses and gravid uteri of single pregnancies in second trimester were 226gm ±0.65 and 1002.667gm ±0.09 respectively, while in twin pregnancies they were 105gm ± 0.07and 1316.5gm ±0.19 respectively. The allantoic fluid in single fetus was measured 545ml ±0.97ml while it was measured 786ml ±0.33 in twin fetus. In single fetus the number, diameter and weight of cotyledon were 90.75±0.96, 3.317cm ±0.44 and 1.025gm ±0.96 respectively. While in twin fetus were measured 100±0.85, 3.375cm ± 0.04 and 4.68gm ± 0.53 respectively. The results were presented in table 3 revealed that the mains of weight of fetuses and gravid uteri of single pregnancies in third trimester were 815gm±0.65 and 2168gm ±0.34 respectively, while in twin pregnancies they were 450gm ±0.65 and 3470gm ±0.41. The allantoic fluid in single fetus was measured 621.42ml±0.65 while it was measured 1158ml ±0.61 in twin fetus. In single fetus the number, diameter and weight of cotyledon were 89.75±0.85, 3.171cm ±0.60 and 10.92gm ±0.52 respectively. While in twin fetus were measured 129±0.05, 4.76cm ±0.94 and 11.10gm ±0.31 respectively.

Table (1): Reveal the Mean ± SE of weight of fetus, number, diameter and weight of cotyledons in the first trimester of pregnancy in single and twin fetus.

Parameter / fetuses	Weight of fetus (gm)	Weight of whole uterus (gm)	Volume of allantois (ml)	No. of cotyledon	Diameter cotyledon (cm)	Weight cotyledon (gm)
Single	26.75±0.77	331.75±0.69	250.25±1.35	74.5±0.83	1.15±0.78	1.35±1.01
Twin	13.5±0.82	432.25±0.06	275.5±0.22	105.25±0.95	3±0.03	3.375±0.06

Table (2): Reveal the Mean ± SE of weight of fetus, number, diameter and weight of cotyledons in the second trimester of pregnancy in single and twin fetus.

Parameter / fetus	Weight of fetus (gm)	Weight of whole uterus (gm)	Volume of allantois (ml)	No. of cotyledon	Diameter cotyledon (cm)	Weight of cotyledon (gm)
Single	226±0.65	1002.667±0.09	545±0.97	90.75±0.96	3.317±0.44	10.25±0.96
Twin	105±0.07	1316.5±0.19	786±0.33	100±0.85	3.375±0.04	4.68±0.53

Table (3): Reveal the Mean ± SE of weight of fetus, Number, diameter and weight of cotyledons in the third trimester of pregnancy in single and twin fetus.

Parameter / trimester	Weight of fetus (gm)	Weight whole uterus (gm)	Volume of allantois (ml)	No. of cotyledon	Diameter cotyledon (cm)	Weight of cotyledon (gm)
Single fetus	815±0.65	2168±0.34	621.42±0.65	89.75±0.85	3.171±0.60	10.92±0.52
Twin fetus	450±0.65	3470±0.41	1158±0.61	129±0.05	4.76±0.94	11.10±0.31

Discussion

Many factors may be influence the weight of single or twin fetuses in ewes, thus, Clarke et al (9) concluded that the additional feed offered to the twin (pellet and barley) treatment groups failed to produce an increase in lamb survival, it did result in an increased live weight of the twins at marking, similar to that of single born progeny run under standard management, our results in this study reveals that the fetus weight in twin pregnant weigh lower than those in single pregnant in all stages of pregnancy (1^{st}, 2^{nd} and 3^{rd} trimesters), this happened during the development where the two fetuses were divide the nutrient materials and the growth materials between them, and this disagreement with the results that obtained by (10) which whose said that single and twin fetuses averaged 0.15 and 0.30 kg (total weight) at day 70 of gestation; and 6.21 and 10.64 kg at day 140, respectively, and they found that the growth rates of single fetuses averaged 31, 71, 129 and 199 g/d while those of twin fetuses averaged 47, 153, 236 and 202 g/d at days 80, 100, 120 and 140, respectively, while the whole weight of gravid uteri were increase significantly ($P<0.01$) in twin than in single fetus in all trimesters of pregnancy, this occur due to the additional weight of the other fetus of twin, these results are in agreement with the data that obtained by (11 and 12). Also the volume of allantoic fluid were increase non significantly ($P<0.01$) in twin pregnant in the 1^{st} trimester of pregnancy, and increase significantly in the 2n and 3^{rd} trimesters of twins (13), whose measured the weight of the allantoic fluid and found increase in the allantoic weight in twin than in the single fetus in all trimesters of pregnancy, and this results are in agreement with this results. In our study, the following parameters of the placentomes were collected which were, number, diameter and the weight of placentomes, the number of placentomes in single pregnancy were significantly less ($p<0.01$) than in twin pregnancy, these results were agreement with the results of (12) which revealed that the number of placentomes/ewe was less for single pregnancies (67.0±4.2) than for twin (87.0±4.1) or triplet (85.7±3.7) pregnancies, this may be due to the twin fetuses need to more blood flow for gases exchanges and nutrient materials and disagreement with the results that obtained by (14) whose said that no differences in the number of placentomes. The placentome diameter may be a good measure to describe the development of the placenta during pregnancy and the relationship between fetal and placental growth (15). Kaulfuss et al. (16) reported that placentome diameter increased more in twin pregnancies than in singletons during the third month of pregnancy. In the present study the difference between placentome diameter size in singleton and twin-pregnant ewes was significant in the 1^{st} and 2^{nd}

trimester in twins fetuses, this may be due to the changes associated with increased placental perfusion and tissue permeability during late pregnancy, It has been speculated that as placentomes advance in type they differ in vascularity and nutrient transport capacity, while there was no variation in the diameter of placentome in the 3rd trimester. This disagreement with the results of the above author. The results also showed that the weight of placentomes increase significantly in the first and second trimesters of twin pregnant, while there was no significant variation in the 3rd trimester in single and twin pregnant. These results agreement with the data that obtained by (3).

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