Study on post-partum uterine involution by Ultrasonography and progesterone profile in local goats in Iraq

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Summary

The study was conducted to investigate and characteriz the time of uterine involution in local goats in Iraq by measuring the uterine diameter, uterine lumen (mm) and monitoring early post-partum ovarian activity as proved by Ultrasonography and progesterone assessment in local goats. 15 goats were submitted to examine from day 3 to 40 after kidding by Ultrasonography. Trans abdominal ultrasound approach was performed from day 3 to 5 after kidding and continued by trans rectal approach to follow up the uterine involution until day 40. Progesterone levels were measured starting from day of parturition, then a weekly measure until day 34 of post-partum period. Progesterone was assayed by Radio immune assay. The obtained results showed that complete of uterine involution started at day 26 (6.67) % and completed at day 34 post-partum in all does (100%). on the other hand involution of the uterus was completed at day 26, 27, 28, 29, 31, 33 after parturition with a percentage of 6.67%, 13.34%, 33.34%, 40%, 46.67%, 66.67%, 73.34% and 80% respectively. Average uterine lumen (mm) from days 3-7, 8- 14, 15- 21, 22- 28, 29 -35 and 36-40 were 9.02, 5.82, 5.14, 3.51, 2.66, and 2.0 (mm) respectively. Average uterine diameter (mm) was 40.25, 33.9, 31.4, 25.57, 20 .15 and 16.35 at day 3-7, 8- 14, 15-28, 29-35 and 36-40 respectively. Regarding progesterone profile, results indicated that the mean value of the hormone was 0.267±0.005 ng /ml at parturition and the values were 0.320±0.007, 0.414±00.5, 0.536 ±0.013, and 1.945 ±0.129 ng/ ml at day 7, 14, 21 and day 30, respectively. It could be concluded that Ultrasonography image proved to be a valuable and safe tool in monitoring uterine involution and measuring of progesterone is a precise biological marker for the detection of resumption of ovarian cyclist during post-partum period.

Keywords: Local goat, Post-partum, Uterine involution, Ultrasonography, Progesterone.

Introduction

Uterine involution in small ruminant is defined as the day when the diameter of the uterus returned to the original non-pregnant size as observed during the normal estrous cycle (1). Uterine involution in goats and sheep is characterized by rapid decrease of uterine size and increase contraction rates, most commonly between the 3rd and the 10th days postpartum, illustrated by measurements of uterine weight and length and reduction in the size of the uterus after parturition is the greatest change occurring during the first few days after parturition (2) several researcher reported that uterine involution in goats was completed by the 16th days postpartum found at slaughterhouse materials (3), at19th (4 and 5) or at the 28th (6). The post-partum period included of a sequence of anatomic and physiologic -changes of both the uterus and endocrine system, and it is an important factor for the resumption of reproductive activity and regular cycling of a breeding. Reduction in the size of the uterus after parturition is the greatest change occurring during the first few days after parturition (7). Post-partum morphological changes and their delay in the post-partum uterus and ovaries of farm animals act as a limiting factor for the reproductive performance following parturition (8). Other techniques used for monitoring uterine involution in goats and sheep were assay of hormones and their metabolites (9 and 10), Ultrasonography is plays considered an excellent tool to differentiate the normal and abnormal postpartum uterus and in early diagnosis of any abnormal condition related to uterus (11). Ending of uterine involution and resumption of sexual activity following parturition in goats and sheep normally depend on several factors, such as nutrition, nursing of offspring and

season of parturition (12 and 13) There are many researches shown different intervals to complete uterine involution in goats. (14) Revealed complete macroscopic uterine involution at day 19 Post-partum, (15) reported that complete uterine involution occurred at day 28 Post-partum additionally, histochemical study of Caprine endometrium indicated complete regression of endometrial and re-epithelialization by day 16 Post-partum (16). With these discrepancies about the period necessary for complete uterine involution, decreasing logarithmic measurement, the greatest change occurring during the first few days after parturition and with rapid shrinkage and contraction of the uterus, particularly during the day 3 to day 10 postpartum, as determined by measurements of uterine horn (2).

Materials and Methods

This study was carried out in a state board-for Agriculture Researches, Ruminant Researches Station –Ministry of Agriculture 25Km north west of Baghdad (Agurgof). Fifth ten (15) local Iraqi Does aged (2-5 years) with an average body weight of (40-45kg). They were housed in semi opened shade .Regarding the nutritional regime, the animals kept on the same regime used in the station. Early grazing for about 4 hrs as well providing with green food, and concentrated diet daily at average of 500 gram besides they supplemented with minerals and water ad libidum. The animals were submitted to careful clinical examination to determine that they are healthy and free from diseases. Trans-abdominal Examination by Ultrasonography were performed on all does starting from day 3to 5 to measure the diameter of the involuted uterine horn, using a real-time B-mode ultrasound scanner with a linear-array transducer (5MH), (HONDIA HS-2000 /200V, Japan) and sector probe (7.5) MHZ. HONDIA HS-2000 /200VChina. After that all does examined transracially by linear-array transducer (7.5 MHZ) ALOKA Co. Ltd., USA starting from day 5 up today 40 post-partum. The does were examined transrectally in standing position after evacuation from feces. The rectal probe was made inflexible by an extension rod and gently introduced into the rectum. After applying sufficient amount of gel, and moved medially and laterally to get the best image of the specific uterus, and the maximum diameter of the uterine horn was recorded. Uterine involution was considered to be complete when no additional decrease in the uterine diameter for sequences of examinations was recorded (17). Blood was collected from the jugular vein by Vacationer gel tubes. The blood samples were collected during the time of parturition for determination of progesterone level, then during post-partum period by weekly collection until the day 35 of post-partum, Progesterone hormone was measured by radioimmuno assay (RIA) (kit IMk -458 china).

Results and Discussion

The Ultrasonography examination on the day 3-5 postpartum using the transabdominal approach, showed uterine lumen and wall clearly. There are only few reports on the promising of ultrasound imaging for monitoring of post-parturient uterine involution in sheep and goats (17-19) most studies on the post-partum period events were preformed grossly on slaughter house and examinations of experimental animals (20). The Present study showed rapid decline in the mean Uterine lumen (mm) 9.02, 5.82, 5.14, 3.51, 2.66and 2 mm, from days 3-7, 8- 14, 15-21, 22-28, 29-35 and 36-40, respectively. (Table, 2). The result also depicted the mean of uterine diameter are 40.25, 33.9, 31.4, 25.57, 20.15 and 16.35 mm at days 3-7, 8-14, 15-21, 22-28, 29-35 and 36-40, respectively (Table, 3). Results in (Table, 3) showed that complete involution in the local Iraqi goats started in this study at day 26 postpartum (6.67%) and uterine involution in all does (100%) completed at day 34 and 80% at day 33 postpartum. This result disagreement with others reported uterine regression is completed about 17 to 19 days after parturition (5 and 6) . The variations in the time required for a complete uterine involution may result from breed differences, nutrition, and period of kidding and suckling. The uterine lumen declined gradually from day 3 until day 34 postpartum (Fig. 1) and accumulation of uterine fluid (lochia) was noted during first week post-partum (Fig. 2) and decreased gradually during the successive examinations.

The end of the uterine involution was characterized by a rapid shrinkage and contraction of the uterus, particularly during the day 3 to day 10 postpartum, The end of the uterine involution was characterized by small uterine diameter, uterine lumen and no further reduction of Uterine diameter for two consecutive examinations and also absence of fluid in the uterine lumen (Fig. 3-7). Regarding progesterone profile during post-partum period in goat, results of the present study (Table. 4) and (Fig. 8) showed low progesterone level was observed at the time of parturition and the mean value was (0.267±0.005) ng/ml and that is true since the event of parturition in goat is triggering by lyses of the corpus luteum and lowering of progesterone level an event followed the activation of hypothalamic -pituitary -adrenal axis resulting in establishment of estrogen synthesis and lowering of progesterone level (21). Progesterone values during the studied period of post-partum at day 7, 14, and 21 were at basal levels 0, 320, 0, 414 and 0, 536 ng /ml respectively on other hand, there is an increase in the Basel level of progesterone with the resumption of post-partum ovarian cyclisty and increase after first ovulation at day 30 post -partum (1.994 ng /ml) this result is general agreement with (22) .The uterine lumen declined gradually from day 3 until day 34 postpartum (Fig. 1) and accumulation of uterine fluid (lochia) was noted during first week of post-partum (Fig. 2) diameter for two consecutive examinations and also absence of fluid in the uterine lumen.

Table, 1: The percentage of uterine involution in postpartum period in local goats in Iraq.

Days after parturition	NO. of doe	% Uterine involution
26	1	6.67
27	1	13.34
28	3	33.34
29	1	40
30	1	46.67
31	3	66.67
32	1	73.34
33	1	80
34	3	100

Table, 2: Mean uterine lumen (mm) in postpartum period in local goats in Iraq.

Days Post-partum	3-7 Days	8-14 Days	15-21 Days	22-28 Days	29-35 Days	36- 40 Days
No. of scan	24	47	55	40	58	17
Mean Uterine lume (mm)	9 .02 mm	5.82 mm	5.14 mm	3.51 mm	2.66 mm	2 mm

Table, 3: Mean Uterine Diameter (mm) in postpartum period in local goats in Iraq.

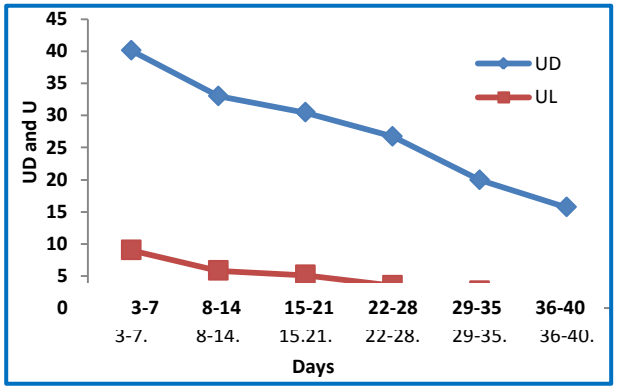
Days (Postpartum)	At days 3-7	At days 8-14	At days 15-21	At days 22-28	At days 29-35	At days 36-40
No. of scan	24	47	55	40	58	17
Mean Uterine Diameter (mm)	40.25	33.9	31.4	25.57	20.15	16.35
SE	±0.472	±0.347	±0.325	±0.374	±0.314	±0.55

Table, 4. Concentration of progesterone hormone -P4 in different days of post-partum period.

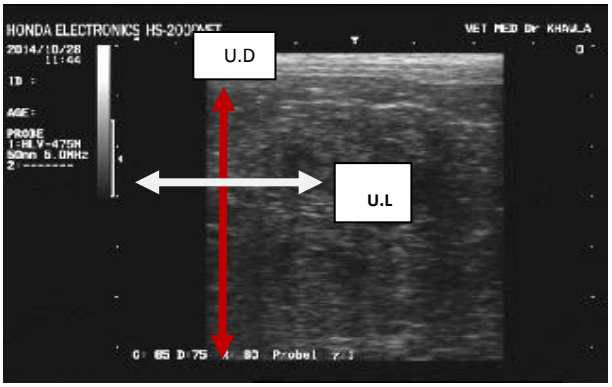
	At partum	At day 7	At day 14	At day 21	At day 30
P4 (ng/ml)	0.267 ± 0.005 c	0.320 ± 0.007 bc	0.414 ± 0.005 bc	0.536 ± 0.013 b	1.945 ± 0.129 a
LSD value	0.249 *				
* (P<0.05)					

The values represented the mean ±SE, Different letters means significant differences at the level (P<0.05).

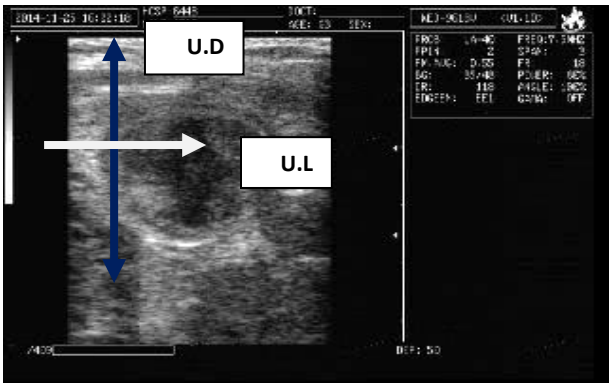
I could be concluded that ultrasonography image proved to be a valuable and safe tool in monitoring uterine involution and measuring of progesterone is precise biological marker for detection of resumption of ovarian cyclisty during post-partum period.



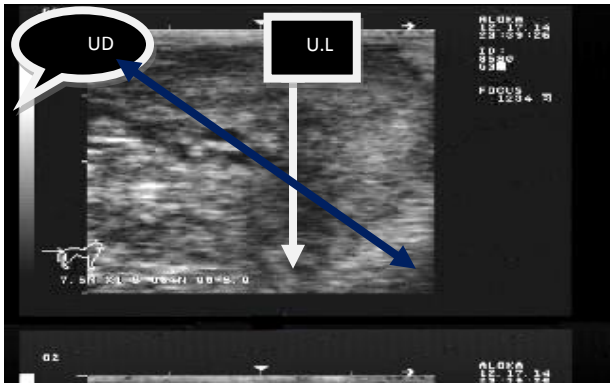
Figure, 1: Uterine diameter and uterine lumen (mm) during different days post-partum period.



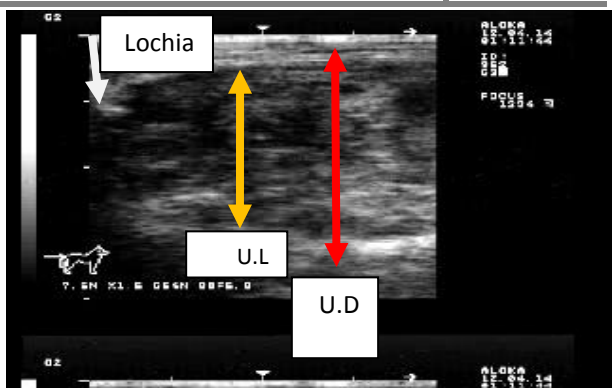
Figure, 2: Ultrasonic image of uterine diameter (40.11 mm), and Uterine lumen (9.6mm) with lochia at days 3 post-partum (arrow) in scanned doe.



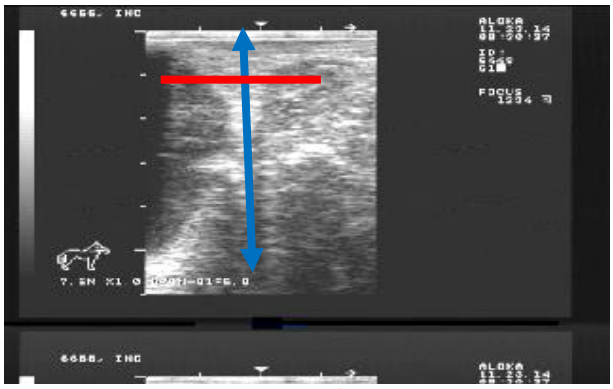
Figure, 3: Ultrasonography image of uterine diameter and uterine lumen at day 7 of post-partum period.



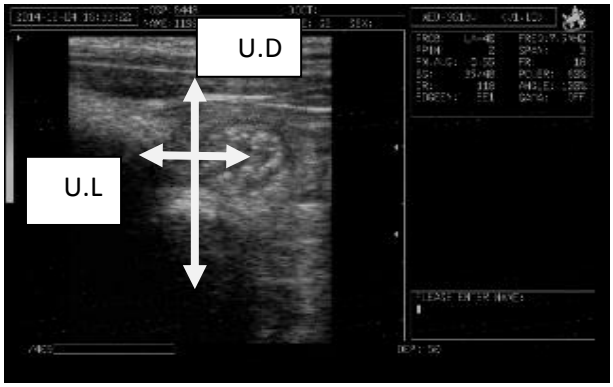
Figure, 4: Ultrasonic image at days 15 days of post-partum uterine diameter (30.47 mm), and uterine lumen (5.14 mm) arrows in scanned doe.



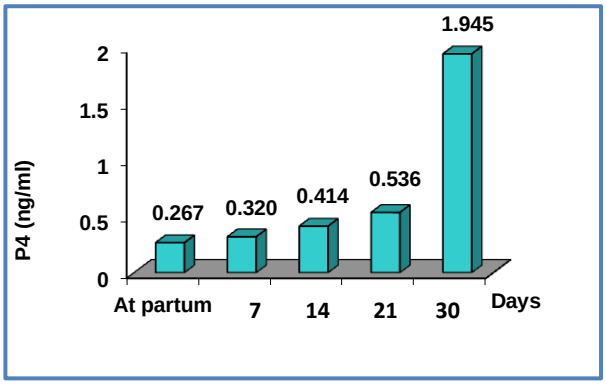
Figure, 5: Uterine involution in doe at day 21 post-partum, with presence of lochia.



Figure, 6: Ultrasonic image of uterine diameter (26.70 mm) days 28 post-partum period arrows in scanned doe.



Figure, 7: Ultrasonic image at days 35 post-partum uterine diameter (19.93) mm, and uterine lumen (2.51mm) arrows in scanned doe.



Figure, 8: Concentration of progesterone hormone -P4 in different days of postpartum period.

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دراسة الارتداد الرحمي بعد الولادة بوساطة جهاز الموجات فوق الصوتية ومستوى هورمون البروجسترون لدى الماعز المحلي في العراق

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الخلاصة

أجريت الدراسة لمعرفة الوقت اللازم لارتداد الرحم في الماعز المحلي بوساطة قياس قطر الرحم والتجويف الرحمي بالمليمتر بوساطة جهاز الموجات فوق الصوتية من اليوم الثالث إلى اليوم 40 بعد الولادة ومتابعة النشاط المبيضي بعد الولادة بواسطة قياس مستوى البروجستيرون في يوم الولادة ثم أسبوعيا لغاية اليوم 30 بعد الولادة. اشتملت الدراسة على 15 معزى خضعت للفحص عن طريق البطن بواسطة جهاز الموجات فوق الصوتية من اليوم الثالث إلى اليوم الخامس بعد الولادة ثم استمر الفحص عن طريق المستقيم لحين اكتمال الارتداد الرحمي. أظهرت نتائج الفحص بوساطة جهاز الموجات فوق الصوتية وبينت اكتمال الارتداد الرحمي بدأ من اليوم 26 وبنسبة 7%. 66 في جميع حيوانات الدراسة بنسبة 100% في اليوم 35 بعد الولادة. أشارت النتائج إلى أنّ تركيز البروجستيرون في يوم الولادة بلغ 0.005±0.267 و 0.007±0.320 و 0.013±0.536 0.5±00.414 و 1.945 ±0.129 نانوغرام/مل في الايام 7 و14 و21 و30 على التوالي. نستنتج من الدراسة امكانية متابعة الارتداد الرحمي بجهاز الموجات فوق الصوتيه وقياس مستوى البروجستيرون في مدة ما بعد الولادة واكتمال ألارتداد الرحمي في اليوم 35 بعد الولادة واعتبار الارتداد الرحمي مكتملاً اعتماداً على بقاء قياس قطر الرحم ثابتاً لعدة قياسات وإن قياس مستوى البروجسترون يعتبر من القياسات المهمة في معرفة ارتداد الرحم بعد الولادة.

الكلمات المفتاحية: الماعز المحلي، مدة بعد الولادة، الارتداد الرحمي، جهاز الموجات فوق الصوتية، البروجسترون.