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Clinical Approach for Assessment The Reproductive Status in Ewes

Abou- El- Roos, M.E.A and Shawki, G.*

Department of Theriogenology, Faculty of Veterinary Medicine
(Moshtohor and Zagazig*), Zagazig University

ABSTRACT

The present study was planned to use the bimanual palpation technique for palpation of internal reproductive organs, pregnancy diagnosis and assessment of approximate stages of gestation in ewes. This work was performed on 70 ewes (40 non pregnant and 30 checked for pregnancy) in addition to 87 slaughter house source ewes. The non pregnant ewes were examined by two hand method for palpability and structural integrity of internal reproductive organs. Of the 30 ewes examined for pregnancy at 30 day post breeding, 21 of them had clear distension of the uterus while 9 did not. The results were confirmed by date of breeding and ultrasonography. The changes of the reproductive tract were monitored at 15 days intervals and the finding categorized by the stage of gestation. Ultrasonographic scanning and post-slaughter verification of pre-slaughter findings based on bimanual palpation indicate that this technique can be used for early pregnancy diagnosis, assessment of the stage of gestation as well as prediction of genital affections in ewes.

INTRODUCTION

Studies have shown that a large proportion of small ruminants are slaughtered at some stages of pregnancy (1) and this is attributable to the lack of simple rapid accurate method for pregnancy diagnosis. Solving infertility problem in small ruminants continues to be a dilemma to veterinarians, so there is a need for early pregnancy diagnosis in sheep and goats. Reliable technique for early detection of pregnancy aids in culling or re-breeding of barren ewes and provides a valuable tool for controlled breeding programs. Inability to detect early pregnancy can result in economic losses in milk and lamb production due to longer lambing intervals (2). On the other hand, gynecological examination and pregnancy diagnosis are easily performed by rectal palpation in large ruminants; however, the small body size of small ruminants makes this approach so difficult. Methods commonly used for pregnancy diagnosis in small ruminants include clinical techniques like external palpation, abdominal ballottement and recto-abdominal technique as well as techniques based on radiography, ultrasonography and hormonal assay (3,4,5,6). Palpation of cervix in small ruminants has been proposed previously (7) and the technique of bimanual palpation was recently developed (8).

The purpose of this work is to study the bimanual technique for gynecological examination and pregnancy diagnosis in ewe guided by ultrasonography and by finding pre- and post-slaughtering of ewes to evaluate the accuracy of palpation.

MATERIALS AND METHODS

This study included 4 trials. In the first one, the reproductive tract and ovaries of 40 non pregnant Ossimi ewes aged (2-3 years) belonging to Faculty of Agriculture Farm, Moshtohor were examined using bimanual technique (Figure 1) adapted by Kutty (9). A method which includes digital palpation per rectum combined with abdominal manipulation in which the ewe was restrained in standing position by an attendant holding the head. Sitting at the level of pelvic region on the right side of the animal. The examiner's pre-lubricated gloved index finger of the left hand was introduced into the rectum. Fecal pellets were removed and a distended urinary bladder was evacuated by gentle recto-abdominal pressure. The right palm was held vertically, with the finger tips touching the ventral floor of the posterior abdomen; it was then lifted upwards to move abdominal organs forward. Then, using regulated forward, upward and backward movements, the repro-

ductive tract within the pelvic cavity could be held in the palm of the right hand. Examination was performed per rectum using the left index finger assisted by the fingers of the right hand. The size, shape, consistency and surface characteristics of the vagina, cervix, uterine horns and adjoining structures were then assessed.

Palpation of ovaries was performed in the same manner, pressing the index finger per rectum against the right fingers. Once the uterine horns were palpated, the ovaries were easily located and palpated lateral to the center of the coils as small oval bodies on each side. Palpation was continued to assess their size, shape, mobility and any other gross structural abnormalities.

Before performing the bimanual technique, the following precautions were observed.

- 1-Examination before feeding and watering.
- 2-Obese animals were fasted over night.
- 3-Fecal pellets were cleared out of the rectum.
- 4-The urinary bladder was emptied before examination.

In 2nd trial of this study. 30 ewes that did not return to estrus after breeding were examined for pregnancy at 30 day after mating using the bimanual technique, and the

presence or absence of clearly distended uterine horns was properly recorded. All the animals were routinely observed for return to heat using a vasectomized ram. Bimanual palpation was repeated in all the non return ewes at 45 and 60 day to detect the progress or any decrease in uterine distension.

In the 3rd trial of the study, ewes diagnosed positive in the previous trial (n=21) were examined repeatedly using the bimanual technique at 15 day interval until the date of lambing.

In the 4th trial 87 ewes were examined using abdominal palpations as well as the bimanual technique at the slaughter houses in different localities at Menoufia and Sharkia province. Findings of the examination before slaughter were recorded and verified through post slaughter exteriorization of the reproductive organs to evaluate the accuracy of palpation. The age of the extracted fetus were determined by measuring of the crown- rump lengths (10).

All ewes in the 1st 3 trials as well as before slaughtering in the 4th trial were examined using an ultrasonic imager, an echo analyzer, 5MHZ transducer of a mechanical linear scanner.

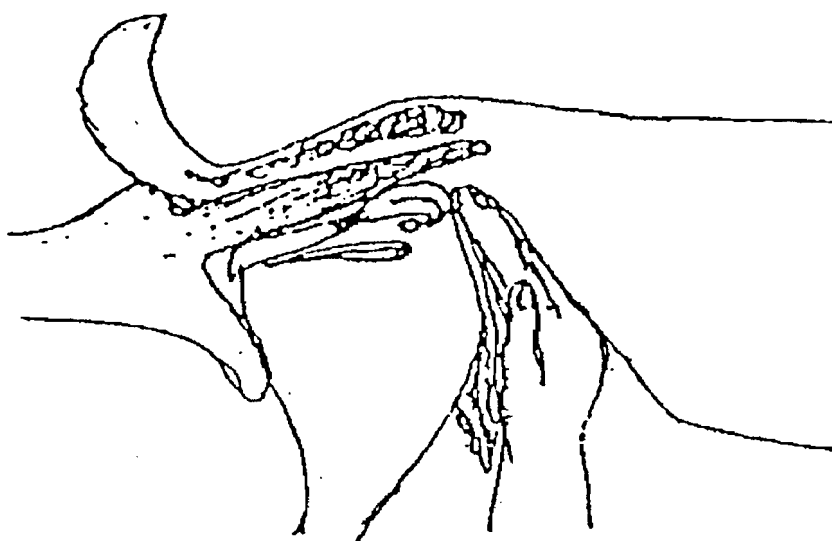


Figure (1) Bimanual examination (diagrammatic representation) of small ruminant reproductive tract. After Kutty (1999)

RESUTES

In all the non pregnant ewes cervix and uterine horns were palpated irrespective of body size and uterus parity status. No gross abnormalities were detected in the tubular organs of any of the ewes except for the

variation in the size and shape of the cervix in a few of them. The number and percentage of successful palpations of the ovaries is given in Table (1) No gross abnormalities could be detected in any of the ewes examined.

Table (1) : Successful palpation of ovaries in ewes

Animals	No. of ewes in which ovaries could be palpated			
	R. Ovaries	L. ovaries	Both	Total
Ewes (n= 40)	6 / 40	4 / 40	25 / 40	35 / 40
Percentage	(15%)	(10%)	(62.5%)	(87.5)

Table (2) show the palpable changes in the tubular genitalia and ultrasonographic picture of the uterus along the whole gestation period. Out of the 30 ewes checked for pregnancy at 30 day after breeding, 21 were detected to have marked distension of the uterus and were considered pregnant. The vaginal wall was relaxed and both cervix and uterus were located in the pelvic cavity without any cervical hypertrophy or uterine asymmetry. The ultrasonographic examination revealed that, the uteri were identifiable as anechoic to hyperechoic image, uterine lumen diameter ranged from 2.4-2.8cm, embryo appeared as a circular hyperechoic structure surrounded by anechoic structure and the length of embryo ranged from 0.9-1.35cm (Figure 2). The remaining 9 ewes had no marked distension of the uterine horns and hence were judged to be non pregnant. Ultrasonography of the non pregnant uterus revealed a hyperechoic uterine horn with uterine lumen diameter ranged from 0.3-0.4cm (Figure 3).

At 45 days of pregnancy, the vaginal wall becomes slightly stretched, the cervix is located at the pelvic brim without hypertrophy but the uterus was located in front of the pelvic brim with clear distension of its wall. Ultrasonographic examination revealed that, the embryo appeared as a circular hyperechoic structure with a length ranged from 3.4 - 4.8 cm with uterine lumen ranged from 4.1- 8 cm.8cm (Figure 4). At 60 days of pregnancy,

the vaginal wall becomes moderately stretched forward and the cervix was slightly hypertrophied and soft but there was a marked uterine distension with indistinguishable uterine horn. Ultrasonic examination revealed an increase in embryo length (5.8-8.3cm) as seen in (Figure 5). At 75 days of gestation, the vaginal wall become highly stretched forward, the cervix become hypertrophied and soft, while the uterus was found within the abdominal cavity. The internal ballotement of the fetus and palpation of placentome could be done. Regarding the ultrasonic scanning, it revealed that, the fetal bones appeared as highly echogenic and reverberation artifacts appeared beyond the well developed bony structure as skull (Figure 6). With advancement of pregnancy from 90 days to fifth month of gestation, the qualitative changes in the tubular reproductive tract were recorded regarding the tension of the vaginal wall, relative position of the cervix and uterus, palpation of placentomes, internal ballotement of the fetus. The cervix was hypertrophied and soft at days 90 to 105 and difficult to be palpated from 120 day to full term. The vaginal wall was stretched forward at days 90 to 105, Moderately stretched at 120 days and Relaxed from day 135 to full term. The uterus was within the abdominal cavity and internal ballotement with palpation of placentome could be done from 90 to 105 day of pregnancy. Only posterior aspect of the uterus was palpable and fetal part and placentomes

were palpated at 120 days of pregnancy. From day 105 to full term fetal parts were palpable within the pelvis.

As shown in (Table 3) pre-slaughter findings of 87 ewes using bimanual palpation showed non pregnant ewes (n = 61, 70%) pregnant (n = 26, 30%) in different gestational stages. All findings (non-pregnant and pregnant) were confirmed post-slaughtering (Figure 7). The results of pregnant ewes using bimanual palpations were external ballotement of fetus (15.38%), early pregnancy (15.38%) and were 11.54% for each palpation of placentomes, internal ballotement, hypertrophy of cervix, pre-pubic uterine position and marked distension of uterus for advanced pregnancy.

Sixty one of 87 (70%) of ewes examined had non gravid uterus as evidenced by the

absence of any criteria of distension of uterus and cervix. The uterine horn and ovaries were palpable in most of ewes. In one ewe the cervix was abnormally large. Ultrasonographic examination revealed hypoechoic wall with marked anechoic content along the margin of the cervix (Figure 8a). Post slaughter verification revealed a large cervical hydatid cyst (Figure 8b). One ewe had a rough and very thick uterine wall with restricted mobility. Ultrasonic picture revealed a diffuse homogeneous hyperechoic contents within the uterus (Figure 9a). Post-slaughter verification revealed a pyometra (Figure 9b). Both ovaries could be palpated in 25 of non pregnant ewes and at least one of the ovaries was palpated in 26 ewes. None of the ovaries could be palpated in 4 non pregnant ewes.

Table (2): Palpable changes in the tubular genitalia and ultrasonographic scanning of the uterus along the whole gestation period of pregnant ewes.

Stage of gestation	vagina	Cervix	Uterus	
			Palpation	Ultrasonography
30 days	Relaxation of vaginal wall	Within pelvic cavity and no hypertrophy	Within pelvic cavity, no clear asymmetry and harder in consistency	The uteri were identified as anechoic to hypoechoic image, uterine lumen diameter was 2-4cm. Embryo appeared as a circular hyperechoic structure surrounded by anechoic structure.
45 days	Slight stretching	At pelvic brim. No hypertrophy	In front of pelvic brim. Clear distension of the uterus.	Embryo appeared as a circular hyperechoic structure with uterine lumen diameter 3-4cm.
60 days	Moderately stretched forward	Slightly hypertrophied and soft	Marked distension of the with uterus, with indistinguishable uterine horn.	All the previous criteria but the embryo length ranged from 5.8-8.3cm.
75 days	Stretched forward	Hypertrophied and soft	Palpation of posterior part of uterus.	Fetal bones appeared as a highly echogenic and reverberation artifacts appeared beyond the well developed bony structures as skull.
90 days	Stretched forward	Hypertrophied and soft	Uterus within abdominal cavity, internal ballotement of fetus and palpation of placentome.	-----
105 days	Stretched forward	In front of pelvic brim and difficult to be palpated in some cases 20%.	Within abdominal cavity. Fetal parts and placentomes were palpated.	-----
120 days	Moderately stretched forward	In front of pelvic brim and difficult to be palpated in about 50%.	Only posterior aspect of uterus palpable and fetal parts placentomes were palpated	-----
135 days	Slight relaxation of vaginal stretching	Difficult to be palpated.	Fetal parts palpable within the pelvis.	-----
Full term	Relaxation of the vagina	Large and soft difficult to be palpated.	Fetal parts palpable within the pelvis.	-----

Table (3): Pre- slaughter finding of ewes using palpation and bimanual palpation techniques.

Ewes suspected to be non pregnant (n= 61)		Ewes suspected to be pregnant (n= 26)	
Palpation criteria	Observed cases	Palpation criteria	Observed cases
Palpation of right ovary	17 (27.86%)	External ballotement of fetus with Palpation of fetal part	4(15.38%)
Palpation of left ovary	9 (14.75%)		
Palpation of both ovaries	25 (40.97%)	Palpation of placentomes	3 (11.54%)
Abnormally large cervix	1 (1.64%)	Internal ballotement	3 (11.54%)
Both asymmetry of uterine horn	4(6.75%)	Hypertrophy of cervix	3 (11.54%)
Very thick uterine wall	1(1.64%)	Pre pubic position of uterus	3 (11.54%)
No ovary palpated	4(6.75%)	Advanced pregnancy	3 (11.54%)
		Marked distension of uterus	3(11.54%)
		Early pregnancy	4(15.38%)



Figure (2) Ultrasonogram of early pregnancy (30 days). Notice hyperechoic image representing the embryo surrounded by anechoic fluid (arrow)

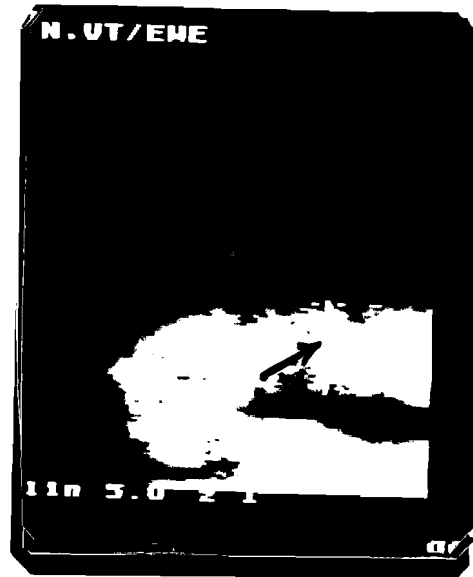


Figure (3) Ultrasonogram of normal non-pregnant uterine horn of ewe. Notice the hypoechoogenicity of the uterine walls and contents (arrow).

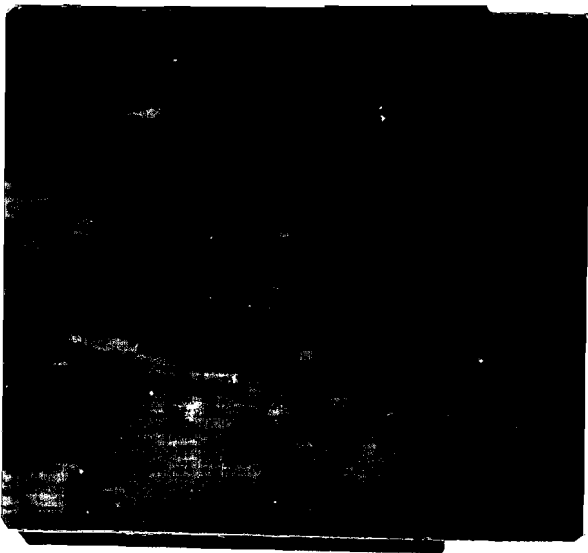


Figure (4) Ultrasonogram of 45 days pregnancy in ewe. The embryo appeared as a circular hyperechoic structure (arrow).

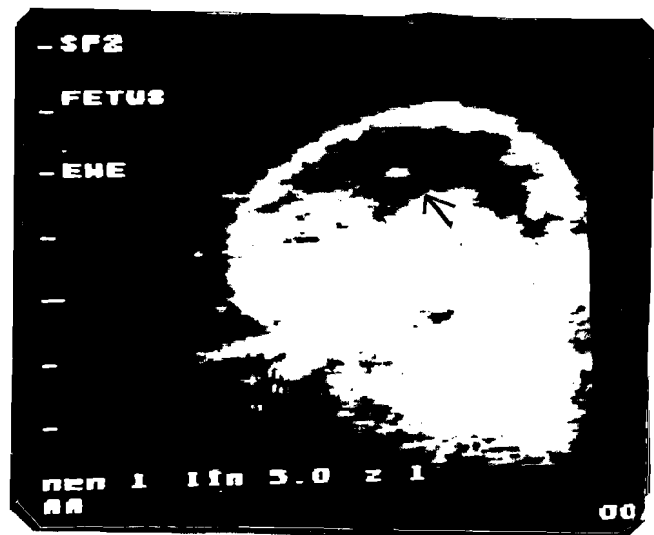


Figure (5) Ultrasonogram of 60 days pregnancy in ewe. The embryo increased in length (arrow).



Figure. 6 Ultrasonogram of 75 days pregnancy in ewe. Notice the reverberation artifact of the fetal bones (arrow)

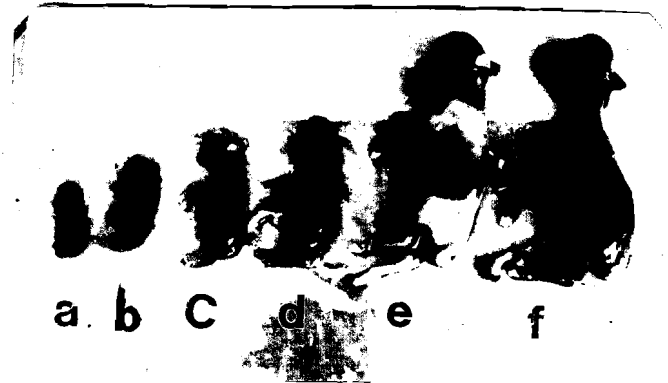


Figure. 7 Different developmental stages of the foetus measured according to Arthur et al. (1989) X= 2.1 (Y+17)

X- is the developmental age in days

Y- is the crown- rump length.

a-36 days

b- 41 days

c- 53 days

d- 61 days

e- 119 days

f- 123 days



Figure (8)

a) Ultrasonogram of cervical hydatid cyst in a ewe. Notice the hypochoic boundaries and the anechoic contents (arrow).

b) Post-slaughter finding of cervical hydatid cyst (arrow)



Figure (9)

a) Ultrasonogram of pyometra in a ewe. Notice the enlarged diameter and the hyperechogenicity of the uterus (arrow).

b) Post-slaughter finding of pyometra (arrow). Note the severe destruction of endometrium.

DISCUSSION

The bimanual palpation technique made possible the palpation of tubular genitalia of ewe. Palpation of both ovaries was successful in 25 cases (62.5%), and its usefulness to some extent in assessing physiological status of

ewes. As it may be useful in detection of gross structural changes like cystic enlargement, adhesions and even tumors (11).

Early pregnancy diagnosis was successful using the bimanual technique from the 1st month (30 day) onwards, as was confirmed by

the dates of breeding together with ultrasonography. The most prominent criteria of bimanual technique at 1st month is the marked uterine distension and this distension when compared with per rectum diagnosis of pregnancy in large animals, the accuracy of diagnosis at 1st month is much lower in large animals, since uterine distension is not marked at this stage compared with that in small ruminants (9). The uteri of pregnant ewes at this stage were identified as anechoic to hypoechoic image and this represents the amniotic fluids. A similar finding was recorded by Davey (12) and Buekrell *et al.* (13). Uterine lumen diameter could be used for pregnancy diagnosis and accurate estimation of gestation period (14,15). The result of this study indicated that measurement of the uterine diameter is one of the best methods together with the distension of the uterine wall detected by bimanual technique. At 45 days of pregnancy, the distension of uterine wall becomes clear with slight stretching of the vaginal wall indicating the progress of gestation. A similar result was obtained by Kutty (9). Ultrasonographic picture revealed that, the embryo appeared as a circular hyperechoic structure with a length ranged from 3.4 – 4.1cm and the uterine lumens diameter ranged from 4.2 – 4.8cm. This finding agrees with Logue *et al* (16) and Russel and Goddard (17). At 60 days, there was a marked distension of the uterus with indistinguishable uterine horn with increase in embryo length as detected by ultrasonograph. At 75 days of gestation, the vaginal wall becomes highly stretched forward and the cervix become hypertrophied and soft with the uterus within abdominal cavity and the placentome could be palpated. This change indicated that the pregnancy progressed (4). Ultrasonographic scanning revealed a highly echogenic fetal bones and reverberation artifacts beyond the well developed bony structure. A similar finding was obtained by Haibel (18) and Bretzlaff *et al* (19).

With advancement of gestation starting from the 3rd month to full term, the qualitative changes in the tubular reproductive tract become obvious, the cervix was hypertrophied and soft and in front of the pelvic brim from 90 to 105 days and it become difficult to be palpated from 120 days to full term. The vaginal wall was stretched from day 90 to 105, moderately stretched at 120 days and relaxed from 135 days to full term. The uterus within the abdominal cavity and internal ballotment with palpation of placentome could be done from 90 to 105 days. A similar finding was also observed by Kutty (11). The pre-slaughter palpation findings were comparable to those post-slaughtering. Ultrasonographic examination for efficacy and accuracy of the bimanual palpation was done on certain cases. A case of abnormally large cyst revealed a hypoechoic wall with marked anechoic content a long the margin of the cervix. A case of very thick uterine wall can be studied by ultrasounds, which reveal a huge amount of pus appeared as hyperechogenic fluid within the uterus (19 and 20).

In conclusion the bimanual palpation is very effective for examining the genital tract of ewes. It offers a simple, effective and inexpensive rapid clinical method for diagnosing early pregnancy in ewes and enables assessment of the approximate stage of gestation as well as for prediction of genital affections which will be useful in fertility management in ewes.

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التدخل الإكلينيكي لتقييم الحالة التناسلية في النعاج

محمود السيد عابد أبو الروس وجمال شوقي*

قسم التوليد والتناسل والتلقيح الاصطناعي - كلية الطب البيطري بمشتهر - جامعة الزقازيق - فرع بنها

قسم التوليد والتناسل والتلقيح الاصطناعي - كلية الطب البيطري - جامعة الزقازيق*

تم في هذه الدراسة استخدام كلتا اليدين Bimanual technique في جس الاعضاء التناسلية وتشخيص الحمل وكذلك تقييم المراحل المختلفة للحمل في النعاج. تم اجراء هذا العمل على عدد ٧٠ (٤٠ غير عشار و ٣٠ تم التوثيب عليهم) وكذلك على عدد ٨٧ نعجة قبل الذبح مباشرة . تم الفحص اولاً: على اناث الاغنام الغير عشار باستخدام اليدين للجس وفحص الاعضاء التناسلية الداخلية. كذلك تم فحص ٣٠ من اناث الاغنام التي تم التوثيب عليها طبيعياً بعد ٣٠ يوم حيث اظهرت النتائج أنه في عدد ٢١ نعجة منهم كان هناك تمدد وامتلاء واضح في الرحم ولم يظهر ذلك على الـ ٩ نعاج الباقين وتم تقييم وتأكيد النتائج على أساس تاريخ التوثيب وباستخدام جهاز موجات فوق صوتية وتم ملاحظة النتائج كل اسبوعين وتم تدوينها في مراحل الحمل المختلفة. كذلك تم استخدام الفحص باليدين في المجذر قبل الذبح مباشرة وتم تدوين النتائج والتأكد منها قبل الذبح عن طريق الفحص بالموجات فوق صوتية وبعد الذبح عن طريق فحص الجهاز التناسلي للحالات التي تم فحصها قبل الذبح. وبناء على ما سبق التوصل اليه من نتائج يمكن استخدام هذه الطريقة Bimanual technique للفحص والتشخيص المبكر للحمل وتقييم مراحل الحمل المختلفة بالإضافة إلى قد يمكن اكتشاف بعض الإصابات للاعضاء التناسلية في النعاج.