Clinical and Ultrasonic Study for Detection of Pregnancy in Iraqi Buffaloes

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ABSTRACT

The present study was conducted on 10 Iraqi pregnant buffaloes aged between 3-6 years at Al-Qasim district-Babylon province, Iraq from December 2018 to December 2019. Those animals diagnosed by rectal palpation and ultrasonography technique to estimate the reproduction status. The results of this study reported wandering of ovum in 10% of animals (1/10). While ultrasonography characterized by increasing placentomes measurement gradually with development of gestation, and the placentomes recorded 8.32±2.46 mm, 13.27±3.25 mm, 18.37±5.34 mm, 23.25±8.63 mm and 28.2±6.87 mm in the 2nd, 3rd, 4th, 5th and 6th month, respectively. Also the total size was recorded by the crown rump length (CRL), which was 0.77±0.05 cm, 5.81±2.54 cm and 14.09±0.73 cm in the 1st, 2nd, and 3rd month, respectively. The heart beat and embryonic vesicle during the 1st and 2nd month were detectable by ultrasonography. In conclusions in the present study, rectal palpation and ultrasonography technique represented one of the most important methods to estimate the gestation period in different stages.

Keywords: Buffaloes, Rectal palpation, Ultrasonography, Pregnancy detection

Introduction

The buffaloes are considered as a major portion of the dairy and meat industries of several south and southeastern Asian countries (1). Pregnancy diagnosis plays an important role in the reproduction management of ruminants since embryonic mortality has a substantial impact on the fertility of a herd (2). Determining pregnancy in cattle by rectal palpation is not particularly difficult, but it requires experience, practice, and knowledge of the reproductive system (3). Rectal palpation is a simple procedure that requires little time or equipment to determine pregnancy, which can be performed accurately 35 days from the time of breeding. However, palpation cannot tell us if the embryo is viable or if the cow is beginning to abort the embryo (4). Trans-rectal ultrasonography diagnosis in buffaloes can be adopted successfully from day 28-30 after service (5). On day 30 it is possible to observe the fetal heartbeat (6). The sensitivity reaching 100% from day 31 after mating onward (6.7). The main advantage of the ultrasound scanning is that it can give an accurate diagnosis earlier than rectal palpation (8). Both rectal palpation and ultrasonography are reliable and relatively quick methods of pregnancy determination (9). Because of little studies about pregnancy diagnosis in Iraqi buffaloes we conducted this study.

Materials and Methods

This study was represented by 10 healthy adult local Iraqi buffaloes, aged between 3-6 years at Al-Qassim district- Babylon province, Iraq and performed from December 2018 to December 2019. Pregnancy diagnosis was carried out by rectal palpation and ultrasonography for recognizing the most characteristic features, including the stages of pregnancy, and the diagnosis included ovaries,
cervix, uterine horns, amniotic vesicle, fetal size, placentomes size and thrilling of middle uterine artery. The animals were divided according to their reproductive status by using rectal palpation and ultrasonography through ultrasound machine containing trans-rectal probe 7.5 MHZ into four stages and assigned as stage 1 non-pregnant (control), stage 2: first trimesters (1-3 months of pregnancy), stage 3: second trimesters (4-6 months of pregnancy), and stage 4: third trimesters (7-10 months of pregnancy). Analysis was arranged in different stages according to mean, Chi-square, standard error and F-test (10).

**Results and Discussion**

The results of rectal palpation during the 1st to 6th months of pregnancy are shown in Table 1. In the first 3 months of pregnancy, the corpus luteum can be palpated, the presence of CL in right ovary was reported in 80% (8/10) in comparison with 20% (2/10) on the left ovary in pregnant buffaloes during the 1st month of pregnancy, while it was 70% (7/10) in the right ovary compared with 30% (3/10) in the left ovary during the 2nd and 3rd months of pregnancy. The site of pregnancy documented 80% (8/10) on the right horn with 20% (2/10) being in the left horn at the 1st months of pregnancy, then it was 70% (7/10) on the right horn compared with 30% (3/10) on the left horn from the 2nd month of pregnancy on word in the pregnant Iraqi buffaloes (Table 1). In the 2nd month of pregnancy, the embryonic vesicle was palpable (size of a mouse), then it was about the size of a rat in the 3rd month reaching a size of a rabbit in the 4th month of pregnancy; however, in the 5th and 6th month the fetus cannot be palpated (sinking stage). Placentomes (caruncle and cotyledon) were palpable from the 3rd month of gestation and their size was about the size of (peas, bean, broad beans and pigeon egg) at the 3rd, 4th, 5th and 6th months, respectively. One of the pregnancy diagnosis parameters studied was the thrilling of the middle uterine artery which started from the 4th month of gestation and was 70% (7/10) on the right side compared with 30% (3/10) on the left side (Table 1). Many changes occurred in the reproductive system including ovaries, uterus and embryo/fetus during pregnancy which could be recognized by rectal palpation in pregnant buffaloes. During the 1st month of pregnancy the CL was palpated and this is in agreement with (11, 12) who found that CL can be palpated easily on the buffaloes ovaries, but disagreed with (13) who found that CL on buffaloes ovaries was mostly embedded deeper in ovarian stroma and project less on the ovarian surface which made it diagnosis per rectum to be difficult. The presence of CL was (8/10) in the buffaloes right ovary in a percentage of 80%, while it was (2/10) 20% present on the left ovary in the 1st month of pregnancy, and this result agreed with the results of many researchers on large number of cows indicating that the right ovary was more active than left (14, 15). It has been found that 60-70% of the ovulation occur on the right ovary (15), but this finding dis-agreed with (14) who showed that the follicular waves and ovulation had no significant difference between the right and left ovary in buffaloes. The presence of CL was 7/10 (70%) on the right ovary compared with 3/10 (30%) on the left ovary during the 2nd and 3rd month of pregnancy in our study. The presence of CL was in the right ovary during the 1st month, then it was located in the left ovary in the 2nd and 3rd month due to the presence of a new follicular wave in the left ovary during pregnancy that lead to formation of CL (with or without ovulation) accompanied by regression of the CL on the right ovary. The site of pregnancy was 8/10 (80%) on the right uterine horn and 2/10 (20%) on the left and this agreed with the findings of the presence CL. Nevertheless, during the 2nd and 3rd month the site of pregnancy was 7/10 (70%) on the right horn, while it was 3/10 (30%) on the left horn, and this may be due to the wandering of ovum (trans uterine migration) and this result agreement with (16).

The parameters determined by trans-rectal ultrasonography (7.5 MHZ) during the 1st six months of pregnancy in Iraqi buffaloes are shown in Table (2). The range of placentomes measurements were 6-10 mm, 11-15 mm, 16-20 mm, 21-25 mm and 26-30 mm at the 2nd, 3rd, 4th, 5th and 6th month, respectively. While the means of measurements were 8.32±2.46, 13.27±3.25, 18.37±5.34, 23.25±6.63 and 28.2±6.87 with a significant difference of P<0.01 related to the 6th month of pregnancy compared with other months as well as between a significant difference of P<0.01 related to the 6th month of pregnancy compared with other months as well as between the 5th and 4th month, 4th and 3rd month, 3rd and 2nd month. Fetal size (crown rump length) was 0.5-0.9 cm, 2.7-8.6 cm and 12-17 cm in the 1st, 2nd and 3rd month of pregnancy in Iraqi buffaloes (Figure 1), while the means of the length were 0.77±0.05, 5.81±2.54 and 14.09±5.73 with superior significant differences (P<0.01) for the 3rd month of gestation compared with the 1st and 2nd stage as well as between the 2nd.
and 1st month. Both means of placentome weight and length increased significantly throughout the gestation with a relative increase in placentome length as pregnancy advances, this result agreed with (17, 18). Some studies have reported that placentome growth continues throughout the gestation period (19, 20); however, (21-23) reported that it ceased around day 200 of gestation. Fetal size (crown rump length) was significantly increased during pregnancy in Iraqi buffaloes, while the means of the length were significantly different (P<0.01) in favor of the 3rd month of gestation compared with 1st and 2nd stage as well as between the 2nd and 1st month. Heart beats were obvious in 1st and 2nd month and the embryonic vesicle (Figure 2) was also visible in the 1st and 2nd months of gestation. During the 2nd month of pregnancy, fetal buds were visible and the skeletal structure (ribs, skull and long bones) were observed from the 3rd month (Figure 3), as well as fetal membranes were noticed from the 2nd month of gestation. In conclusion, rectal palpation and ultrasonography technique represented one of the most important methods to estimate the gestation period in different stages.

Table 1. Characteristics of pregnancy (ovaries, corpus lutein, fetal size, placentome and thrilling) by rectal palpation according to month of pregnancy in local Iraqi buffaloes

<table>
<thead>
<tr>
<th>Months</th>
<th>Ovaries with CL</th>
<th>Fetal size</th>
<th>Placentome</th>
<th>Thrilling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left %</td>
<td>Right %</td>
<td>palpable</td>
<td>size</td>
</tr>
<tr>
<td>1st</td>
<td>(2) 20%</td>
<td>(8) 80%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2nd</td>
<td>(3) 30%</td>
<td>(7) 70%</td>
<td>Mouse</td>
<td>-</td>
</tr>
<tr>
<td>3rd</td>
<td>(3) 30%</td>
<td>(7) 70%</td>
<td>Rat</td>
<td>+</td>
</tr>
<tr>
<td>4th</td>
<td>-</td>
<td>(7) 70%</td>
<td>Rabbit</td>
<td>+</td>
</tr>
<tr>
<td>5th</td>
<td>-</td>
<td>(7) 70%</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>6th</td>
<td>-</td>
<td>(7) 70%</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

*Wandering of ovum

Table 2. Parameters determined by trans rectal transducer during 1st to six months of pregnancy in Iraqi buffaloes

<table>
<thead>
<tr>
<th>Parameters</th>
<th>1st month Mean±SE</th>
<th>2nd month Mean±SE</th>
<th>3rd month Mean±SE</th>
<th>4th month Mean±SE</th>
<th>5th month Mean±SE</th>
<th>6th month Mean±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placentome measurement</td>
<td>-</td>
<td>(6-10 mm.) 8.32±2.46</td>
<td>(11-15 mm) 13.27±3.25</td>
<td>(16-20 mm) 18.37±5.34</td>
<td>(21-25 mm) 23.25±8.63</td>
<td>(26-30 mm) 28.2±6.87</td>
</tr>
<tr>
<td>Fetal size (CRL cm)</td>
<td>(0.5-0.9 cm) 0.77±0.05</td>
<td>(2.7-8.6 cm) 5.81±2.54</td>
<td>(12-17.5 cm) 14.09±5.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart beats</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Embryonic vesicle</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fetal buds</td>
<td>-</td>
<td>+</td>
<td>+ skeletal structure (ribs, skull and long bones)</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fetal membranes</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Different small letters mean significant differences (P≤0.01) between stages
Acknowledgements

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Conflict of Interest

The authors declare that they have no conflict of interest.

References


دراسة سريرية وباستخدام الموجات فوق الصوتية لتشخيص الحمل في الجاموس العراقي

سعد محسن مناتي، ايناس علي سلطان، طالب موسى الحمدياوي
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الخلاصة

أجرت الدراسة الحالية على عشرة جواميس عراقية تراوحت أعمارها بين (3-6) سنوات في قضاء القاسم / محافظة بابل للفترة من كانون الأول (2018) الى نيسان (2019). شُخصت هذه الحيوانات بطرق بسيطة عبر المستقيم، واستخدام جهاز الموجات فوق الصوتية لغرض تحديد الحالة التناسلية لها، سجلت نتائج الدراسة الحالية وجود حالة تجوال البيضة (وجود الجسم الإصفرفي جهة والحمل في جهة معاكسية) لواحدة من حيوانات الدراسة. ونسبة 10/16合肥 من خلال الفحص بجهاز الموجات فوق الصوتية بأن هناك زيادة تدريجية في قياس الفلقات مع تطورات الحمل المختلفة والتي سجلت 8.32±2.46 ملم، 12.37±3.25 ملم، 18.34±5.34 ملم، 23.25±6.63 ملم، 28.2±8.63 ملم، 6.87±2.82 ملم. للاشهرتين الثلاثة والسادس، والثامن والسادس على التوالي اما مابين الطول النابض للجنين فقد سجلت 0.77±0.05 مم، 0.58±0.24 مم، 14.09±0.73 سم في الشهرين الأول والثاني والثالث فقط، كما تم تسجيل ومحاولة دقات القلب والحويصلة الجنينية خلال الشهرين الأولي من الحمل، خلاصة الدراسة الحالية طريقة الجسن عبر المستقيم وكذلك باستخدام الموجات فوق الصوتية تعتبر واحدة من اهم الطرق لتشخيص الحمل في المراحل المختلفة.

الكلمات المفتاحية: الجاموس، الجس عبر المستقيم، جهاز الموجات فوق الصوتية، تشخيص الحمل