



Effect of early pregnancy diagnosis by per rectum amniotic sac palpation on pregnancy loss, calving rates, and abnormalities in newborn dairy calves



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ABSTRACT

The objectives of the present study were to evaluate the effect of per rectal amniotic sac palpation (ASP) for pregnancy diagnosis during the late embryonic period on pregnancy loss, calving rates, and abnormalities in newborn calves. A controlled, randomized, blocked, blind experiment containing 680 lactating pregnant dairy cows with a viable embryo diagnosed by transrectal ultrasonography was performed. Two dairy operation sites (farm A and farm B) were selected. At each farm, the cows were randomly divided into control (CON) and ASP groups. The CON group was not subjected to pregnancy diagnosis via per rectum palpation. The ASP examinations were performed by one experienced veterinarian between Days 34 and 45 after breeding. All cows were reevaluated by transrectal ultrasonography only between 2 and 4 weeks later. Two calving rates were calculated: calving rate 1 (cows that calved from the initial number of pregnant cows) and calving rate 2 (cows that calved from cows pregnant at reexamination). In farm A, the percentages of early pregnancy loss were 11.5% (19 of 165) and 13.2% (24 of 182) for the CON and the ASP groups, respectively ($P = 0.64$). In farm B, the percentage of early pregnancy loss was 11.2% (19 of 170) for the CON group and 8.8% (14 of 159; $P = 0.48$) for the ASP group. In farm A, the percentage of late pregnancy loss was 7.6% (11 of 145) for the CON group and 5.5% (8 of 155; $P = 0.39$) for the ASP group. In farm B, the percentage of late pregnancy loss was 3.7% (5 of 137) for the CON group and 6.3% (8 of 127; $P = 0.32$) for the ASP group. In farm A, early pregnancy loss was higher than late pregnancy loss (12.4% vs. 6.3%; $P = 0.01$), and in farm B, the same tendency was detected (10.0% vs. 4.9%, for early and late pregnancy loss, respectively; $P = 0.02$). In farm A, calving rate 1 was 81.2% (134 of 165) for the CON group and 80.8% (147 of 182; $P = 0.92$) for the ASP group. Calving rate 2 for the same groups was 92.4% (134 of 145) and 94.8% (147 of 155), respectively ($P = 0.68$). In farm B, calving rate 1 was 77.7% (132 of 170) for the CON group and 74.8% (119 of 159; $P = 0.55$) for the ASP group. Calving rates 2 for the same groups were 87.4% (132 of 151) and 82.1% (119 of 145), respectively ($P = 0.20$). Two female calves with atresia coli were

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diagnosed only in the CON group. It was concluded that ASP during the late embryonic period for pregnancy diagnosis did not increase the pregnancy loss, affect calving rates, or produce abnormalities in calves.

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1. Introduction

Per rectum palpation (PRP) is the most frequent procedure used by veterinarians around the world for pregnancy diagnosis in cattle [1–4]. This technique began its usage after the second half of the past century [5,6]. Despite its intensive application, few investigations were designed to answer two important aspects of this practice such as safety and accuracy [7–10].

At present, new methods of pregnancy diagnosis are available in the process of development in cattle [9,11–13]. However, PRP continues to be the procedure of choice for veterinarians for pregnancy diagnosis for several reasons: It does not require equipment or a laboratory, the results are almost immediate, allowing for a rapid decision, and it is an accurate technique after Day 35 of breeding when performed by trained veterinarians [1–4]. Per rectum palpation allows aging of the pregnancy, assesses the viability of the fetus, and has a low cost compared with other procedures [1–4,7,8]. It also gives additional information about other internal organs while simultaneously permitting the examiner to evaluate the body condition score, cleaning score, leg conformation, udder, and other variables [8,14].

Pregnancy diagnosis by PRP is based on the detection of at least one of the four positive signs of pregnancy: allantochorion membrane, amniotic vesicle, placentomes, and fetus [1]. Not all of these signs appear simultaneously during pregnancy [1,3,15]. During earlier stages of gestation, the detection of either the amniotic sac or the allantochorion membrane (also known as fetal membrane slip technique) per rectum is used as a positive sign of pregnancy [16,17]. In addition, the size of the amniotic sac in relationship to the fingers or size of the hand allows one to estimate the age of pregnancy during the first 65 to 70 days of gestation [15]. Moreover, for the diagnosis of twin pregnancies, the identification of the number of amniotic vesicles by PRP is required [1,3,18].

In regard to the effect of PRP for pregnancy diagnosis on the conceptus, conflicting evidence has been published [8,19,20]. Investigators in some studies suggested that PRP had little or no effect on pregnancy loss [21–23]. Conversely, other reports suggested that PRP during early gestation increased pregnancy loss [24–29]. However, these studies had important limitations in their design as previously reported [8]. In recent multiple independent studies, it was shown that the detection of either the allantochorion sac or the amniotic sac by PRP through the embryonic period did not increase the pregnancy loss when reexamined by transrectal ultrasonography (TRUS) in the course of the fetal period [8,19,20]. However, in those studies, no information about calving rates or clinical abnormalities of the newborn calves was reported. Studies in the United States and in other areas of the world have observed an association between amniotic sac palpation

(ASP) during the embryonic period for pregnancy diagnosis until Day 45 of gestation [30] and an increased risk of atresia coli and/or jejuni in newborn calves [31–35]. In atresia coli and/or jejuni, a section of the large bowel or jejuni is absent, resulting in a blind-ending intestinal tube. This clinical congenital condition is lethal, and surgical correction is the only treatment available [36–39]. Atresia coli and/or jejuni has been reported in different countries and in more than 10 breeds of cattle with a marked predominance in Holstein calves [40]. On the basis of those findings, some sources have recommended avoiding PRP of the uterus during the first 45 days of gestation [31–35,41,42]. In spite of this, intestinal atresia was also reported to be inherited as an autosomal recessive trait in Jersey and Swedish Highland cattle [43,44]. Intestinal atresia could develop either from imperfect canalization of the gut or from insufficient blood supply to the affected portion of the intestine [45], and ASP was suggested to act for this last mechanism [33,40]. Nevertheless, the cause of atresia coli and/or jejuni remains controversial and not completely understood [37,40,45]. In general, in the authors' practice, the ASP for early pregnancy diagnosis is not routinely used; however, cases of atresia coli or jejuni were detected. Interestingly, atresia coli and/or jejuni was also diagnosed in newborn calves from dams that underwent PRP only by detection of the allantochorion membrane during the first trimester of gestation either during the late embryonic period or during the fetal period; during the second trimester of gestation, females were diagnosed as pregnant only by TRUS (Romano, unpublished data). These observational findings strongly suggest that ASP during gestation was not associated with this pathologic condition. Unfortunately, at the present time, no controlled randomized studies are available to demonstrate whether ASP for pregnancy diagnosis could produce atresia coli and/or jejuni.

In general, the bovine practitioner performs an early pregnancy diagnosis during the late embryonic period (≤ 45 days) for technical and economic reasons; therefore, accurate information about potential deleterious effect of PRP on conceptus is capital [8]. Transrectal ultrasonography permits an early and accurate method for early pregnancy diagnosis that does not affect the embryo or fetus [11,46–50]. Therefore, the use of TRUS could reduce or eliminate the PRP of the uterus by constructing a better experimental design by creating a contemporaneous control (CON) group of pregnant females that does not undergo PRP that could be contrasted with a treatment group of pregnant females that undergoes PRP. Consequently, the conclusion using this experimental approach will be better and less biased.

The objectives of the present study were to evaluate the effect of ASP for pregnancy diagnosis in lactating dairy cows during the late embryonic period on pregnancy loss, calving rates, and abnormalities in newborn calves.

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