

Uteropexy in Sheep as Potential Method for Prevention of Uterine Torsion

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ABSTRACT

Background: Uterine torsion is one of many causes of dystocia in sheep. Failure in performing of wright-time diagnostic procedures and treatment by certain obstetric procedures, can result with death of both fetus and ewe. There is sufficient knowledge about risk factors which could contribute to the occurrence of uterine torsion in sheep, but there is insufficient knowledge about measures for prevention of uterine torsion. The aim of this study was to evaluate the effects of performing incorporative uteropexy as potential method for prevention of uterine torsion.

Cases: This research was part of the experimental research of changes in the anterior presentation in sheep fetuses due to their ventro-sacral position in the 2nd half of gestation. At the same sheep farm where afore mentioned research was conducted, the farmer has reported the death of 3 pregnant ewes. In all of 3 animals, torsion of the uterus was diagnosed by patho-anatomical examination. This study was conducted on 6 ewes. All of the animals were in the period around the 100th day of pregnancy at the time of clinical examination. The exact day of pregnancy was not determined because of free mating in the herd. Confirmation of pregnancy in all of 6 ewes was performed by ultrasound examination. Uniparous pregnancy was found in all of 6 ewes. The entire surgical procedures were performed in the field conditions. Laparotomy was performed in the animals positioned in the left lateral recumbency. Surgical procedure of incorporative uteropexy was performed during the closure of muscle layers of abdominal wall. In need for experimental research of changes in the anterior presentation in sheep fetuses due to their ventro-sacral position in the 2nd half of gestation, 14 days after surgical procedures were conducted, all of sheep were positioned by assistants into a sitting position so that their trunks were vertical to the ground and kept in that position for 2 min. Ultrasound examination of surgical place of uteropexy confirmed that, in all of animals, uteruses were in place of surgical procedures. All of 6 ewes included in this study lambed naturally. One of 6 sheep was sent for economic exploitation on the 14th day after lambing. At the slaughter line, the abdominal wall was evaluated at the site where the incorporative uteropexy was performed. Patho-anatomical examination revealed tissue adhesions at the junction of the uterine horn with the abdominal wall.

Discussion: Postsurgical tissue adhesions develop during normal healing process of tissue. According to our knowledge, previous studies do not mention effective measures that could contribute to the prevention of uterine torsion in sheep, but attention is focused on prompt diagnosis and treatment of the disease. According to the results of this study, postsurgical tissue adhesions were developed and confirmed by patho-anatomical examination in 1 sheep. Other 5 sheep were not economically exploited or sacrificed, and no studies were performed to establish the presence of postsurgical tissue adhesions. In conclusion, it could be said that incorporative uteropexy could be considered as preventive procedure in order to avoid the development of uterine torsion in ewes which have shown a history of this pathology, but also in ewes with identified risk factors for the disease. In future studies, it is necessary to identify more parameters which will contribute to identification of sheep which have high risk factors to obtain the torsion of uterus. Also, it is necessary to use non-invasive methods of clinical diagnostics, primary ultrasound diagnostic, to evaluate the area of incorporative uteropexy in order to assess newly formed tissue adhesions as well as to assess the vitality of fetus. It is necessary to follow the lambing process of ewes with incorporated uterus, and to provide medical assistance to the animals if complications occur during the lambing time.

Keywords: sheep, uterus, fetus, torsion, incorporative uteropexy.

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INTRODUCTION

Changes in uterus and birth canal are causes of dystocia in 35-50% of observed clinical cases of difficult births in sheep [2,9,13,15,16]. In most cases, dystocia occurs in the winter lambing season, in uniparous first-borns that carry a large male lambs [9]. Uterine torsion is considered to be very rare in sheep (2-15%) [13,15], but it has been reported [13] that could be present at 41.5% of causes of dystocia in sheep and goat in which cesarean section was performed. Two etiological factors are considered as the most important in development of uterine torsion in sheep: anatomy and position of pregnant uterus within abdominal cavity and small size of colon [8,15].

Uterine torsion in sheep most often occurs in the 1st stage of birth [13]. Primary symptoms of uterine torsion are: non-progressive labor, restlessness and occasional stretching of the animal, painful and tense abdominal wall [8,16]. However, these symptoms are often not enough to make a final diagnosis, so it is necessary to conduct intravaginal and per rectal examination [13,16].

Torsion of uterus in sheep is an urgent condition that requires prompt diagnosis and performing of certain obstetric procedures, because otherwise fetus and ewe may die. The most common procedures performed in the repair of uterine torsion in sheep are the Schaffer's method and the modified Schaffer's method as forms of conservative therapy, and the cesarean section as surgical form of therapy [11,12,16,17]. Performing a cesarean section achieves high survival rate of fetuses and ewes [9,13,15,16].

The aim of this study was to evaluate the effects of performing incorporative uteropexy as potential method for prevention of uterine torsion.

CASES

This research was conducted as part of the experimental research of changes in the anterior presentation in sheep fetuses due to their ventro-sacral position in the 2nd half of gestation. At the same sheep farm where afore mentioned research was conducted, the farmer has reported the death of 3 pregnant ewes. In all of 3 animals, torsion of the uterus was diagnosed by patho-anatomical examination (Figure 1 A & B).

This study was conducted on 6 ewes. The breed of ewes was indigenous breed - Vlasic pramenka. The age of selected animals and the parity were not known.

All of the animals were in the period around the 100th day of pregnancy at the time of clinical examination. The exact day of pregnancy was not determined because of free mating in the herd. Confirmation of pregnancy in all of 6 ewes was performed by ultrasound examination. The ultrasound examination was conducted using the ultrasound device [Falcovet]¹, with linear ultrasound probe of 6-8 MHz, in real time. The ultrasound examination of ewes was performed in the standing position of the animals, by examination of the abdominal cavity in the inguinal regions. Uniparous pregnancy was found in all of 6 ewes.

After the ultrasound examination of sheep was conducted, the right ventrolateral side of the abdomen was prepared for surgery. The skin of surgical field was clipped and washed with neutral soap. A 10% solution of povidone iodine was used to disinfect the surgical field. The entire surgical procedures were performed in the field conditions.

Sedation of sheep was performed by bolus intravenous administration of xylazine² [Xylased - 0.05 mg/kg, v.o.] and midazolam³ [Dormicum[®] - 0.2 mg/kg, v.o.]. Induction and maintenance of general anesthesia were performed by bolus intravenous administration of ketamine⁴ [Ketamidor 10% - 5 mg/kg, v.o.].

Laparotomy was performed in the animals positioned in the left lateral recumbency, with hind limbs extended caudally and abduction of the upper limb. Incision line was approximately 25 cm long, went through the ventrolateral abdominal wall - few cm laterally from the caudal superficial epigastric vein and parallel with the linea alba. Surgical procedure of incorporative uteropexy was performed during the closure of muscle layers of abdominal wall, by suturing the uterine wall into the surgical incision line with the simple interrupted suture pattern (Figure 2). Incorporative uteropexy was performed at the uterine horn as near as possible to the uterine body. Monofilament slow-resorption suture - polydioxanone⁵ [Monosorb - USP 0] was used to perform incorporative uteropexy. Skin was closed with the simple continuous suture pattern. Polyamide⁵ [Nylon - USP 0] was used to make skin closure. On the 14th postsurgical day, the skin sutures were removed.

In need for experimental research of changes in the anterior presentation in sheep fetuses due to their ventro-sacral position in the 2nd half of gestation, 14 days after surgical procedures were conducted, all of

sheep were positioned by assistants into a sitting position so that their trunks were vertical to the ground and kept in that position for 2 min. Ultrasound examination of surgical place of uteropexy confirmed that, in all of animals, uteruses were in place of surgical procedures. This indicated the possibility that incorporative uteropexy may serve as a preventive measure in the development of uterine torsion in sheep. All of 6 ewes included in this study lambbed naturally. One of 6 sheep was sent for economic exploitation on the 14th day after lambing. At the slaughter line, the abdominal wall was evaluated at the site where the incorporative uteropexy was performed. Patho-anatomical examination revealed tissue adhesions at the junction of the uterine horn with the abdominal wall (Figure 3). No further studies were performed to establish the presence of tissue adhesions in the remaining 5 sheep included in this study.

DISCUSSION

Postsurgical tissue adhesions develop during normal healing process because of serosal injury or ischemia of tissue, and can be beneficial but also may lead to postsurgical morbidity [6]. In the comparative study on postsurgical adhesion formations in the rat model [7], postsurgical adhesion formations subsequent to the standard uterine trauma inflicted by laparoscopy or by laparotomy approach were compared. It has been reported that, in laparoscopy group, postsurgical tissue adhesions were developed in 17 of 31 rats, while in laparotomy group, postsurgical tissue adhesions were developed in 18 of 30 rats. According to the results of this study, postsurgical tissue adhesions were developed and confirmed by patho-anatomical examination in one sheep. Other 5 sheep included in this study were not economically exploited or sacri-



Figure 1. A & B- Patho-anatomical examination of all 3 dead animals revealed the presence of uterine torsion. [Source: Jovan Spasojević].

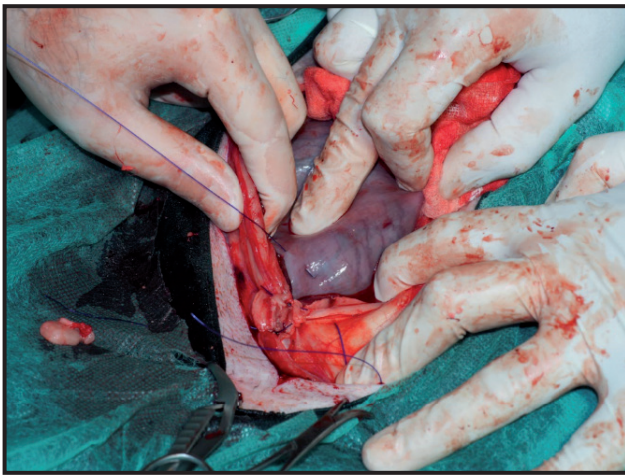


Figure 2. Performance of incorporation of the uterine wall into the abdominal wall during the closure of the surgical incision. [Source: Slobodan Sekulić].

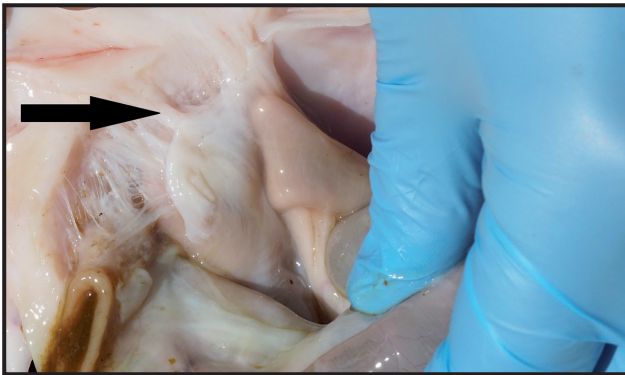


Figure 3. Arrow indicates newly formed tissue adhesions as the result of incorporative uteropexy. [Source: Slobodan Sekulić].

ficed, and no studies were performed to establish the presence of postsurgical tissue adhesions. In the first reports about sheep and goat [5,10], respectively, with dystocia caused by adhesions between gravid uterus and intraabdominal wall, it has been reported that causes of adhesions were not known, and it has been also hypothesized that utero-peritoneal adhesions were responsible for the retained fetuses because of reduced or absent myometrial contractions. Cesarean section was performed in both of the reported cases as method of choice in dystocia resolving. Compared to these results, all of 6 sheep included in this study gave births in naturally way, without any medical assistance. In this study, the place of incorporative uteropexy was on uterine horn as near as possible the uterine body, and this could be a reason that myometrial contractions were still present at the moment of lambing.

According to our knowledge, previous studies do not mention effective measures that could contribute to the prevention of uterine torsion in sheep, but attention is focused on prompt diagnosis and treatment

of the disease. In other species of animals, especially in dogs, as well as in women, methods of uteropexy have been described, but primarily in order to prevent uterine prolapse. In the clinical case of uterine prolapse during labor in bitch [14] it has been reported that it is indicated to perform the uteropexy procedure if viability of uterine wall is present. The uteropexy procedure in the mentioned research was performed by incorporation of the uterus into the lateral abdominal wall of the bitch and it represented a preventive measure of relapse of uterine prolapse. In the case of the existence of uterine prolapse in dog [1], it has been reported that, depending on the viability of the uterus, the most effective treatment for the prolapse was to perform ovariohysterectomy of the bitch. In the case of existence of uterine viability, the same authors have reported that uterine repositioning is possible but maintaining of the next pregnancy is questionable.

In the study in which the variety of uteropexy prolapse repair techniques including the surgical outcomes were reviewed [3], it has been reported that uteropexy is a rational option in the management of prevention of uterine prolapse in women, but also a challenge in selecting adequate patients for surgery.

In the study with mares [4], it has been reported that both of the uteropexy in mares and raising the uterus to an almost horizontal position, contribute to the health status of the uterus and to the restoration of fertility. In this study, uteropexy in mares was performed by raising the uterus to the almost horizontal position and incorporating it into the mesometrium.

In conclusion, it could be said that incorporative uteropexy could be considered as preventive procedure in order to avoid the development of uterine torsion in ewes which have shown a history of this pathology, but also in ewes with identified risk factors for the disease (uniparous first-born ewes with large male lambs). As it is an invasive method, incorporative uteropexy carries a certain risk for further fetal development and birth process, because the integrity of uterine wall is disturbed by both of its incorporation into abdominal wall and presence of tissue adhesions. Also, in the performing of incorporative uteropexy under the general anesthesia, the selection of an adequate anesthesia protocol presents a risk factor, and must be safe for life and health of both ewe and fetus. In future studies, it is necessary to identify more parameters which will contribute to identification of sheep which

have high risk factors to obtain the torsion of uterus. Also, it is necessary to use non-invasive methods of clinical diagnostics, primary ultrasound diagnostic, to evaluate the area of incorporative uteropexy in order to assess newly formed tissue adhesions as well as to assess the vitality of fetus. It is necessary to follow the lambing process of ewes with incorporated uterus, and to provide adequate medical assistance to the animals if complications occur during the lambing.

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