

## Scientific Report

# Outbreak of primary pregnancy toxemia in fat tailed ewes due to ultrasonographic misdiagnosis of pregnancy

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## Summary

Four fat-tailed ewes from an indoor flock (n=40) were examined for recumbency and depressive nervous signs. They were from a seemingly nonpregnant group of the flock that had been diagnosed by transabdominal ultrasonography. The ration consisted of mainly wheat straw since their separation from the pregnant group. Detection of pregnancy on abdominal palpation along with depressive nervous signs and laboratory findings of hypoglycemia, ketonuria with severe fatty liver at necropsy followed by relevant histopathological findings confirmed an outbreak of primary pregnancy toxemia. While ultrasonographic pregnancy diagnosis is known as an accurate method, its accuracy could be strongly influenced by technical inexperience and improper implementation of the method. Indecent execution of the technique was considered the key predisposing factor for current outbreak.

**Key words:** Ewe, Pregnancy toxemia, Twin pregnancy diagnosis, Ultrasonography

## Introduction

Pregnancy toxemia in sheep is a major metabolic disorder of energy metabolism. It mainly occurs because of a decline in the plane of nutrition, especially in ewes carrying twins or triplets in the last month of pregnancy (Rook, 2000; Radostits *et al.*, 2007). Failure to identify and separate ewes bearing twins and triplets, over fat condition, prolonged starvation, intercurrent diseases, and stress are known to predispose the pregnant ewes to this disorder (Rook, 2000; Radostits *et al.*, 2007; Sargison, 2007). Recently, ultrasonographic diagnosis of pregnancy has gained great attention due to its abilities in early pregnancy diagnosis, determination of fetal numbers and their ages, which are known as important reproductive management practices in sheep flocks (Bazer *et al.*, 2007; Ganaie *et al.*, 2009). However, like any other diagnostic technique, probable operator errors can

easily occur. Experience and scanning the animals during optimal stage of gestation are known to reduce the errors (Pugh, 2002; Karen *et al.*, 2006; Bazer *et al.*, 2007). The objective of this report is to signify the importance of meticulous implementation of this method by documenting an outbreak of pregnancy toxemia in fat-tailed ewes because of erroneous pregnancy diagnosis and consequent false separation of ewes after examination.

## Case history

In a seven-day period, starting from December 27, 2007, four ewes from a flock of eighty sheep, having a 40 ewe facility of fat tailed "Shaal of Qazvin" ecotype, were referred to the Veterinary Research and Teaching Hospital, University of Tehran. The cardinal signs were recumbency and profound depression. Reproduction management history revealed ram

presentation on August 4, 2007. The rams remained in the flock until September 6. Afterwards, the pregnant ewes were separated by B-mode transabdominal ultrasonography from non-pregnant ewes on October 28. A group of nineteen out of forty were diagnosed as being non-pregnant so they were separated from pregnant ewes and were hand fed with a wheat straw based diet along with small amounts of alfalfa, just enough for their maintenance. The sick ewes were all from the apparently non-pregnant group and were multiparous (3-5 parity) with roughly low body condition scores.

### **Clinical findings**

At presentation, the mental states were depressed and the ewes were in sternal recumbency, which subsequently transformed to lateral recumbency in terminal stages of the disease. The animals were oblivious to their surroundings and showed muscular twitches over the thorax and flank regions. One of the ewes showed an involuntary champing of the jaws with a persistent movement of the mandible. The animals did not appear blind, although the menace response was significantly slower than normal. The rectal temperatures were normal to hypothermic, especially in terminal stages. Tachycardia and polypnea were constant findings in all four cases. Mucous membranes were pale and it was cyanotic in one case. The rumens were atonic or hypomotile and the feces were scant but normal in shape and consistency.

During the palpation of the abdominal region in the first referred ewe, the pregnancy was detected and the same finding was repeated in three other cases as well. Blood and urine samples were submitted to the laboratory for paraclinical investigations. The results showed hypoglycemia (blood glucose <2.5 mmol/L) in two cases but ketonuria, detected by a urinary dipstick, was a persistent finding in all four ewes. A stress leukogram was found in three ewes with mild leukocytosis, neutrophilia, and lymphopenia without a shift to the left. Moreover, the first referred ewe was examined by abdominal ultrasonography and the twin pregnancy was

confirmed. The liver seemed hyperechoic compared to kidney cortex and the spleen, which was considered a consequence of fatty infiltration. Supportive treatments included the administration of 25 mg of intravenous Dexamethasone (Vetacoid, Aburaihan Pharma Co. Iran), daily venous fluid therapy using isotonic saline followed by 5% dextrose solutions (40-60 ml/kg BW) and B-vitamin (Vitafort B, Razak, Iran) injections with a dose of 5 ml/day. Moreover, intravenous calcium-magnesium-phosphorus solution was administered to support the ewes and to rule out hypocalcemia. Despite the therapies, ewes died over the course of two to three days after presentation without any signs of lambing. Two cases were subjected to necropsy. The carcasses were lean and dehydrated. The severe fatty change of the livers was grossly evident with the livers being enlarged and pale with slightly round edges and grayish to white discoloration. In addition, the twin pregnancy of the ewes was observed. The fetuses were all found dead at necropsy. The liver and brain tissues were submitted for histopathological examination. The results revealed a severe diffuse hepatic fatty change, severe cerebral edema along with sub-meningeal edema and cerebral perivascular hemorrhage with intramyelinic edema. As no concurrent disease was detected in examined cases, it was assumed that the primary type of the pregnancy toxemia has caused the mentioned signs.

### **Discussion**

Pregnancy toxemia is believed to have a higher incidence rate in twin pregnancies and the term "twin lamb disease" is used to describe this condition in sheep (Rook, 2000). In this case, all the ewes had an undiagnosed pregnancy and they were in the last month of their pregnancy with twins, in which the fetal growth is maximal and an energy demand is about 180-200% above maintenance (Rook, 2000; Pugh, 2002). Likewise, the twin pregnancy had caused the increasing susceptibility of the ewes and the severe form of the disease to take place (Schulmbohm and Harmeyer, 2008). Along

with the misdiagnosis of pregnancy, the consequent low plane of nutrition based on wheat straw and alfalfa was the major contributor to occurrence of the disease. The morbidity of 10% and case fatality rate of 100% was indicative of an outbreak in this flock as in similar reports (Rook, 2000; Van Saun, 2000).

The pregnancy diagnosis errors can happen in determination of the presence of pregnancy, litter size, their age and health status (García *et al.*, 1993; Bazer *et al.*, 2007). Because of the seemingly appropriate date of pregnancy examination on October 28, of which approximately eighty days was after ram presentation (Bazer *et al.*, 2007), the problem of the current flock was assumed mainly as a result of an operational error. Inexperience of the operator in sheep uterine ultrasonography and lack of sufficient skills in twin diagnosis might have precipitated the problem. Other probable errors, which were speculated from the history information, were the lack of proper off-feed duration prior to scanning, improper clipping of the region of interest and insufficient restraint of the ewes throughout the scanning that could have prevented the appropriate locating of the uterus.

It can be concluded that along with introducing efficient methods like ultrasonography to animal husbandry plans, it is of great importance for veterinarians to gain proper skills for meticulous implementation of such methods to prevent unexpected losses. Combination of estrous synchronization programs to narrow the variations in pregnancy stage might also reduce the likelihood of probable errors in ultrasonographic examinations.

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