Atrial Septal Defect in a Newborn Holstein Calf

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ABSTRACT

We aimed to present a case of atrial septal defect (ASD) in a newborn Holstein calf in a commercial dairy farm in Tehran, Iran. Despite the incidence of some congenital cardiac disorders such as ventricular septal defect (VSD) in young calves, detection of ASD in Holstein calves has been rarely reported with no distinct picture of the area involved. In the current report, ASD is pictured noticeably which would be an appropriate example for diagnosing it in other cases. Apparently, issues related to cardiac system occur more frequently than expected, however, they are not diagnosed precisely on farm mainly because of inadequate knowledge of such disorders. Young dairy calves are often diagnosed with respiratory distress or fever with weakness and hyperpnea. Severe hyperpnea may be associated with heart defects which can be confused with respiratory diseases and fever in newborn dairy calves. In the current report, the calf was initially diagnosed with respiratory distress. However, further examination of heart beats and sound by palpation of the thorax led to suspect on heart defects. In the physical examination of both sides of the thorax, murmur and trill were clearly diagnosed. The calf died after 48 hours. After necropsy, ASD was identified as the cause of calf death. Calf loss means economic loss. Thus, diagnosing the problem timely can help minimize congenital issues risks and in turn increase calf survival and herd productivity.

KEYWORDS: Atrial septal defect; Holstein calf; Respiratory disease; Farm economy

CLINICAL PRESENTATION AND DISCUSSION

Atrial septal defect (ASD) is defined as an opening between two upper chambers of the heart allowing relation of these distinct parts which are naturally separated [1]. As a result, oxygen-poor and oxygen-rich bloods mix and cause heart and lung damages. Unequivocally, the severity of damage depends on the hole size. The ASD observed in our study (a newborn Holstein calf) is presented in Figure 1. Atrial septal defect is a congenital disorder in both human and animal infants mediated by genetics and environmental factors. It has been demonstrated that ASD is a genetic dependent disorder with greater gene frequency in Maine-Anjou breed [2]. However, the authors mentioned that this disorder is not limited to Maine-Anjou breed.

Detection of ASD in a 15d old Simmental calf [3] confirmed that ASD is not restricted to a typical breed and can occur in other breeds as well. Since our reported ASD occurred in a Holstein calf, it is suspected that factors other than genetics might play role in the incidence of ASD in calves. Rooting of the problem is important for improving the herd economy given that stillbirth calving might be attributed to ASD. It has been demonstrated that maternal stress can be a main factor in the etiology of congenital heart problems in human fetuses [4]. In addition, the importance of maternal nutrition and dietary patterns during pregnancy is notable [5]. In a human case, the authors concluded that better maternal nutrition was associated with lowered congenital heart defects in infant [6]. Cumulative evidence suggests that exposing the mother to stress and poor nutritional circumstances may predispose neonates to congenital heart defects such as VSD and ASD.

The last 60d of pregnancy (i.e., dry period) is an important stage of dairy cattle life during which any stress or nutritional deficiency affects biology and health of both dam and fetus [7]. Given the elevated price of animal feeds such as energy and protein sources as well as vitamin and mineral supplements in most countries, producers are forced to formulate more economical rations. As such, it can be expectable that the risk of congenital...
disorders would increase as the quality of pregnant cow diet would decrease. As noted in our previous report [8], the incidence of heart defects has recently increased which could be partly attributed to deteriorated nutritional and stress management of dam, especially during late pregnancy. To sum, in addition to genetics, maternal feeding and nutrition quality and the presence of stressors should be evaluated as potential causes for heart defects in neonates.

CONCLUSION

Congenital atrial septal defect (ASD) can be a fatal disorder in neonate Holstein calves. In our case reported herein, the newborn calf diagnosed with ASD died 48h after birth. Sever hyperpnea, murmur and trill were the most common diagnostic signs of heart disorders. To prevent such defects, dam genetics and nutritional programs should be scrutinized and improved carefully and precisely.

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REFERENCES