

## Case Report

## Report of the Occurrence of Schistosomus Reflexus in a Goat Kid



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## ABSTRACT

The schistosomus reflexus (SR) etymologically refers to an abdominal and or thoracic cleft with eventration of viscera. This pathology is a rare and lethal congenital syndrome in calves, lambs, and goat kids. This condition is likely caused by various factors such as endocrine, metabolic, hereditary, and teratogenic in the first third of gestation, leading to disorders in embryonic development. In this report, a 3-year-old female Alpine goat was examined with a history of dystocia. The presence of an abnormal dead goat kid exposed to the abdominal viscera was detected in the birth canal and delivered successfully with gentle intervention. In the gross pathological examination, signs of the abdominal fissure, visibility of viscera, placement of viscera in a membrane, ankylosis of the limbs, hypoplasia of the right hind limb, inversion of the hind limbs due to inversion of the spine, pulmonary hypoplasia, lack of diaphragm formation and cleft palate were recorded. According to the gross pathology, SR was diagnosed. The present report shows the occurrence of SR in an Alpine goat kid.

**Keywords:** Congenital, Dystocia, Goat, Anomaly, Necropsy

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## 1. Case History

**S**chistosomus reflexus (SR) is a rare and lethal congenital syndrome in calves, lambs, and goat kids. Characteristics of this syndrome are abdominal fissure, visceral exposure, ankylosis of the limbs, placing the limbs next to the skull, inversion of the spine, pulmonary hypoplasia, and diaphragmatic hypoplasia. Among the three species of cattle, sheep, and goats, the incidence of SR is higher in cattle, and delivery of a newborn with this syndrome often requires intervention such as manual, C-section, or fetotomy (Laughton et al., 2005). The present report describes the occurrence of SR in an Alpine goat kid.

## 2. Clinical Presentation

In February 2021, a 3-year-old Alpine female goat was examined on the Alian farm in Sorkheh City (Semnan Province, Iran) with a complaint of dystocia. After examination, the veterinarian noticed the presence of an abnormal dead goat kid in the birth canal, placed in the canal with exposure of the abdominal viscera. With gentle manual intervention, the abnormal goat kid was delivered. Then, the goat kid was examined by necropsy.

## 3. Diagnostic Testing

### Necropsy

In the gross pathology, the symptoms of a completely abnormal goat kid include severe abdominal fissure (Figure 1 A), exposure of viscera (Figure 1 A), placement of viscera in a membrane (Figure 1 A), ankylosis of the limbs (Figure 1 B), Hypoplasia of the right hind limb (Figure 1 C), inversion of the posterior limbs (Figure 1 D), pulmonary hypoplasia (Figure 1 E), lack of diaphragm formation (Figure 1 E), and cleft palate (Figure 1 F) were recorded. According to the gross pathology, SR was diagnosed.

### Assessments

A very low incidence of congenital malformations in lambs and goat kids, such as limbs malformations, urinary tract defects, genital disorders, brachygnathia, parrot mouth, prognathia, failure to close the vessels between the umbilicus and bladder (persistent urachus), umbilical hernia, anal atresia, eye disorders, microencephalitis, schistosomus reflexus, and spina bifida are found in most sheep and goat herds. These congenital malformations are caused by random genetic mutations

in the fetus and developmental abnormalities (Sargison et al., 2018).

Lambs with potentially fatal malformations are sometimes born alive and require uninterrupted euthanasia, but some malformations (such as brachygnathia and genital disorders) are not fatal, but they cause growth retardation (Eriksen et al., 2016). The outbreaks of congenital malformations occur rarely, and they are usually associated with viruses (such as border disease) or toxins (Dennis, 1993).

Congenital malformations of lambs and goat kids may be associated with genetic disease resulting from randomly improper recombination and expression of abnormal genes (Sargison et al., 2018).

Most inherited genetic diseases are recessive or show incomplete penetrance and are influenced by other environmental, phenotypic, and genetic effects. Genetic diseases are insidious and may be present in many animals, but they are difficult to control before their clinical signs are recognized (Scott, 2012).

Most studies have discussed the morphology of infants with this syndrome, and the exact etiology of SR is unknown (Megahed et al., 2015), but genetic etiology is a possibility. Most studies suggested that SR is an autosomal recessive inherited genetic defect (Citek, 2012).

The highest incidence of SR was reported in cattle. However, the incidence of SR was reported in other animal species (horse, donkey, sheep, goat, camels, dog, cat, *Ceratotherium simum simum*, *Lepidochelys olivacea*, *Pogona vitticeps*, *Bothrops jararaca*) (Barcenas-Ibarra et al., 2016; Lankton et al., 2014; Megahed et al., 2015). Characteristics of SR syndrome include severe abdominal fissure, visceral exposure, ankylosis of the limbs, placement of the limbs near the skull, inversion of the spine, and pulmonary and diaphragmatic hypoplasia (Laughton et al., 2005). These characteristics indicate that SR occurs in the early embryonic period and post gastrulation and affects the middle mesoderm (Megahed et al., 2015). The diagnosis of this syndrome is based on autopsy findings (Megahed et al., 2015).

In 2016, Kumar et al. reported a goat kid with SR syndrome, in which the diaphragm was healthy, the spine was angled so that the hind limb was adjacent to the head, the abdominal wall was incompletely formed, and all the viscera were out of the body and covered in a thin membrane (Kumar et al., 2016). In the report described by Prabakaran et al. (2020), a case of dystocia in goats



**Figure 1.** Goat kid with SR

A) Abdominal fissure, exposure of viscera, placement of viscera in a membrane B) Ankylosis of the limbs, C) Hypoplasia of the right hind limb, D) Inversion of the posterior limbs due to inversion of the spine, E) Pulmonary hypoplasia, lack of diaphragm formation, F) Cleft palate.

and manual delivery of goat kids with SR was reported (Prabaharan et al., 2020). In a report by Yadav et al. in 2017, a case of dystocia in the goat and delivering the goat kid with SR by fetotomy was reported (Yadav et al., 2017). In the literature, no reports of SR treatment and survival of the newborn with SR were found. The present study shows the occurrence of SR in Alpine goat kids.

## Ethical Considerations

### Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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## Authors' contributions

All authors equally contributed to preparing this article.

## Conflict of interest

The authors declared no conflict of interest.

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## چکیده



شیستوسوموس ریفلکسوس از نظر لغت‌شناسی به شکاف شکم یا قفسه سینه و خروج احشاء اشاره دارد. این عارضه یک سندروم مادرزادی کشنده و نادر در گوساله، بره و بزغاله است. احتمالاً این نقیصه در اثر عوامل مختلفی نظیر عوامل آندوکرینی، متابولیک، ژنتیکی و تراژون در یک‌سوم ابتدایی آبستنی ایجاد شده و به اختلال در تکامل رویان منجر می‌شود. در این گزارش یک رأس بز ماده سه ساله نژاد آلباین با تاریخچه سخت‌زایی مورد معاینه قرار گرفت. حضور یک نوزاد مرده غیرطبیعی با مشاهده احشاء در کانال زایمان تشخیص داده شد و با مداخله آرام از طریق مهبل، بزغاله با موفقیت خارج شد. بزغاله پس از تولد، کالبدگشایی شد و در بررسی کالبدگشایی علائمی نظیر شکاف شکمی، قابل مشاهده بودن احشاء، قرار داشتن احشاء در یک غشاء آنکیلوز اندام‌های حرکتی، هیپوپلازی اندام حرکتی عقبی راست، برعکس بودن اندام‌های حرکتی عقبی در اثر معکوس شدن جهت ستون فقرات، هیپوپلازی ریه، عدم تشکیل دیافراگم و شکاف کام مشاهده شد. با توجه به علائم بالینی و کالبدگشایی انجام‌شده، تشخیص شیستوسوموس ریفلکسوس انجام شد. گزارش حاضر نشان‌دهنده رخداد شیستوسوموس ریفلکسوس در یک بزغاله نژاد آلباین است.

**کلیدواژه‌ها:** نقص مادرزادی، سخت‌زایی، بز، ناهنجاری، کالبدگشایی.

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