

# Gallbladder agenesis in a male Holstein calf

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## Abstract

In this report, we aimed to present a case of gallbladder agenesis in a male Holstein calf. Early life quality has a critical role in determining upcoming dairy cows' productivity because many congenital, nutritional and infectious diseases occur and are diagnosed during this time period. In addition to environmental infectious diseases, congenital issues of digestive tract may be problematic. Gallbladder agenesis (GA) is an anomaly of the digestive system which has been rarely reported in the literature. Reports in dogs and human are available; however, we are unaware of any gallbladder agenesis report in calves. A two-week old Holstein male calf was diagnosed with signs of lethargy and standing difficulties which progressed to crippling. The calf did not respond to any of the common treatments and was culled shortly afterwards. After on-farm necropsy, the absence of gallbladder was observed and confirmed.

## Introduction

The high mortality rate of young calves in the pre-weaning period and during the first year of age (16.5% or greater) [1] indicates that calf loss occurs frequently on dairy farms. The digestive tract diseases such as diarrhea (nutritional or infectious), abomasal bloat, and rumen abnormalities are amongst the most common causes of calf mortality and poor growth in early ages. The liver and biliary disorders may be an origin of the problem. For instance, hepatitis and liver abscesses might occur following navel infection which can lead to death [2]. In addition, hepatic cysts are occasionally found in calves [3]. Gallbladder agenesis (GA) is one of the most rarely reported cases in both human and animals. To our knowledge, gallbladder agenesis in calves has not been reported previously.

It seems that no significant differences exist in the frequency of GA incidence between males and females [4]. In a human study, the probability of GA incidence was around 1 per 6500 live births [5]. As the incidence of this disorder is highly rare, it can be mistaken by other common diseases. In a 35 years old woman, intermittent abdominal pain on the right upper quadrant was described by the patient [4]. The incidences of GA in dogs, independent of their breeds, were 12 cases up to 2018 [5]. In a case report, a 9-month-old Bull Terrier was taken to a veterinary clinic with grey-green, unformed and pasty stools [5]. After the veterinary examination, the dog was diagnosed with GA. In contrast to the previous cases in which vomiting was the main clinical sign, in that study, diarrhea was recognized as the main clinical sign instead.

In the present calf case, we observed some similar and some different clinical signs compared with reported cases, indicating that GA signs may be specific in different species. Gallbladder agenesis reported in this article can provide basic information for the future cases.

## Case presentation

In a large dairy farm with over 1000 milking dairy cattle (Behroozi Dairy Complex, Tehran, Iran), a two-week old male calf was initially diagnosed with lethargy and some difficulty in standing. As a herd routine, rectal temperature was measured using a digital thermometer to check if the calf had a fever or not. Rectal temperature (39°C) was within the normal range and no signs of infectious diseases such as diarrhea and navel infection were detected. Fecal consistency was normal and there were no signs of digestive disorders such as abdominal bloat. Calf appetite was also normal. The calf continued to drink milk. These signs led to a rational that serum therapy may be useful for the calf to recover from lethargic conditions. Consequently, 1 liter of dextrose and sodium-chloride solution was infused intravenously on d-2 of diagnosis. The serum was supplemented by B-complex vitamins to support calf's energy metabolism. Fat soluble vitamins (i.e., A, D3 and E) were also injected intramuscularly to help sustain the calf's general health. However, these supportive treatments were not eventually effective and the calf crippled 7 d after the initial diagnosis. Over time, the signs of vitality disappeared and the calf went to coma. Interestingly, diarrhea occurred on d 6 after the initial identification. The diarrhea did exacerbate the calf's general health issues. Finally, the calf was culled according to the herd management decision for further investigation.

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**Figure 1.** Gallbladder agenesis in a 2-week old male Holstein calf

Necropsy was performed on-farm by professional experts and the causes of such phenomena were explored. No signs of haemorrhage or petechiae were found on mucosal membranes. The heart and lung were normal in size, shape and color. However, the peculiar finding was that the liver was smaller than a normal one. Further evaluation of the liver led to observe and ensure that the gallbladder was absent (Figure 1).

The kidneys were in normal size but their color had changed to dark green. The small intestine was haemorrhagic possibly related to diarrhea. Diarrhea was similar to the case of GA in the Bull Terrier [5]; however, lethargy and crimpling were diagnosed in the current case with a male calf. In this case, apparently there was no abdominal pain with the palpation of calf's abdomen as reported in human cases.

### Conclusion

Gallbladder agenesis was detected and reported in a male Holstein calf on a large commercial dairy herd in Tehran, Iran. The calf was diagnosed with lethargy and standing difficulties at 2 weeks of age and was finally culled because of the progressive lethargy and health issues. The necropsy findings demonstrated the absence of gallbladder and presence of a small-size liver. Further pathological and biochemical examinations of the future cases would be recommended.

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