

Colon Atresia in a Neonatal Piglet

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ABSTRACT

Background: Intestinal atresias are anomalies that occur during embryonic development and may involve the jejunum, ileum, colon and anus. In swine, these anomalies can affect one or more piglets, presenting varying degrees, and it's common for them to be present at birth or become evident shortly thereafter. However, establishing a definitive diagnosis can be challenging, as the investigation of perinatal conditions often requires multiple sources of information, especially when the lesions are minimal and knowledge about subsequent events is quite limited. This study aims to report the clinical management, clinical signs, radiographic findings, and necropsy of a case of colonic atresia in a pig.

Case: A 10-day-old male pig, a crossbreed between the Large White and Landrace breeds, weighing 1.9 kg, was presented to the Large Animal Veterinary Hospital of the Federal University of Lavras, with a chief complaint of lethargy and abdominal distension. The sow was in its 4th parity and had no history of gestational or parturition problems. The pig was raised in an intensive breeding system and was born in a litter of 14 piglets of uniform weight, none of which showed clinical abnormalities. At birth, the piglet had a good body condition score and alert demeanor. However, on the 8th day of life, abdominal distension, lethargy, and anorexia were observed. On physical examination, the piglet exhibited dyspnea with pronounced abdominal effort, an arched back, and difficulty in movement. The heart rate was 160 beats per minute, respiratory rate 48 breaths per minute, and rectal temperature 37.5°C. The mucous membranes were pink, and pulmonary auscultation revealed coarse crackles and wheezing. Based on clinical signs, intussusception was suspected, and abdominal ultrasonography and radiography were performed. Ultrasound examination revealed a large amount of fluid within the intestines, although no free abdominal fluid or other significant abnormalities were noted. Radiographic evaluation showed an accumulation of intestinal content and gas. Due to the presence of coarse crackles and wheezing, treatment for bronchopneumonia was initiated. The piglet exhibited improvement in respiratory function and resumed milk and water intake but remained unable to defecate. On the 3rd day of treatment, the animal died, and a necropsy was performed. *Post mortem* examination revealed that the small and large intestines were filled with content, while the final portion of the spiral colon was completely empty. Additionally, an abscess was identified in the spiral colon, along with a congenital atresia affecting the terminal segment of the spiral colon.

Discussion: The initial diagnostic suspicion in this case was intussusception; however, it was ruled out during necropsy. The characteristics of colonic atresia in this report were more consistent with a type II classification, as a fibrous remnant connected the 2 ends of the colon. Congenital intestinal abnormalities are rare but can cause significant losses in swine farming. Therefore, they should always be considered in the differential diagnosis of neonatal pigs presenting with abdominal distension and lethargy. Due to the potential hereditary nature of the condition, it is recommended that the parents be removed from breeding to reduce the risk of recurrence in future litters. Further studies on intestinal anomalies in pigs are necessary, as the current literature remains scarce.

Keywords: intestinal atresia, bowel, congenital, necropsy, swine.

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INTRODUCTION

Congenital diseases present characteristic clinical signs at birth; however, establishing a definitive diagnosis can be challenging, as the investigation of perinatal conditions often requires multiple sources of information, particularly when lesions are minimal and knowledge about subsequent events is limited [15,16].

Malformations result from errors in morphogenesis [16]. In swine, these anomalies can affect 1 or more piglets, presenting with varying degrees of severity, and are commonly present at birth or become evident shortly thereafter [14]. Cases of jejunal, ileal, colonic, and anal atresia have been reported [3]. In the colon, atresia is frequently observed in Dutch calves and foals, while in pigs, both atresia and stenosis can occur in the terminal intestinal segment [2,4].

Embryonic malformations may result from genetic or chromosomal alterations, as well as physical, chemical, hormonal, and infectious agents, among other factors. The use of fertilizers, fungicides, herbicides, insecticides, and other agricultural products can contaminate water and food. Consequently, identifying the cause of malformations in livestock species is particularly challenging due to exposure to waterborne contaminants and feed additives. Additionally, factors such as radiation, infectious diseases, hypoxia, hypothermia, hyperthermia, and stressful conditions may also contribute [1].

The aim of this study is to describe the clinical management, clinical signs, radiographic findings, and necropsy of a case of colonic atresia in a pig.

CASE

A 10-day-old male piglet, resulting from a cross between the Large White and Landrace breeds, weighing 1.9 kg, was attended by the team at the Large Animal Veterinary Hospital of the Federal University of Lavras (UFLA), presenting with lethargy and abdominal distension as the chief complaint. The sow was in her 4th parity and had no history of gestational or birthing complications. The piglet was raised in an intensive breeding system and was born in a litter of 14 piglets of uniform weight, none of which exhibited clinical abnormalities. On the 3rd day of life, tail docking was performed, along with the administration of iron dextran¹ [Ferrodex[®] - 2.0 mL IM, single application] and toltrazuril² [Isocox[®] - 50 mg/kg PO, single application]. The piglet was born with good

body condition and an alert demeanor; however, on the 8th day of life, abdominal distension (Figure 1), lethargy, anorexia, and weakness were observed. Upon physical examination, the piglet exhibited dyspnea with pronounced abdominal effort, an arched back, and difficulty in movement. The heart rate was 160 beats per minute, the respiratory rate was 48 breaths per minute, and the rectal temperature was 37.5°C. The mucous membranes were pink, and crackles and wheezing were detected in the lungs. The clinical signs of the animal raised suspicion of intussusception; therefore, ultrasound and radiographic examinations were requested. Abdominal ultrasound revealed a large amount of fluid in the large intestine. However, no free fluid was detected in the abdominal cavity, and no other significant abnormalities were observed. Radiography showed a substantial accumulation of intestinal content and gas in the large intestine (Figure 2).

Due to the presence of coarse crackles and wheezing, treatment for bronchopneumonia was initiated, consisting of an intramuscular (IM) injection of enrofloxacin³ [Chemitril[®] - 5 mg/kg IM, once daily for 7 days]; flunixin meglumine² [Flumax[®] - 2.2 mg/kg IM, once daily for 3 days]; bromhexine⁴ [Aliv V[®] - 0.5 mg/kg IM, once daily for 7 days]; and dexamethasone³ [Délixium[®] - 0.02 mg/kg IM, single application]. An enema was performed using 5 mL of mineral oil and 5 mL of warm water, but it was unproductive.

The patient showed improvement in respiratory status, as well as in milk and water intake, but continued to be unable to defecate. On the 3rd day of treatment, the animal died, and a necropsy was performed. The examination revealed that both the small and large intestines were filled with content, while the final portion of the spiral colon was completely



Figure 1. A 10-day-old piglet exhibiting abdominal distension due to colonic atresia.



Figure 2. Radiographic image of the abdomen showing the large intestine filled with content and gas.

empty. Additionally, an abscess was observed in the spiral colon (Figure 3), along with a congenital atresia in the terminal segment of the spiral colon (Figure 4).

DISCUSSION

The initial diagnostic suspicion for this case was intussusception. However, this condition is defined as the invagination of the proximal portion of a tubular organ into its distal part [5,7], a possibility that was ruled out during necropsy.

The widely accepted theory on the pathogenesis of intestinal atresia suggests an ischemic episode as the underlying cause. Experimental studies in lambs, dogs, rabbits, and chickens have demonstrated that persistent or temporary occlusion of the fetal intestine's blood supply leads to atresia, particularly types II and III, affecting the jejunum, ileum, or colon [13]. The characteristics of colonic atresia in the present

case align more closely with type II classification, as a fibrous remnant was observed connecting the 2 ends of the colon, indicating the absence of complete separation.

It is not possible to rule out the possibility of atresia being a hereditary trait. Gene mutations have been identified in calves with multiple congenital atresias, as well as in their parents [8]. However, this hypothesis cannot be confirmed in the present case, as there were no reports of congenital abnormalities among the piglets born to the mother of the affected animal.

Clinical signs of intestinal atresia emerge after birth, with distal or anal atresias leading to a gradual onset of symptoms, while proximal atresias cause a more rapid manifestation [12]. In the present report, atresia was located in the final segment of the colon, resulting in a slower progression of clinical signs, which became apparent on the 8th day of life and persisted until the animal's death at 13 days of age.

Intestinal atresia typically presents with abdominal distension, inability to defecate [10], depression, anorexia, and absence of feces [3], all of which were observed in the piglet in question. In some cases, this intestinal abnormality may contribute to dystocia due to fetal abdominal distension [9].

The diagnosis of intestinal atresia is often presumptive, based on age, history, and clinical examination findings. Imaging tests can provide additional diagnostic support. Plain radiographs may reveal gas accumulation and the absence of content in the distal portion of the intestine, while contrast radiography can help identify the atretic site by showing where



Figure 3. Abdominal organs of a 13-day-old piglet, revealing an abscess in the spiral colon during necropsy.



Figure 4. Atretic segment of the colon located caudal to the abscess in the spiral colon.

the contrast medium ceases to progress. Additionally, exploratory laparotomy and necropsy findings are valuable for confirming the diagnosis [3]. In the present case, radiographic examination revealed a large amount of gas and intestinal content, aligning with findings reported in the literature. However, due to significant abdominal distension and the location of the atresia in the terminal portion of the large intestine, the affected segment could not be clearly visualized. The definitive diagnosis was established through necropsy, which confirmed the presence of the atretic segment of the colon.

Van der Gaag [13] conducted a study on 34 cases of intestinal atresia in different species, including foals, calves, dogs, piglets, and felines. Among these cases, 4 were classified as type I atresia, 6 as type II, 19 as type III, and 5 as stenosis. In pigs, 3 cases were reported, all of type III, with 2 involving small intestine atresia and 1 involving colon atresia. In the present case, the patient exhibited type II atresia, characterized by a fibrous remnant resembling a cord in the intestine.

In a study about the prevalence of congenital abnormalities in pigs, 339 piglets were observed, of which 43 (11.1%) had defects related to the gastrointestinal tract [6]. Among them, 36 were affected by anal atresia and 7 by intestinal atresia, indicating that intestinal malformations are rare. Furthermore, no

additional reports detailing the occurrence of colon atresia in pigs were found.

The treatment for intestinal atresia is surgical. Once the blind end of the colon is identified, it should be dissected, an enterotomy performed, and an anastomosis established with the adjacent colon segment. Singh [11] describes a case of successful surgical treatment in a calf affected by this condition, with recovery shortly thereafter, while Yurdakul [17] reports a successful outcome in a foal following corrective surgery for colon atresia. In the present case, surgical intervention was not performed, as the animal died on the 3rd day of hospitalization, a period during which differential diagnoses and treatments for similar conditions were still being considered. Additionally, in this piglet, the atresia was extensive, rendering surgical correction unfeasible and the animal's survival impossible.

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