



Case Report

Surgical management of atresia coli in a Darehshouri foal

Fatemeh Heydari, Amir Hessam Torghabe\*, Hamid Reza Siahkouhi, Mohammad Shahraki, Alborz Mirzadeh, Fattah Iranmanesh Zarandi, Mohammad mehdi Oloumi, Ehsanollah Sakhaee

Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran

ARTICLE INFO

Received: 25 November 2019

Accepted: 23 December 2019

KEYWORDS:

Atresia coli

Darehshouri foal

Anastomosis

ABSTRACT

Atresia coli is a rare congenital abnormality that result in an inability to pass feces since birth. Signs of colic progressed during 24 hours of first life in this defect. The equine large intestine consists of the following segments: cecum, large colon, and small colon. Colon is the segment of intestine that most often involved (Atresia coli). The popular theory related to the pathogenesis of intestinal atresia is vascular accident. If the foal can't pass meconium during 12 hours after birth, it could be described as 'retained meconium'. Atresia coli can be diagnosed by clinical signs, physical examinations and diagnostic imaging. Surgical prognosis of atresia coli is poor. In this study a Darehshouri foal was presented with signs of colic and absence of meconium repelling. The final diagnosis of partial agenesis of the right dorsal colon (type III colon atresia) was confirmed during laparotomy. End to end anastomosis between remained right dorsal and transverse colon was done.

مدیریت جراحی یک مورد عدم تشکیل کولون در یک راس کره اسب نژاد دره شوری

فاطمه حیدری، امیرحسام طرهبه\*، حمیدرضا سیاهکوهی، محمد شهرکی، البرز میرزاده، فتاح ایرانمنش، محمدمهدی

علمی، احسان اله سخایی

گروه علوم درمانگاهی، دانشکده دامپزشکی، دانشگاه شهید باهنر کرمان، کرمان، ایران

چکیده

عدم تشکیل کولون یک اختلال مادرزادی نادر است که منجر به عدم توانایی دفع مدفوع در اوایل تولد می گردد. علائم کولیک ناشی از این ضایعه ۲۴ ساعت بعد از تولد شروع می گردد. به طور کلی روده های بزرگ شامل سکوم، کولون های بزرگ و کوچک بوده که کولون ها از جمله بخش های مهم درگیر در این عارضه محسوب می شوند. فرضیه ی رایج پاتوژنز این عارضه بیشتر مربوط به اختلالات خون رسانی می باشد. در صورتی که کره قادر به دفع مدفوع در ۱۲ ساعت اولیه ی تولد نباشد "احتباس مکنونیوم" می تواند یکی از علائم این عارضه باشد. تشخیص عدم تشکیل کولون از طریق ارزیابی علائم بالینی، معاینه فیزیکی و تصویربرداری تشخیصی میسر می گردد. پیش آگهی جراحی این عارضه ضعیف است. مطالعه حاضر به بررسی یک مورد عدم تشکیل کولون در یک راس کره اسب نژاد دره شوری با علائم کولیک و احتباس مکنونیوم می پردازد. پس از انجام معاینات اولیه عدم تشکیل بخشی از کولون فوقانی راست توسط لاپاراتومی تایید شد. در نهایت هم دهانی انتها به انتها بین باقیمانده کولون راست و عرضی به روش جراحی صورت گرفت.

واژه های کلیدی: آترزی کولون، کره اسب دره شوری، هم دهانی

\* Corresponding author's email: Amirhessam.Torghabe@gmail.com  
©2019 Islamic Azad University, Urmia Branch. All rights reserved.

## INTRODUCTION

Intestinal atresia has been reported in several species such as human, cattle and horses [1]. In the horses it most commonly occurs in the colon, rectum or anus [1]. Atresia coli is very rare in foals and classified into four types: membrane atresia which a membrane or a diaphragm has been obstructed the intestinal lumen, cord atresia which two blind ends of intestine are joined by a cord of connective tissue and blind-end atresia which is classified into 2 categories. [2]. In the first type a segment of intestine is absent and in the second one the distal segment of affected part is spiral. Final type of atresia included multiple types of atresia. Atresia coli can diagnosed by clinical signs, physical examinations and diagnostic imaging and prognosis of surgical intervention is poor [2,3]. The present report describes occurrence of a third type of blind- end atresia coli in a Darehshouri male foal.

## HISTORY AND CLINICAL FINDINGS

In 23 April 2019, a 35 hours old Darehshouri male foal was referred to the Teaching and Research Hospital of Faculty of Veterinary Medicine at Shahid Bahonar University of Kerman, Kerman, Iran, with the history of anorexia, recumbency, meconium impaction and mild colic about 10 hours after birth.

On the farm, treatment with Paraffin oil (10 ml.kg<sup>-1</sup>, orally, HANNAN pharmaceutical company, Borujen, Iran) and Flunixin meglumine (1.1 mg.kg<sup>-1</sup>, IM, Rooyan darou, Tehran, Iran) were not effective. The foal had normal temperature of 38.1°C, while pulse rate (120 beats/min) and respiratory rate (50 breaths/min) were increased. Oral mucous membranes were cyanotic and there was ping sound in the right flank. Treatment was continued with the presumption of a meconium impaction, in the hospital, but differential diagnoses such as colic due to bladder rupture or atresia coli began to be propounded.

In order to medical therapy an 18 gauge over the wire catheter was placed into the right jugular vein. Primary supportive therapy included fluid therapy induced by 4 to 5

ml.kg<sup>-1</sup> hypertonic sodium bicarbonate (Zoopharmian pars, Tehran, Iran) and continued by isotonic ringer solutions (Shahid Ghazi Pharmaceutical, Tabriz, Iran) plus 50 ml dextrose 5% (Shahid Ghazi Pharmaceutical, Tabriz, Iran) and Flunixin meglumine (1.1 mg.kg<sup>-1</sup>, IM) were prescribed. Blood sample was taken for further evaluation (Table 1) and yellow fluid reflux obtained through the nasogastric intubation. Clinical signs of colic progressed so the foal was referred to surgery section. Alpha 2 agonists and phenothiazine drugs didn't applicate for sedation because of depression of the foal, so general anesthesia was induced by Ketamine hydrochloride 10% (2 mg.kg<sup>-1</sup>, Bremer pharma GMBH34414, Warburg, Germany) and continued with 2% Isoflurane (Piramal critical care, Inc. USA) for maintenance and ventral midline laparotomy was performed with dorsal recumbency. During the surgery atresia coli was found with partial agenesis of right dorsal colon (Figure1).



**Figure1:** Partial agenesis of right dorsal colon in a Darehshouri foal.



**Figure2:** End to end anastomosis between remained right dorsal and transverse colon in a Darehshouri foal.

End to end anastomosis between remained right dorsal and transverse colon was done (Figure 2) and prepared for recovery. Intravenous injection of Meloxicam (0.6 mg.kg<sup>-1</sup>, Rooyan darou, Tehran, Iran) for pain control and antibiotic therapy consisted of Penicillin potassium at a dose of 30000 IU.kg<sup>-1</sup>, Erfan darou, Tehran, Iran) for secondary infections control were administered. The foal was recovered from anesthesia gradually, but unfortunately, 5 hours later became lateral recumbent due to electrolyte imbalance and endotoxemia and finally eventually died.

## DISCUSSION

Congenital malformations occur in the embryogenesis that genetic and geographical factors are involved in the occurrence of these anomalies [4,5]. Intestinal atresia is an unusual congenital malformation in many species and it has been reported in various parts of the gastrointestinal tract. The incidence rate of this complication in human is 1 in 5000 births in infants [6]. Frequency of intestinal atresia in calves is higher than in other domesticated species and rare in equine foals. To the best knowledge of authors, it seems that present study is the first colonic atresia report in the Darehshouri foals. In this study, a type III colon atresia was diagnosed in a Darehshouri foal and clinical signs were similar to other

previous reports of colon atresia. Colonic atresia had

**Table 1.** Serologic and hematological parameters of a 35 hours old Darehshouri male foal referred to the hospital

Parameters	Normal Value	Test	Unit
Total protein	4.6 - 6.9	4.6	g.dl <sup>-1</sup>
Fibrinogen	200 - 450	200	mg.dl <sup>-1</sup>
WBC	5.5 - 12.5	2.4	10 <sup>3</sup> . µl <sup>-1</sup>
Neutrophil (seg)	3 - 6.5	3.4	10 <sup>3</sup> . µl <sup>-1</sup>
Neutrophil (band)	0 - 2	3	10 <sup>3</sup> . µl <sup>-1</sup>
Lymphocyte	2.5 - 7	5.8	10 <sup>3</sup> . µl <sup>-1</sup>
Monocyte	0.5 - 7	5	10 <sup>3</sup> . µl <sup>-1</sup>
Eosinophil	0 - 1	0	10 <sup>3</sup> . µl <sup>-1</sup>
Basophil	0 - 3	0	10 <sup>3</sup> . µl <sup>-1</sup>
RBC	6.5 - 12.5	11.1	10 <sup>6</sup> . µl <sup>-1</sup>
PCV	32 - 59	54.2	%
Hemoglobin	11 - 19	15.2	g.dl <sup>-1</sup>
MCV	34 - 58	48.9	fL
MCH	12.3 - 19.7	13.7	pg
Thrombocytes	10 - 60	23	10 <sup>4</sup> . µl <sup>-1</sup>
RDW	15 - 19	16	%

occurred in the right dorsal colon. The high rate of surgery failure is primarily related to differences in the diameter of the anastomotic end but generally, the prognosis depends on the area involved. Complications following surgery for colon atresia include ileus of the dilated oral portion, peritonitis due to leakage of contents from the anastomotic segment, incontinence in stool disposal and diverticulitis [7].

Nappert et al. (1992) reported an occurrence 1.3% incidence of atresia coli in foals at the Large Animal Hospital of University of Montreal, Canada. The breed distribution of cases was included Appaloosa (N = 2), Morgan (N = 1), Standardbred (N = 1), Thoroughbred (N = 1), Paint Horse (N = 1) and Quarter Horse (N = 1). Five foals had type III (blind-end) and 2 foals type II (cord atresia). Surgical treatment had been done in 3 foals but it was unsuccessful. They stated a grave prognosis should be considered when this condition is diagnosed in foals (8). Hunter and Belgrave (2010) reported atresia coli in a Thoroughbred foal [9].

One of the most important theories related to intestinal atresia is disorder in blood supply in a part of the intestine leading to segmental atrophy in the embryonic period [6]. A Swedish Highland autosomal recessive gene is responsible for atresia jejuni in Jersey breeds [10].

Diagnosis of intestinal atresia requires taking history, clinical signs, physical examinations, rectal palpation, ultrasonography, endoscopic examination and radiography using barium enemas [11,6] and surgical repair is recommended [12]. Correction of colon atresia surgery has a low success rate and prognosis of these cases, were very poor [13].

#### **CONFLICT OF INTEREST**

The authors have no conflict of interest to declare.

#### **REFERENCES**

- [1] Van der Gaag, I. and Tibboel, D. (1980) Intestinal atresia and stenosis in animals: A report of 34 cases. *Vet. Path.* 17, 565-574.
- [2] Elsa, A., Onyeyili P., Surgical management of small intestinal atresia in Sokoto red goats. *Pak J Biol Scien*, 2004; 7(11): 2024-2025,.
- [3] Srivastava, P., Gangopadhyay A., Gupta D., Sharma S., Upadhyaya V.D., Kumar V., Jaiman R. Atresia of ileocecal junction, ileocecal valve: Rare variants of bowel atresia. *J Indian Assoc Pediatr Surg*, 2009; 14(3): 117.
- [4] Bai, Y., Chen, H., Yuan, Z.W., Wang, W.: Normal and abnormal embryonic development of the anorectum in rats. *J Pediatr Surg*, 2004; 39: 587-590.
- [5] Cassini, P., Montironi, A., Botti, S., Hori, T., Okhawa, H., Stella, A., Andersson, L., Giuffra, E.: Genetic analysis of anal atresia in pigs: evidence for segregation at two main loci. *Mamm Genome*, 2005; 16: 164-170.
- [6] Mair, T.S., Divers T.J., Ducharme N.G. *Manual of equine gastroenterology*, WB Saunders, 2002.
- [7] MICHAEL W. ROSS R. REID HANSON, JR., *C-19-Large-Intestine-Equine-Surgery-Equine-Surgery-1992*
- [8] Nappert, G., Laverty, S., Drolett, R., Naylor, J. Atresia Coli in 7 Foals (1964-1990). *Equine Vet J*, 1992; Suppl. I3: 57-60.
- [9] Hunter, B., Belgrave, R.L., Atresia coli in a foal: Diagnosis made with colonoscopy aided by N-butylscopolammonium bromide. *Equine Vet Educ*, 2010; 22 (9): 429-433.
- [10] Kilic, N., Sarierler, M. Congenital intestinal atresia in calves: 61 cases. *Revue Méd Vét*, 2004; 155(7):381-384.
- [11] Azizi, S., Mohammadi, R., Mohammadpour, I. Surgical repair and management of congenital intestinal atresia in 68 calves. *Vet Surg*, 2010; 39(1):115-120.
- [12] Laikul, A., Phetudomsinsuk, K., Aumarm, W., Sritrakul, T., Prukudom, S., Congenital colonic atresia in horse. *J Kasetsart Vet*, 2010; 20(1): 36-40.
- [13]. Fischer, A.T. (2006) Colic: diagnosis, preoperative management, and surgical approaches. In: *Equine Surgery*, 3rd edn., Eds: J.A. Auer and A. Stick, W.B. Saunders, St Louis. p 393.