



Original Articles

Epidemiology of colic syndrome in horses over 15 years of care

Epidemiologia da síndrome cólica em equinos ao longo de 15 anos de atendimento

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ABSTRACT

Colic syndrome is a condition of great importance in equine production, a syndrome considered to be complex and multifactorial in nature. In this way epidemiological studies have been acting to contribute to the identification of risk factors in the development of wind power. This study evaluated the clinical epidemiology of the colic syndrome according to race, gender, diagnosis, affected segment, therapeutic decision and outcome of the cases treated at the Veterinary Hospital "Dr Halim Atique", interior of São Paulo. The medical records of the animals assisted from January 2004 to July 2018, whose complaint was abdominal discomfort, were evaluated. Of the 535 animals, the most affected breed was the Quarter Horses (69.3%) followed by the Mangalarga (6.9%); females (53.1%) were more prone to the development of the syndrome. Compaction (28.8%), gastritis (11.8%), followed by gas distension (10.3%) were the most frequent changes; the affected segments being the stomach (21.9%), major colon (17.2%), and small intestine (15.7%). Clinical treatment (64.7%) was the most instituted and in the outcome of the cases, the discharge (77.4%) prevailed. The study presents data that can support epidemiological research in the area, assisting in the identification of causal and predictive factors for the colic syndrome.

RESUMO

A síndrome cólica é uma afecção de grande importância na equideocultura, síndrome essa considerada de natureza complexa e multifatorial. Desta forma os estudos epidemiológicos vêm atuando para contribuir na identificação de fatores de risco no desenvolvimento da cólica. Este estudo avaliou a epidemiologia clínica da síndrome cólica de acordo com a raça, sexo, diagnóstico, segmento acometido, decisão terapêutica e desfecho dos casos atendidos no Hospital Veterinário "Dr Halim Atique", interior de São Paulo. Foram avaliados os prontuários dos animais atendidos no período de janeiro de 2004 a julho de 2018, cuja queixa foi o desconforto abdominal. Dos 535 animais, a raça mais acometida foi a Quarto de Milha (69,3%) seguido do Mangalarga (6,9%); quanto ao sexo, fêmeas (53,1%) se mostraram mais propensas ao desenvolvimento da síndrome. Compactação (28,8%), gastrite (11,8%) seguido da distensão por gás (10,3%) foram às alterações mais frequentes; sendo os segmentos acometidos, o estômago (21,9%), cólon maior (17,2%) e intestino delgado (15,7%). O tratamento clínico (64,7%) foi o mais instituído e no desfecho dos casos, a alta (77,4%) prevaleceu. O estudo apresenta dados que podem subsidiar pesquisas epidemiológicas na área auxiliando na identificação de fatores causais e preditivos para a síndrome cólica.

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INTRODUCTION

The colic syndrome is characterized by the presence of abdominal pain, usually of gastrointestinal origin, presenting a complex and multifactorial nature (REEVES, 1997; ARCHER, PROUDMAN, 2006). Considered the first major cause of death in horses (POLLITT, 2008), its annual cost in the United States was estimated at \$115,300,000 with a national incidence of 4.2 cases/100 horses per year and a mortality rate of 11% (TRAUB-DARGATZ et al., 2001).

The incidence rate can vary within the same population and is influenced by variables present in and outside the places where the animals are located (ARCHER, PROUDMAN, 2006). In Ethiopia, a rate of 10.3% was found in a 5-month study (WORKU et al., 2017); the annual rate in Iran was 8.6% (MEDNI, MOHAMMED, 2006); and in the Pure Blood training facilities in the British Isles the cumulative colic rate was 5.8% (HILLYER, TAYLOR, FRENCH, 2001). There are several risk factors that influence the development of the colic syndrome, including the increase in dietary concentration, change in housing management (CURTIS et al., 2019), seasonality, gender, age (KANEENE et al., 1997), and racial predisposition (COHEN, GIBBS, WOODS, 1999; TRAUB-DARGATZ et al., 2001).

Retrospective and prospective epidemiological studies are published annually with the main objective of identifying risk factors that predispose the development of colic in the equine species. Epidemiological research is of utmost importance to know how the disease behaves regionally and nationally (WORKU et al., 2017), allowing the development of prevention strategies (ARCHER, PROUDMAN, 2006), as well as helping in the diagnosis and elaboration of new hypotheses of possible causes of the disease (ARCHER, 2017).

In view of these considerations, this study aimed, through a retrospective study, to describe the clinical epidemiology of the colonic syndrome according to race, sex, diagnosis, affected segment, therapeutic decision, and outcome of the case.

MATERIAL AND METHODS

Research project approved by the Ethics Committee on the Use of Animals (CEUA) registered by protocol no. 02/2017 LE.

This is a retrospective study of colic syndrome of cases referred to the Veterinary Hospital "Dr Halim Atique", interior of São Paulo, from January 2004 to July 2018. The medical records were evaluated from the authorized access to the hospital's data system by the hospital's management and only the animals sent with abdominal discomfort complaints were selected through filters. The data collection was performed over a period of 6 months. The data obtained were tabulated according to race, sex, diagnosis, affected segment, therapeutic decision, and outcome of the case.

The diagnosis of the colic syndrome and the clinical or surgical therapeutic decision were based on the results obtained from the physical examination of the animal, where heart rate, respiratory rate, intestinal motility, body temperature, capillary filling time, skin turgor, and evaluation of the staining of the oral mucosa were evaluated. The characteristics and amount of reflux were obtained by nasogastric probing found on rectal palpation. The images were obtained by transabdominal ultrasonography, collection and evaluation of the peritoneal fluid, and response to pain control therapy. The data were analyzed in Sas On Demand and the frequency of interest variables was extracted.

All patients underwent routine clinical procedures to stabilize homeostasis, receiving fluids to correct volemia, dehydration, and basic acid and hydroelectrolytic imbalance; stomach decompression by nasogastric and cecum probing by tiflocentesis, if necessary; and complementary tests such as blood counts, serum biochemistry, and peritoneal fluid were collected, and ultrasonography was performed after initial physical examination, as recommended by Godoy, and Teixeira Neto (2007).

RESULTS AND DISCUSSION

According to the survey of the medical charts, it was possible to verify that there were 535 cases from January 2004 to July 2018 with an average of 35.6 cases of colic per year. The most affected race in the study was the Quarter Horse (69.3%), followed by the Mangalarga (6.9%); females (53.1%) prevailed (Tables 1 and 2). In retrospect with 25 cases of colic syndrome in horses in Rio Grande do Norte, Brazil, a higher prevalence of the disease was also observed in Quarter Horses and Mixed Breeders, totaling 80% of the cases (OLIVEIRA et al., 2014). In the region of Umuarama, Paraná, Brazil, 60% of the 25 cases were also of the Quarter Horse breed (REIS et al., 2017). In the latter, similarly to what was observed in the present study, the second most affected breed was Mangalarga, with 12% of cases. In Western Canada, of the 604 horses with colic, 32.3% of the cases involved Quarter Horse animals (ABUTARBUSH, CARMALT, SHOEMAKER, 2005). A study of 50 animals in the region of Jaboticabal, São Paulo, Brazil, revealed a higher prevalence in Brasileiro de Hipismo, a result justified by the proximity with large centers of breeding of the breed (DI FILIPPO et al., 2010). It is believed that in this study, a similar association can be made, since the Quarter Horse breed is the most abundant in the region. The animals are used in Drumming and Team Penning competitions, common sporting activities that enrich the region's rodeo parties.

Although the other breeds present low frequency in the study, it is necessary to take into account the heritability of major colon volvulus in Thoroughbred horses, which can be justified together with environmental factors and additive genetic variation

(PETERSEN et al., 2019) and the influence of the height of the animals of the breed (SUTHERS et al., 2012). The Arabs presented a greater risk in the development of colic, both by genetic predisposition and sensitivity to some gastrointestinal disorders, and by the fact that breeders include a different management for the breed (COHEN, GIBBS, WOODS, 1999).

Despite the small difference observed between the sexes, the values corroborate with other studies where

females were more affected. In this study, the percentage is explained by the larger number of breeding females resident in stud farms in the studied region (DI FILIPPO et al., 2010). A systematic review performed to compile the main risk factors for colic (Curtis et al., 2019) found a variation of 37% to 64.5% in the percentage of females with colic among the studies.

Table 1. Distribution of cases according to race.

Race	<i>n</i>	%
Quarter horse	371	69.3
Mangalarga	37	6.9
English thoroughbred	19	3.5
Brasileiro de Hipismo	18	3.3
Paint horse	11	2.0
Pony	11	2.0
Others*	68	13
Total	535	100

n = number of animals

*Others: UDB (8,6%); Hinnies (1,9%); Arab (0,4%); Appaloosa (0,4%); Lusitano (0,4%); Socó (0,4%); Campolina (0,2%); Andaluz (0,2%); Uninformed (0,4%).

Table 2. Distribution of cases according to sex.

Sex	<i>n</i>	%
Female	284	53.1
Male	229	42.8
Uninformed	22	4.1
Total	535	100

n = number of animals

Compaction was the main cause of the diagnosed colic syndrome, with 28.8% of the cases (Table 3). Similar findings were described not only in Brazil (OLIVEIRA et al., 2014), but also in regions of Canada (ABUTARBUSH, CARMALT, SHOEMAKER, 2005), United States (KANEENE et al., 1997), South Africa (VOIGH et al., 2009), and Ethiopia (WORKU et al., 2017), in which the higher occurrence of compaction was explained by anatomical factors, such as decreased lumen of the gastrointestinal tract of horses. As a triggering factor of compaction we can cite the quality of food available to the animals, because in periods of drought the hay is presented with greater amount of lignin (WHITE, 1998), making digestion difficult and favoring accumulation during gastrointestinal transit. In this study, compaction may also be associated with the period of droughts, since 68.2% of the cases of compaction occurred in the period between April and October, a period considered to be of little rainfall in the interior of São Paulo (CLIMATE-DATE, 2019). However, other risk factors may be associated with the involvement of the colic syndrome in these animals, such as high levels of dietary concentrate, changes in food or housing management (CURTIS et al., 2019), presence of stereotypes such as "swallowing air" and biting wood (MALAMED et al. 2010), low water intake (KAYA,

SOMMERFELD-STUR, IBEN, 2009), weight loss, dental disease, and previous episodes of colic (COX et al., 2009).

The most affected segments were the stomach (21.9%), major colon (17.2%), small intestine (15.7%), followed by pelvic flexion (12.1%) (Table 4). The greater occurrence of complications in these segments can be explained by the anatomical particularities present in these regions, such as small gastric capacity and lumen decrease (THOMASSIAN, 2005). Works describe higher frequency of compaction in large colon and small intestine (ABUTARBUSH et al., 2005; KANEENE et al., 1997; DI FILIPPO et al.; 2010; OLIVEIRA et al., 2014).

In this study, clinical treatment was more implemented (64.7%) compared to surgical treatment (27.5%) and the discharge rate (77.4%) was higher compared to the percentage of death (9.7%) (Tables 5 and 6), data that corroborate those found by Kaya, Sommerfeld-Stur and Iben (2009). Nevertheless, regarding the surgical treatment, 27.5%, it was noted better results in animals that did not present ischemic lesion and that were early forwarded to the veterinary hospital, a result also observed by Di Filippo (2010).

Table 3. Distribution of cases according to the diagnosis.

Diagnosis	<i>n</i>	%
Renal colic	4	0,7
Colitis	9	1,7
Compaction	154	28,8
Dislocation	36	6,7
Gas distension	55	10,3
Proximal Duodenum Fasting	35	6,5
Incarceration	2	0,4
Epiploic foramen incarceration	1	0,2
Nephrosplenic incarceration	7	1,3
Enterolith	2	0,4
Spasmodic	3	0,6
Gastrite	63	11,8
Intussusception	8	1,5
Obstruction	5	0,9
Rupture	16	3
Sablosis	2	0,4
Gastric overload	35	6,5
Torsion	26	4,9
Uninformed	72	13,4
Total	535	100

n = number of animals

Table 4. Distribution of cases according to the segment affected.

Segment affected	<i>n</i>	%
Caecum	39	7.2
Major Colon	92	17.2
Minor Colon	13	2.4
Esophagus	1	0.2
Stomach	117	21.9
Pelvic Flexure	65	12.1
Small intestine	84	15.7
Peritoneum	1	0.2
Straight	2	0.4
Uretra	3	0.6
Uterus	1	0.2
Uninformed	117	21.9
Total	535	100

n = number of animals

Table 5. Distribution of cases according to the therapeutic decision.

Therapeutic decision	<i>n</i>	%
Clinical	346	64.7
Surgical	147	27.5
Uninformed	42	7.8
Total	535	100

n = number of animals

Table 6. Distribution of cases according to the outcome of the cases related to the therapeutic decision.

Outcome	n	%	Surgical	Clinical
High	414	77,4	78	308
Euthanasia	66	12.3	46	16
Death	52	9.7	20	22
Uninformed	3	0,6	-	-
Total	535	100	147	346

n = number of animals

In a study conducted in Iran with 128 horses, 82% of the animals showed mild clinical signs of colic syndrome; therefore, they were treated with routine clinical procedures, including administration of lubricants, nonsteroidal anti-inflammatory drugs, walking and change in diet when deemed necessary. Only one death supposedly occurred to the only animal referred to surgical treatment with serious clinical signs caused by thromboembolism of the cecocolic segment (MEHDI, MOHAMMAD, 2006). Despite the low number of animals treated surgically, the Iranian study corroborates with the present study regarding a high rate in clinical treatment practice.

Due to the need to obtain data through a computerized system of a 15-year period of care in a school hospital, limitations such as the absence of relevant information for the case (age, evolution of clinical signs, beginning of treatment, and complete history of the animal), lack of completeness of information, and lack of methodological criteria for filling out the medical chart make it difficult to interpret cases individually and completely.

CONCLUSIONS

Of the 535 cases in the study, the females and the Quarter Horse breed had a higher frequency of colic, and the clinical treatment was the most implemented and the most common affection was compression. The study presents data that can support epidemiological research in the area, assisting in the identification of causal and predictive factors for the colic syndrome, as well as knowing the epidemiological distribution of the disease in the country.

REFERENCES

ABUTARBUSH, S. M.; CARMALT, J. L.; SHOEMAKER, R. W. Causes of gastrointestinal colic in horses in western Canada: 604 cases (1992 to 2002). *The Canadian Veterinary Journal*, v. 46, n. 9, p. 800-805, 2005.

ARCHER, D. C. Equine colic: putting the puzzle together. *Vet. Rec.*, v. 181, n. 11, p. 289-290, 2017.

ARCHER, D. C.; PROUDMAN, C. J. Epidemiological clues to preventing colic. *The Veterinary Journal*, v. 172, p. 29-39, 2006.

CLIMATE-DATA. Clima São José do Rio Preto. Available in: <<https://pt.climate-data.org/america-do-sul/brasil/sao-paulo/sao-jose-do-rio-preto-4231/>>.

COHEN, N.; GIBBS, P.; WOODS, A. Dietary and other management factors associated with equine colic. *JAVMA*, v. 215, p. 53-30, 1999.

COX, R. et al. Case control study to investigate risk factors for impaction colic in donkeys in the UK. *Prev. Vet. Med.*, v. 92, p. 179-187, 2009.

CURTIS, L. et al. Risk factors for acute abdominal pain (colic) in the adult horse: A scoping review of risk factors, and a systematic review of the effect of management-related changes. *PLoS ONE*, v. 14, n. 7, 2019.

DI FILIPPO, P. A. Estudo retrospectivo de 50 casos de cólica em equinos atendidos no hospital veterinário da FCAV – UNESP, no período de setembro de 2004 a julho de 2005. *Ciência Animal Brasileira*, v. 11, n. 3, p. 689 – 694, 2010.

GODOY, R. F.; TEXEIRA NETO, A. R. Cólica em equinos. In: RIET-CORREA, F.; MENDEZ, M. C.; SCHILD, A. L.; LEMOS, R. A. A (Ed.). *Doenças de ruminantes e equinos*. Santa Maria, SP: Pallotti, 2007. p. 63-76.

HILLYER, M. H.; TAYLOR, F. G.; FRENCH, N. P. A cross-sectional study of colic in horses on Thoroughbred training premises in the British Isles in 1997. *Equine Vet J*, v. 33, n. 4, p. 380-385, 2001.

KANEENE, J. B. et al. Risk factors for colic in the Michigan (USA) equine population. *Prev Vet Med*, v. 30, p. 23-36, 1997.

KAYA, G.; SOMMERFELD-STUR, I.; IBEN, C. Risk factors for colic in horses in Austria. *J Anim Physiol Anim Nutr*, v. 93, n. 3, p. 339-349, 2009.

MALAMED, R. et al. Retrospective evaluation of crib-biting and windsucking behaviors and owner-perceived behavioral traits as risk factors for colic in horses. *Equine Vet J*, v. 42, n. 8, p. 686-692, 2010.

MEHDI, S.; MOHAMMAD, V. A farm-based prospective study of equine colic incidence and associated risk factors. *J Equine Vet Sci*, v. 26, n. 4, p. 171-174, 2006.

OLIVEIRA, C. M. M. et al. Cólica em equídeos no Rio Grande do Norte: estudo retrospectivo dos principais achados clínico-epidemiológicos de 25 casos. *Acta Veterinaria Brasilica*, v. 8, n. 4, p. 290-294, 2014.

PETERSEN J. L. et al. Preliminary heritability of complete large colon volvulus in Thoroughbred broodmares. *Vet Records*, v. 185, n. 9, p. 269, 2019.

POLLITT, C. C. *Equine laminitis: current concepts*. Australia: RIRDC, 2008.

REEVES, M. J. What really causes colic in horses? Epidemiology's role in elucidating the ultimate multifactorial disease? *Equine Vet J*, v. 29, p. 413-414, 1997.

REIS, N. M. et al. Estudo retrospectivo sobre a ocorrência de cólica equina nos hospitais veterinários de Umuarama, Paraná. *Revista de Ciência Veterinária e Saúde Pública*, v. 4, n. 2, p. 9, 2017.

SUTHERS. J. M. et al. Risk factors for large colon volvulus in the UK. *Equine Vet J*, v. 45, n. 5, p. 558-563, 2012.

THOMASSIAN, A. *Enfermidades dos Cavalos*. 4. ed. São Paulo: Varela, 2005.

TRAUB-DARGATZ, J. L. et al. Estimate of the national incidence of and operation-level risk factors for colic among horses in the United States, spring 1998 to spring 1999. *JAVMA*, v. 219, n. 1, p. 67-71, 2001.

VOIGT, A. et al. Causes of gastrointestinal colic at an equine referral hospital in South Africa (1998-2007). *S. Afr. Vet. Ass.*, v. 80, n. 3, p. 192-198, 2009.

WHITE, N. A. Large colon impaction. *Equine Vet Educ*, v. 10, n. 6, p. 291-293, 1998.

WORKU, Y. et al. Equine colic: clinical epidemiology and associated risk factors in and around Debre Zeit. *Trop Anim Health Pro*, v. 49, p. 959-965, 2017.