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Review

Epidemiological clues to preventing colic

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Abstract

Colic remains a significant problem in the horse in terms of welfare and economics; in some equine populations it is the single most common cause of death. Many causes of colic are cited in the equestrian and veterinary literature but little scientific evidence exists to substantiate these theories. Recent epidemiological investigations have confirmed that colic is complex and multi-factorial in nature. Studies have identified a number of factors that are associated with increased risk of colic including parasite burden, certain feed types, recent change in feeding practices, stabling, lack of access to pasture and water, increasing exercise and transport. These findings are reviewed together with examples of management practices that may be altered to reduce the incidence of specific types of colic. This is an opinionated, not a systematic, review focusing on those areas that are considered most relevant to the practitioner.

Keywords: Horse; Colic; Epidemiology; Risk-factors; Parasites; Nutrition; Management

1. Introduction

Colic, a term used to describe abdominal pain, usually gastrointestinal in origin, has been recognised as a disease of the horse for centuries. It is a significant disease due to compromise of equine welfare and its economic impact; in the USA the annual cost of colic has been estimated at $115.3 million, losses due to death accounting for 66% of this figure (Traub-Dargatz et al., 2001).

Colic is reported to be the single most common cause of death in some horse populations, representing over a quarter of all deaths in one study (Tinker et al., 1997a). There are many anecdotal reports of causes, and prevention, of colic in the veterinary and equestrian literature but little scientific evidence to substantiate these theories. Recent epidemiological studies have shown that colic, like most non-communicable diseases, is complex and multi-factorial in nature (Reeves, 1997). Identification of risk factors, particularly those that are modifiable, may enable disease-prevention strategies to be developed. The results of these epidemiological studies form the basis of best, current, evidence-based advice that can be given to horse owners on prevention of colic in the horse.

An electronic search for papers was conducted using MEDLINE pubmed (http://www.pubmed.gov) using a variety of search words such as equine, horse, colic, epidemiology, anthelmintic and gastrointestinal. Papers that were not identified on these searches but referenced to in other papers were selected in addition to papers in journals not referenced on MEDLINE and proceedings of equine conferences known to the authors. In this article we review the risk-factors for colic identified in some of these studies. This is not a systematic or comprehensive review of the epidemiology of colic, which is a large subject area, and we acknowledge that there may be personal and cultural bias in the papers we have selected to review. Instead this is an opinionated review that highlights those

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areas that we consider to be most relevant to the practitioner.

Many papers report odds ratios from observational studies. An odds ratio (OR) is defined as the odds of disease in exposed individuals relative to the odds of disease in the unexposed (Schlesselman, 1982). An OR of 1 suggests that there is no association between exposure (e.g., feed type) and disease (i.e., colic), OR < 1 suggests that exposure reduces the risk of colic and OR > 1 suggests that exposure increases the risk of colic.

2. Incidence, types of colic and mortality rates

The reported incidence of colic in different horse populations varies from 3.5 to 10.6 colic episodes per 100 horses per year (Kaneene et al., 1997; Tinker et al., 1997b; Traub-Dargatz et al., 2001; Hillyer et al., 2001). Within a horse population, incidence rates can vary considerably, influenced by variables between and within horse establishments. Tinker et al. (1997b) reported between-farm variations from 0 to 30 episodes per 100 horse years. It has been suggested that investigations should be undertaken in horse populations with more than 20 colic episodes per 100 horse years to identify preventative measures that could be undertaken (White, 1997).

In many cases of colic, the exact gastrointestinal dysfunction or lesion is unknown. A diagnosis of spasmodic/gas colic or colic of unknown cause was diagnosed in 69–72% of cases seen within the general equine population and only 7–9% of cases in two of these studies were surgical in nature (Proudman, 1991; Hudson et al., 2001; Mair, 2004). Risk factors may be different for specific types of colic and studies looking at colic of any cause could miss some disease specific findings (Reeves et al., 1996; Hudson et al., 2001). However, it is important to note that these specific types of colic represent only a small minority of horses and most cases of colic within the general equine population fall into the 'spasmodic/gas/unknown' category.

Overall, reports of estimated case fatality rates as a result of colic vary from 6.7% to 15.6% depending on the population studied and the type of lesion (Tinker et al., 1997b; Kaneene et al., 1997; Mair, 2004). In one study, medical colics were reported to have a case fatality rate of 9% compared to 31% in horses with surgical lesions (Kaneene et al., 1997) highlighting the importance of preventing colic, particularly those forms that may require surgical intervention. Acute and subacute forms of equine grass sickness (EGS) are invariably fatal making prevention of this disease a key area of current equine gastrointestinal research in the UK.

2.1. Geography

Traub-Dargatz et al. (2001) did not identify any association between incidence of colic and geographic location in the USA. However, it must be emphasised that data were derived from a national equine survey that was conducted over a limited time period only (Spring 1998–Spring 1999). It is recognised that horses living in or originating from a particular geographic area are at increased risk for developing specific types of colic (White, 1997). One example is EGS which occurs predominantly in the UK, Northern Mainland Europe and South America (McCarthy et al., 2001). Other examples of types of colic that exhibit geographical clustering include sand colic, which is common in regions with sandy soils, and enterolithiasis (Ragle et al., 1989; Hassel et al., 1999).

Obstruction of the gastrointestinal tract by enteroliths is uncommonly seen in the UK but is particularly common in certain geographical regions such as California, USA. Reasons for clustering of this disease may include mineral content of soil, feed and water in individual regions but, given that all horses within these regions are not affected, it is likely that the disease is multi-factorial in nature (Hassel et al., 1999). The prevalence and severity of duodenitis-proximal jejunitis (also known as proximal or anterior enteritis) is reported to vary depending on geographic location. California would appear to have a lower prevalence of the condition than other regions of the USA and Europe. A more severe form of this condition has been reported in Southeastern USA compared to Northeastern regions of the country and generally the less severe form of the condition is reported in the UK (Edwards, 2000; Freeman, 2000).

2.2. Season

The incidence of colic may be seasonal in some horse populations and for specific types of colic. Proudman (1991) reported an increased incidence of colic of any type during the months of spring and autumn in the UK. This pattern of colic incidence was also reported in Thoroughbred horses in training yards in the UK (Hillyer et al., 2001).

In two separate studies conducted over a 12 month period in the USA, Traub-Dargatz et al. (2001) reported a higher percentage of colic cases in spring compared to summer or autumn, whereas Tinker et al. (1997a,b) reported highest incidence density in the months of December, March and August of the study year. EGS can occur at any time of the year but peak incidence of this condition in the UK is reported in the months of spring and early summer and the month of May in particular (Doxey et al., 1991; Wood et al., 1998). In addition there is strong evidence that, in the UK, grass