

Equine Colic - A Complex Jigsaw



The
Horse Trust

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Colic is one of the most common emergencies equine practitioners are called upon to treat and can have devastating consequences. Even in the mild form it is distressing for both the horse and the owner. It is no respecter of breeding or value and is just as likely to affect the most valuable racing thoroughbred as it is a child's pony. It is difficult to put an accurate figure on the incidence of the condition but surveys have shown that in the course of a year 10-30% of horses in a population can be expected to have at least one bout of colic. The mortality rate is approximately 6-7%.

The pain may be due to any one or combination of the following; distension of bowel, abnormal contractions of intestine, traction on the tissue suspending it, inflammation of its lining or, more seriously, interference with its blood supply. The horse's response to the pain can vary from occasional flank watching and pawing of the ground, to recumbency and violent thrashing about.

Fortunately, approximately 92%, of colic cases have mild problems which respond to medical therapy or may even resolve spontaneously. However, the remaining 8% have intestinal obstructions which require surgical correction if their lives are to be saved. Because these obstructions can rapidly result in severe cardiovascular collapse, particularly strangulation lesions which interfere with intestinal blood supply, it is essential that these horses undergo surgery as quickly as possible.

Until the 1960's, the vast majority of horses with these severe problems died or were euthanased to spare them further suffering but attempts were being made to treat some surgically. Tremendous advances in anaesthesia of horses were opening up the possibility of performing a wide range of complicated surgical techniques requiring safe prolonged anaesthesia, excellent muscle relaxation and quiet recovery. Those surgeries which were carried out were often performed as a last resort and, more often than not, were unsuccessful largely due to delay.

Nevertheless, the experience gained in recognising and correcting the wide variety of obstructive lesions to which the gastrointestinal tract of the horse is prone, was invaluable in the context of saving horses' lives in the future and also helped identify areas for research. Means of accurately evaluating the viability of intestine which had been obstructed and determining the length of intestine which could be removed without compromising the horse's digestive function in the future were investigated. Optimum methods for resecting intestine and restoring continuity together with reliable secure methods of closing the ventral abdominal incision have been developed.

Initially getting the patient through surgery and into the anaesthetic recovery box was an achievement in itself but the fight to save the horse's life was only just beginning. A much better understanding of the pathophysiology of intestinal obstruction has resulted in improved methods of combating and reversing the effects of endotoxins released from the damaged intestine which can have a catastrophic effect on the horse's cardiovascular and other systems. The tendency for the small intestine to become paralysed in the early post operative period, thereby substituting a physiological obstruction for a mechanical obstruction which has just been corrected surgically, has prompted considerable research which has yet to provide a complete solution.



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As a result of all these developments, the short-term survival rate, i.e. horses recovering and being discharged from the hospital 6-9 days after surgery, is now in excess of 80%. Based on burgeoning clinical experiences and ongoing research, the surgery which is being performed is constantly being refined but the major research effort is now being directed at trying to reduce the overall incidence of colic by identifying the factors which cause it. Whilst factors such as diet, management practices, intestinal parasites etc. are known to have an important role, much of the information was based on clinical impression and hypothesis and was not substantiated by epidemiological observations. The increasingly sophisticated epidemiological techniques now available are being widely used to redress these deficiencies. Despite the practical and methodological challenges associated with conducting epidemiological studies of equine colic, the benefits of undertaking them is becoming increasingly evident. The result of these studies, several of which have been funded by the HORH, illustrate that risk factors for the disease do in fact exist and that colic, like most non-communicable diseases, is complex and multifactorial in nature: Once risk factors associated with various types of colic can be identified, it should be possible to reduce the prevalence of colic in the horse population by recommending changes which can alter these factors.



Echo, survivor of the 1982 Hyde Park bombing who lived at The Home for over 20 years and suffered from regular bouts of colic. He finally died of the disease in December 2003.

The best known parasite-associated colic is that associated with the early migratory stages of the large strongyle which was once claimed to cause 90% of all colic cases. However, since the introduction some 20 years ago of the avermectin wormers which are very effective against the migrating larvae, the prevalence of this parasite has dramatically reduced yet there has been no decrease in the overall incidence of colic as a result.

In marked contrast, tapeworms, which frequent the junction of the small intestine with the caecum, were considered of no clinical significance by parasitologists and pathologists. However, in the 1980's surgeons began to link certain types of intestinal obstruction with the presence of large numbers of tapeworms suggesting that they were implicated in the development of these obstructions. Unlike the strongyle infestations which could be identified and quantified by finding and counting eggs in the faeces, this was not possible for tapeworms. Research has resulted in an immunological test carried out on a blood sample which enables horses with more than 100 tapeworms, a level of infestation known to cause significant pathological changes in the gut wall, to be identified. The test has enabled epidemiological studies to be performed which have confirmed the important role of this parasite in the aetiology of a variety of lesions causing not only surgical but also medical colics. As a result, the inclusion of an anthelmintic (wormer) effective against tapeworms into the annual worming programme of horses has had a dramatic effect in reducing the incidence of these types of colic.

The small strongyles (cyathostomes) have now taken over from the large strongyles as the most important gastro intestinal parasite in horses. They pose a particular problem because they are relatively non-susceptible to all modern wormers. Cyathostomes exist as a group of more than 40 different species which cannot be distinguished from one another outside the horse. This inability to identify cyathostomes has resulted in a lack of information regarding the basic biology, prevalence, epidemiology and pathogenicity of the individual species. Consequently it has proved difficult to design strategies for controlling cyathostomes. As the first step towards rectifying this deficiency, the HORH funded a research project to develop species-specific DNA probes for the diagnosis of cyathostomosis and has funded further studies into developing an immunological test and into the pathogenesis of the colitis caused by the parasite.

Feeds or feeding activity have long been blamed for colic but much of the information about diet and colic is based on hypothesis or extrapolation from experimental data that have not been substantiated by epidemiological studies.

Horses at pasture are 'trickle-feeders' and graze almost continuously for up to 17 hours per day. The very specialist large intestine of the horse has developed to allow it to thrive on a high fibre diet. The stomach and small intestine which have evolved to digest soluble nutrients function to reduce time spent by the fibre in these parts of the gut before delivering it rapidly to the large intestine. Domestication imposes highly artificial conditions on this delicate process and could be responsible for many gastrointestinal diseases. Deviation from a grazing pattern can lead to gastric ulceration and to colic. Other factors that can play an important part in altering digestive tract function are the digestibility of grain, the nature of pasture and access to water.

There is much we need to learn about the effects of feed type, quantity and frequency of feeding on digestive function and motility. The HORH has funded sophisticated physiological research into characterising the transport of nutrients across the mucosal lining of the intestine and the differences between horses at grass and those receiving concentrate feed. Further studies into the identification of bio markers for dietary-induced intestinal disease and the use of exhaled breath tests for non-invasive evaluation of gastric and intestinal function have also been funded.

There is increasing pressure on veterinary surgeons to practice evidence-based medicine. To assist them they need objective survival data in order to advise their clients of the likely outcome of surgical intervention and to guide their selection of treatment options. Furthermore, we must address the issue of medical/surgical audit and ensure that appropriate methods of monitoring postoperative outcome and complication prevalences are being used. Surgery, be it on humans or animals, is notoriously difficult to evaluate scientifically. Postoperative complications and mortality can occur many weeks or months after surgery. Since 1998, a data base had been compiled of all horses undergoing colic surgery at the Liverpool University Equine Hospital. All horses recovering from laparotomy for acute, chronic or recurrent colic are included. The progress of each horse is rigorously followed by periodic telephone and postal questionnaires. The very high response (96%) attests to the concern that horse owners have about colic and their desire to help us acquire more knowledge about the condition.

This study was initiated with funding from the HORH and to date the database includes more than 1000 horses that have recovered from colic surgery and nearly 2000 horse years of survival. In addition to demonstrating patterns of survival and rates of post operative complications, the study has identified risk factors for the complications, and a significantly higher mortality rate in horses affected with certain types of obstruction.

It is important that this type of long term survival study continues because the power and validity of the statistical analyses increases with the number of cases studied and allows a variety of other problems to be investigated.

The group approach to colic research has much to offer. At Liverpool, the strong gastrointestinal research group comprising clinicians, pathologists, parasitologists, epidemiologists and physiologists has been very productive in researching a range of problems prompted by the clinical case-load of the hospital. There is also increasing collaboration between the veterinary schools and other institutes.

The 8th Colic Research Symposium will be held in Quebec City from 2nd-5th August 2005 at which the results of several research projects funded by the HORH in the UK will be presented. This Symposium, first held in 1982 to establish an open international forum to discuss both research and clinical aspects of colic, has proved highly successful and attracts participants from more than 20 countries. This reflects the amount of research effort being put in world-wide.

Each study places another piece into the complex jigsaw which is equine colic but there are still large gaps in our knowledge and new conditions appearing to present new challenges. I feel it is most appropriate that the HORH has chosen to set up the Echo Memorial Appeal to further research into the prevention and management of this very important condition which has such strong welfare implications.