

WHAT CAUSES

SOFT PALATE PROBLEMS AND BLEEDING IN RACEHORSES?:

The answer is on the tip of the horse's tongue

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- In March 2011, the RCI (Association of Racing Commissioners International) urged U.S. racing's administrators, within the next five years, to phase out bleeding medication on race days.
- In May 2011, Senator Udall introduced the Interstate Horseracing Improvement Act of 2011 in the Senate, "to end the use of performance-enhancing drugs in the sport of horse racing."

The RCI informs racing's administrators that it considers the use of bleeding medication to be unacceptable. I agree. Furthermore, it seems that if racing's administrators do not ban race-day drugs, the government will intervene. Perhaps the threat of federal regulation will provide the necessary impetus to action. As Samuel Johnson observed, "When a man knows he is to be hanged in a fortnight, it concentrates his mind wonderfully." Sadly, as judged by published reports from the summit meeting at Belmont Park on June 13 and 14th, 2011, only baby steps forward were taken.

Yet there is a simple solution. Most other countries have solved the problem - race-day drugs are banned. I have to wonder why racing's administrators in the U.S. are so puzzled by the problem. Why, in this country, do they support a pharmaceutical approach to bleeding (Salix) when it is evident that the therapy fails to cure and, in the attempt, only succeeds in harming the horse and damaging the sport?

Our addiction to drugs for bleeding might be justifiable if the 'treatment' was rational and based, as all treatments should be, on removal of the cause. Failure to focus attention on the cause is, I believe, a source of confusion in our thinking about the problem. So-called exercise-induced pulmonary hemorrhage (EIPH) remains an unresolved problem because removal of the cause is a prerequisite of treatment and the only consensus in racing on this vital question is that the cause is supposedly unknown. As explained below, it is I believe no

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coincidence that dorsal displacement of the soft palate (DDSP) and EIPH, two serious problems of the racehorse are both common and of unknown cause. The two problems are related. Elevation of the soft palate, with or without DDSP, is the major cause of EIPH.

This article is offered in the hope of clarifying the question of cause and thereby emphasizing the need to discontinue ineffectual and unnecessary race-day drugs. Bleeding is a management problem.² It requires a management not a pharmaceutical solution. This is something for racing's administrators to solve, not racetrack veterinarians. In the U.S. discontinuation of race-day drugs is the first priority. Worldwide, racing's administrators should focus on the second priority – another management change. In my opinion, a rule update (approval of the crossunder bitless bridle for racing) would not only significantly reduce the prevalence of bleeding but would virtually eliminate dorsal displacement of the soft palate and many other disease and behavioural problems. At the same time it would reduce accidents and vastly improve the welfare of the horse. As though this was not sufficient inducement for change, performance would be improved. The bit is a handicap to performance. For both the athletes involved, racing would become healthier, happier and safer and – for other stakeholders - more pleasurable, honourable and profitable.

This opinion is given by a veterinary researcher who was the first to publish evidence indicating that racehorses with 'nosebleeds' were bleeding from the lungs (Cook 1974) and someone who has retained an intense interest in the cause of bleeding ever since. I realise that I am promoting a minority opinion on cause but, in my defence, science in general depends for progress on tenable minority opinions. Science advances by a process of disagreement. I am disagreeing with the status quo on cause.

There was much regret expressed, in the early reports from the Belmont Summit of the lack of consensus. But advance in science does not depend on a majority vote. It depends on evidence. All it needs is for racing's administrators to consider the evidence. Let's remember that the consistency of a hypothesis depends, not so much on the evidence to support it, but on the inability to refute it. A scientific hypothesis that cannot be refuted deserves to stand, at the present state of knowledge. Down the road, any hypothesis may have to be adjusted in the light of new evidence or even abandoned altogether. But until such time as conflicting evidence is discovered, an unrefuted hypothesis constitutes the best guide to action. This said, my working hypothesis is that pulmonary 'bleeding' in the racehorse is caused by any upper airway obstruction. I have tried diligently to refute this hypothesis and failed. As far as I am aware, so have others, as no publications have appeared to provide contrary evidence. .

² A better name than exercise-induced pulmonary hemorrhage would be man-induced pulmonary hemorrhage

The syndrome that became known as EIPH has been written about extensively in the veterinary literature. Most of the research articles have focused on its supposed alleviation with a diuretic (Salix). Relatively little has been published on its cause.

Two competing explanations have been proposed for the cause. Both focus on the air/blood barrier of the lung. The word 'barrier' in this context does not carry the meaning of 'impassable.' It refers to the infinitely delicate lining membrane of the lung's air sacs that separate the dense network of small blood vessels in the lung from the air sacs of the lung. The membrane can be thought of as the lung's highly specialised 'skin' exposed to the atmosphere. When the membrane works correctly (in health), it allows for the exchange of oxygen and carbon dioxide. Under normal conditions, it is thin enough to allow for gas exchange and thick enough to prevent the escape of fluids. The balance is critical.

I will call the two possible causes 'A' for air and 'B' for blood. 'A' stands for the pressure of air in the air sacs when the horse breathes in and 'B' for the pressure of blood in the capillaries. The 'A' supporters believe that 'bleeding' is caused by an abnormally low air pressure. The 'B' supporters believe that it is caused by an abnormally high blood pressure. 'A' implies too much suction force on the air side (the outside) and 'B' too much fluid force on the blood side (the inside). Though I promoted the 'A' explanation, the 'B' explanation has held sway over the years and been the most popular. The unsuccessful attempts to eliminate EIPH by reducing blood pressure are based on the B explanation.

Some 'B' supporters have suggested that high blood pressure during racing is an inherent part of the Thoroughbred's make-up and that bleeding is inevitable or 'normal.' I find this unacceptable, because it is not consistent with equine physiology. Airways are for air, not blood. EIPH is not an accurate name for the syndrome. It is neither exclusively '*exercise-induced*' nor a true '*hemorrhage*.' So-called EIPH can occur in the stable when a non-exercising horse is accidentally asphyxiated. The fluid is not blood but edema fluid, albeit heavily blood-stained. Bleeding is not a problem exclusive to the discipline of racing and, in considering the cause, it is helpful to keep this in mind.

The 'A' explanation is consistent with the known facts about bleeding. An abnormally negative pressure in the small airways results from any obstruction of the upper airway, i.e., anywhere from nostril to first rib. A rational treatment based on this explanation requires removal of the airway obstruction. The benefits that such a step would bring racing are enormous. They extend far beyond 'bleeding.'

Breathing is a suck/blow process. Air is sucked into the lungs during the negative pressure of inspiration as the diaphragm flattens. It is blown out again on expiration, under positive pressure, when the diaphragm relaxes. Too great a suction pressure when breathing-in affects the 'skin' of the horse's lung in the same way as a 'hickey' on human skin. The only

difference is that, in man, the effect is a subcutaneous bruise whereas in the horse, as the 'skin' of the air sac is fifteen times thinner than a sheet of airmail paper, red blood cells are sucked straight through the pores of the membrane, accompanied by edema fluid. The lung's 'skin' leaks. It can be thought of as 'sweating blood.' This blood-stained fluid forms a puddle in the windpipe at the entrance to the chest. After a race, when the horse drops its head to drink, it may drain out at the nostrils and the horse appears to have had a nosebleed. In my opinion, the basic pathology of 'bleeding' in the Thoroughbred (or any other breed – for EIPH occurs in all disciplines) is water-logging of the lung (pulmonary edema). The cause is strangulation.

99% of racehorses 'bleed' when they run. Whatever causes EIPH has to be very common. Initially, I taught that paralysis or partial paralysis of the voice box (recurrent laryngeal neuropathy - RLN) was the major cause. Regretfully, RLN, commonly known as 'roaring' is common enough to be considered as the culprit. I still maintain that RLN plays a part, especially when the neuropathy is advanced. However, in the last 13 years I have discovered that there is an even more common and serious cause of upper airway obstruction. It has been staring man in the face for 5000 years. I refer to the horse's bit. The good news is that whereas RLN is untreatable (and in my opinion inherited), the bit could be removed if the rules of racing were updated. After 5000 years of bit usage such a proposition will sound like heresy or even madness, "yet there is method in't." I repeat, bitless racing and training would be safer for horse and rider, accidents would be reduced, performance enhanced and the horse's quality of life improved.

Some readers may question how a bit in the mouth could possibly obstruct the airway. It must be remembered that though the bit can only lie on the tip of the tongue which, together with the body of this large and muscular sense organ are indisputably in the mouth, the long root of the tongue lies in the throat. Indirectly, the bit grabs a horse in the throat. When a horse avoids the bit by withdrawing the tip of its tongue (a common evasion) the bulky root of the tongue bulges upwards in the throat. This in turn elevates the soft palate (which lies on the tongue's root) and obstructs the airway. In England, trainers describe an attack of suffocation from such a cause as a horse 'swallowing its tongue' and 'choking up.' There are many other mechanisms whereby a bit obstructs the airway, including bit-induced poll flexion (see 'Further Reading').

I declare a conflict of interest but without apology. I know that by removing the bit, horsemen can do much for the horse, themselves and the reputation of racing. EIPH would not be entirely eliminated (as RLN and a few uncommon sources of airway obstruction would still occur) but I predict that its frequency would be significantly reduced. A significant bonus is that there would be a major reduction in the occurrence of dorsal displacement of the soft palate (DDSP) which, like the even more common elevation of the soft palate, is almost exclusively caused by the bit. DDSP and EIPH are both predominantly

management problems. For the same reason, there would be a major reduction in the incidence of epiglottal entrapment. Until the bit is removed, we shall never know how much this might also reduce the occurrence of catastrophic musculo-skeletal accidents and breakdowns caused by bit-induced pathophysiology, pain and fatigue.

In closing, I make two recommendations. First, I propose that a more accurate name for EIPH would be 'Negative Pressure Pulmonary Edema (NPPE).' Secondly, I recommend that readers carry out an Internet search for a relatively uncommon but life-threatening disease in man by this name. Readers will find that so-called EIPH in the horse is analogous to NPPE in man. They will also be able to read many descriptions of the mechanism whereby this occurs. Though upper airway obstruction is the primary cause, a secondary effect of upper airway obstruction is to raise pulmonary blood pressure. 'A' and 'B' mechanisms are both involved.

Administrators of racing and other stakeholders will have much to think about as a result of the RCI press release. If I can help by answering questions I would be glad to do so in writing or by telephone.

Further reading

An asterisk after the reference indicates that the article is available online at

www.bitlessbridle.com

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