Editorial

Evidence-based medicine and clinical audit: what progress in equine practice?

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It is over five years since we published editorial leaders in *Equine Veterinary Education* on the subjects of evidence-based medicine and clinical audit (Rossdale et al. 2000; Mair 2001). It seems timely, therefore, to readdress these topics and consider whether they will ever achieve the importance and relevance in equine practice that they have achieved in human healthcare.

Evidence-based medicine (EBM) has been defined as the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best external clinical evidence from systematic research (Sackett et al. 1996).

The concept of EBM was introduced in the 19th century, but only really flourished in the last few decades of the 20th century (Rigby and Michaels 2005). In mid-19th century Paris, Pierre-Charles-Alexander Louis used statistics to measure the effectiveness of bloodletting, the results of which helped put an end to the practice of leeching. At the end of the 19th century Ernest A. Codman, an orthopaedic surgeon working in Massachusetts, developed his ‘End Result Idea’, a notion that all hospitals should follow up every patient it treats “long enough to determine whether or not its treatment is successful, and if not, why not?” in order to prevent similar failures in the future (Kaska and Weinstein 1998). In the UK, one of the most important early advocates of EBM was Archie Cochrane, who conducted trials in prisoner-of-war camps on the use of yeast supplements to treat nutritional oedema. In 1972 he published his book *Effectiveness and Efficiency*. He advocated the use of the randomised controlled trial (RCT) as the gold standard in the research of all medical treatment, and, where possible, systematic reviews of these trials. One of the first systematic reviews of RCTs was of the use of corticosteroid therapy to improve lung function in threatened premature birth. Although RCTs had been conducted in this area, the true conclusions of the results were not clear from the individual studies, but became clear with the systematic review. The review showed that corticosteroids (an inexpensive and readily available therapy) reduced the risk of these babies dying from complications of immaturity by 30–50% (Anon 1999).

In 1992, as part of the UK National Health Service (NHS) research and development programme, the Cochrane Collaboration was established. In 1995, the first centre for EBM in the UK was established at the Nuffield Department of Clinical Medicine, University of Oxford. The main driving force behind this centre was David Sackett, who had moved to a new Chair in Clinical Epidemiology in 1994 from McMaster University in Canada, where he had pioneered self-directed teaching for medical students. From these roots, interest in EBM has exploded across the world. EBM is not limited to hospital-based medicine, but is increasingly being practised in nursing, general practice and dentistry. The veterinary profession, in comparison to the professions servicing human healthcare, is very small, and opportunities to practice EBM are therefore restricted. However, there is an increasing interest in veterinary EBM, including within equine practice, and it is expected that the concept will evolve and expand in future years.

While it is universally acknowledged that clinical experience is of paramount importance, the rapidly changing world of medicine and veterinary science means that clinicians must keep abreast of new advances and, where appropriate, integrate research findings into everyday clinical practice. Neither research nor clinical experience alone is enough to ensure high-quality patient care; the two must complement each other. In order to practice EBM, 5 steps are needed:

1. To convert information needs into answerable questions.
2. To be able to track down efficiently the best evidence with which to answer them.
3. To be able to appraise the evidence critically for its validity and usefulness.
4. To apply the results of this appraisal in clinical practice.
5. To evaluate performance (Sackett et al. 1997).

A major hurdle to the widespread introduction of EBM in equine practice is the limited body of evidence available from high quality RCTs. One major reason for this is the high costs involved in performing these studies. The veterinary pharmaceutical market represents only a tiny fraction of the entire pharmaceutical industry, and the industry is therefore unlikely to conduct studies whose costs could exceed potential returns. Despite this problem, useful and relevant studies in equine medicine can be achieved on relatively small budgets.
However, it is of vital importance that the clinician reading the published study is able to recognise and appreciate both the advantages and limitations inherent in the evidence generated by a variety of clinical trial designs. The critical appraisal of external evidence has two steps; deciding whether it is valid (close to the truth) and deciding whether it is important (and therefore potentially important to you as the clinician). The recent introduction of the ‘Clinical Evidence’ category of articles published in *Equine Veterinary Journal* is a useful step in promoting the concept of EBM, and it is hoped that in time more and more researchers will strive to conduct studies that fulfill the criteria for inclusion in this category.

The paucity of RCTs is not only a problem in equine medicine and surgery; there is also a limited body of evidence from high-quality RCTs in human surgery, for example. For an RCT to be ethically acceptable, there needs to be a clinical equipoise. In other words, there needs to be a sufficient level of uncertainty about an intervention before a trial can be considered. For example, it would be unethical to conduct an RCT in the use of burr holes for extradural haematomas, because the observational data alone are so overwhelming as to the high degree of effectiveness that it would be unethical to deny someone a burr hole to prove the point (Rigby and Michaels 2005). Many surgeons feel unhappy with having to explain to a patient that there is clinical uncertainty about a treatment, as patients have historically put their trust in the surgeon’s hands. Similar feelings apply to the relationship between veterinarians and their clients. This reluctance to perform RCTs and the belief that they would be difficult to carry out has led to practices that are poorly supported by high-quality evidence. Given that RCTs in horses are rare and difficult to perform, other forms of studies, such as observational studies, are likely to be more important and attainable sources of evidence in equine medicine. Patient-based studies are forms of epidemiological studies, and such studies have been performed successfully in limited areas, including epidemiological studies on colic undertaken in Texas (Cohen 2003). The quality of the results of such studies will be dependent upon the quality of their design, conduct and analysis. The concept of patient-based studies has been promoted in equine practice (Mair and Cohen 2003) and is being actively pursued by way of the BEVA evidence-based medicine research programme (www.beva.org.uk). In time, we hope that such initiatives will provide increasing volumes of clinically relevant data and evidence.

Clinical audit is the systematic critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, use of resources, and resulting outcome and quality of life for the patient (Anon 1998). Audit is a dynamic process (an audit loop) (Fig 1) in which standards are defined and data are collected against these standards. The results are then analysed and, if there are any variances, proposals for change are developed to address the needs. These changes are then implemented and the quality of care reassessed. This closes the audit loop, and the procedure begins again. One key to effective audit is that the loop must begin (wherever possible) with the development of evidence-based standards. The lack of readily available EBM studies in many areas of equine clinical practice is a potential problem with respect to practising effective audit; however, clinical audit should not be considered as impossible to undertake as a result.

The essence of the audit process is that it should be a continual cycle of improvement, designed to bring about an improvement in clinical performance by means of organisational change. Audit has played an increasingly important role in the UK medical profession and NHS over the past 20 years, and it is now considered a routine part of medical practice. The veterinary profession has been slower to adopt the principles of clinical audit, but there are now increasing moves to introduce the concepts into veterinary practice (Mosadale 1998; Viner 2005; Viner and Jenner 2005). The introduction of clinical audit into veterinary practice is currently being researched by an MSc group established by the Society of Practising Veterinary Surgeons, in conjunction with the Professional Development Foundation and the University of Middlesex. The Royal College of Veterinary Surgeons has also introduced the requirement for tier 2 and tier 3 practices under the Practice Standards Scheme to show some degree of involvement in the audit process (Anon 2004). In equine practice, a proposal has been made to establish an international audit and database of colic surgery (Mair and White 2005). By collating the results of colic surgery from a large number of equine hospitals around the world, this database will provide its own standards against which individual hospitals or surgeons can compare their own results. Similar approaches will be possible in other areas of equine practice.

In conclusion, the last 5 years has seen a slowly growing interest in the development of EBM and clinical audit in the veterinary profession and equine practice. Although the potential for these concepts will never be as great as in human healthcare, it is expected that they will continue to evolve and expand in the future. We look forward to being able to publish the results of such studies over the next few years.

**Fig 1: The audit loop.**

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**References**


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BRIEF SUMMARY

INDICATIONS: Marquis (ponazuril) is indicated for the treatment of equine protozoal myeloneuroencephalitis (EPM) caused by Sarcocystis neurona.


PRECAUTIONS: Prior to treatment, EPM should be distinguished from other diseases that may cause ataxia in horses. Injuries or lameness may also complicate the evaluation of an animal with EPM. In most instances, ataxia due to EPM is asymmetrical and affects the hind limbs. Clinicians should recognize that clearance of the parasite by ponazuril may not completely resolve the clinical signs attributed to the natural progression of the disease. The prognosis for animals treated for EPM may be dependent upon the severity of disease and the duration of the infection prior to treatment.

The safe use of Marquis (ponazuril) in horses used for breeding purposes, during pregnancy, or in lactating mares, has not been evaluated. The safety of Marquis (ponazuril) with concomitant therapies in horses has not been evaluated.

ADVERSE REACTIONS: In the field study, eight animals were noted to have unusual daily observations. Two horses exhibited blisters on the nose and mouth at some point in the field study, three animals showed a skin rash or hives for up to 18 days, one animal had loose stools throughout the treatment period, one had a mild colic on one day and one animal had a seizure while on medication. The association of these reactions to treatment was not established.

ANIMAL SAFETY SUMMARY: Marquis (ponazuril) was administered to 24 adult horses (12 males and 12 females) in a target animal safety study. Three groups of 8 horses each received 0.10, or 30 mg/kg (water as control, 2X and 6X for a 5 mg/kg [2.27 mg/lb] dose). Horses were dosed after feeding. One half of each group was treated for 28 days and the other half for 56 days followed by necropsy upon termination of treatment. There were several instances of loose feces in all animals in the study irrespective of treatment, sporadic inappetence and one horse at 10 mg/kg (2X) lost weight while on test. Loose feces were treatment related. Histopathological findings included moderate edema in the uterine epithelium of three of the four females in the 6X group (two treated for 28 days and one for 56 days).

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8 Good Clinical Practice Knowledge from best external evidence based on clinical research Judgement from experience. Understanding of patient's beliefs & preferences. Definition: We need to contextualise this regarding the practice in Malawi. 10 Evidence Based Medicine Conscientious, explicit and judicious use of current best evidence in making decisions about the care of an individual patient. This takes evidence beyond studies and statistical analysis to applying evidence to the needs of the individual patient. This is the crux of practice. Change in guideline needed? Clinical audit needed? Education for patients/carers: How can you explain the results to a patient/guardian prior to consent and explanation? Evidence-Based Medicine Working Group. A NEW paradigm for medical practice is emerging. Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiological rationale as sufficient grounds for clinical decision making and stresses the examination of evidence from clinical research. Evidence-based medicine requires new skills of the physician, including efficient literature searching and the application of formal rules of evidence evaluating the clinical literature. An important goal of our medical residency program is to educate physicians in the pr...