

# The creation of an international audit and database of equine colic surgery: Survey of attitudes of surgeons

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## Summary

**Reasons for performing study:** Currently, there is a lack of available evidence-based data concerning the optimum treatments for horses affected by different types of colic and this precludes the application of clinical audit in this area. In order to accumulate such data, a large-scale, multicentre database of the outcomes of colic surgery is proposed. The attitudes of surgeons is an important consideration in determining the feasibility of developing this database.

**Objectives:** To assess attitudes and opinions of equine surgeons concerning clinical audit and to assess the perceived advantages and problems of setting up a large-scale international audit/database of colic surgery.

**Methods:** Interviews were conducted with 30 equine surgeons (large animal/equine surgeons who are diplomates of either the American College of Veterinary Surgeons or the European College of Veterinary Surgeons). Questionnaires were sent by e-mail to 98 equine surgeons.

**Results:** Face to face interviews were conducted (n = 30) and 43/98 completed questionnaires received (44%). The results of the 2 techniques were very similar. There was generally a high level of interest in the development of a large scale database of colic surgery, but perceived problems included time to collect and submit data, and confidentiality issues. A minority of surgeons reported that they were undertaking any form of specific monitoring of the results of colic surgery within their hospitals.

**Conclusions:** There is a good level of interest among equine surgeons to develop a large scale database of colic surgery and most would be willing to contribute data from their own hospitals provided that data collection is quick and easy, and that confidentiality is maintained.

**Potential relevance:** A large scale audit and database would provide relevant information to equine surgeons concerning the current success and complication rates of colic surgery. Such evidence-based data could be used in clinical audits within individual equine hospitals. The data would also be useful to identify trends within the discipline and could highlight areas that would benefit from active research.

## Introduction

Equine colic surgery has been performed routinely by equine surgeons since the mid 1960s. Although general success rates have improved significantly (Mair and Smith 2005a), it still carries with it a significant case fatality rate and risk of complications. Surgery is also expensive, especially in cases that require significant post operative critical care. It is important that this type of surgery be undertaken efficiently and to the highest attainable standards. Owners (and insurers where appropriate) have a right to see evidence that surgeons are achieving these goals, while treating horses in the most humane and appropriate ways.

There are many factors that influence death and complication rates of colic surgery. Most importantly, the time delay between the onset of colic and surgery, the nature of the underlying disease (i.e. strangulating vs. simple obstruction) and the severity and effects of shock and toxæmia all have major influences on the success and complication rates (Abutarbush *et al.* 2005; Mair and Smith 2005a,b,c,d; Proudman *et al.* 2006). However, other factors, such as competency of the surgical team and the nature of post operative care that are known to affect outcomes in human surgery (Anon 1999 and 2001), are also likely to influence outcomes of equine colic surgery.

At a time when there is increasing awareness, both within the profession and within the general public, of the importance of clinical standards in human healthcare, it is appropriate that attempts are made to introduce protocols to measure and improve standards of care in veterinary surgery. The concept of an international audit and database of colic surgeries was proposed in an editorial leader published in the *Equine Veterinary Journal* (Mair and White 2005). The aim is, firstly, to improve the quality of care for colic cases by allowing appropriate comparison of clinical performance with local, national and international standards and, secondly, to provide useful data on changing trends within the specialty. This could be achieved by: 1) systematic collection of an agreed minimum dataset (MDS) at each contributing centre on a defined patient population; 2) aggregation and validation of data; 3) analysis and development of risk stratification models for outcome measures; and 4) regular feedback to contributing centres

Clinical audit is a technique that aims to measure and improve clinical performance, thereby improving standards of care. It

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requires the comparison of data relating to a clinical issue from a specific clinician or institution with a standard set of data that describes the 'normal' or 'expected' results. The absence of readily available standards in many areas of veterinary clinical work (including colic surgery) makes it difficult to undertake effective clinical audit. One of the major objectives of the proposed international audit/database of colic surgery is to provide evidence-based data that can be used as the standards (or 'targets') in clinical audit.

The aim of the present study was to assess the feasibility of setting up and running a large international database of colic surgery outcomes. By surveying the opinions of a sample of equine colic surgeons, the potential advantages and disadvantages of such a database could be identified and the level of understanding among surgeons of the general concept of clinical audit investigated.

## Materials and methods

A survey of equine surgeons was undertaken. This was performed by asking a set of preformulated questions in a predetermined sequence by both semi-structured interviews and a structured questionnaire (i.e. employing a combination of closed and open questions) (Blaxter *et al.* 2001) to a sample of individuals considered to be representative of equine colic surgeons. The same questions (Table 1) were included in the interviews and the questionnaire in order to compare and validate the results of the 2 techniques. The surgeons were selected from the lists of diplomates of the American College of Veterinary Surgeons (ACVS) and the European College of Veterinary Surgeons (ECVS); only individuals listed or known to be equine/large animal surgeons were selected. An electronic letter was sent before undertaking the survey. This letter described the aim of the survey, explained how the respondents' names were obtained, the importance of their response, emphasised the confidentiality of the results and stated how the results were to be used. A participant ethics release form was also sent with this letter. The approval of the ACVS and ECVS was sought beforehand, and this was stated

**TABLE 1: Questions used in the interviews and the questionnaire of colic surgeons**

1. What is your current position/job description?
2. What are your professional qualifications?
3. What type of practice or institution do you work in?
4. How many years have you been performing colic surgery (as primary surgeon)?
5. Approximately how many colic surgeries do you (personally) perform *per annum*?
6. Approximately how many colic surgeries does your hospital perform *per annum*?
7. How many surgeons perform colic surgery in your hospital?
8. Do you understand the term clinical audit?
9. If yes, how would you define clinical audit?
10. How do you assess/monitor clinical standards and outcomes with respect to colic surgery in your hospital?
11. What data relating to colic surgery do you record (apart from routine medical records)?
12. Do you think that a large-scale international audit/database of colic surgery would be useful? If yes, in what way?
13. If a database was available, would you be interested in contributing data to it?
14. What problems would you have in contributing data?
15. Are there any other concerns/worries that you have about a large-scale audit/database of colic surgeries?

in the letter. Face to face interviews were arranged with 30 equine/large animal surgeons listed by the ACVS and ECVS at their place of work or, more commonly, at conferences (including the annual conferences of the American Association of Equine Practitioners, American College of Veterinary Surgeons, and British Equine Veterinary Association). Selection of surgeons for the interviews was not random but was biased to surgeons known by the authors to have an interest in colic surgery.

Questionnaires were sent to an additional 98 equine/large animal surgeons; these 98 surgeons represented all of the other equine/large animal surgeons listed by the ACVS and ECVS on their respective websites. The questionnaire was sent via e-mail.

The interviews were taped, and notes transcribed later (within 7 days of the interviews). Content analysis was undertaken in order to present the data in a categorised manner. Qualitative data obtained from both the open and closed questions in the questionnaires and interviews were coded (using a numerical code) (Baxter 2002) and entered onto a spreadsheet. Basic descriptive statistical analysis was performed using a statistical programme (Minitab for Windows release 13)<sup>1</sup>.

## Results

### Interviews

All 30 surgeons invited to be interviewed agreed to participate in the study. Details of the interviewees are summarised in Table 2. The replies to the major questions are summarised in Table 3.

Although 93% (28/30) of the interviewees answered yes to the question "Do you understand the term clinical audit?", when asked to define the term, most interviewees (25/28, 89%) recognised the fact that the procedure aims to measure clinical

**TABLE 2: Details of surgeons surveyed by interviews and questionnaires**

		Interviews (n = 30)	Questionnaires (n = 43)
Place of work	Academic institution	21 (70%)	28 (65%)
	Private practice	9 (23%)	15 (35%)
	United Kingdom	5 (17%)	9 (21%)
Geographical location	Continental Europe	7 (23%)	14 (32%)
	USA	16 (53%)	18 (42%)
	Australia	1 (3%)	2 (5%)
	Asia	1 (3%)	0
Diplomate status	ACVS	17	19
	ECVS	17	31
	ACVS and ECVS	4	7
Period of time undertaking colic surgery (years)	Range 3–18	Range 3–27	Range 3–27
	Mean 10.6	Mean 10.6	Mean 21.6
	Median 11	Median 11	Median 14
Approximate no. of colic surgeries performed by surgeon <i>per annum</i>	Range 6–100	Range 0–70	Range 0–70
	Mean 49.4	Mean 49.4	Mean 31.2
	Median 50	Median 50	Median 30
Approximate no. of colic surgeries performed at the hospital <i>per annum</i>	Range 7–250	Range 15–130	Range 15–130
	Mean 120.5	Mean 120.5	Mean 109.5
	Median 107	Median 107	Median 100
No. of surgeons at the hospital performing colic surgery	Range 1–8	Range 1–10	Range 1–10
	Mean 3.7	Mean 3.7	Mean 0.5
	Median 4	Median 4	Median 3

performance, but few (5/28, 18%) discussed its aims of improving clinical care. Only 27% (8/30) of the interviewees reported current monitoring of the outcomes of colic surgery in their hospitals. This was achieved by maintaining an accurate database of the outcomes of colic surgeries and 2 of these included follow-up data obtained after the horses had been discharged from the hospital; these databases were used primarily for research purposes. The routine monitoring of all surgeries described by 12 interviewees included such procedures as daily clinical rounds, and morbidity and mortality rounds. The majority of interviewees (97%) indicated that they considered a large-scale database of colic surgery to be potentially useful. The most commonly cited advantage of this would be to use the data for benchmarking purposes. Many surgeons also recognised the potential value of the database in identifying trends and undertaking clinical research in colic surgery.

Twenty nine (97%) of the interviewees reported that they would be interested in providing data for the proposed database. Six of the interviewees (20%) expressed concerns over the standard of surgical care that they had observed in the past being applied to horses with colic in their hospitals; they felt that recording outcomes in a large database would be helpful in identifying and managing such deficiencies in the standards of care. The major concerns that were expressed concerning participation in the proposed database were the time involved and practicalities of data collection (reported by 13/30 interviewees [43%]). In reply to the question "Are there any other concerns/worries that you have about a large-scale audit/database of colic surgeries?", the commonest concerns that were raised included: concerns over confidentiality in 4/30 interviewees (13%); concerns about the way that the database is managed in 2/30 (7%);

concerns over comparing results from different countries and different populations of horses in 5/30 (17%); legal concerns in 2/30 (7%); and concerns over reliability of data in 2/30 (7%).

### Questionnaires

Of the 98 questionnaires sent out, 43 were returned in a usable form (43.9%). Details of the respondents are summarised in Table 2. The replies to the major questions are summarised in Table 3.

Most respondents (29/43: 67%) believed that they understood the concept of clinical audit, but in reply to the question "How would you define clinical audit?", the answers demonstrated a wide range of understanding. Most respondents (27/29, 93%) recognised that clinical audit involves some form of measurement/assessment of some aspect of health care with the objective of monitoring clinical care. However, relatively few respondents stated that the objective of clinical audit is to improve patient care (5/29 respondents, 17%), and none mentioned the fact that effective clinical audit involves a cyclical activity. Only 3 respondents (7%) stated that they currently undertake regular monitoring of the outcomes of colic surgery by maintaining a basic database used for research purposes, but that did not include follow-up data obtained after discharge of the horses from the hospital.

The majority of respondents (41/43, 95%) indicated that they thought that the proposed database of colic surgery would be valuable, especially with respect of the ability to use such data for benchmarking purposes. Potential problems relating to participation in the project included the time involved in data collection (recorded in 20/43 respondents, 47%) and concerns over confidentiality of the data (expressed by 15/43 respondents, 35%).

In reply to the question "Are there any other concerns/worries that you have about a large-scale audit/database of colic surgeries?", the commonest concerns included: worries over confidentiality in 23/43 respondents (53%); concerns about the way that the database is managed in 14/43 (33%); concerns over comparing results from different countries in 7/43 (16%); and legal concerns in 4/43 (9%).

### Discussion

The results of this study suggest that there is generally a high level of interest among equine surgeons in the concept of a large international database of equine colic surgery. However, it must be recognised that the response rate for the questionnaires was only 43.9% and, therefore, no data have been collected from 56.1% of the surgeons sent e-mail questionnaires. This leaves potential for bias, and it is possible that the opinions of the nonrespondents would be different in some way to the respondents (Bowling 2002). Although a combination of interviews and questionnaires was used to triangulate and validate the results, the selection of surgeons for interviews was not random. Despite these potential drawbacks, the majority of surgeons surveyed (95% of the questionnaire respondents and 97% of the interviewees) stated that they would be interested in contributing data to the database. Most surgeons recognised the potential advantages of such a database in providing data that could be used for benchmarking (i.e. comparing their own results with results from other surgeons) and for clinical audit, as well as being useful for monitoring trends in colic surgery and for undertaking clinical research into colic. However, there was also a high level of concern over the ease and

**TABLE 3: Responses to individual questions in the interviews and questionnaires**

Questions	Replies	Interviews (n = 30)	Questionnaires (n = 43)
Do you understand the term clinical audit?	Yes	28 (93%)	29 (67%)
	No	2 (7%)	9 (21%)
	Partially	0	5 (12%)
How do you assess/monitor clinical standards and outcomes with respect to colic surgery in your hospital?	Specific monitoring of outcomes of colic surgery	8 (27%)	3 (7%)
	Routine monitoring of all surgeries	12 (40%)	22 (51%)
	None	10 (33%)	18 (42%)
Do you think that a large-scale international audit/database of colic surgery would be useful?	Yes	29 (97%)	41 (95%)
	No	1 (3%)	2 (5%)
If a database was available, would you be interested in contributing data to it?	Yes	29 (97%)	41 (95%)
	Possibly	0	1 (2.5%)
	No	1 (3%)	1 (2.5%)
What problems would you have in contributing data?	Time/practicalities of data entry	13 (43%)	20 (47%)
	Confidentiality issues	1 (3%)	15 (35%)

time involved with capturing the data and its confidentiality. These aspects would need to be addressed in the design of the database. Other commonly expressed concerns included legal issues, reliability of the data from different sources; and difficulties in comparing results from different countries and different populations of horses. These issues also need to be carefully considered in the design of the database and the interpretation of the results.

Evidence-based medicine (outcomes-based clinical practice) has been advocated and implemented in human medicine since the 1990s (Sackett *et al.* 1996; 1997). Although there are advantages and disadvantages of this approach, there is substantial evidence that indicates that evidence-based medicine can improve communication, patient care and outcomes in clinical practice (White 2004). Traditional scientific and medical literature has inherent problems. Within 5 years of publication, about 60% of the highly cited medical literature is considered to be untrue or less efficacious than when reported, so it is vital for clinicians to constantly review new evidence in order to provide the best care for their patients (Ioannidis *et al.* 2001; Ioannidis 2005). Clinical studies are ideal for providing the most relevant and robust evidence. The highest level of evidence is achieved from the results of systematic reviews (e.g. meta-analysis) and prospective randomised placebo-controlled clinical trials (Yusef *et al.* 1998; Innes 2007). However, in veterinary clinical practice, it is very difficult to undertake such studies due to ethical problems, inadequate treatment group sizes, difficulties in achieving randomisation and lack of funding (Mair 2001; Kapatkin 2007). The establishment of multicentre studies helps to overcome some of these problems and there is growing interest in developing multicentre outcome measures programmes in veterinary surgery, particularly small animal orthopaedic surgery (Brown 2007; Cook 2007; Innes 2007; Kapatkin 2007; Schulz 2007). The proposed database of colic surgery should provide relevant outcome measures and objective data as a valuable resource for surgeons who are interested in maximising clinical efficacy and undertaking 'best clinical practice'.

There is currently no statutory mechanism to measure performance or standards of care among equine surgeons, unless professional negligence is implied. In the UK, the Royal College of Veterinary Surgeons (RCVS) has recently introduced a Practice Standards Scheme, which is currently voluntary, but which goes some way towards dictating standards that different types of practices should attain. The scheme requires that tier 2 (equine practices) and tier 3 practices (equine hospitals) undertake clinical audit. Since 1990, clinical audit has become part of everyday life for most human healthcare professionals in the UK (Stern and Brennan 1994; Humphrey and Berrow 1994; Teasdale 1996), as one way of attempting to improve clinical standards and identify deficiencies in practice (Lord and Littlejohns 1997). Clinical audit has been defined by Viner (2005) as: "...a quality improvement process in clinical practice that seeks to establish protocols for dealing with particular problems, based on documented evidence when available, monitoring the effectiveness of these protocols once they have been put into effect, and modifying them as appropriate. It should be an ongoing upwards spiral of appraisal and involvement." While clinical audit is becoming recognised and established in the veterinary profession in the UK, the authors are unaware of its application in other countries at this time.

When asked about the concept of clinical audit, most of the equine surgeons interviewed understood that this is a technique for

monitoring the quality of clinical care; however, many failed to appreciate the fact that clinical audit is primarily a quality improvement tool. Clinical audit is the systematic and critical analysis of the quality of clinical care, including procedures used for diagnosis, treatment and care, the associated use of resources and resulting outcome and quality of life for the patient (Anon 1993). Clinical performance and aspects of patient care, including processes and outcomes, are selected and evaluated against explicit criteria with the aim of improving the quality of care of patients (Teasdale 1996). In human health care, clinical audit has become a fundamental process that allows appraisal and improvement of the quality of care. A trend to introduce clinical audit into veterinary practice is currently taking place in the UK (Viner 2005). However, evidence-based data is required in order to undertake effective clinical audit, and one of the main reasons for establishing a large database of colic surgery is to provide such evidence-based information on which the targets (or standards) of clinical audits can be based. Equine colic surgery is well-suited to being assessed by clinical audit in view of the associated expense and welfare implications.

Few of the surgeons surveyed undertake any specific monitoring of their results of colic surgery (7% of the questionnaire respondents and 27% of the interviewees) these stated that they kept accurate records of the results of colic surgery, although many, especially those working in academic institutions routinely undertake monitoring of all surgical cases via such techniques as regular clinical rounds, morbidity and mortality rounds. A number of the equine surgeons interviewed expressed major concerns over the quality of surgical care that they had observed being applied to some horses with colic. These concerns related mainly to the technical knowledge and competency of some surgeons undertaking colic surgery. The recognised high death and complication rates associated with colic surgery were allegedly often used as excuses to explain poor outcomes of individual cases. This situation is not surprising, but the proposed large database of colic surgery should ultimately be helpful in setting an acceptable standard and improving the overall quality of colic surgery being undertaken worldwide.

This study used a survey approach to obtain information about the feasibility of setting up a large international database of colic surgery. Preformulated questions were used in a predetermined sequence in both a structured questionnaire and interviews to a sample of individuals drawn as representative of a defined population (Hutton 1990; Gill and Johnson 2002). One advantage of the survey approach is the ability to gather data from a wide range of representative respondents. In this study, the sample consisted of equine colic surgeons drawn from the lists of diplomates of the American College of Veterinary Surgeons and the European College of Veterinary Surgeons. In view of the ease of accessing these surgeons electronically, an e-mail format of questionnaire was used. A structured questionnaire, using standardised closed questions and some open questions was employed (Bowling 2002). Such a format allows for the collection of unambiguous and easy to count answers, leading to quantitative data for analysis. The use of open questions allowed greater freedom for the respondents to express their own views. The same questions were included in the interviews in order to compare and validate the results from the 2 techniques. Despite concerns over bias, the results from the 2 survey methods were remarkably similar, which helps to support the reliability and validity of the results.

In conclusion, the results of this survey suggest that there is sufficient interest among equine surgeons worldwide to establish a large database of colic surgery outcomes. Data accumulated in this fashion should have numerous applications, both for clinical research and for use in quality improvement schemes, including clinical audit.

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### Manufacturer's address

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**Author contributions** Both authors contributed to all aspects of this study.