



Improving decision-making in complicated or rare cases—An approach towards Evidence-based Veterinary Medicine in small animal reproduction

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Abstract

The concepts of Evidence-based Veterinary Medicine (EBVM) provide a methodological and systematic approach to include the best evidence from research into clinical decision-making. These concepts include steps as the search and assessment of relevant research findings and consideration of individual aspects. In addition, owners and other persons involved in animal health care should be included in shared decision-making. Some breeders have good basic knowledge concerning breeding management and characteristics of diseases and concerning advantages and disadvantages of different therapeutic approaches, while others are notable to understand complex medical interrelations or emergency situations. All these aspects need to be addressed when communicating and discussing different diagnostic, prophylactic and therapeutic options. In special fields, such as small animal reproduction, veterinarians often see animals with rare diseases or complex conditions so that an application of standard therapies and well-established textbook recommendations is not possible. To learn more about cases too rare for successful systematic research, the case collection tool REPROCASES (www.evssar.org/reprocases) is now available. The aim of this project is to gather information from specialists on small animal reproduction in a multicentre approach. If you see rare or not well-investigated cases such as cystic ovarian diseases, cryptorchidism or others, you are more than welcome to share your findings via the database. Even if this approach cannot completely replace standardized clinical trials, the idea is to gather more information on effects, prognosis, side effects and long-term fertility for specific conditions.

KEYWORDS

evidence-based veterinary medicine, shared clinical decision making, case report collection tool

1 | INTRODUCTION

We as veterinarians should use optimal diagnostics, interventions, and medications to examine and treat veterinary patients as best as

we can (Arlt & Heuwieser, 2014). In addition, decision-making and giving good advice to patient owners are a central task of veterinary practitioners (McKenzie, 2014). These demands may easily be met in routine practice when patients are presented with common diseases

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or if concise- and science-based guidelines are available. However, in some cases it is difficult to base clinical work on reliable research data, especially for conditions that we rarely see in practice and for which performing clinical research is difficult (Arlt & Heuwieser, 2014).

For several years now, the concepts of Evidence-based Veterinary Medicine (EBVM) have provided a methodological and systematic approach to include the best evidence from research into clinical decision-making (Holmes, 2007). However, it has been claimed that very few of our decisions are really evidence-based (Buczinski & Vandeweerd, 2012).

2 | SHARED CLINICAL DECISION-MAKING

In human medicine, the patient–physician interaction has been a topic of great interest to research in the past years and several studies have shown that an effective interaction is beneficial to several outcomes such as patient satisfaction and cost reduction (Budych, Helms, & Schultz, 2012). It can be assumed that similar results are true for an effective interaction between veterinarians and patient owners.

Sharing decisions, as opposed to clinicians making decisions on behalf of patients or patient owners, means that clinicians and patients share the best available evidence when faced with the task of making decisions. By help of evidence and the responsible clinician, the patients or patient owners are supported to consider options and to achieve informed preferences (Elwyn et al., 2010).

Thanks to the Internet, many patient owners are nowadays well equipped with information concerning characteristics of diseases and different therapeutic approaches. According to our experience, this is especially true for dog and cat breeders. Through the Internet and online networks, this client group shares a lot of knowledge and experiences, which may lead to good information or in other cases results in misinformation that requires clarification by veterinarians.

Studies in human medicine have shown that patients may have different preferences regarding the involvement of doctors in decision-making (Charles, Gafni, & Whelan, 1997). As stated by Christiansen, Kristensen, Lassen, and Sandøe (2016), most animal owners want their veterinarian to actively support the decision-making and at the same time respect the autonomy of every customer. In addition to this general attitude, previous knowledge of animal owners and also the clinical situation may have a significant influence on the desired influence of the veterinarian. It can be assumed that in most routine situations experienced breeders would favour autonomy in their decision-making, for example if or when to measure progesterone concentrations in blood serum for ovulation timing. In cases that are more complicated, the involvement of the veterinarian may need to be more intense. Especially in rare cases such as ovarian cysts or emergency cases such as dystocia, even experienced breeders may be overburdened so that these situations may require more guidance by the veterinarian. In

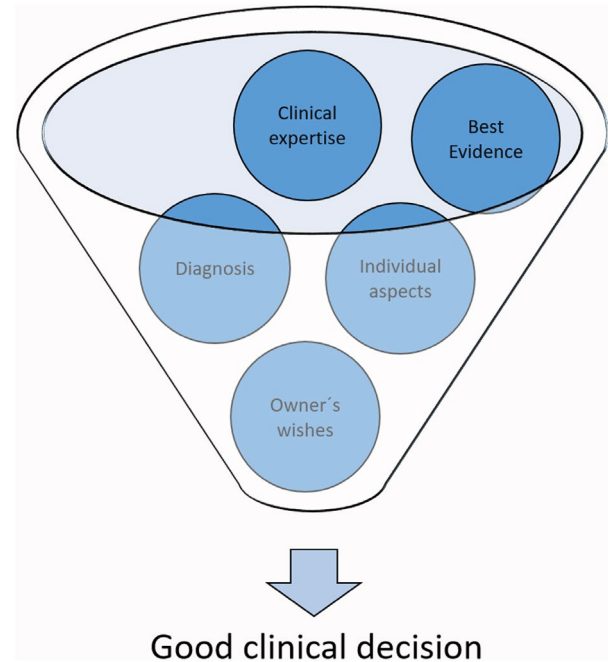


FIGURE 1 Clinical decisions should be based on a proper diagnosis, best available evidence, the clinical expertise, wishes of the client and individual aspects of the patient or the case, all influenced and directed by our skills in performing and communicating these steps

these cases some owners may prefer to delegate responsibility to the doctor (Charles et al., 1997).

3 | GENERAL STRATEGIES FOR DECISION-MAKING

Ideally, clinical decision-making is based on a clear and proper diagnosis, profound research and clinical expertise. In addition, it should encompass individual aspects of the case or the patient, and the wishes of the owner (Figure 1). For all these steps, sufficient skills are necessary.

Following aspects of clinical decision-making may support our clinical work

3.1 | A proper diagnosis

To handle clinical cases properly, we need profound knowledge in our field of expertise and good clinical skills in performing examinations. Beyond that, the number of cases seen and handled successfully surely influences our approach. Of course, attending special courses in the area of our interest that provide us with the latest, practice-oriented news from science and help us to train practical skills are also helpful. In addition, we may need some equipment such as a variety of specula, an adequate ultrasound machine. Especially in complicated cases, recommendations from other experts might provide

a first impetus for a good clinical approach. According to a survey conducted by Haimerl, Arlt, and Heuwieser (2013), 83.1% and 77.4% of veterinary practitioners seek advice from their colleague or employer, respectively. Moreover, the respondents attributed to both these information sources a high or very high quality. To obtain medical advice beyond the borders of your direct professional environment, networking tools of societies, such as the American College of Theriogenologists (ACT), the European Veterinary Society for Small Animal Reproduction (EVSSAR) or the European Society of Domestic Animal Reproduction (ESDAR), mailing lists such as *caferepro* or other societies or groups, may be helpful. However, we need to be cautious whether the suggested diagnostic tests and/or therapies are really applicable and helpful in our specific case.

3.2 | Finding the evidence

In daily practice, it is important to recognize knowledge gaps and limitations when facing a specific case. After determination of a diagnosis, using treatment protocols simply because they have 'always been used' or are written in a textbook is often not appropriate in the rapidly developing field of veterinary science. Accepting that we need more information that is valid to make an appropriate clinical decision is the first step in using the concepts of EBVM. (Arlt, 2018).

Filtering out good evidence of the mass of published literature is a complex task that should follow a specific strategy:

3.2.1 | Ask

After the identification of a knowledge gap, it helps to break the complex case down into one or two precise and answerable clinical questions (PICO approach).

P – Patient, population and problem

I – Intervention

C – Comparison or control

O – Outcome

In an exemplary case of benign prostatic hyperplasia (BPH), the *patient* and *problem* may be a male dog with BPH. *Intervention* would involve castration, while a treatment with osaterone acetate, could serve as a *control* (or *alternative intervention*). The desired *outcome* could be that the owners just want a healthy prostate gland or to maintain fertility. Using the PICO words leads to a precise clinical question: *Does castration have a better prognosis than a treatment with osaterone acetate in a seven-year-old Labrador dog showing signs of BPH with moderate clinical signs?* The clinician can then research surgical versus medical treatment for BPH.

3.2.2 | Acquire

In a next step, we should access the best available information to answer our question. We need skills to efficiently find and retrieve

relevant articles via literature databases (Arlt, 2018). The terms used for the PICO question usually can be used as search terms.

3.2.3 | Appraise

Next task is to assess the quality of the relevant information found. This is necessary because even in relevant articles published in scientific journals the evidence may be not sufficiently robust (Dean & Heneghan, 2019). The quality of studies can be ranked from weak to strong based on methodology, regardless if they focus on diagnostics, therapeutic procedures, disease prevention or another area of research (Dean, 2013).

The following questions will be helpful in assessing the information found in a paper:

- Is the information relevant to my clinical question or my patient(s)?
- Is the study design appropriate to answer my clinical question?
- Are the level of evidence and the quality of the paper good enough to rely on the results?

Several checklists have been published that aim to guide veterinarians through appraising relevant quality aspects while reading a paper (Arlt, 2018). We should determine the evidence level (i.e. meta-analysis, clinical trial, case report, expert's opinion or experience) and assess additional quality criteria. The latter are study design, information content and objectivity. Common sources of bias in veterinary literature include factors such as a small number of study animals, a lack of or incomparable control groups, missing specifications of diagnostic procedures or missing definitions of diseases (Arlt, 2018). The checklists are not completely comprehensive and allow no in-depth appraisal of the scientific quality but give a rough impression of the quality and practical applicability of the information.

3.3 | You are the expert: Your expertise is the central part of the decision-making process

The term clinical expertise refers to what we have learned in the vet school together with the experiences we have collected during our daily work during the years. We need to encompass all information about the diagnosis, the scientific information, wishes of the owner and specific individual aspects to make good decisions.

3.4 | The owner has to decide

After we have proven new information to be of good quality, we should further assess information to determine whether it is appropriate for the actual patient. Then, we should discuss all pro's and con's with the owner(s). In addition, it may be beneficial to also include vet nurses, technicians and paraprofessionals in decisions

concerning the quality of the care an animal receives (Dean & Heneghan, 2019). This is a high but important demand in our busy working days and requires good communication skills. Breeders often know much about canine or feline fertility, sometimes even too much, or they believe wrong facts. It is essential that we consider the respective knowledge of the breeders and address good or wrong thoughts, concerns and wishes, and possible financial limits.

3.5 | Individual aspects

Finally yet importantly, we should include individual aspects, such as general health, reproductive history, breed, age, susceptibility test results and other relevant factors, in our decision.

4 | BUT WHAT IF WE DO NOT HAVE GOOD RESEARCH EVIDENCE?

When complicated cases or rare diseases are presented, we should be more circumspect concerning the choice of diagnostic tests and treatment strategies. Moreover, counselling of patient owners concerning advantages or disadvantages of the respective strategies may be more time-consuming than it is in routine cases.

In special fields such as small animal reproduction, we often see animals with rare diseases or complex conditions because the owners purposefully seek our advice or are referred to us by their vet. In these cases, we are often unable to apply standard therapies and well-established textbook recommendations, and may have to use new and not yet researched treatment strategies. Low prevalence and incidence of these diseases hamper the development of a good expertise in these fields. Especially for veterinarians with little clinical experience, it may be, therefore, difficult to manage rare cases if little or no research data are available. In some textbooks, one may find therapy suggestions without clear treatment regimens or dosages of medications. In other cases, treatments and dosages may be based on single case reports, which means that this information is of low evidence (Arlt & Heuwieser, 2016).

Frequently, as shown for many clinical topics, good research data are simply not available (Arlt & Haimerl, 2016; Haimerl, Heuwieser, & Arlt, 2018; Simoneit, Heuwieser, & Arlt, 2011). While in some cases the published literature is of poor quality (Ganz, Fux, Conze, Gajewski, & Wehrend, 2019), a good proportion of scientific research projects do not lead to publications in relevant and indexed journals. This is also true for projects in the field of animal reproduction. Robin and Fontbonne (2019) pointed out that 45.1% of abstracts published in EVSSAR proceedings from 1998 until 2015 had not been published in peer-reviewed scientific journals, entailing a significant loss of knowledge. Potential reasons for the non-appearance of scientific data are subject of ongoing research projects.

In small animal reproduction, we face several diseases with a low incidence such as ovarian cysts or ovarian neoplasia (Arlt & Haimerl, 2016). Therefore, it is difficult to enrol a sufficient number of animals

in controlled clinical trials in reasonable time. In addition, in most cases of such diseases the animals are neutered soon, so that other treatment options and long-term effects (e.g. regarding fertility) are mostly unknown. Other treatment options are often indicated only if the owners want to breed the dog in the future.

5 | A NEW TOOL TO COLLECT CASE REPORTS

For veterinarians, it is always important to make decisions based on the latest scientific research. This, however, requires a high number of cases, which are absent in diseases with a very low incidence, like the ovarian cysts. Ovarian hysterectomy is believed to be curative in most conditions, as the risk of recurrence in non-breeding bitches can be eliminated. But neutering should not be the only option for breeders to treat their animals.

In order to collect apparently rare cases in small animal reproduction, the project REPROCASES (www.evssar.org/reprocases) has been launched in June 2019. Aim of this project is to gather information from specialists on small animal reproduction in a multicentre approach. The first disease we want to investigate exemplarily is ovarian cysts in the bitch. A case report form for this condition is already available and in use. Depending on the number of future entries, it may be possible to evaluate the cases with qualitative and descriptive or even statistical methods. Ovarian cysts are a subject on which reliable information concerning the efficacy of medical treatment options, side effects and prognosis regarding fertility is hardly available (Arlt & Haimerl, 2016). So far, there are only few clinical studies that go beyond the individual case reports published (Knauf, Failing, Knauf, & Wehrend, 2013). In a few weeks, we will launch a case report form for cryptorchidism in dogs. More topics with low incidence will follow.

Similar to small cohort or case-control studies, this multicentre data collecting approach will not completely replace systematic research. However, we expect that bringing together several case reports will encourage the identification of trends and patterns. The collection of cases (incl. outcomes, side effects, subsequent fertility and other information) might also help to find some clinical answers that can be included into advice for patient's owners.

The data might also complement other research results. Research often is conducted in rigid settings with standardized animals, diagnostic procedures, treatments and outcome measures. Therefore, it is often criticized that research settings do not reflect real-life practice situations and patients, so that outcomes may not be applicable in practice (Treweek & Zwarenstein, 2009).

On the other hand, it has to be noted that the results of a case collection are to a certain extent biased and pre-selected. However, if this is taken into account when interpreting the findings, some results of the case collection might help to prove research findings or to find differences—and maybe even explain differences. Finally, a summary of case reports may provide researchers with hypotheses for further clinical research. This clinical research, in turn, could

serve to develop Critically Appraised Topics (CATs). These are standardized summaries of research evidence regarding a clinical question generated from a specific patient situation or problem (Foster, Barlas, Chesterton, & Wong, 2001). It is a document of up to three pages, which comprises a clinical conclusion and clinical application of the results. Since a CAT is a synthesis of one or more research articles and includes a critical appraisal of the internal, external and statistical validity of research, the information contained is of higher evidence compared to a simple data collection (Arlt, Haimerl, & Heuwieser, 2012).

Until such evidence-based research information is available, however, preliminary aim of the project REPROCASES is to provide practitioners, in particular EVSSAR members, with some more information that help to make reliable clinical decisions for case management.

6 | DISCUSSION AND CONCLUSION

The history of medicine is replete with examples of treatments once common practice but now known not to work—or worse, cause harm (Doust & Del Mar, 2004). Also, in veterinary medicine old textbooks are full of recommendations that are now outdated and should not be followed anymore.

It has been claimed that we need to stop grumbling about how bad the veterinary science base is (Dean & Heneghan, 2019). In fact, the gaps in textbooks have to be filled where no clear treatment strategies and not well-established medications and dosages are available. If robust research on rare diseases is difficult or even impossible, we should focus on the collection of case reports. This means we need to address practitioners and other persons involved in animal health care to gather as much information as possible. Databases may support this approach by providing structured case report forms. Collection of cases and information on rare diseases in small animal reproduction may help to draw new conclusions. These conclusions will not be as robust as results from randomized, controlled clinical trials because they may suffer from confounders such as selection and reporting bias. Nevertheless, the results may be still superior to single case reports or expert opinions. Whether this idea really leads to a broad participation of veterinarians is currently subject of research projects.

On the other hand, it is essential that we fulfil our obligation regarding continuing education and be critical towards the literature, to provide optimal health care. In that regard, the presented steps of decision-making may support us when we see patients with rare diseases or complex conditions—and also in routine practice.

In the field of small animal reproduction, it may be essential to choose options that maintain fertility and/or do not harm the offspring if this is reasonable under the given conditions. However, the range of possible options considering the named challenges is limited. This is because for many treatment options no research data on subsequent fertility or on possible detrimental effects on embryos, fetuses and neonates are available. Examples are lacking data on

treatment options for ovarian cysts or the effect of progesterone supplementation on the fetuses genital organs in the first half of pregnancy in cases of hypoluteinism. This means that we need to accept that for some conditions, no valid recommendations are available and we need to rely on our own experience or the advice from colleagues.

Finally, using these steps in practice should be neither dogmatic nor static. We should assess whether changes implemented really lead to better outcomes. Although it is easy to reflect on cases in which something went wrong or that had an unexpected outcome, it is also important to reflect on what went well in cases with positive outcomes (Arlt, 2018).

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ETHICAL APPROVAL

Since no animals were used in context of this manuscript, no ethical permit was required.

AUTHORSHIP CONTRIBUTIONS

All authors drafted and revised the manuscript.

DATA AVAILABILITY STATEMENT

In context of this manuscript, no data were generated. In future, collected data will be available on the website www.evssar.org/repro cases.

REFERENCES

- Arlt, S. (2018). Top 5 Steps to Practice Evidence-Based Veterinary Medicine. *Clinician's Brief* December 2018, 26–30.
- Arlt, S. P., & Haimerl, P. (2016). Cystic ovaries and ovarian neoplasia in the female dog - a systematic review. *Reproduction in Domestic Animals*, 51, 3–11. <https://doi.org/10.1111/rda.12781>
- Arlt, S., & Heuwieser, W. (2014). Evidence-based Medicine in Animal Reproduction. *Reproduction in Domestic Animals*, 49, 11–15. <https://doi.org/10.1111/rda.12323>
- Arlt, S., & Heuwieser, W. (2016). The staircase of evidence – a new metaphor displaying the core principles of Evidence-based Veterinary Medicine. *Vet Evidence*, 1, 1–12.
- Arlt, S. P., Haimerl, P., & Heuwieser, W. (2012). Training evidence-based veterinary medicine by collaborative development of critically appraised topics. *J Vet Med Educ*, 39, 111–118. <https://doi.org/10.3138/jvme.1111.112R>
- Buczinski, S., & Vandeweerd, J. M. (2012). Evidence-based veterinary medicine. *Veterinary Clinics of North America: Food Animal Practice*, 28, xiii–xiv. <https://doi.org/10.1016/j.cvfa.2012.01.003>.
- Budych, K., Helms, T. M., & Schultz, C. (2012). How do patients with rare diseases experience the medical encounter? Exploring role behavior and its impact on patient-physician interaction. *Health Policy*, 105, 154–164. <https://doi.org/10.1016/j.healthpol.2012.02.018>
- Charles, C., Gafni, A., & Whelan, T. (1997). Shared decision-making in the medical encounter: What does it mean? (or it takes at least two

- to tango). *Social Science and Medicine*, 44, 681–692. [https://doi.org/10.1016/s0277-9536\(96\)00221-3](https://doi.org/10.1016/s0277-9536(96)00221-3)
- Christiansen, S. B., Kristensen, A. T., Lassen, J., & Sandøe, P. (2016). Veterinarians' role in clients' decision-making regarding seriously ill companion animal patients. *Acta Veterinaria Scandinavica*, 58, 1–14. <https://doi.org/10.1186/s13028-016-0211-x>
- Dean, R. (2013). How to read a paper and appraise the evidence. *In Practice*, 35, 282–285. <https://doi.org/10.1136/inp.f1760>
- Dean, R., & Heneghan, C. (2019). Do we need an evidence manifesto? *Veterinary Record*, 185, 58–59. <https://doi.org/10.1136/vr.l4653>
- Doust, J., & Del Mar, C. (2004). Why do doctors use treatments that do not work? *BMJ*, 328, 474–475. <https://doi.org/10.1136/bmj.328.7438.474>
- Elwyn, G., Coulter, A., Laitner, S., Walker, E., Watson, P., & Thomson, R. (2010). Implementing shared decision making in the NHS. *BMJ*, 341, c5146. <https://doi.org/10.1136/bmj.c5146>
- Foster, N., Barlas, P., Chesterton, L., & Wong, J. (2001). Critically Appraised Topics (CATs): One method of facilitating evidence-based practice in physiotherapy. *Physiotherapy*, 87, 179–190. [https://doi.org/10.1016/S0031-9406\(05\)60604-9](https://doi.org/10.1016/S0031-9406(05)60604-9)
- Ganz, S., Fux, V., Conze, T., Gajewski, Z., & Wehrend, A. (2019). Systematic analysis of the literature regarding dystocia in the bitch. *Reproduction in Domestic Animals*, 54 (Suppl. 2), 55.
- Haimerl, P., Arlt, S. P., & Heuwieser, W. (2013). Entscheidungsfindung in der tierärztlichen Praxis. *Tierärztliche Praxis*, 4, 229–236. <https://doi.org/10.1055/s-0038-1623713>
- Haimerl, P., Heuwieser, W., & Arlt, S. (2018). Meta-analysis on therapy of bovine endometritis with prostaglandin F_{2α}—An update. *Journal of Dairy Science*, 101, 10557–10564. <https://doi.org/10.3168/jds.2018-14933>
- Holmes, M. A. (2007). Evaluation of the evidence. *The Veterinary Clinics of North America. Small Animal Practice*, 37, 447–462. <https://doi.org/10.1016/j.cvsm.2007.01.004>
- Knauf, Y., Failing, K., Knauf, S., & Wehrend, A. (2013). Treatment of bitches with ovarian cysts using human chorionic gonadotropin-releasing hormone analogue. A case series of 30 bitches. *Tierarztl Prax Ausg K Kleintiere Heimtiere*, 41, 93–100.
- McKenzie, B. A. (2014). Veterinary clinical decision-making: Cognitive biases, external constraints, and strategies for improvement. *Journal of the American Veterinary Medical Association*, 244, 271–276. <https://doi.org/10.2460/javma.244.3.271>
- Robin, T., & Fontbonne, A. (2019). Descriptive analysis of the abstracts printed in the successive proceeding books of the EVSSAR congresses from 1998 to 2015, which haven't been published in international peer-reviewed journals. *Reproduction in Domestic Animals*, 54, 77.
- Simoneit, C., Heuwieser, W., & Arlt, S. P. (2011). Evidence-based medicine in bovine, equine and canine reproduction: Quality of current literature. *Theriogenology*, 76, 1042–1050. <https://doi.org/10.1016/j.theriogenology.2011.05.007>
- Treweek, S., & Zwarenstein, M. (2009). Making trials matter: Pragmatic and explanatory trials and the problem of applicability. *Trials*, 10, <https://doi.org/10.1186/1745-6215-10-37>

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