

Ethical responsibilities of veterinarians in the context of genetic testing for degenerative myelopathy in dogs

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Abstract

This paper explores the veterinarians' ethical responsibilities when confronted with a pup with a possible complex genetic condition where genetic testing reveals both parents carry the Degenerative Myelopathy (DM) allele. It is based on a case report of a young puppy brought to the attention of vets by the breeders, who are also the current owners.

Beyond the direct care for the clinically diseased puppy, the vets can prioritise the 'no-harm' principle with regard to different stakeholders (current and future owners and future pups) by proposing genetic screening, coherent with the adagium 'primum non nocere'. In this context, this seems the only possible action towards the most important stakeholders for veterinarians, the animals. By explaining the use of genetic testing in responsible dog breeding the vets also adhere to the principle of autonomy (informed consent), in so far as the owners/breeders understand the consequences of possible test results. This also connects to the concept of trustworthiness as the owners cannot claim to be 'lured' into testing the animals. The informed consent, and the vet's primary duty (to care for animals), ethically outweigh the harm to the breeders resulting from the test results on the (economic) value of the pups.

When the test results are known, it seems the only responsibility for the vets is to provide the owners with sufficient information to ensure the proper care for all pups into their adult life, thereby trying to improve their wellbeing (or at least minimize the amount of harm).

Vets may feel it is ethically right to inform the pups future owners of the animals' (possible) genetic heritage. Nevertheless, there are practical and deontological barriers preventing them to do so. On the one hand, they will probably not know who the future owners are, but more importantly, they remain bound to professional confidentiality. Without any immediate threat to the animals' health, veterinarians cannot break this confidentiality, and therefore we do not consider it the responsibility of the veterinarians to inform the future owners.

Introduction

This paper discusses the ethical responsibilities of veterinary practitioners in the context of genetic testing. The exploration is based on a case referral to the University of Ghent (Belgium) veterinary clinic specialised in molecular genetic testing of pets, in particular for the diagnostics of hereditary diseases.

Case description

In this case the referral concerned an allergy-related issue in a pup of a brachycephalic breed. The young puppy was brought to the attention of the university veterinarians by the breeders, who still own the animal. The puppy is destined to be sold to new owners when old enough.

Section 3

Such allergy cases can be due to a complex genetic condition involving genetic mutations. Genetic testing is therefore relevant to identify the proper care for the pup, and it will provide information about the possible health status of litter mates and possible further offspring of the sire and dam.

In this case, the genetic testing revealed that the animal carried a mutation causing Degenerative Myelopathy. As explained by Boeykens et al. (2020), canine degenerative myelopathy (DM) is a late-onset, progressive, neurodegenerative disorder with a fatal outcome, occurring in a vast number of dog breeds across the world. When DM emerges the animal experiences difficulty coordinating its back legs and shows weakness due to nerve issues in the spine. This progresses to complete paralysis of all four limbs and problems in the brainstem. Normally, dogs only begin to suffer from the condition later in life (eight years old, or more), but not every homozygous dog develops the disease (and heterozygous animals do not). This particular case was complicated by two issues. First, only after the sire was found to carry the gene, the dam was tested and found to be a carrier as well. Secondly, and most importantly, the pup brought to the clinic came from an allegedly unplanned litter, but the dam was found to be pregnant again before the test results were available.

Importantly, there is no causal link between the brachycephaly and the mutation. The breeding of brachycephalic dogs certainly presents significant ethical challenges (see e.g. Fawcett *et al.*, 2019), but these are independent from (although inextricably entangled with) the issues raised by the discovery of the genetic problems in this dog. Therefore, in this paper we will not discuss these issues, although we acknowledge that in practice veterinarians will have to address both issues simultaneously.

Analysis framework

We identified different human and non-human stakeholders in this case: the pups from the current litter(s), pups from possible future litters, the current and future owners, and the veterinarians. In this paper we focus on the ethical responsibilities of the veterinarians, but we will also touch upon the responsibility of the breeders-owners.

We use the ‘four principles approach’ or principlism of Beauchamp and Childress (2001) as the analysis framework with its four *prima facie* principles: non-maleficence, beneficence, justice and respect for autonomy, and – where relevant – we refer to the Veterinary Code of Conduct drafted by the Belgian Federal Council of Veterinarians (Hoge Raad van de Orde der Dierenartsen, 2024)).

The principlist approach emerged from medical ethics and aims to combine different ethical theories in a practical analysis framework, and has been introduced in agricultural and veterinary ethics by Mepham in the 1990s in his Ethical Matrix (Mepham, 1996). In short, the principles could be defined as follows. The non-maleficence principle is an obligation not to inflict evil or harm on others. The principle of beneficence refers to actions for the benefit of others, thus to actively contribute to their welfare. Respect for autonomy is the obligation to value autonomous choices and actions. It refers to self-governance, meaning at minimum being free from paternalist influences and from information deficiency, hindering intentional action and making responsible choices. This clearly needs to be redefined or reinterpreted for use with respect to animals. Finally, respect for justice is the moral demand for a fair access to and distribution of services and goods. It requires that equal cases are treated equally.

Vets' responsibilities before all test results are available

Before any tests

At the time a clinically diseased pup such as the one in this case report enters the clinic, there are more animals to be considered than the pup itself. Indeed, the condition implies a possible genetic background, and therefore the parents and the rest of the litter should also be taken into account. Certainly, the first concern is the welfare of the pup in the direct care of the veterinarians. One could say by taking direct health measures the veterinarians abide by Article 15 of the Code of Conduct, stating that the first duty of a veterinarian is to 'ensure the protection and welfare of the animals', and hereby they cover the non-maleficence and beneficence principles with regard to this pup.

In order to ensure the longer-term welfare by identifying the underlying mechanism for the allergy, genetic screening is relevant. One could do such analysis on the pup that is brought to attention, but if a genetic disorder is present, this will normally have resulted from the genetic background of the parent animals. This means that in such case, not only the allergy-stricken pup should be considered, but also the parents, and current and future siblings. By that reasoning, a genetic screening of the sire and dam is most relevant. In the case under scrutiny, this is exactly what was proposed to the animal's owners.

When also future animals are considered, we are looking at the longer-term perspective. In the case under review, the vets have prioritised the 'no-harm' principle with regard to future pups, current and future owners by proposing the screening — coherent with the adagium 'primum non nocere'. Generalising, this seems the correct course of action, and the only possible action towards possible future animals, normally the most important stakeholder for veterinarians (between future pups, current and future owners). Of course, there is some debate whether preventing the future existence of animals is better than an existence with possible suffering, but if the four principles are prioritized in the sequence mentioned above (in which non-maleficence is the first), then preventing the birth of diseased animals is the preferred choice. For the current and future owners too, knowledge about the genetic background of the breeding animals will offer the possibility to avoid bringing diseased animals into existence, thereby avoiding additional costs (to name only the effect they will directly experience).

The principle of autonomy is most readily applicable here in the interaction between the veterinarians and the breeders/owners. It is usually understood in such cases as adherence to informed consent. This is also a deontological duty as outlined in Article 17 para. 2 of the Code of Conduct (Hoge Raad van de Orde der Dierenartsen, 2024). By explaining the relevance of such a test in the context of the case in point, and in responsible dog breeding in general, the vets can leave the decision on the medical course of action with the owners. In so far as the owners understand the consequences of possible test results, one could consider this principle 'covered'. This is also the best way for the veterinarians to remain trustworthy — an elusive concept, extensively discussed by Meijboom *et al.* (2006) — as the owners cannot claim to be 'lured' into testing the animals if they are duly informed.

Looking from the perspective of the veterinarians, their primary duty is towards animals, and by seeking informed consent they have fulfilled their ethical responsibilities. This means that, in our opinion, prioritizing the (future) animals' welfare in combination with informed consent ethically outweighs the harm to the breeders resulting from the test results on the (economic) value of the pups.

Section 3

After the DM allele is identified in the sire

The analysis and conclusions with regard to the longer term still applies after the sire's test results become known. Indeed, there is a significant difference between the expected percentage of progeny with a problematic genome when only the sire is affected, compared to the situation in which both parents carry the defective allele. Therefore, also testing the dam is the preferred next step, and by proposing this to the owners, the veterinarians in the proposed case have further fulfilled their responsibilities to the future animals.

With hindsight, having both parents tested simultaneously would have been better in this case. It would not have changed the situation for the first litter, but it may have decreased the likelihood of a second litter.

Vets' responsibilities after all test results are known

When all results are known, it seems the only remaining responsibility for the vets is to provide the owners with sufficient information to ensure the proper care for the pups into their adult life (the referral as well as the rest of the litter), thereby trying to improve their wellbeing (or at least minimize the amount of harm). We would consider this the further application of the beneficence principle — and the application of Article 15 of the Code — to the animals that may (or will) develop symptoms.

As we have stated above, preventing further births of animals carrying the defective allele is a way to prevent additional suffering in the future (a form of non-maleficence). The most effective way of reaching this goal, is to prevent reproduction by two carriers. In the case under review, both sire and dam are carriers, and it appears the owners are not able to prevent unplanned litters. Statistically, in any future litter a significant number of puppies would suffer from DM, and many would carry the defective allele. Preventing reproduction, i.e. to neuter the sire and dam, would be the most effective measure. This is not something veterinarians should do without the consent of the owners. Whatever the result, the vets should at least inform the owners (again) about the statistical percentage (and thus numbers) of animals that may be born with problematic genomes when further breeding occurs, and the potential suffering that may result. By this, they may persuade the owners to have the sire and/or dam neutered.

There is one more party that is involved in this case: the future owners of the puppies. In the case where they acquire one of the animals carrying the defective allele, there is a real risk they will encounter veterinary costs beyond those typical for the breed. The vets originally bringing this case under our attention feel it is ethically right to inform the pups future owners of the animals' (possible) genetic heritage. We concur. All four ethical principles seem better served when the future owners are informed of their puppy's (possible) genetic background. Ideally, of course, this would mean that all puppies too are tested for possible genomic deficiencies.

The autonomy of the potential future owner is only respected when they are informed that (at least the possibility exists that) their puppy carries a defective allele, and may develop problems later in life. When duly informed, they can consent to the responsibility that such a puppy will bring, or they can decline.

This would also be the most just (or fair) approach with regard to the animals. Only when the owners are informed that the animal is likely to develop problems, they can provide the necessary preventive and curative measures. Indeed, it is only just to create the circumstances in which the right care can be given, when this information is available ahead of time.

There is no direct, immediate effect on the wellbeing of the puppies, and it may seem the beneficence principle is not at play in this instance. Nevertheless, it is when the longer term is considered: early knowledge of possible problems in the hands of owners that knowingly consented to provide that better and earlier care will be given, thereby improving the animals' wellbeing.

Finally, non-maleficence. Again, informing future owners prevents people from encountering (medical and other) costs they are not willing (or able) to carry. Although it may not be possible to prevent suffering (some animals will develop problems), additional suffering is avoided when the animals are with people willing to provide the necessary care.

Unfortunately, there are two elements that prevent the veterinarians from informing future owners. The first, and very practical element, is a lack of knowledge. It is relevant to note that — at least under Belgian law — there is no obligation to document hereditary diseases in animal passports. In that situation, the breeder-dog side of the veterinary triangle (see Figure 1) essentially serves as a wall between the vet and the new owners in the diamond-shaped situation that emerges in the current case. It prevents the vets from knowing the new owners. It is clearly impossible to inform people that one does not know.

A second pressing issue, is the legal obligation of professional secrecy. Professional secrecy applies under criminal law under Article 458 of the Belgian Penal Code (Anonymous, 1867): '(...) all other persons who, by virtue of their state or profession, have knowledge of secrets entrusted to them and disclose them except when called upon to appear before a court (...) and, except where the law, decree or ordinance obliges or permits them to disclose those secrets, shall be punished with imprisonment for one to three years and a fine of one hundred euros to one thousand euros or with one of those punishments alone.' This clearly also applies to veterinarians.

This means veterinarians are bound to professional confidentiality. It has been argued that there are situations in which a breach of this confidentiality (Aerts *et al.*, 2023) can be ethically defensible, but as there is no immediate threat to the animals' health in the case under review, none of these reasons apply.

It is therefore our opinion that it is the current owners' ethical responsibility to inform future owners about the (possible) condition of the puppies. Whether this is a realistic expectation, is beyond the scope of this paper.

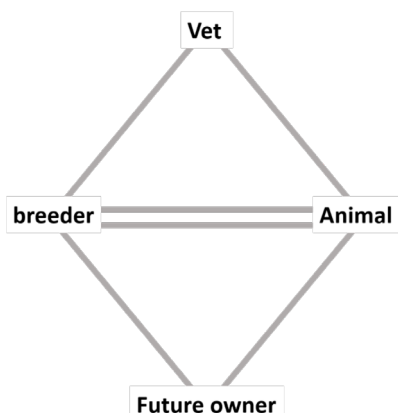


Figure 1. Diamond shape, emerging in the situation where veterinarians are called upon to treat animals that will be sold to a third party. The breeder-animal side of the primary triangle serves as an information wall between the veterinarian and the future owners.

Conclusion

Starting from this case we conclude that there are important ethical responsibilities for veterinarians beyond the care (and interests) of the animal brought to their attention when confronted with a patient that is likely to suffer from a condition that is due to a genomic defect. The most important of these are the responsibilities towards the other animals in the litter, and other future progeny of the parental animals. In our view, the ethical principle of non-maleficence (or “no harm”) calls for genetic tests to identify the presence of the defective allele(s) in the parents.

The second most important principle in this case is the principle of autonomy. This plays an important role in the relation with the dogs’ owners. When genetic testing and possible further steps (such as neutering) are called for, this can only be done with informed consent from the owners.

Finally, we conclude that important ethical responsibilities remain with the breeders, and not with the veterinarians. Not only are the current owners the party that is able to prevent future litters (e.g. by consenting to neutering), but it is also their duty to inform future owners of the (possible) genomic background of their new animal.

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