The Ethics and Role of AI with Fresh and Frozen Semen in Dogs

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Contents

The use of artificial insemination (AI) with fresh semen has resulted in many benefits for the management of dog breeding, but there are disadvantages that can sometimes be overlooked. Furthermore, poorer quality semen arising as a result of cryopreservation necessitates uterine insemination, which raises the potential for surgical insemination. A number of significant ethical concerns have been raised by key stakeholders (such as The Kennel Club and the Royal College of Veterinary Surgeons) about AI per se, but particularly about the use of surgical insemination. This paper discusses the technological development of AI and explores a number of the ethical issues raised by its application to dog breeding. An Ethical Matrix method is used to map the potential ethical issues for key interest groups, namely dogs, breeders, owners, veterinarians and wider society. There are national variations in the way in which institutions have evaluated potential ethical impacts, and this is reflected in the different regulatory frameworks governing the use of AI in dogs. In order to facilitate decision-making and reduce some of the ethical risks associated with this technology, the veterinary research community could take several proactive steps including: (i) clarifying clinical decision-making processes, (ii) enhancing informed choice among clients and (iii) increasing the knowledge-base of potential impacts of AI.

Introduction

Artificial insemination (AI) is the process of placing semen into the female reproductive tract without a natural mating. AI has become popular as a result of the importing and exporting of frozen dog semen, however, semen can be inseminated fresh, or cooled and stored for a few days prior to insemination, or frozen and stored indefinitely before being thawed prior to use. The first specific report of mammalian AI was in a dog in the 1700s, and the first AI following storage of dog semen was reported in the 1950s. In the ensuing 50 years, there have been huge developments in reproductive biology and biotechnology enabling the use, and potential misuse, of AI. There are national variations in the ethical and legislative frameworks governing the use of AI in dogs, and the purpose of this paper is to review the techniques and consider some of the potential ethical questions posed by increasing use of AI in this species.

Role of Artificial Insemination in Dogs

Advantages and disadvantages of AI

There is no doubt that AI with fresh semen has a number of potential advantages in the management of breeding in dogs including that it: (i) may allow the use of males or females that are unable to breed because of anatomical or pathological reasons, (ii) may overcome refusal to breed because of psychological reasons, (iii) may allow the splitting of an ejaculate so that more females can be bred, (iv) is an acceptable method of line breeding, (v) can be highly efficient at facilitating genetic improvement, (vi) may allow the control of some infectious diseases either by removing physical contact between animals or by allowing treatment of semen prior to insemination, (vii) enables examination of semen quality prior to insemination and if necessary the selection of an alternative stud, (viii) can be a convenient and rapid method of breeding, and (ix) by cryopreservation enables conservation and storage of valuable genes from male animals almost indefinitely. When combined with semen preservation, there are additional potential advantages including: (i) making shipping of semen possible such that genetic material is available from outside of a breeding colony, (ii) overcoming quarantine restrictions, (iii) overcoming the need to transport the animal (reducing transportation stress/disease risks), and (iv) the ability to utilize semen after death of the male. For breeders producing dogs for professional purposes, such as bomb/mine detection dogs, drug detection dogs and guide dogs for the blind, etc., semen freezing can enable castration of males at an early age but maintaining availability of their genes while their performance can be evaluated. The need to keep males in the breeding kennels is also reduced, which will reduce costs.

Despite these clear benefits, the possible veterinary disadvantages are often overlooked. These can include: (i) causing physical or psychological trauma during the AI process, (ii) undertaking AI for inappropriate reasons (e.g. where reluctance to breed is a manifestation of underlying hereditary disease such as hip dysplasia or anatomical abnormality of the reproductive tract), (iii) potential for introduction of heritable diseases or abnormalities, (iv) potentially allowing overuse of a male within a programme or breed, and (v) possibly allowing confusion of parentage (for review see Linde-Forsberg 2002). In all the cases, it would be prudent to ensure a controlled and certified process involving clinical and/or molecular examination of males to ensure that they do no spread genetic or infectious disease.

Technique of insemination

At the time of natural mating, semen is deposited within the vagina but sperm are transported into the uterus because of significant vaginal and active uterine contractions (Evans 1933). While vaginal insemination (AI(V)) is a simple procedure that is well tolerated in the bitch (Seager et al. 1975), vaginal contractions are...
scarce even when efforts are made to cause vaginal distension, and active uterine contractions do not appear to develop at least not to the same extent as with natural mating (GCW England, unpublished observations). The lack of a bitch’s physiological response at the time of AI results in relatively few sperm being transported into the uterus and this situation is worse for cryopreserved semen, because the sperm themselves have poor motility. Furthermore, cryopreserved sperm have a short longevity compared with freshly ejaculated sperm (Olar 1984). These two effects probably explain the relatively poor fertility observed when cryopreserved semen is inseminated into the vagina (Olar 1984).

For these reasons, a number of techniques have been developed to place the semen at the cervix or into the uterus. This is difficult in the bitch, because the vagina is long and narrow and the cervix is placed at an unusual angle (Lindsay 1983). However, Takeishi et al. (1976) reported success from intra-cervical insemination [AI(C)], and various commercial devices have been produced to achieve AI(C) whereby semen is forced into the cervix using a special catheter, which forms a tight seal at the cranial vagina. The catheter can be left in place to simulate a copulatory ‘tie’.

Transcervical intrauterine insemination [AI(TC)] is possible using a method described initially by Fouger et al. (1973). An outer catheter sheath is placed into the vagina, the cervix can then be realigned by palpating through the abdominal wall and a central catheter is inserted through the cervix. Relatively few reports detail the success rates in achieving AI(TC) or the incidence of complications (England and Verstegen 1996); however, although overall the technique is thought to be minimally invasive, it is reported that the transabdominal palpation is resented by a significant proportion of bitches (Wilson 1993, 2001). The AI(TC) was further developed by Wilson (1993) with a rigid endoscopic method and using a wire to guide a catheter through the cervix. Wilson (1993) reported that 97% of bitches could be relatively easily catheterized using this method, and while it is clear that significant training is required, to date no reports of adverse effects have been reported (Wilson 2001).

A simple way to overcome the requirement for training and to ensure that uterine AI can be reliably performed is to undertake surgical intrauterine insemination [AI(S)] at laparotomy or laparoscopy (Smith 1984; Wildt 1986). Clearly, these methods are invasive and require general anaesthesia, and although there is wide applicability in some countries, especially the USA, the ethics of a surgical insemination has been the subject of some debate (Royal College of Veterinary Surgeons (RCVS) 2005). Interestingly, there are no published data on complications of surgical insemination.

**Success rates of artificial insemination**

There are many reports of pregnancy rates after AI, but with a few notable exceptions (Linde-Forsberg and Forsberg 1993; Thomassen et al. 2006), most involve very small numbers of animals and lack adequate control groups. Furthermore, variations in pregnancy rates may be the result of differences in timing of insemination, quality of the semen inseminated, site of semen deposition, number of inseminations and the inherent fertility of the female and the male (including effects of age). Linde-Forsberg and Forsberg (1993) developed a simple scoring scheme in an attempt to quantify these variables, but application of their method to other published studies is difficult as many authors fail to report these important factors. Nevertheless, it is commonly agreed that; (i) fresh semen AI has a greater success rate than cryopreserved semen AI regardless of the site of insemination, (ii) increasing the number of sperm inseminated improves the success rate regardless of the site of AI, (iii) multiple AIs have a greater success rate than single AIs, (iv) AI(TC) and AI(S) produce higher pregnancy rates than AI(V), especially when using frozen-thawed semen (see Fontbonne and Badnani 1993; Linde-Forsberg and Forsberg 1993; Thomassen et al. 2006).

The success with fresh semen AI depends upon its quality and the fertility of the bitch, but pregnancy rates are approximately 80 ± 16 (SD)% for AI(V) and 97 ± 4 (SD)% for AI(TC) and AI(S). Reported pregnancy rates for chilled semen inseminations are on average 47 ± 9 (SD)% for AI(V) and 81 ± 19 (SD)% for AI(TC). Finally, pregnancy rates for frozen-thawed semen are on average: 45 ± 24 (SD)% for AI(V); 60 ± 15 (SD)% for AI(C); 70 ± 11 (SD)% for AI(TC); and 95 ± 7 (SD)% for AI(S) (data collated from: Seager et al. 1975; Olar 1984; Smith 1984; Fontbonne and Badnani 1993; Linde-Forsberg and Forsberg 1993; Wilson 2001; Thomassen et al. 2006). It is important that these data are interpreted cautiously because of significant variations in methodology and the small numbers of animals used in many of the studies.

**Conducting an Ethical Analysis**

With technological improvements and an increasing interest in the use of AI(TC) and AI(S), a number of significant ethical concerns have been raised (RCVS 2005). One approach for exploring these ethical issues is to conduct a structured ethical analysis. A number of methods have been developed to facilitate ethical analysis and stakeholder engagement, including the Ethical Matrix (EM) method (Mepham 2000). The EM is applied to facilitate the assessment of a proposed strategy (i.e. the use of reproductive technology) in terms of respect (or lack of respect) for three ethical principles; wellbeing, autonomy and fairness, as applied to a defined set of interest groups. The ‘weight’ or significance assigned to each ethical impact is determined by the evaluation of evidence. The EM method has been previously applied to a number of biotechnology cases (e.g. Mepham 2000; Mepham et al. 2006; Millar and Tomkins 2007). It should be noted that this method is not prescriptive and therefore will not produce ‘an answer’, but the method can make the ethically relevant issues transparent and thus facilitate informed decision-making. The value of the approach is that, it makes explicit the evidence used to justify a position and encourages ethical reflection on the impacts for all ethically relevant interest groups. The method can
also act as a starting point for ethical deliberation in public policy decision-making.

When considering the ethical issues raised by the use of AI in the dog, an adapted form of the Matrix method can be applied. This adapted EM (Fig. 1) will be applied to map the issues raised and to analyse whether the application of AI approaches might infringe upon or support broadly-defined ethical principles for the specified interest groups. Within the limits of this paper it is not possible to comprehensively explore all of the ethical issues raised by the various forms of AI; however, this method can be used to highlight some of the more prominent ethical considerations and clarify where conflicts may arise. It should be noted that ethical analysis will highlight differences between the different forms of AI (with fresh or frozen semen).

The modified Matrix, which will be applied here, incorporates five interest groups; dogs, breeders, owners, veterinarians and wider society. Here, breeders are defined as those individuals responsible for the mating of the bitch and dog, whereas owners are the recipients of the pups. In a number of cases, this can be the same person, but this distinction is important when considering the ethical issues raised.

Ethical Analysis of the Use of AI by Interest Group

**Dogs (dog, bitch and puppies)**

*Welfare (DW)*

It is necessary to consider two welfare aspects when assessing the use of AI in dogs; firstly, what are the generic benefits and risks for the bitch or and dog? and secondly, what are the risks associated with the different AI methods?

Many organizations classify natural breeding as the preferable means of producing a pregnancy. In order to respect the wellbeing particularly of the bitch, any decision to intervene must be carried out in her best interests. Some benefits can be conferred from intervention; specifically, forced mating may be traumatic in itself and can lead to physical and psychological harm. In such cases, the use of AI can respect animal wellbeing and prevent harm, yet, the selection of an alternative sexual partner would represent greater respect. Wellbeing may be respected if the use of AI protects against the transmission of infectious disease. However, it might be argued that the existence of a disease risk may be justification in itself not to breed from these animals. In countries where import regulations are strict and where the breeding population is very small, AI may be necessary to prevent inbreeding, which may compromise health.

It has been claimed that the bitch gains no welfare benefit from becoming pregnant. However, beyond a behavioural need, some authors contend that bitches may gain a number of physiological benefits from pregnancy and lactation such as reducing the risk of developing pyometra and mammary neoplasia, although evidence to support these assertions is very anecdotal. Even if reproductive intervention is not considered in the best interest of the dog, intervention may represent only a neutral or very minor infringement of wellbeing (although any intervention must be explained and clearly justified). It is, therefore, important to ascertain the documented impact on animal wellbeing and the perceived risks from the three forms of AI.

Complications from AI appear to be rare and the welfare risks associated with AI(V) often relate only to the need to physically restrain the bitch in order to inseminate. It might be suggested that any form of uterine AI has a greater welfare risk than AI(V). Of the methods available, AI(TC) is by its nature a reduced welfare burden than AI(S). However, the use of AI(TC) is seen as a procedure requiring a skilled operator and in inexperienced hands may result in local

| **Modified ethical matrix**
| (Translation of the ethical principles for the corresponding interest group) |
| **WELLBEING** | **AUTONOMY** | **FAIRNESS** |
| **DOGS** (dog, bitch and puppies) | Welfare (DW) | Behavioural freedom (DA) | Intrinsic value (DF) |
| **BREEDERS** | Satisfactory income and working conditions (BW) | Managerial freedom (BA) | Fair regulations and trade (BF) |
| **OWNERS** | Safety and quality of life (OW) | Choice (OA) | Affordability of products (OF) |
| **VETERINARIANS** | Satisfactory income and working conditions (VW) | Professional freedom (VA) | Equitable standards of practice (VF) |
| **SOCIETY** | Safety and social harmony (SW) | Democratic choice (SA) | Fair resource allocation (SF) |

Fig. 1. Modified ethical matrix

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trauma or a prolonged and potentially stressful procedure. The AI(S) is an infringement of wellbeing even if the procedure is conducted without complications. Justification for the use of AI(S) is that, adverse effects are minimal and therefore the welfare risk is equally small; however, there is limited data to support or refute this statement. Some have also claimed that AI(S) may be less stressful to the animal than a difficult AI(TC), and that AI(TC) may not be possible in some smaller breeds as well as in some large or obese bitches; however, both these difficulties may be due to operator inexperience or inappropriate equipment (i.e. endoscope size). The use of low-dose sedatives, may reduce handling stress.

When examining the risks of AI and the animal welfare burden, the use of non-surgical approaches, namely AI(V) and AI(TC), respectively, appear to represent far smaller welfare risks than AI(S).

**Behavioural freedom (DA)**

When AI is used over natural mating, dogs and bitches are denied the ability to engage in normal sexual behaviour (a negative infringement). Studies have indicated that some bitches can be highly selective in their mating choices. If breeder intervention occurs, either forced mating or insemination removes the ability to self-determine the mate and this infringes the instinctive behavioural pattern. In addition, forced mating can be traumatic for an unreceptive bitch. Continued attempts to mate could reinforce a negative behavioural experience. In these circumstances, the use of AI would be the only option for breeding.

**Intrinsic value (DF)**

When considering whether the use of AI may infringe or respect the notion of intrinsic value of the animal, it is important to consider whether the application of these technologies is potentially increasing the objectification of the dog or bitch. It could be argued that the need to produce pups results in the dog being seen merely as a ‘reproductive vessel’. This may in turn detract from the relationship between dog and owner/breeder and deny the dog respect as an animal that has value in its own right, beyond its instrumental value, for example, as a working dog or breeding dog. However, it may be argued that the dog has an innate drive to reproduce and raise young and that by denying the bitch the ability to do so would be an infringement of her ‘telos’ or innate purpose (linked to respect for behavioural freedom). There is no indication from the literature or from anecdotal experience by dog breeders that, bitches that are artificially inseminated as opposed to naturally mated females show less maternal behaviour towards their pups.

** Breeders**

**Satisfactory income and working conditions (BW)**

Breeders are not a homogenous group; many breeders, particularly in the UK, are individuals who operate on a non-commercial basis and are driven by their admiration of a specific breed. In contrast, a number of breeders focus on economic factors and a need to produce pedigree dogs for sale. However, when considering the conditions that drive requests to veterinarians to use AI, a number of overarching aspects can be identified for all breeders as well as specific aspects that relate exclusively to commercially-oriented breeders. The availability of assisted reproductive technologies (ARTs) allows breeders to manage their breeding programmes and maximize fertility rates for their best bitches. The availability of AI prevents breeding delays and should not reduce litter size, which might prohibit use. In addition, breeders may wish to introduce breeding programmes for animals that have exaggerated physical or temperamental features, which can make natural mating difficult. However, this may result in breeders sustaining problem behaviour or undesirable physical features within a line. The use of AI could, therefore, inadvertently perpetuate the selection of undesirable traits within a breed which would negatively impact on breeders’ wellbeing as well as being detrimental for the breed. In contrast, the technology could allow the introduction of desirable traits and ensure the preservation of endangered breeds with the secondary benefit of potentially enhancing the wellbeing of breeders.

**Managerial freedom (BA)**

Breeders are free to apply and optimize all available reproductive technologies. Some breeders may have no option other than to request AI, as quality breeding dogs may only realistically be available from other breeders outside of their geographic region. AI also allows breeders to use those dogs that are not accustomed to mating bitches (e.g. inexperienced dogs) or the dogs that are rejected by the bitch. The technology can ensure that these quality animals are still able to breed and produce litters. However, the free availability of this technology may result in breeders opting for AI for virgin dogs and bitches, rather than investing time in training these animals to mate naturally. This may lead to an ‘intervention treadmill’ where AI is always requested for high value animals to ensure timely pregnancies.

**Fair regulations and trade (BF)**

The increasing availability of new reproductive technologies may undermine the ability of smaller breeders to trade in an increasingly competitive environment, as only large commercial breeders will have the financial means to access these technologies. This difference between commercial and leisure breeders may be positively reinforcing over time and could eventually change the composition of the breeding community. However, this argument could be advanced for all new innovations such as nutritional advances, veterinary treatment, etc., therefore representing a minor or neutral infringement of the principle of justice for all breeders. The breeding of certain dogs, particularly sporting dogs and service dogs, may be a highly commercial enterprise, and therefore, improving breeding efficiency is a natural
progression for an industry that is developing within a market economy.

Owners (recipients of pups)

Safety and quality of life (OW)

Using AI may reduce the risk of disease transmission that will not only benefit the dog but could also have potentially positive impacts on the puppies’ owner(s). Use of AI may ensure a high-quality supply of pups and allow owners to receive a pup on demand, rather than being affected by breeding difficulties. However, AI use with problem dogs (male and female) may result in progeny that are unsuitable as companion animals (e.g. behavioural problems) or which will not reproduce themselves without intervention (e.g. anatomical or physiological limitations). The overuse of males through AI may also facilitate the incorporation of undesirable traits within a line that are not apparent until later generations. Any form of ART use may be seen by some to infringe the dog-owner relationship. The risks to animal welfare associated with the use of AI and the perceived view of the unnaturalness of the process may be seen to have a negative impact on the companion animal–human relationship and, hence, infringe the wellbeing of the owner.

Choice (OA)

In order to respect the principle of autonomy for potential owners, it is important that all techniques and procedures applied to produce pups are disclosed. This will allow owners to make an informed decision about whether they want a pup that has been conceived using AI, particularly AI(S); as this may be an important differentiation for some owners. Potential owners should also be privy to the justification for using AI, i.e. such as for behavioural or anatomical reasons. In order to respect the autonomy of potential owners, this information should be logged in the breeding record and should be offered (i.e. this is a positive duty) to owners rather than being made available on request. The use of AI may compromise the reliability of the parentage information as semen may be ‘mixed’ or the origin may be difficult to verify. However, this risk could be managed through current systems such as breeder certification and veterinary supervision of AI (e.g. the use of stud books and mandatory DNA sampling at the time of semen collection etc.).

Affordability of products (OF)

Recently, the International Association of Human-Animal Interaction Organizations declared that “it is a universal, natural and basic human right to benefit from the presence of animals”. The introduction of AI technologies could result in a number of specialized breeds being prohibitively expensive for some members of society. If that was the case, an increase in the use of this technology within the dog-breeding community may be seen as an infringement, and therefore, unfair to some economically disadvantaged members of the dog-owning community.

Veterinarians

Satisfactory income and working conditions (VW)

Unlike human health professionals where services are supported via public funding, veterinarians operate in a market environment where the quality and diversity of their services influence their income streams. Veterinarians who invest in new skills and are able to offer additional services can enhance the profitability of their practice and their personal income. In a market environment, this can result in a competitive advantage over rival practices. The ability to respond to clients’ needs and offer new services, such as AI, enhances (respects) veterinarians’ wellbeing.

Professional freedom (VA)

Freedom to innovate is an important driver of change in many fields and this is no less the case for the veterinary profession. By developing and applying new diagnostic methods, surgical techniques and veterinary products, veterinarians have improved the wellbeing of their patients as well as their clients (e.g. dog owners). The opportunity to use AI allows veterinarians to determine the best course of treatment for their patients so respecting their professional autonomy, particularly if the cause of the bitches’ infertility is a barrier that can only be overcome by AI. Artificial insemination may provide the only option for treating dogs that are compromised because of anatomical, physiological or behavioural problems.

Equitable standards of practice (VF)

It may be claimed that the availability of novel technologies, which are cost-effective but perhaps pose risks for animal welfare (e.g. surgical risks), could unduly influence the market and decrease the use of other non-invasive techniques that may require additional skills or be more time-demanding. In order to ensure the principle of justice is not infringed, adequate information would need to be provided to breeders and owners on the options for treatment. This could include advising against the use of an intervention method or possibly even advising against breeding from a particular dog. In addition, when considering the use of the different AI methods, the risks of each technique should be clearly stated and, if necessary, referral to other qualified veterinarians should be offered. This would ensure that trading and professional standards were not unduly influenced by lack of transparency in the market.

Society

Safety and social harmony (SW)

The routine use of reproductive technologies may affect the human–dog relationship by increasing society’s instrumental view of companion animals. However, the clinical ability to intervene and facilitate a successful pregnancy may further enhance the positive nature of
the animal–human bond. The impact on society’s wellbeing will be influenced by the justification put forward for using the technique and whether the stated ‘reasons’ enhance or infringe the human–dog relationship.

Democratic choice (SA)

The development and application of these techniques may result in the ability to conserve valuable genetic traits for the canine species and this could be seen as a positive impact. This will ensure society’s ability to choose the breed traits that it wishes to preserve and potentially allow future generations a degree of autonomy that may not have been possible without the application of these technologies. However, this argument is relevant to the use of the technique only when applied to specific breeding strategies, rather than for routine treatment purposes.

Fair resource allocation (SF)

Because the financial cost of using any form of AI will be born by the breeder and the potential owner of the new pup, the impact for the principle of justice for society will be neutral.

Ethical Evaluation and Discussion

Although, because of the limits of this paper, the ethical analysis has only initially mapped the possible impacts of the application of AI technologies in dogs, the analysis has highlighted a number of important issues. In order to come to a final judgement or position, the impacts for the various interest groups need to be weighed against each other (ethical evaluation). It is this weighing that can help identify the key areas of disagreement or value conflict between stakeholders. This process can also help identify knowledge gaps and areas of uncertainty. For some groups, the use of a scoring system (e.g. +1, 0, −1) can aid this weighing process, but it should be noted that the EM is a decision-support framework and not a decision-making tool. The use of numerical weighing in ethical evaluation has its limitations.

It is clear from the analysis that the use of AI may infringe ethical principles, particularly for the affected animal, but that it may respect other principles for breeders, owners and veterinarians. Any veterinary procedure has a risk of infringing an animal’s wellbeing and autonomy as well as potentially being unjust. However, veterinarian intervention is repeatedly justified on the basis of clinical ‘need’ (i.e. inflicting acute pain for long-term benefit). One of the key issues in the debate that surrounds the use of AI is the interpretation of ‘need’, as any ‘unnecessary procedure’ would represent an infringement of the dog’s wellbeing and would not be an ethically acceptable intervention under the majority of EU veterinary codes of practice. This implies that before AI is considered appropriate a comprehensive reproductive assessment must be carried out by a veterinarian. It also implies that a sequential approach should be applied with the justification for each decision step [i.e. ruling out natural service and proceeding to the use of AI(V)]. This information should then be proactively offered to future puppy owners and kennel clubs, etc.

While the use of AI can result in a number of positive ethical impacts (for example for disease control or preservation of genetic material), which outweigh potential risks, such benefits appears to be predicated on four conditions: (i) a sequential decision-making process, which ensures that the use of AI is applied after natural mating options are ruled out for clinical reasons, (ii) informed choice for breeder and owner is ensured through proactive information provision and appropriate record keeping, (iii) veterinarian competence in use of AI technologies is ensured, and (iv) the welfare consequences for the bitch are measured as negligible.

If AI per se is acceptable under these conditions, it also appears that the judgment on whether surgical AI is acceptable (when all other options are excluded) is modulated by evidence on (i) the incidence and nature of the reproductive failure and (ii) welfare consequences for the bitch. What appears to confound the assessment of these two issues is a paucity of data. The literature contains very few reports on the consequences for the bitch and there are even fewer studies that record the frequency of use and the form of the decision-making process. There is a significant need for peer-reviewed evidence in these areas in order to facilitate an informed ethical evaluation.

Without explicitly conducting an ethical analysis, a number of national bodies and professional organisations have articulated their approach to ‘weighing’ the conflicting impacts and set out their ethical positions (e.g. through guidelines, regulations, etc.). It is useful here to examine a few of these positions and to reflect on the risks associated with these strategies. In the UK, the Royal College of Veterinary Surgeons (RCVS) set out their position (RCVS, 2005), stating that, although the use of surgical AI ‘is unlikely to be carried out in the best interests of any particular dog’, veterinary surgeons may perform the procedure when justified (e.g. ‘for example, the incorporation of new genetic traits’). The RCVS indicated that the reasons for not using other approaches, e.g. transcervical insemination, should be recorded. The RCVS approach is more conservative than that applied in the USA where AI(S) is more commonly used. It is important to note that the RCVS’s ethical position is based on the assumption that, in exceptional circumstances, the potential welfare consequences for the dog are acceptable only if a sequential decision-making process and good record keeping occur. However, no explicit advice is given on ensuring informed choice [i.e. information provision on the availability of AI(TC)] or whether the ‘recorded justification’ for the procedure will be audited and reviewed by the RCVS. Because the surgical procedure is invasive, there may also be a proactive duty of care for the attending veterinarian to monitor and report on the welfare outcomes for the bitch. These three aspects may represent a significance risk to the RCVS’s principled approach (ethical position) on the use of AI(S).

Some EU countries, for example, Sweden, have prohibited the use of AI(S). In the light of uncertainty
regarding the welfare consequences for the dog, these countries appear to have applied a much more precautionary approach and have advanced their responsibility to the dog (duty of care) over the autonomy of breeders and veterinarians. The decision also appears to be predicated on the availability of viable alternatives. Although some clinicians have argued that this type of ‘ban’ is unworkable, as the availability of viable alternatives is extremely limited (i.e. there are few surgeons who can perform the AI(TC) procedure successfully), others have argued that such a position may enhance veterinarian wellbeing and autonomy in the long-term by encouraging: (i) innovation through research (i.e. development of new techniques and enhanced semen preservation) and (ii) personal investment in insemination training.

In conclusion, the use of AI raises some important ethical questions which cannot be fully analysed and evaluated here, however, the veterinary and research community can take several proactive steps to reduce the ethical risks associated with this reproductive technology by: (i) clarifying clinical decision-making, (ii) enhancing informed choice among clients and (iii) increasing the knowledge-base on potential impacts and the use of all methods of AI.

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