An Examination into the Embryo Disposal Practices of Human Fertilization and Embryology Authority Licenced Fertility Centers in the United Kingdom

ABIGAIL MAGUIRE

Abstract: When fertility centers dispose of embryos, how should this be done? Current regulatory guidelines by the Human Fertilisation and Embryology Authority state that, when terminating the development of human embryos, a clinic should act with sensitivity, taking account of the embryo's "special status" and respecting the interests of the gamete providers and recipients. As yet, it is unclear as to how and to what extent this achieved within fertility clinics in the UK. Resultantly, this paper examines the largely undocumented domain of embryo disposal practice. By undertaking an empirical study into policy and procedure and noting divergence in clinic practice, it then comments on the ethical implications of these protocols for patients and practitioners. Specifically, this paper argues for a more holistic approach to embryo disposal. An approach that effectively meets the requirements of the lab, is respectful of the "special status" of the human embryo, and, perhaps most importantly, reflects the multifaceted needs of the patient.

Keywords: embryo disposal; Human Fertilisation and Embryology Authority; fertility clinics; human embryo

Introduction

It is hard to miss the substantial impact that in vitro fertilization (IVF) has had on scientific progress, human reproduction, and society at large. However, with the numbers of those born through artificial reproductive technology only set to rise, centers and individuals are increasingly faced with deciding the future of "spare" or unwanted embryos. By the very nature of the IVF process, it is impossible to know the exact figure of embryos that will be suitable for transfer at oocyte retrieval. Resultantly, patients are often left with supernumerary embryos that are surplus to requirements. When faced with complex decisionmaking determined by individual circumstance, they "may find it difficult to decide to what do next."[1]

Although several options exist for those facing disposition choices, discarding embryos is commonplace. Almost 2.5 million embryos have been discarded since data collection commenced in 1991, more than the total number of embryos transferred.[2] Much has been discussed concerning the moral permissibility of embryo destruction with polarizing discourse occurring in both private and public spheres. However, where the choice is made to discard embryos, little about the methods and techniques employed by UK clinics to bring about their demise has been considered. Under regulation by the Human Fertilisation and Embryology Authority (HFEA), as specified in the Code of Practice, clinics should:

> …take account of the special status of the human embryo when the development of an embryo is to be brought to an end. Terminating the

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> development of embryos and disposing of the remaining material should be approached with appropriate sensitivity, having regard to the interests of the gamete providers and anyone for whose treatment the embryos were being kept.[3]

As yet, it is unclear as to how and to what extent this is achieved within HFEA licenced fertility clinics in the UK. As a result, the purpose of this paper will be to examine this largely undocumented domain of embryo disposal practice.[4]

Why are Embryos Destroyed?

The cryopreservation of embryos is an accepted part of the IVF process and approximately half a million embryos are currently in storage in the UK.[5,6] With elective single embryo transfer (eSET) becoming standard practice, and clinics aiming for low multiple birth rates (<10%),[7] more embryos are created than are routinely transferred. Accordingly, surplus embryos are stored under liquid nitrogen until the point where a decision is made regarding their fate.

Multiple options exist for those facing decisions regarding their supernumerary cryopreserved embryos; they can be used in further treatment cycles, donated to others, donated to research and/or training, or destroyed. In cases where embryos are destroyed, they are withdrawn from cryopreservation and "allowed to perish."[8,9,10]

Currently, in accordance with mandatory HFEA licence conditions, clinics must have "a documented system in place that ensures the identification of all gametes and embryos from procurement to use or disposal."[11] Since 2009, centers have reported both the number of embryos withdrawn from storage and the cause for doing so, on the "Embryo and Gamete Movement—Out" form.[12] Aside from donation, the form records two reasons for the removal from cryopreservation as either "Withdrawal of consent" or "End of storage period."[13] Where consent to the cryopreservation of embryos is withdrawn, patients must record this in writing on the relevant HFEA "Withdrawing your consent (WC)" form. By withdrawing their consent to embryo cryopreservation, an individual will "automatically consent to allowing… [their] embryos to perish."[14] Alternatively, when the maximum statutory storage period is reached, embryos must also be removed from cryopreservation. Ordinarily, this time period is 10 years, although can be extended in the specific instance of premature infertility up to a maximum of 55 years.[15]

How are Embryos Destroyed? What We Know So Far

As previously mentioned, the HFEA Code of Practice specifies that the disposal of embryos should be approached with "appropriate sensitivity" and conducted in such a way that "takes account of the special status" of the human embryo, while "regard[ing]… the interests" of all involved parties.[16] However, there is no specific guidance as to how this is to be applied in practice.

Under the Human Fertilisation and Embryology (HFE) Act 1990, it is the duty of the nominated "person responsible" to ensure that the "proper arrangements (for embryo disposal) are made."[17] Thus, clinics have individual policies and procedures regarding embryo disposal. However, when this is taken alongside information presented on the HFEA website that when embryos are disposed of, they are "simply removed from the freezer and allowed to perish naturally in warmer

temperatures or water,"[18] an inconsistency occurs. Thus, the question arises, "who is it that decides how supernumerary embryos are disposed of?", the HFEA or fertility centers? Further, if clinics are free to decide their own policies and procedures, what exactly happens? This ambiguity, alongside the lack of literature and debate surrounding the topic of embryo disposal practices in the UK, necessitates further exploration. Resultantly, research was undertaken to ascertain the exact nature of clinic practices.

Methods

A survey instrument was developed in the form of an online, cross-sectional, anonymous questionnaire. With approval from the St Mary's University Ethics Sub-Committee, the questionnaire was initially piloted among a small sample size. The feedback was used to refine the instrument, making improvements to its clarity and form. Then, in June 2018, the questionnaire, in its final form, was emailed to HFEA licensed fertility centers, for the attention of either the laboratory manager or the designated "person responsible." There exists no central database for the correspondence details of these positions, and so individual clinics had to be contacted by telephone in order to gain the correct mailing address. Of the 133 clinics regulated by the HFEA, only 80 provide services of IVF, ICSI, or IVF for patients with communicable viral disease.[19] Additionally, some centers share facilities or are satellite clinics for other centers; meaning that three clinics were ineligible for the study. A further clinic was uncontactable. Thus, 76 clinics in total were eligible to receive the questionnaire.

Most of the survey questions were closed-ended and used either nominal or modified ordinal scales in order to minimize respondent burden. However, questions specifically regarding disposal practices and techniques were more suited to open, qualitative methods.

Results

Of the 76 centers contacted, 26 (34%) responded by completing the survey. One participant started, but did not complete the questionnaire, leaving 25 surveys available for analysis.

Disposal Practices

All centers had a predetermined policy for standardizing embryo disposal practices and techniques. When asked about the exacting nature of these practices, participants were free to describe briefly and, in their own words, what happened within their setting. Based on the responses ($n = 25$; 100%) to this question, disposal practices can be broadly categorized into three main stages: consent and verification; removal of the embryo from storage; and the disposal of the now nonviable embryo.

Consent and verification. In their description of disposal practices, 19 respondents (76%) chose to mention the actions taken before an embryo is removed from storage involving either consent and/or checking. 14 (56%) directly mentioned that patient consent was checked prior to disposal. Some chose to describe the appropriate forms

that were completed in order to obtain this consent (in-house and/or relevant HFEA form).[20] A further 4 (16%) mentioned that additional contact was made with patients to confirm their wishes for embryo disposition. A variety of checks were reported including cross-referencing patient(s)'s signatures against other records ($n = 10$; 40%); identity confirmation using unique patient identifiers ($n = 3$; 12%), or verifying paperwork more generally ($n = 7$; 28%). Twelve respondents (48%) stated that the cross-checking process extended to the embryo straws in the cryogenic vessels. Finally, 18 respondents (72%) commented that the checking process involved the work of two embryologists or members of the laboratory team.

Removal of embryo from storage and disposal of the nonviable embryos. When asked to describe clinic disposal practices, 22 participants (88%) referred to the removal of the embryos from cryogenic storage in liquid nitrogen. 15 (60%) noted that the removal was witnessed and overseen by two embryologists. Some ($n = 15$; 60%) chose to detail the thawing process immediately following the withdrawal of the carrier devices from the cryogenic storage tank. Of these, 7 (28%) mentioned that the embryos were left to warm rapidly to room temperature. Two (8%) recorded the time that they were left as 30 min and 2 h, respectively, and a further respondent indicated that the thawing embryos were left in a designated area on the laboratory bench. Four (16%) respondents expressed that embryos were exposed to air, with two explaining that this would render them immediately nonviable due to osmotic shock. Several other methods were articulated, with respondents claiming that their clinic placed embryos into water ($n = 2$; 8%) or alcohol/70% ethanol ($n = 2$; 8%). Twenty-one (84%) noted that after the process of removal from storage was complete, the storage devices containing the embryo(s) were placed in the clinical waste or sharps bin, to be sent for incineration.

Patient Involvement and Preference

When respondents were asked whether patients were permitted to observe the discarding of their embryos, 17 (68%) indicated that, to their knowledge, this had never occurred within their setting and 8 (32%) indicated that this would be accommodated upon patient request. Two clinics (8%) recalled times where patients had requested to be present during the discarding, and the clinic had fulfilled their request. One respondent (4%) noted apart from one occasion, "no other patients have specifically requested to watch or even (asked about) the method of disposal."

Twenty-one clinics (84%) stated that the disposal of embryos within their setting was not marked in any significant, ceremonial or commemorative way. However, two (12%) recorded occasions where patients have taken their thawed, nonviable embryos away to make their own personal disposal arrangements such as cremation or burial. Additionally, two respondents (8%) commented that they had been asked by a patient to say prayers and/or significant words while in the process of removing embryos from storage, and a further respondent stated that the disposal of embryos was significant in that it was witnessed and documented by a second person.

Alternative Provision

The final section of the questionnaire inquired into the prospect and availability of any alternative provision at the centers. Building upon a previous question, 15 (60%) of

clinics affirmed that, although not exclusively advertised, they would permit patients to take their nonviable embryos home upon request. Eight (32%) noted that patients were not allowed to do so, whereas two (8%) indicated that although this was not currently an option, it would be considered should they ever receive such a request.

Finally, respondents were asked about compassionate transfer, when an embryo is transferred into a woman's uterus at a time where she is extremely unlikely to get pregnant. Thirteen (52%) of clinics had never provided this provision, nor had patients ever enquired about it. One clinic (4%) would permit compassionate transfer on patient request, and the remaining 11 (44%) had not yet considered the procedure but would do so in the future, if appropriate.

Summary of Results

This first examination of embryo disposal practices in the UK reveals certain areas of practice that are consistent across all HFEA licenced clinics. The results highlight that fertility centers have a high regard for principles of consent, verification, and double witnessing. Resultantly, they implement rigorous methods within their policies and practices to ensure that these principles are upheld. The results gained from the questionnaire in this area are unsurprising. Embryology laboratories are required to "have in place robust and effective processes to ensure that no mismatches of gametes or embryos or identification errors occur."[21] Failure to do so has obvious and "catastrophic consequences."[22] Resultantly, centers are obliged to "double check the identification of samples and the patients or donors to whom they relate at all critical points of the clinical and laboratory process."[23]

However, the results also reveal significant diversity in policies relating to actions that occur after an embryo is removed from cryopreservation. Clinics recorded four differing methods of rendering a frozen embryo nonviable. This discrepancy draws attention to the mistaken claim on the HFEA website that embryos are "simply removed from the freezer and allowed to perish naturally in warmer temperatures or water."[24] Clearly, this is not always the case. Although the use of water or a change in temperature is used in some clinics, the statement does not account for alternative methods that are used (such as the use of ethanol).

Further, the results of the survey indicate a variety of clinic attitudes toward patient involvement in the disposal of embryos. Most clinics would be willing to accommodate the preferences of patients in this area, but the responsibility of requesting such involvement lies solely on the patient. The majority of clinics do not mark the disposal of embryos in any significant, ceremonial, or commemorative way. Resultantly, establishing the permissibility of patients' requests is done reactively and not often considered in advance. Although based on this survey, the frequency of patients asking to be involved in the process of disposing of their embryos is rare, there also seems to be a lack of awareness (from both patients and clinics) of alternative or more nonconventional options that may be available.

The study must also be considered within its limitations. First, the response rate of the survey instrument was relatively low (34%), leading to a small sample size. The answers of those who did not respond may well have differed from those that did respond. As such, it is not possible, from this study, to gain a complete cross-sectional view of embryo disposal practices across the UK. Second, the possibility of response error is also acknowledged with the risk of social desirability bias present. Some respondents may have answered the survey in such a way that

overemphasized more socially acceptable practices. Or, conversely (and perhaps more likely due to the sensitive nature of the study), they may have failed to describe practices that were perceived to be less socially or morally acceptable. Nevertheless, the possible occurrence of both of these potential limitations is unknown, and so insightful conclusions can still be gained from the data recorded. Most notably, the outcomes of the survey raise some fascinating issues surrounding the difference between clinic policies and the rationale behind them.

Discussion

The debate concerning the status and nature of the embryo is both contentious and ongoing. Opinion is polarized, often complex and typified by a lack of consensus. In addition to being biological entities, embryos are subject to social, cultural, religious, and political construction.[25,26]

In light of such varying, deeply-held, and discordant standpoints on the status of the embryo, it is easy to see how statutes and guidelines in this area are regarded by some as "muddled,"[27] "conflicting,"[28] and "problematic."[29] The embryo occupies that which Elves and McGuiness deem a "liminal space"[30] in UK jurisdiction. Neither the *in vivo* nor the *in vitro* embryo has independent legal rights until birth. However, this does not mean that the embryo is completely exempt from some level of juridical protection. The embryo accrues escalating legal safeguards in line with development and is also conferred a "special status" at all expressions of development.[31]

This "special status" finds its basis in the initial work of the Warnock Report,[32] where it was suggested establishing when the life or personhood of an embryo begins are "complex amalgams of factual and moral judgements."[33] As such, they were largely irresolvable. Resultantly, the committee chose instead to focus on the primarily pragmatic question of "when… do we begin to think of [the embryo] as something that merits protection?"[34] In answer to this, it was decided that all embryos, regardless of their stage of development should be entitled "to some added measure of respect beyond that accorded to other animal subjects."[35] However, such legal measure should not be "the same status as a living child or adult."[36] It was this intermediate measure of respect, somewhere between animal and child, that afforded the embryo its "special status."

Some have criticized the notion of the "special status" of the embryo, claiming it to be "radically ambiguous"[37] and "unintelligible, meaningless, and bound to be discarded."[38] Although the determination of the embryo's status is an important ethical and practical consideration, these comments amplify the tension that exists between the seemingly paramount principle and its less defined rationale. In the report, the Warnock Committee failed to articulate what constituted a special status, which criteria the status should be based on, or a suitable justification for its value. The same is true for the present day where there is no widely accepted or detailed definition of the "special status" of the embryo from a UK regulatory or legislative context. Consequently, it is difficult to ascertain how clinics should take account of this "special status" when disposing of embryos.

Embryo Disposal Policies and Human Tissue Policies: A Comparison

Regardless of the complex ethical and pragmatic deliberations of an embryo's status, they are afforded (as previously stated) a measure of protection and are

handled accordingly, in a manner that is careful and considered. Even if one were to regard the embryo as having no moral, legal, or special status, they should, at the very least, be due the same treatment in their disposal as other human tissue. The disposal of other human tissue is regulated by the Human Tissue Authority (HTA), and the relevant sections of its guidelines are worth detailing.

The Code of Practice A claims that "the disposal of human tissue should be managed sensitively and the method of disposal should be appropriate to the nature of the material."[39] It recognizes the divergence in attitudes toward the use and disposal of tissue and affirms that "each case and decision is an individual and personal one, and should be treated as such."[40] Under the Human Tissue Act 2004, it is lawful for surplus tissue to be dealt with as waste.[41] However, "processes should be in place to inform donors of how their tissue will be disposed of."[42] On a pragmatic level, the HTA also recommends that "it is good practice for human tissue to be bagged separately from clinical waste."[43,44]

Nevertheless, the HTA's guidelines for tissue disposal are, for the most part, more comprehensive in comparison to the HFEA's guidelines for embryo disposal. Although both agree that remaining material should be dealt sensitively, the HTA also gives practical guidance as to what this disposal might look like by recommending that human tissue is stored separately from other clinical waste. For embryos, too, the results of the survey conducted in this study show that the final destination of most embryos was also in the clinical waste. However, although it cannot be known for certain, it is unlikely that this would be isolated from other clinical waste. Some respondents, for example, explicitly stated that the embryos were placed in the medical sharps bin, presumably alongside other entities. As a result, it could be argued that, at least from a practical perspective, embryos are treated with less sensitivity in their disposal compared to the treatment of other biological tissue.

In a further comparison, both governing bodies value the transparency of information in order for patients to make informed choices. One of the HFEA regulatory principles, for example, is to "give prospective and current patients and donors sufficient, accessible, and up-to-date information to enable them to make informed decisions."[45] Yet, although the HTA is explicit in informing individuals as to how their tissue is destroyed, the HFEA seems, for whatever reason, less forthcoming with information pertaining to the exact nature of embryo disposal. As previously observed, the HFEA does make reference, in several places, to embryos being "allowed to perish." However, it is difficult to reconcile the HFEA's presumed desire for transparency with its failure to explain or describe embryo disposal practices, *per se*. Further, upon the sparse occasions where the nature of this practice is elucidated (as being "simply removed from the freezer and allowed to perish naturally…"[46]), the account is not always reflective of clinic procedure revealed by respondents in this study. For instance, it is difficult to see how placing an embryo in alcohol might constitute a "natural" perishing.

The discrepancy between clinic practice and the aforementioned description of embryo disposal on the HFEA website is a cause for concern. As it stands, research suggests that in regard to embryo disposal, patients "lack any real information about what the process actually entailed."[47] Although it is recognized that patients are not required to have an encyclopaedic knowledge of the medical-technical procedures, they should be "given enough information to enable them to understand the nature, purpose, and implications" of any proposed action.[48] With

information scarce, and what is available being potentially inaccurate, principles of transparency and honesty are undermined. At a minimum, this may leave patients unnecessarily confused as to what actually happens to their embryos. It is also conceivable that consequences could be more severe where a lack of basic confidence is instilled, and patients are uncertain as to whether the embryo discard has even taken place.[49]

Having addressed the considerations due to the embryo's status and nature in regard to its discard from a regulative perspective, attention is now drawn to embryo disposal in relation to the patient or gamete provider.

Patient Perspectives on Embryos and Their Disposal

In many ways, approaching the termination and disposal of an embryo with "appropriate sensitivity"[50] is a subjective concept, inextricably linked to a person's conceptualization of the embryo. It seems difficult to know how to treat an embryo with appropriate sensitivity without first understanding its perceived value to the patient.

For patients, disposition decisions regarding the fate of frozen embryos are surrounded by ambivalence and uncertainty. Reaching a resolution presents emotional challenges[51,52] and involves both cognitive and psychological difficulties.[53] Frequently, patients change their minds[54,55] and put off decisionmaking for as long as possible.[56] Further, in both academic and more popular circles, it is indicated that many patients find no single "acceptable" disposition choice,[57] and so decisions are based on the rejection of less desirable alternatives (i.e., they choose the least, worst option).[58,59] However, arguably the most important factor influencing how patients decide the final destination of their surplus embryos is their personal conceptualization of the preimplantation embryo itself.[60,61,62]

Patients' Conceptualization of the Embryo

As is true of the rest of society, patient perceptions of embryos are varied and complex, subject to change, even as treatment progresses. Some patients regard embryos as a collection of cells not dissimilar to other human tissue. Others, however, hold a view at the other end of the spectrum and pursue a "life discourse"[63] where embryos are perceived to be a human life and are, to a greater or lesser degree, personified as "virtual children."[64] Where patients identify their embryos as "life," their understanding of what this life constitutes or when it begins is also varied.[65] Nevertheless, their narrative is one of "life" comprising something other than a purely biological process, toward more of a philosophical value judgement. For instance, some patients conceptualized their embryos in terms of kinship, genetically linked to their family[66] or as siblings to existing children.[67]

The narrative of life and death with regard to the preimplantation embryo is, at times, problematic. Ellison and Karpin note that the embryo "can be made to pass from a state of apparent life to a state of apparent death by exposing it to nothing more taxing than room temperature."[68] As such, it occupies a "hinterland between activity and inactivity rather than the clearer boundaries of life and death."[69] The HFEA too, in its readily accessible literature, is careful to avoid the language of life and death, choosing instead to use terminology that is less polarized and arguably more passive and permissive. "Allowed to perish" is the most usual phrase used in

reference to embryo disposal, which implies a "natural disintegration"[70] rather than action conducted by an individual or group, something that is "allowed" to occur within the hidden realm of the embryology lab where the patient's involvement is not required nor necessary. Accordingly, and as the results of the survey indicate,[71] patients may not have considered or even know about the range of alternative options available to them.

However, the view that embryo disposal is a passive event is not one that is reticent of all parties. Sheryl De Lacey, in discussion of her 2017 study, describes the fluidity of the way in which patients construct the discard, noting; "on the one hand, it was perceived to be a natural and inevitable ending. On the other hand, it was perceived to be an unnatural and sudden death that was brought about through deliberate intervention."[72] As a result, patients may refrain from disposition decisions, such as disposal, for fear of causing harm or suffering to their embryo or because they consider disposal as analogous to termination or even murder.[73]

The Disposal Decision and the Quest for Choice

In light of the patients' different conceptualizations of cryopreserved embryos and their disposal, it is clear that their experience appears dissimilar to anything else that they may have previously encountered, making disposition decisions all the more complex. Patients frequently become attached to their embryos, perhaps due to the construction of their embryos in terms of a form of life but also because of what the embryos represent. For many, their fertility journey spans years or decades and involves significant financial, emotional, and durational investment. Having embryos in cryopreservation acts as a marker of success or achievement, in a way that fresh embryos discarded in the course of treatment do not.[74] Further, embryos also exist as a symbol of a patient's relationship with their partner, beyond a purely genetic link, as a representation of the couple's connection with each other.[75]

As embryo disposal is such a complex experience, patients are often unsure how to make sense of their experiences. Consequently, they translate or map their experiences onto more familiar ones in order to construct meaning from them. Thus, some patients consider the experience of embryo disposal in terms of "stillbirth, miscarriage, pet, or human death, [they] described feelings of grief and, in some cases, outline rituals that mimicked human or pet cremation and burial practices." [76]

The extent of loss experienced by patients as a result of embryo disposal may not be exactly equivalent to postimplantation or perinatal loss.[77] However, de Lacey, notes fertility clinics often fail to acknowledge patient's embryo discard as a form of loss. Resultantly, those interviewed "shared the common themes of wanting to discard their embryos in a more respectful way than medical disposal…."[78] It is recognized that, for some patients (as in other forms of reproductive loss), discussions about embryo disposal practices may not be appropriate, either because they do not wish to know or because they would like the clinic to handle the matter on their behalf. Nevertheless, for those who desire, the need exists for patients to be able to make more purposeful choices about feasible, more considerate, or compassionate embryo disposal practices. Pragmatically speaking, the way in which embryo disposal could be deemed as being more respectful, ritualistic, or considerate will be deeply personal to a patient and a matter of individual choice. However, several alternative practices could be considered such as taking embryos home; marking the

disposal of the embryo in a significant, ceremonial or commemorative way; being able to observe the discard; forms of ritualism or memorialization; or the option to select alternative disposal methods such as compassionate transfer which uses the female body to provide a final destination for the embryo.

Conclusion and Recommendations

Issues surrounding the creation, use, and handling of embryos have long been the subject of much bioethical debate. For embryo disposal, specifically, the matter is fraught with both legislative, ethical, and personal challenges. Until now, the exacting nature of embryo disposal methods has remained largely undocumented. However, in undertaking research in this area, this paper has not only gained valuable insights into clinic procedure but also begun to open up discussion that, it is hoped, will ultimately lift the taboo surrounding embryo disposal.

Overall, the study revealed that the demise and disposal of surplus embryos is work that is undertaken carefully by clinics. Centers consistently adhere to effective and robust disposal policies that prioritize the principles of consent, verification, and double witnessing. This ensures the safety and legitimacy of any proposed disposition decision.

However, there was also some marked diversity in practices relating to methods of disposal. This has the potential to leave patients unnecessarily confused or doubting the transparency of any information provided. Additionally, the extent to which patients are able to be involved in the decisionmaking process relating to the disposal of their embryos (should they desire) is also limited, with clinics predominately acting reactively to patient requests.

With reference to embryo disposal, the HFEA stipulates that a center must take account of the embryo's "special status," act with "appropriate sensitivity," and consider the interests of the patient(s).[79] Yet, with no formal constitution of this special status, its criteria, or its justification, it is difficult to ascertain how clinics should "take account" of this status when allowing an embryo to perish. Nevertheless, on a practical level (complex deliberations of its moral status aside), it has been argued that embryos should, at the very least, be granted the same measure of treatment in their disposal as any other human tissue. Accordingly, the HTA provides some useful guidelines, such as ensuring that patients are explicitly informed as to how their tissue is destroyed and storing human tissue separately from other clinical waste.

Further, this paper also asserts that in order for embryos to be disposed of with "appropriate sensitivity," the patient's conceptualization of their embryo needs to be considered. Evidence suggests that patients' experiences and feelings toward embryo disposal are multifaceted, unique, and unparalleled. As a result, some map their experiences on to more familiar discourses of loss and grief. Consequently, the need exists for patients to be able to make individualized and purposeful choices about feasible embryo disposal practices, should they wish. By recognizing patients' differences in their conceptualization of the embryo and presenting several options to choose from, patients are free to decide a disposal method that they consider to be the most considerate or respectful. Alongside appropriate counselling and support, it is hoped that such an approach would empower patients in their decisionmaking in such a way that enables them to construct meaning from their experiences.

In light of concluding comments, it seems pertinent to end with some general recommendations arising from the research. These recommendations are primarily regulative and, as such, are addressed to the HFEA. However, with clinics engaging with patients daily, and implementing their own policies relating to embryo disposal, some of these recommendations will also apply to individual clinics.

1. Embryo disposal should, at the very least, be due the same treatment as the disposal of other human tissue under HTA regulation, that is,
    a. Patients should be explicitly informed of exactly how their embryos will be disposed of.
    b. Embryos that are discarded should be stored and bagged separately from other clinical waste.
2. The HFEA should ensure that accounts of the exacting nature of embryo disposal in its literature are consistent with the actuality of clinic practice.
3. Patients should be provided with more information about what the process of embryo disposal actually entails, including but not limited to alternative ways of destroying embryos to enable them to make an informed choice. Patients should also be free to decline this information should they wish.
4. Patients, if they desire, should be offered a more individualized arrangement for the disposal of their embryos that accounts for their personal conceptualization of the embryo, acknowledges potential feelings of loss, and enables them to construct purpose and meaning from their experiences. They should be able to discuss and/or choose an alternative method of embryo disposal alongside clinic staff.

Notes

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10. See note 1, Human Fertilisation and Embryology Authority 2017, at 2.
11. See note 3, Human Fertilisation and Embryology Authority 2019, at 147.
12. See note 5, Human Fertilisation and Embryology Authority 2014, at line 20.
13. See note 7, Human Fertilisation and Embryology Authority 2009, at 6.
14. Human Fertilisation and Embryology Authority. Withdrawing your consent (WC) form. Version 7, 2017 Apr, at 3; available at https://ifqlive.blob.core.windows.net/umbraco-website/1421/wc-form.pdf (last accessed 23 Nov 2018).
15. See note 3, Human Fertilisation and Embryology Authority 2019, at 51.
16. See note 3, Human Fertilisation and Embryology Authority 2019, at 151.
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