

Original Article

Post-mortem Sperm Retrieval and Posthumous Grandparenthood in the United States and Internationally

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ABSTRACT

Postmortem sperm retrieval (PMSR) is a procedure to procure sperm from a man who has been dead for a short period of time, or a man who has been declared dead by neurological criteria and is being kept alive artificially. Requests for PMSR are typically made by widows with the intention of using the sperm for artificial insemination in the future, but this is not always the case. This article examines requests for postmortem sperm retrieval from parents and family members. I will first overview the legal landscape and policies regarding PMSR internationally. Next, I will provide two clinical cases of requests for postmortem sperm retrieval from parents and family members which occurred at a major medical center in California, USA. I will then analyze the salient ethical features with particular emphasis on California laws and Israel posthumous grandparenthood policies. Requests for postmortem sperm retrieval from parents, which will not necessarily result in posthumous grandparenthood, will become more frequent. This is a compelling reason for major hospitals to draft policies. I conclude with policy suggestions for this rarified request, which I believe will become routine in the future.

Keywords: Postmortem sperm retrieval; ethics; posthumous grandparenthood; policy

INTRODUCTION

Post-mortem sperm retrieval (PMSR) is a procedure to procure sperm from a man who has been dead for a short period of time, or a man who has been declared dead by neurological criteria and is being kept alive artificially. In previous decades, PMSR was accomplished by cutaneous vibratory stimulation and rectal probe electroejaculation [1]. Currently, PMSR is done by en-bloc orchiectomy (castration) with epididymectomy and vasal sperm aspiration; orchiectomy plus epididymectomy; epididymectomy alone; or electroejaculation [2]. Sperm is viable up to 24 to 36 hours after cardiac death, depending on the method of extraction [3].

Requests for PMSR are typically made by widows with the intention of using the sperm for artificial insemination in the future, but this is not always the case. This article examines requests for post-mortem sperm retrieval from parents and family members. I will first overview the legal landscape and policies regarding PMSR internationally. Next, I will provide two clinical cases of requests for post-mortem sperm retrieval from parents and family members which occurred at a major medical centre in California, USA. I will then analyse the salient ethical features with particular emphasis on California laws and Israel posthumous grandparenthood policies. I

conclude with policy suggestions for this rarified request, which I believe will become routine in the future.

LEGAL LANDSCAPE AND POLICIES

Requests for post-mortem sperm retrieval remain relatively rare, but have garnered sufficient medical and ethical attention that multiple countries have produced laws governing its acceptability. From these laws, medical institutions have drafted policy.

International Laws, Policies, and Guidelines

Browne Lewis reports that, currently, PMSR is prohibited by law in Germany, Sweden, and France. Lewis also states that PMSR is conditionally legal in the U.K., Canada, Netherlands, and Greece with prior written consent [4]. According to Dostal, et al., in Eastern Europe, the Czech Republic practices PMSR with written consent; Estonia allows PMSR if assisted reproduction treatments are already in progress and attempted pregnancy occurs within one month of the death; Cyprus, Latvia, Lithuania, Malta, Poland, and Slovakia do not mention PMSR in legislation or guidelines; and Hungary and Slovenia prohibit PMSR by law [5]. Sikary, Murty, and Bardale indicate that Japan allows post-mortem sperm retrieval “if blood relationship and husband’s agreement are confirmed.” Sri Lanka has no guidelines or rules for PMSR, Pakistan forbids it, and Nepal, Bhutan, Bangladesh, and India have no guidelines in place [6]. In Australia and New Zealand, there are inconsistent, ambiguous, or absent laws regarding the retrieval and use of sperm after death. In some cases, there are guidelines without laws [7]. Domestic policies in the United States are checked as well.

United States Laws, Policies, and Guidelines

In the United States, the earliest guidelines on post-mortem sperm retrieval were published in 2003. They were derived from recommendations developed by an institutional review board (IRB) at Cornell University and were in use from 1994 to 2002. The criteria for accepting a request for PMSR required four components: 1) evidence of intended paternity from the deceased man, 2) legal consent from the next of kin (i.e. the widow), 3) sudden death (permitting retrieval less than 24 hours post-mortem), and 4) the widow consenting to a 1-year bereavement waiting period before use [8].

Ten years later, the Ethics Committee of the American Society for Reproductive Medicine (ASRM) issued *Posthumous Collection and Use of Reproductive Tissue: A Committee Opinion*. The 2013 opinion stated, in short, “Posthumous gamete (sperm or oocyte) procurement and reproduction are ethically justifiable if written documentation from the deceased authorizing the procedure is available.” They further clarified that “in the absence of written documentation from the decedent, programs open to considering requests for posthumous gamete procurement or reproduction should only do so when such requests are initiated by the surviving spouse or life partner” [9].

The pioneering policy work at Cornell University and the guidelines issued by the Ethics Committee of the American Society for Reproductive Medicine provide a framework for U.S. hospitals to create bespoke policies on post-mortem sperm retrieval. Nevertheless, very few hospitals have adopted policies. By 2016, a survey of 50 major academic medical centres in the United States found that only five had policies on post-mortem sperm retrieval (Columbia University, Cornell University, Tufts University, University of Iowa (Carver), and University of Virginia) [10].

Existing hospital policies are moving in the direction of honouring requests for post-mortem sperm retrieval in the context of prior written consent, yet policies have not yet been developed for post-mortem sperm retrieval in absence of a consenting spouse. For the purposes of this article, I will leave aside requests for post-mortem sperm retrieval from a fiancée, girlfriend, or casual lover since policies comment on these other sexual relationships by way of absence. Rather, my focus will be on requests from biologically related parents and family members. I will present two cases, at an academic medical centre in California (United States), which have been de-identified in accordance with standards of patient privacy.

CLINICAL CASES

Case 1

A young man in his mid-20's suffered an ischemic stroke. He was brought to the emergency room unconscious, put on multiple life supports, and later declared dead by neurological criteria. The patient was an only child. His parents were in their 50's and too old to have additional biological children. The patient did not have a wife or any children. The parents jointly request post-mortem sperm retrieval with the intention of use. It seemed that the parents wanted to find a gestational surrogate and raise the grandchild.

The patient had never given oral or written indication that he would want PMSR. He had never given consent for sperm banking while alive, and it was unclear what the patient's wishes would have been for marriage or paternity, had he survived.

Case 2

A young man in his early 20's was brought to the hospital following a sudden cardiac arrest. He was conscious while the medical team stabilized him. Within several hours his clinical condition deteriorated and he was declared dead by neurological criteria. The patient had parents, several adult siblings, and a girlfriend. The man did not have a wife or any children. The family, as a unit, requested post-mortem sperm retrieval.

The family reported that on several different occasions including the current hospitalization, a prior hospitalization, and in the home setting, the patient had verbally indicated that he wanted his sperm banked in case any of his siblings or friends had trouble conceiving. He did not mention wanting to have a child with his girlfriend, or any other woman he had a relationship with in the past. The family could not produce written documentation of his request, but several family members confirmed the content of this discussion, either to them directly, or in their presence. The parents, siblings, and girlfriend were unanimously agreed that this was what the patient wanted.

DISCUSSION OF ETHICAL FACTORS

Clearly these two cases have similarities: both are young, unmarried, childfree men whose family spearheaded a request for post-mortem sperm retrieval. Neither man gave written consent for the procedure. There are also relevant differences: Case 2 includes oral requests made by the patient over a period of time and on more than one occasion. Case 2 also has intended recipient/s. While both cases were prompted by family requests, the first case features a request for retrieval, with the intention of use, for cross-generation childrearing, while the second case was a request for retrieval, with possible use, and same-generation childrearing. These ethical factors will be analysed here, beginning with the legality of the requests.

Legality

In the eyes of the law, both cases are clear-cut: in absence of written consent and a spouse, post-mortem sperm retrieval and use cannot proceed. In California, where these cases occurred, restrictions are defined by Penal and Professional statutes.

The California Business and Professions Code Section 2260 (a) stipulates that gametes can be retrieved and used by the spouse without donor consent, or by someone other than a spouse with written consent from the donor [11]. Since neither man had a spouse, sperm retrieval could not proceed without written consent. Neither had given written consent and post-mortem sperm retrieval, in these cases, would have violated the law.

Laws must circumscribe guidelines and all hospital must draft policy in accordance with the law. In places where the law is ambiguous or silent there is room for interpretation. However, this was not the case. While I maintain that it would be reckless to draft guidelines or policies that flout laws, and that there is a very high bar for an action that is simultaneously ethical and illegal (e.g. violating racial segregation laws), merely stopping ethical analysis at the crossroads of law stymies moral reflection. Thus, the other salient aspects of this case will be discussed.

Consent

There are various ways of giving consent, some of which the law recognizes and some which it does not. Consent appears on a spectrum rather than a neat positive-negative dyad. Dead people cannot consent, but their ability to consent can be recorded prior to death and these wishes can be carried out. Such is already the case with organ donation, autopsy, and posthumous reproduction. In Belgium, all individuals undergoing fertility treatments are required to complete and sign a Convention specifying, among other scenarios, what will happen to their surplus gametes or embryos if they die [12]. There are numerous ways of obtaining prior written consent for PMSR from young men, such as during hospital admission, upon college enrollment, or during military enlistment. Therefore, flouting patient consent based on unforeseeable circumstances is not persuasive.

In the cases above, it cannot be said that consent was given because the standard elements of consent—including information about the procedure, possible benefits and harms, and alternatives—were not presented to the men. Nor were they asked directly if they would want post-mortem sperm retrieval. The well-cited *Scholoendorff v. Society of New York Hospital* definitively states, “Every adult person with capacity has a right to determine what shall be done with his own body; a surgeon who performs an operation without his patient’s consent commits an assault.” [13]. Of course, dead people do not have capacity and cannot give consent, but the crux of *Scholoendorff v. Society of New York Hospital* is communication and assent within the physician-patient relationship. This element was also lacking in both of the family’s request for PMSR, since the requests were never made to the physician from the patient but rather to the physician from the surrogate decision makers. Surrogate decision making is a privilege and responsibility with its own internal criteria for validity.

Surrogate Decision Making

In absence of written consent from the patient, medical decisions can be made by surrogate decision makers (SDM), who are usually the next-of-kin. Surrogate decision makers must follow a hierarchy for making these decisions, first, by identifying the previously expressed wishes of the patient. If this is unknown then, second, SDM ought to use substituted judgement, in an attempt to ascertain what the patient likely would have wanted. If this cannot be established, then, third, decisions should be made in the best interests of the patient [14]. SDM that proceeds along the first two lines must be able to provide evidence of the patient’s wishes by providing specific—not vague—examples. Accounts are fortified when multiple people can confirm the patient’s desires and if the patient themselves gave compelling reasons for their wishes. In both of these cases, the parents were the patient’s SDM by default, since neither patient had a written advance directive naming their surrogate decision maker nor a durable power of attorney naming their agent. In Case 1, there was no evidence that the patient would have consented to post-mortem sperm retrieval. The parents did not have a written or oral request and there were no conversations about PMSR. It was unknown what the patient’s wishes were and the SDM could not proceed on the basis of PMSR being in the patient’s best interest. In Case 2, the patient had not requested PMSR, but he had expressed a desire to have his sperm banked. Perhaps he intended on doing this while he was alive, but he did not.

In addition to the oral requests for sperm banking—but not PMSR—the family members in Case 2 could identify several occasions when the patient expressed a desire to donate sperm to potentially infertile siblings or friends. Moreover, the family reported that he had stated this wish to multiple family members, thus making his request widely known. However, repeated oral requests for sperm banking is not equivalent to requests for post-mortem sperm retrieval.

Finally, the context of the requests for sperm banking is significant. In Case 2, the family stated that one of the requests for sperm banking was made during a prior hospitalization and another request was made during the current hospitalization when the patient had time to reflect on his mortality and desires for his gametes following death. These vocalizations indicate a serious, rather than fleeting, desire for sperm banking. Yet, it is a *non-sequiter* that a strong desire for a procedure while alive would translate to consent for a similar procedure after death. Indeed, the conflation

of sperm banking and post-mortem sperm retrieval convoluted the issue. While the outcome of sperm banking and PMSR are the same—cryopreservation of one's gametes—there are several important ethical and technical differences between sperm banking while alive and PMSR.

Sperm banking can only proceed with informed consent. This ensures that the man understands the nature and process of banking, what will happen to the sperm after procurement, and how long it will be cryopreserved. Post-mortem sperm retrieval, in cases of a parent or family request, does not give information to the patient and lacks the element of consent. Furthermore, the manner in which sperm is obtained is different from the living and the dead. Sperm banking is most commonly done through masturbation with the use of pornography [15]. This is non-invasive, non-technological, and pleasurable. In contrast, PMSR is done through enbloc orchiectomy (castration) with epididymectomy and vasal sperm aspiration; orchiectomy plus epididymectomy; epididymectomy alone; rectal probe electroejaculation or sperm retrieval from the penile tract. Some men might find post-mortem sperm retrieval to be invasive, degrading, and outside of the way they would want their dead body to be treated.

A final salient distinction between sperm banking and post-mortem sperm retrieval is the opportunity to change one's mind about banking and subsequently request sperm disposal. While alive, a man retains control over his banked sperm, but in the absence of consent, PMSR removes self-determination from the patient and places it within the jurisdiction of family members. The patient may abdicate autonomy, but it cannot be taken from him.

It is undeniable that the patient in Case 2 wanted his sperm banked. This was his clearly expressed wish, made on several occasions, under different circumstances, to various family members. Despite this, during his life the man did not put into writing his desire for sperm banking, nor take steps to enact this rather simple procedure, or even discuss it with a clinician. More significantly, he never mentioned PMSR. Thus, it could only be said that sperm banking while alive would have been an accurate endorsement from the SDM, based on the patient's wishes. However, the surrogate decision makers had no basis for their request for PMSR. There was no evidence that post-mortem sperm retrieval would have been the patient's desire, nor would it be in the best interests of the patient. The request of the SDM was not valid. In addition to the primary ethical features of these cases—illegality and lack of consent—there were two other aspects of significance.

Relationship of the Potential Child to the Requesters: Posthumous Grandparenthood

In a typical case of post-mortem sperm retrieval, the person requesting the sperm is the wife or partner of the dead man and the potential child will be the offspring of the man and woman who were in a relationship. The Ethics Committee of the American Society for Reproductive Medicine affirms, "The desire of a surviving partner to have a child with the gametes of the deceased, in light of their intention to have a family together, may be viewed with sympathy" [16]. This was not the situation in either of the cases. Rather, it was the parents of the man in the first case and the parents of the man, supported by the siblings and girlfriend, in the second case, who requested the sperm. This generational and blood relationship alters the ethical dimensions of requests for post-mortem sperm retrieval.

The same ASRM Report indeed addresses a request for post-mortem sperm retrieval from the parents of the dead man with the intention of using the gametes to become grandparents. They opine, "A more troubling situation is when the request for gametes for posthumous reproduction does not come from a spouse or life partner, but from the parents of the deceased, who see this intervention as promulgating the legacy of their child or as the only way to become grandparents. Ethically, these situations are not comparable. In the case of a surviving parent, no joint reproductive project can ever be said to have existed. Nor do the desires of the parents give them any ethical claim to their child's gametes" [17]. The Ethics Committee of the American Society for Reproductive Medicine therefore recommends rejection of requests for posthumous grandparenthood in the absence of written instructions from the adult child.

In Case 1, the relationship of the potential child to the requesters would have been grandchild and grandparent and would not be endorsed by the ASRM. Beyond the ethical components, there are

logistical and practical implications of such an arrangement specific to this case, which would include finding a gestational surrogate, deciding if the child would have a relationship with the biological mother, concerns over the remaining lifespan of the grandparents, and the psychological and social welfare of the child. However, it is worth noting that Israel has permitted requests for posthumous grandparenthood, thus confronting some of the aforementioned concerns.

Israel

In Israel, petitions for PMSR are processed according to the non-legally binding *Israel Attorney General Guidelines* [18]. The guidelines support PMSR requests from a widow or partner on the basis of presumed consent of the dead man [19]. However, cases outside of these guidelines can be superseded by court order [20] and a number of parents have successfully petitioned courts for post-mortem sperm retrieval as well as post-mortem egg retrieval from their single, adult children [21]. Between 2003-2010, 10 of the 21 petitions for PMSR and freezing were made by a parent for posthumous grandparenthood [22]. Factors permitting PMSR requests from would-be grandparents in Israel are complex.

Israel's mandatory military service unites the country by policy, but also leaves families vulnerable to loss of only children. Empathy for the parents of fallen soldiers may add weight to successful requests for PMSR when they are in the context of combat fatality [23]. Denial of PMSR requests, in these situations, can be viewed as calloused. Moreover, courts have time pressure to authorize the procedure, due to limited sperm viability [24].

Modern social and political concerns of Israel, including ability to defend the country, territory wars, and shrinking numbers of Israelites, have led to permissive policies and laws encouraging reproduction—from the dead and the living [25]. In Israel, unlimited attempts at artificial fertilization are government-funded for all women up to 51 years old, until the birth of two live children [26]. Israel now has the highest percentage of babies born from in-vitro fertilization in the world, at 4% [27]. Israel also permits artificial insemination for single women, but sperm banks are anonymous. Hila Rimon-Greenspan and Vardit Ravitsky observe that the genetic mystery of sperm banks may make women more amenable to using sperm that has been obtained posthumously at the request of the parents [28]. This “sperm with a past” is appealing for the woman and also mitigates some of the logistical challenges of finding a surrogate who would give the child to the grandparents, social challenges of grandparents raising a biological grandchild, and concerns for the psychological and social welfare of the child.

However, Israel appears to be moving towards accepting requests for PMSR from parents without these safeguards. Yael Hashiloni-Dolev and Silke Schicktanz report that in 2014, the courts granted a request for PMSR from parents of a dead man without reference to their son's wishes and in 2016 “an Israeli judge decided in favour of parents who are planning to raise their grandchild on their own, using a surrogate and an egg donor who will not actively parent the child” [29]. This indicates that the *Israel Attorney General Guidelines* will increasingly be disregarded and their efficacy, importance, and credibility will continue to decline—new guidelines or legislation notwithstanding. Any new guidelines must address the unfounded assumption that a dead man would want his parents to continue his genetic lineage using PMSR.

Recent qualitative data indicates that posthumous grandparenthood is against the wishes of a majority of men surveyed. Young, childfree, Israeli men stated that request for posthumous reproduction is acceptable if it comes from wanting to leave a legacy, but not a memorial [29]. Thus, they would assent to PMSR if their wife or partner made the request, but not if their parents did so. Similar surveys have yet to be done in the United States or other countries.

Overall, the acceptance of posthumous grandparenthood is unlikely to be compelling outside of Israel. Primarily, PMSR requests from parents are widely regarded—by the ASRM, multiple country's laws, and most clinical practices—as unacceptable. While consensus is not always correct, there is oftentimes wisdom in the ethical reflections of the international medical community. Secondly, it is debatable to what extent national policies—like mandatory military conscription—should influence health care policy. If peace is a worldwide goal, then one could argue health care has an obligation to lobby for preventing mortality and morbidity related to war, rather than addressing the casualties of combat.

Regardless, a fundamental objective of health care is the health and healing of all people and military associated health care hazards are a reality. It is therefore necessary to offer medical assistance to soldiers and their families since they make sacrifices that, oftentimes, behove their own society. PMSR may be one safety net that health care can offer servicemen. To be sure, the United States military offers pre-deployment sperm preservation, ostensibly for this reason.

However, further analysis of reproductive programs appears to serve the military more than the individual. Soldiers who delay reproduction, become permanently disabled, or die are not always able to fulfil their procreative plans, while the families of fallen soldiers lose an irreplaceable family member. Thus, positing that the military should influence health care—at least in the case of PMSR requests from parents—is a shaky supposition since it fails to address the health care needs of the enlisted and their families. Israel's move towards honouring requests for PMSR from parents lends little credence to supporting posthumous grandparenthood elsewhere. However, cross-generation sperm use seems favourable.

In Case 2, although the request for post-mortem sperm retrieval was primarily made by the parents, it was not on their own behalf, but rather for sperm use by the patient's siblings and friends. This aspect assuages some of the ethical dilemmas raised by the ASRM and the logistical and practical implications listed above, while raising others.

A child, in this case, would be the nephew or niece of the patient—if a sibling used the sperm—and unrelated in the case of a friend's use. While there would still be concerns for the welfare of the child, [30] challenges inherent in cross-generation childrearing would yield to same-generation childrearing. On the other hand, if clinicians were to regard the request for PMSR coming indirectly from the siblings or friends, there would be issues with proximity of next-of-kin and questions about the rightful claims to the gametes of one's sibling. Even more troubling would be the implication of entitlement to gametes by friends, who are unrelated. Furthermore, in this particular case, there were other ways of honoring the intentions of the deceased man, such as having another brother in the family donate his sperm in the event of sibling infertility.

Although the request for post-mortem sperm retrieval is more palatable in Case 2 because of the emphasis on a child being created for siblings or friends instead of grandparents, the latter case would be equally unacceptable for a different reason. In absence of an advance directive or durable power of attorney, the parents of an unmarried child are generally identified as the decision makers and it is doubtful that they should be requesting PMSR on the behalf of one of their other children since it is a conflict of interest. Even less persuasive is that the parents may legitimately request PMSR for use by a friend who has no legal ties to the patient. Finally, I will consider the distinction between PMSR for storage and for use.

Retrieval Versus Use

In Case 1, the family requested post-mortem sperm retrieval with very clear intentions of using the banked sperm. In Case 2, post-mortem sperm retrieval was primarily for storage, with contingent use. In California, it is against the law to fertilize a woman without the consent of the sperm donor. California Penal Code Section 367g (b) states, "it shall be unlawful for anyone to knowingly implant (sperm, ova, or embryos), through the use of assisted reproduction technology, into a recipient who is not the (...) provider, without the signed written consent of the (...) provider and recipient" [31]. Thus, Case 1 should not proceed with PMSR and use because the patient did not specify who could be fertilized with his sperm. Neither the parents, nor anyone else, may direct the usage of another's gametes. It would be unprofessional and illegal to use sperm obtained from PMSR without signed written consent. In contrast, this particular law would be irrelevant in Case 2 since the primary content of the request was removal and storage, not use.

On the surface, it may seem innocuous to merely retrieve and bank the sperm. Collection can have a mollifying effect on the family in distress, especially if the intention is simply a "back up" plan. In other medical situations, the presence of options can facilitate better choices (e.g. hospice care with the option for hospitalization). I will bracket the concern that gamete storage without use can cause emotional turmoil over surplus gametes, since the latter situation could be partially remedied by an institutional policy on gamete disposal after a set number of years, thus relieving the burden

of a family having to authorize disposal.

However, doctors acceding to the request for post-mortem sperm retrieval and banking, even without intended use, is a case of “treating the family,” commonly seen in pediatrics [32] and could not be supported. Performing procedures on a human being without their consent for the emotional benefit of someone else is a breach of autonomy and contradicts the goals of medicine, which is to treat and heal and individual. Therefore, even PMSR without use, in this case, should not proceed on the basis that it would offer no curative or therapeutic benefits to the patient.

Law, consent, the relationship of the potential child to the requesters, and categories of sperm retrieval versus sperm use all played an interconnected role in the two clinical cases above. Although each case had overlapping and unique features, a detailed ethical analysis could not support PMSR or use. However, there may be cases where requests for PMSR from parents and family members would fall within clinical ethics.

POLICY SUGGESTIONS FOR PMSR FROM PARENTS AND FAMILY MEMBERS

Requests for PMSR will become more frequent in the medical industry and this alone is a compelling reason for all major hospitals to draft policies. In the case of requests for post-mortem sperm retrieval from parents and family members, there should be four criteria for consideration:

1. **Legality:** PMSR must be allowed by the state or country in order to proceed.
2. Written informed consent by the patient in the presence of a witness. Here, the stress is on the *informed* aspect of consent. PMSR must be clearly and clinically explained in a manner that lay people can understand.
3. **Specification of the terms of use:** The patient consenting to legal PMSR should stipulate who he intends his sperm to be donated to (e.g. siblings); under what social conditions (e.g. one or two socializing parents; financial stability; preclusion of embryos from being aborted, etc.); and a time frame for disposal. In Belgium, while PMSR is illegal, both posthumous insemination and posthumous embryo implantation may be legally provided if similar specifying conditions are outlined in a signed Convention, thus offering clarity and confidence for clinicians.
4. A one-year bereavement period before the sperm can be accessed by family members or friends. This parallels current U.S. hospital policies and is a compassionate and balanced approach to grieving parents and family members.

CONCLUSION: FUTURE ROUTINIZATION OF PMSR

The future of the medical industry may include not only requests for PMSR, but also routinization. Similarly, requests for post-mortem egg and uterus retrieval will need to be more fully addressed. In the United States, the tides of individualistic health care, in tandem with the booming artificial reproductive technology (ART) industry will make these procedures more common. Refinement of technology and sophistication of techniques in PMSR and ARTs will increase live birth rates and desirability of posthumous reproduction vis-à-vis PMSR. In this case, the “four topics” approach to clinical ethics—first proposed in 1982 by Albert R. Jonsen, Mark Siegler, and William J. Winslade—is relevant as a guide to navigate the complexity of PMSR.

The four topics for organizing ethical reasoning include medical indications, patient preferences, quality of life, and contextual features [33]. Quite simply, PMSR—regardless of consent or spouse—has no medical indications; does not support quality of life; and defies various contextual features, such as allocation of scarce medical resources and economics. Moreover, post-mortem sperm retrieval has enormous ethical and social consequences, not the least of which is the addition of another elective procedure to the immense carbon footprint of the medical industry [34]. The purpose and goals of PMSR needs to be seriously weighed against the principles of Green Bioethics and environmental sustainability, among other global concerns [35].

Despite skirting three of the four topics of clinical ethics, post-mortem sperm retrieval does, at times, fit firmly within patient preferences. Even so, it cannot be assumed that a childfree man

would be fertile and thus the objective of post-mortem sperm retrieval for use would be defeated. If the deceased man was fertile, it may be the case that he suffered from genetic problems or transmittable diseases that would render his sperm undesirable [36]. Given the circumstances of most requests for PMSR—sudden death—utilizing sperm taken from the deceased might give the recipient pause to consider if they would condemn their child to a similar fate of early and unpredictable death. Indeed, fear of hereditary transmission is one reason oncofertility use is lower than preservation rates [37]. Thus, hospitals must be prepared to address these aspects of clinical ethics by having policies that support rigorous ethical thinking and best patient care without wasting resources for futile procedures that will not physically benefit patient, family, or friends. Policies—like guidelines—fall short of legal standing but should also be given more *gravitas* than just a suggestion. PMSR will be an inexorable feature of modern health care. The medical industry should proceed with caution.

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