Preserving Future Possibilities

THE ETHICS OF EGG FREEZING

By David Cohen, MD

Imagine finding out you have cancer, but you haven’t yet completed school or found your life partner. Doctors tell you the tumor is treatable and that chances of surviving are higher now than in the past—75 percent compared to older figures of less than 10 percent. Imagine you are then told that the treatment has a high probability of leaving you infertile.

Your plans for life are changed in an instant. If you’re a man, you have the option of freezing sperm before initiating cancer treatment. This procedure is relatively simple and inexpensive. If you’re a woman, however, the opportunity to try to preserve fertility is much less simple. Freezing eggs, a process called oocyte cryopreservation, involves not only complex reproductive issues, but also intense ethical debates.
The American Society for Reproductive Medicine, the professional organization to which nearly all physicians offering these services to women in the United States belong, makes it clear that oocyte cryopreservation for any purpose is considered experimental, that patients should be aware of this fact and should be required to sign a consent form approved by an institutional review board.

At every step of these complex procedures, doctors and patients ask serious ethical questions. Consider the hypothetical case above. Should a procedure with such a low chance of success even be offered to this patient? Is it fair to offer what might be false hope to a woman at such a vulnerable moment? Who, if anyone, should have legal control of the frozen oocytes if she dies? Who should be involved in making these decisions?

There are dozens of questions and no easy answers. Should this technology be available to anyone? Should these procedures be offered to the younger woman who has chosen to delay having children while pursuing an education or a career, aware of her diminishing fertility with advancing age?

Understanding several fundamental reproductive principles is crucial to the consideration of freezing eggs. A woman of reproductive age with normal ovarian function most frequently produces only one mature egg, or oocyte, per month. In a healthy patient having unprotected intercourse, this oocyte has only a 10–20 percent chance of being fertilized and leading to a viable fetus. By comparison, the typical ejaculate contains more than 50 million sperm, of which at least half are typically viable. In order to overcome the small number of oocytes available, the ovary can be stimulated with medications that provoke the production of as many as 50 oocytes, but more frequently 10 to 20. This process is expensive and cumbersome. It requires that the woman receive multiple injections, takes at least 10 days to complete and demands expert monitoring to avoid dangerous side effects. Finally, in order for doctors to obtain the oocytes, patients must undergo an invasive surgical procedure.

Once harvested, oocytes traditionally are fertilized immediately, and the resulting embryos used right away or frozen. Recently, however, the technology has been developed to freeze unfertilized eggs. The technology to successfully “defrost” sperm has been around for decades, but while frozen sperm has essentially the same success rate as sperm that has not been frozen, success rates using frozen eggs are much lower than with fresh.

The discrepancy between success rates using sperm and oocytes after thawing results from differences in how the cells are constructed. Sperm are small compared to oocytes (4 microns versus 100 microns), and the water content of an oocyte is much greater, making the egg much more vulnerable to damage during the freezing process.

The water crystallizes when frozen, and the crystals act as shards inside the cell, tearing the machinery needed to permit normal cell division after fertilization. The crystallization phenomenon can be diminished using specific cryoprotectant compounds, but these may be toxic to the cell. Finding the right balance between protecting against damaging crystals and poisonous chemicals is the focus of many laboratory efforts.

Each oocyte, once obtained, must be isolated and prepared for fertilization in the laboratory and incubated with sperm for several days before the resulting embryo is ready to be transferred into the uterus. With “fresh” eggs, each embryo has an approximately 1 percent chance of successfully implanting. Therefore, more than one embryo is frequently transferred with the hope that at least one normal embryo successfully attaches.

If oocytes are frozen before fertilization, the chance of successfully conceiving after the oocyte is thawed, fertilized and transferred is 5 percent. And importantly, the woman’s age at the time the oocytes are obtained will predict the chances of an ultimately successful outcome, with the likelihood of success decreasing with advancing age.

At the Center for Reproductive Medicine and Fertility at the University of Chicago, we do not have a specific protocol to resolve all questions for all patients. Instead, we have adopted a practice of presenting complicated ethical questions to the University Ethics Committee to discuss all angles of each case, in a forum composed of individuals from many different backgrounds. Currently, we do not have any specific restrictions, and we have, thus far, resisted the urge to produce written criteria, preferring to consider each case separately.

We have recently vigorously debated how to offer a procedure to a healthy woman without misguiding her to a false expectation of success. Just explaining the process and the success rates, even if she clearly understands how poor they may be at the time, seems insufficient. We require each patient to accept in writing the institutional review board consent statement, as well as the standard surgical consent, before proceeding.

Additionally, we make it clear that the current cryotechnology is more likely to be successful with standard in vitro fertilization—that is, if harvested eggs are directly fertilized and the embryos frozen—than if the unfertilized eggs are frozen to be fertilized after thawing.

Reproduction has always been considered a fundamental right, and each new technology demands that medical experts reassess how we address the issues of the individual and society. As doctors, we are harnessed between our desire to give patients autonomy and our own need to respect our instincts of what we consider appropriate and safe interventions. At what point does a patient’s autonomy to make decisions about her reproductive options conflict with our duty to do no harm?

As we answer these questions, each patient must be considered individually. Reproductive technologies are changing at an amazing rate, and ethics committees that comprise physicians and nonphysicians must be prepared to face new and unforeseen challenges as patients face life-changing decisions.

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