

Patient Information

Sperm Banking

INTRODUCTION

The rapid advancements of assisted reproductive technology have greatly enhanced the chances for men undergoing cancer treatments or other therapies that may result in sterility, to father their own biological children. Unfortunately, a frequent outcome of improved therapy is infertility. Infertility can result from chemotherapy, radiotherapy, surgery or a combination of these treatments. So far, pretreatment sperm banking is the only proven alternative guard against the sterilizing effect of these treatments. This is accomplished by freezing semen samples prior to the start of surgery, chemotherapy or radiation therapies. Cryopreserved specimens, when properly stored, will remain viable for almost an indefinite period of time. Pregnancies have been reported for cases in which the sperm has been stored for 20 years prior to thawing.

WHAT IS INVOLVED?

Cryopreservation of semen is being done for the specific purpose of preserving sperm for future use. If time permits, one to three days abstinence is recommended between collection of samples. This should allow for the best possible specimen to be produced on the day of the appointment. We understand the urgency of beginning treatments as soon as possible; therefore, we are able to schedule all patient appointments within 1 to 3 days. Under most circumstances, we can also schedule appointments immediately.

Specimens will be collected by masturbation using sterile technique for cleansing hands prior to collection. Patients are encouraged to collect specimens in the Andrology Laboratories at Geisinger Medical Center, but arrangements can be made for collection of specimens at home or in other locations within the hospital. The Andrology Lab will provide the necessary collection materials and instructions for specimen collection.

If possible, it is advantageous for patients to bank all semen specimens prior to beginning their chemotherapy or radiation treatment. We will limit collection to no more than four specimens. Semen will be cryopreserved according to currently accepted methodologies. Most patients should consider banking at least two specimens. This should permit a suitable number of doses to be banked for future use. All semen specimens are stored in liquid nitrogen.

Patients are required to complete and sign an Informed Consent form prior to banking.

HOW IS THE SPERM FROZEN?

After collection, an analysis will be done to determine whether sperm cells are present in the ejaculate. If there are sufficient numbers of motile sperm present, the semen is diluted with a cryoprotective medium. Depending upon the quality of the specimen, one ejaculate may be sufficient to divide into four or more individual samples for freezing. First, the samples are frozen in the vapors of liquid nitrogen. Then, the samples are totally immersed in the liquid nitrogen itself. The samples are then stored in liquid nitrogen until used by the donor. Liquid nitrogen is extremely cold (-196°C) and

samples can be stored almost indefinitely. Additionally, once samples are frozen, they can easily be transported to other storage facilities or clinics if you move. After collection of the first specimen, a small portion of semen will be frozen for post-thaw analysis. If the post-thaw motility is poor, the patient must decide whether or not to continue cryobanking.

ARE THERE ANY RISKS OF THE PROCEDURE?

Cryopreservation of human semen is a well established and accepted procedure, but post-thaw viability of sperm is extremely variable. Post-thaw viability averages from 40-60% in most sperm banking programs, but this is from a selected group of pre-screened donors. There is no guarantee, without pre-screening, that **your** sperm will survive the freeze/thaw process. In addition, many disease processes may also affect the initial and post-thaw quality of semen. Pregnancy from the use of these cryopreserved specimens is not guaranteed. It should be noted that with advanced reproductive technologies such as sperm microinjection, even post-thaw samples with only a few motile sperm cells present may be sufficient to initiate a pregnancy.

HOW WILL MY TREATMENTS AFFECT MY FERTILITY?

Pelvic or groin surgery can impair fertility potential and ejaculatory function, whereas chemotherapy and radiotherapy alone or in combination, can often inflict potentially irreversible damage to the stem cells responsible for producing sperm. Radiation injury is dependant upon dose, duration and especially, the radiation field. In cases where direct testicular radiation is necessary, there is a greater risk for infertility. For other radiation treatments, testicular shielding is mandatory whenever possible in order to protect the testes from radiation damage.

Chemotherapeutic agents interfere with sperm cell production. The type, dose and number of chemotherapy cycles may all influence gonadal function. Radiation therapy combined with chemotherapy has the worst prognosis. Long term recovery of spermatogenesis following treatment with different chemotherapeutic agents is illustrated below:

Reasonable

adriamycin
methotrexate
prednisone
estrogens
androgens
vincristine
thioguanin
6-mercaptopurine
5-fluorouracil

Moderate

doxorubicin
PEB
ABVD
cisplatin
bleomycin
vinblastine
carboplatin

Poor

cyclophosphamide
chlorambucil
mechlorethamine
procarbazine
MOPP
busulfan
nitrosurea

Because of the various combinations of treatments, therapeutic agents and underlying disease processes, it is not possible to predict which patients, after treatments, will become sterile and which will recover adequate spermatogenic function. Permanent azoospermia (absence of sperm cells in the ejaculate) is reported in anywhere from 16-

68% of patients. Depending on the agents used, as well as the dosage and duration of treatment, fertility may or may not return, or may only return after many years following treatment. Often, sperm cell production that returns is at reduced levels. For this reason, sperm banking is strongly recommended for all patients who may wish to have children in the future.

WILL MY TREATMENTS AFFECT ANY CHILDREN I MAY HAVE IN THE FUTURE?

There is no evidence of an elevated relative risk of malformation in children fathered by patients after chemotherapy, just as there is no evidence of an increased risk of malignancies in these children. Following treatments, there is no generally accepted proof that any chemical agent or radiation can cause permanent mutations in the sperm cells that would result in an increase in genetic defects in your children. There are many reports, however, that show mutagenic effects in sperm cells during and shortly after treatments. These changes, however, appear to be temporary. Therefore, because safety issues regarding semen collection *during* chemotherapy treatment remain unanswered, it is strongly advised that cryopreservation of semen not occur following the initiation of chemotherapy or radiotherapy.

WHAT IF SOMETHING SHOULD HAPPEN TO ME?

Cryopreserved semen will initially be stored for up to ten years. You, the patient, make all the decisions regarding disposition of your stored specimens. At any time in the future, the patient may direct that the semen be thawed and discarded. In the event of the death of the patient during the storage period cryopreserved semen will be discarded, unless otherwise previously directed by the patient.

IS THERE A FEE FOR FREEZING AND STORING?

There is a fee for analysis and freezing of the first specimen and for each additional freeze. In addition, storage fees will be charged on a monthly basis and billed annually. You should check with your insurer to see whether any or all of these fees are covered.

HOW DO I REQUEST SEMEN CRYOPRESERVATION?

If you are interested in participating in this program and would like additional information, please contact The Fertility Center at Geisinger Medical Center at (570) 271-5620.