A sperm bank (cryobank) is a specially licensed enterprise that collects and stores sperm from volunteers. The majority of people using stored third party sperm are heterosexual infertile couples and lesbian couples. Besides volunteers, sperm donors are also men facing medically treatments that may affect their sperm quality and production, and men at risk for an environmental accident that could leave him infertile. Pregnancy achieved using donor sperm is no different from a pregnancy achieved using partner sperm. The sperm bank can provide to clients safe, disease-tested sperm from a wide selection of screened and tested anonymous donors, with comprehensive physical and intellectual information about them. However, many questions surrounding sperm banks are still the subject of intensive ethical and medico-ethical discussions. The main concerns are related to: the rights of the sperm donor, the rights of the clients, the rights of the donor-conceived children, as well as the criteria by which sperm are collected and the number of children that can be conceived by one man sperm. Altogether, third-party reproduction is a complex process requiring consideration of social, ethical, and legal issues.

Descriptors: BANK, SPERM, ETHICS

Introduction

A sperm bank (cryobank) is a specially licensed enterprise that collects and stores sperm from volunteers. Sperm is used by women to achieve pregnancy with a person who is not her sexual partner. The process for introducing the sperm into the woman is called artificial insemination and it is one of the oldest and most common procedures in assisted reproduction.

A sperm donor will be biological father of every child produced as a result of his donation. However, he is not intended to be a legal father. Sperm can be stored for as long as twenty years. However, only 50% of the sperm cells survive that time and have normal capability to fertilize the egg.

The first successful artificial insemination of a woman with her husband's sperm was recorded in 1790. However, it took centuries for human society to accept the idea to use the sperm of a man other than the woman's husband to achieve a pregnancy. Another problem was linked with the sperm preservation. The first successful human pregnancy with frozen sperm was reported in 1953 and this triggered interest in the possibility of sperm banks. The first one was established in early 70s in USA. However, the full worth of using frozen sperm, in contrast to fresh one, came to the daylight after identification of sexually transmitted disease - AIDS. The use of frozen sperm with a grace time of six months give time to retest the donor for the presence of HIV, hepatitis and other sexually transmitted diseases.

The majority of people using stored third party sperm are heterosexual infertile couples where the male partner has reproductive problems and single women or lesbian couples who desire a pregnancy but who lacks male partner. The sperm donors are volunteers, but also men who donate sperm facing medically treatments that may affect sperm quality and production, and men at risk for an environmental accident that could leave him infertile.

In addition, there are also instances of sperm donation inside the family (father to son, or brother to brother), as well as posthumous sperm retrieval.

Sperm banks - positive and negative sides

The sperm bank can provide to their clients safe, disease-tested sperm from a wide selection of screened and tested anonymous donors, with comprehensive physical and intellectual information about them. Another word, the bank assure rigorous screening of donors (in personal and medical meaning/safety is the primary advantage) so that the client know as much as possible about sperm donor (1).

However, the bank cannot guarantee successful conception, as well as healthy pregnancy or child, and cannot determine the mental or physical characteristics of a child. Due to the specificity
of female reproductive system as well as women's egg production (gestation) artificial insemination is recommended to younger women (late teens and early twenties); all women over their thirties who are planning this procedure should discuss this with her doctor.

Is it possible the women will get the incorrect sperm? Such possibility always exist (2). However, in cry banks which strictly follow assigned procedures (accurate labeling, computer-based data storage, and sperm processing) that confusion is unlikely.

However, there are also reports about failures in the operation of sperm banks. The most important are: 1. many have not accurate records of babies born from donated sperm of single donor; 2. they do not update about medical history on donors (their medical form is an image of one day in the life; and what if the donor is a healthy young fellow who do not report accurately about family history); 3. they do not share medical information amongst families (for instance, how many donor-conceived children have been diagnosed with serious diseases such as attention deficit disorder, attention deficit hyperactivity disorder, Autism, Tourette's, Von Recklinghausen disease etc.); 4. some do not adequately counsel their donors.

Ethical considerations

**Limiting the number of donor offspring.** The most important issue is limiting the number of offspring from a single donor (3). This would prevent accidental consanguinity and incest between donor offspring and spread of genetic disease (4, 5). Although the majority of countries agree about this problem, the rules are quite different around the world depending mostly, but not always, on the size of the country. For instance, in China sperm from one donor can be used for five impregnations, while in the USA the limit is higher, 25 children per 800,000 population (from single donor). In United Kingdom individual donor sperm can be used to produce 10 children, while in Australia different regions have different limitations varying from 1:5 to 1:10 (donor:offsprings).

**Emotional and psychological effects of being a donor offspring.** This is a special problem. The majority of donor-conceived children never learn how they were born, while others may suffer of the knowledge that they have a large number of half-siblings. On the contrary, some may feel disappointed not having the possibility of knowing and contacting the biological father or half-siblings. They fill as they miss a piece of its own history. This happens because donor-conceived people born before 2005 have no right to know the identity of their donor. Nowadays, a number of banks are offering a premium for donors who are willing to share (with a future children) at least partial information and a photograph.

However, more and more state governments thought about applying oblige non-anonymity of sperm donors. Not only for those men who are donating sperm nowadays, but also had who donated sperm in the past. For instance, in Australia, "people conceived after 1998 will have unconditional access to details about their donor; those conceived between 1988 and 1998 will also be able to get identifying information (like donors name, date of birth, or ethnic background); but people born before 1988 will have no access at all." So, "the men who anonymously donated sperm decades ago might be soon obligated to reveal their personal data to their offspring's." However, as this is not yet a case, it comes beyond the scope of this article.

**Risk of infection and genetic diseases.** The guidelines for selection of a donor are very strict (6). It is generally accepted that sperm donors as well as sperm should undergo screening that they cannot transmit sexually (hepatitis B and C and HIV) or hereditary disease on the offspring (7-9). They are tested for Treponema pallidum, Chlamydia trachomatis, Neisseria gonorrhoeae, HIV-1, HIV-2, human T-lymphotropic virus (HTLV)-I and HTLV-II, CMV, hepatitis B surface antigen, and hepatitis C antibody (10).

However, is it possible to test the donor for all genetic diseases we are aware today? What if a donor does not reveal some genetic abnormalities or other serious medical problem existing in his family? For example, genetic testing for cystic fibrosis, Huntington's disease and chromosomal aberrations are performed in the USA for all donors. However, comprehensive genetic testing is impractical. So, how to cope with this, as well as with the problem that for certain hereditary conditions still don't exist any standard testings. Therefore, sperm banks cannot guarantee 100% that the sperm doesn't carry some genetic disease (11). Other tests that are also performed include urinalysis, complete blood count, chemistry panel and blood typing. Moreover, the recipient may select donor sperm on the basis of the donor's looks, personality, race, and many other factors.

**Age for sperm donors.** Literature data on the impact of sperm donor age on outcome of insemination is deficient. It is generally accepted that sperm fertilization ability deteriorates with increasing men age. Therefore the most countries require that sperm should not be taken from donors younger than 18 years. The upper age limit is usually 40 years of age (12, 13). Specificity is China where limits are 22 and 45 years. However, different sperm banks inside one country can also have their own rule. For example, "California Cryobank only accepts donors who have graduated, who are tall, heterosexual, and between 19 and 34 years old."

An extreme example is Repository of Germinal Choice which at one time only accepted sperm from Nobel Prize winners. Other sperm banks are not so "selective". However, the imbalances in demands among these banks raise ethical questions. Is the searching for only exquisite sperm a form of eugenics?

Anyhow, sperm donors should have good health status and no genetic diseases in their family.

**Anonymous versus non-anonymous sperm donation.** This is a very sensitive issue while parents, donors and offspring may have different considerations on anonymous versus non-anonymous sperm donation (14). The reasons reci-
pients are choosing anonymous or non-anonymous donor, or the reasons donors want to be anonymous or non-anonymous, vary greatly from individual to individual and couple to couple (15). Several research studies argue that anonymity is still important for the majority of the donors. If a sperm donor wants to be anonymous no one can compel bank to disclose donor identity (16). However, sperm donors are mostly young fellows who are donating sperm mostly because of money (17, 18). At the time of donation they do not thought very much about what will really happen with their sperm; they take anonymity for granted. They do not consider consequences sperm donation bear with. Sometimes, later in their lives, when they have their own families and children, they may wish to know how many children they really have (19). This information is easily to obtain because sperm banks kept the records of donor identity for 30 years. But nothing more if the recipient of the sperm asked for anonymity. However, if the donor decided to be non-anonymous, he may face the same situation as anonymous donor in the case if the recipient wants to be anonymous (16). The anonymous sperm donors must also consider that one day, when they will have their "real" own children, they possibly would like to know about their half-siblings. Or, on the contrary, they might feel angry of knowing their father was a sperm donor. In contrast, non-anonymous sperm donor may expect, in a decade or two, to be contacted by his genetic offspring (upon they reach 18 years of age). Some of them are not worried about this knowing that there is a difference between biological and social father, and that they are free from any responsibility to the biological offspring (20).

Who is the father? A key question is whether donor-conceived children should be informed of their biological father and, if so, when, and how much information about donors should be revealed (21). Some children may react to such information by social and psychological disorders especially if they cannot get more information about the father and cannot meet him. Some other children react quite opposite (22). However, there is a general agreement that when children discover the truth accidentally, as a result of a medical test, or when a parent dies, the consequences could be severe (23).

Those who advocate non-anonymous sperm donation assume that human beings have right to know their biological origins (24). Not telling the child the truth about its origin violates its autonomy. From one study conducted in 2009 on a large sample of donor offspring it turned out that: 1. "offspring of single mothers and lesbian couples learned of their donor origins earlier than offspring of heterosexual couples; 2. those told later in life reported more negative feelings regarding their donor conception than those told earlier; 3. offspring's feelings toward their parents were less clear, with some of those told later reporting more positive feelings and others reporting more negative feelings; 4. offspring from heterosexual-couple families were more likely to feel angry at being lied by their mothers than by their fathers; 5. it seems that it is less detrimental for children to be told about their donor conception at an early age."

Let's see one example: a young married donor-conceived woman (ET) get pregnant. Then she discovered that her blood group O is incompatible with her father, who was AB. Even after this discovery, it took four more years their parents informed her about how she was conceived. ET said: "I absolutely, categorically think I should have been told as a child - as soon as I was old enough to process the information. It is such a fundamental piece of information to have about yourself - to know who your parents are. Sometimes I get angry thinking about it." In this particular case the medical treatment trigger discussion about offspring origin. But, there are even more sad cases where, not telling the children that they are donor-conceived in conjunction with medical condition could have devastating consequences. For example, there have been some people decided not having a children (up to the discovery the truth about their parentage) because they believed they had inherited a genetic disease such as Huntington.

It is best to start telling children the truth before the child can speak so the parents have enough time, until child is able to perceive the essence, to explain the full story (25, 26).

Cases on the court

1) A lesbian women have sued a sperm bank after she became pregnant with sperm donated by a black man instead of a white one. When she was five months pregnant she decided to reserve more sperm from the same donor for eventual next pregnancy. But then the large mix-up was revealed; she was informed that she had been inseminated with sperm from No. 330, a black donor, and not No. 380, a white donor she had chosen. Finally, she gave birth to a biracial baby girl, who is nowadays four years old. She is loved child, but a woman is concerned about raising her in the 98% white town where she lives. The women decided to sue the bank to prevent it from making the same mistake again. The mistake happened because the sperm bank had no computer-based record-keeping - the numbers on the vials with sperm where manually written, and the bank had no quality controls that would have prevented it from sending the wrong sperm to fertility clinics.

2) Similar also happened to a white family in Northern Ireland; due to the sperm bank mistake they gave birth to mix race child. In Italy, a fertility clinic implanted the wrong embryos into a woman, which resulted in her giving birth to another couple's twins.

Many of these cases happen due to the human error as a consequence of inadequate record-keeping.

3) The story began 17 years ago when it was impossible for women to use official sperm banks unless they had a male partner. This is no longer the case. Then the gay, happily "married" for many years and who do not wanted his own children, donated twice his sperm to fertility clinics.

He was never named on their birth certificates and had no role in their raising, and had no contact with the family for 10 years. Despite of this, he was...
suited to the court after lesbian couple split up leaving one of the mothers with both children. Now it’s costing him £26 a week. The court explanation was: only anonymous sperm donors, at licensed centers, are exempt from being treated as the legal father of a child born as a result of their donation.

In such situations when both, sperm donors and intended parents are known, they are advised to have separate legal counsel and sign a legal contract that defines the financial obligations and rights of the donor as well as recipient of the sperm.

Sperm banking - medical reasons

Sperm cryopreservation is strongly recommended for all men of reproductive age requiring medical treatment that may jeopardize fertility. Sperm banking offer them the opportunity to use it later in life, after their cure the disease (27).

Mostly, these are cancer patients because all cancer therapies (chemotherapy, radiation) are potential threats to a man’s reproductive potential. However, the use of sperm banking is lower than expected, and very few donors return to use it for reproductive purposes (28).

There are a variety of reasons why a patient may choose not to cryopreserve semen prior to starting cancer treatments, including modesty of both the patient and healthcare provider, privacy, discomfort, cost, urgency to begin treatment, access to sperm banking facilities, and the lack of information.

Additionally, sperm banking is recommended to men suffering from other diseases such as ulcerative colitis or Chrone’s disease, to men about to undergo orchiectomy as well as to men suffering from azoospermia, and men positive for a sexually transmitted disease. Although the exact age at which sperm production begins, adolescent males ranging from age 14 to 17 years, are a good candidates for sperm banking (29).

Posthumous sperm retrieval

Posthumous sperm retrieval (PSR) implies sampling and cryopreservation of sperm after the death of men either as a consequence of an accident or serious disease. The sperm extraction should be done between 24-36 hours post mortem. Usually the sperm is used by surviving partner to achieve the pregnancy. The first successful retrieval of sperm from a cadaver was reported in 1980. Since that time a number of requests for the procedure have been made, with around one third approved and performed (30). However, despite of this, the main concern about PSR is still unresolved. Is it ethical to use a dead man’s sperm to father a child?

The policies around this questionable procedure greatly vary across the world, although many experts agree it is ethically justifiable if written consent from the deceased is available. In its absence, PSR should be done only when such requests are initiated by the surviving spouse or life partner (31). Although PSR is relatively simple procedure, it raises numerous ethical and medicolegal issues, such as: the rights of the deceased, the question of informed consent, the best interest of the child, the motivation of the applicant, impact on other living children (32).

Canada, France, Germany, and Sweden deem PRS illegal, regardless of the deceased’s directive. The USA has no formal legislative regulations, the UK requires written consent, while in Australia the codes are different among states; some require written consent, in some the coroner has to authorize the procedure, some forbid it, and some have no legal requirements (33).

It is obvious that PRS is fraught with medical and ethical implications, especially when demands for PRS came from deceased person parents or even third parties.

Sperm bank in Croatia

Currently the sperm bank in Croatia exist in University Hospital for Gynecology and Obstetrics, Zagreb, but only for cancer patients purposes. Long ago it was also established for third party insemination, but due to the changes in low which require donor non-anonymity and lack of bonus payment there were no interested donors.

Conclusion

The present study presents the information surrounding sperm banks/ sperm donors and highlights the complex ethical and medical concerns about this issue. The main ethical questions are related to: the rights of the sperm donor, the rights of the clients, the rights of the donor-conceived children, as well as the criteria by which sperm are collected and the amount of sperm that a single man can donate. Altogether, third-party reproduction is a complex process requiring consideration of social, ethical, and legal issues.

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Sažetak

BANKE SPERME - ETIČKA RAZMATRANJA

J. Pavelić

Banka sperme je licencirano poduzeće koje skuplja i skladišti spermu davatelja - volontera. Većina klijenata koji koriste sklađenju spermu treće stranu su heteroseksualni neplodni parovi i lezbijski parovi. Osim volontera, donori sperme su i muškarci suočeni sa različitim vidovima medicinskog liječenja koje može utjecati na produkciju i kvalitetu njihove sperme, i muškarci koji su u riziku od okolišnih oštećenja koja mogu uzrokovati neplodnost. Trudnoća postignuta uz pomoć donorske sperme ne razlikuje se od trudnoće postignute korištenjem partnerove sperme. Banka sperme priaža svojim klijentima sigurnu spermu testiranu na bolesti, od širokog izbora provjerenih i testiranih anonimnih donora, uz cjelovite podatke o njima, fizičke i intelektualne. Međutim, mnoga pitanja oko banaka sperme i dalje su predmet intenzivnih etičkih i medicinsko-etičkih rasprava. Temeljna pitanja odnose se na: prava donora sperme, prava klijenata, prava djece začete uz pomoć sperme donora, kao i kriterije po kojima se sperma skuplja te na broj djece koji smije biti začet od sperme jednog muškarca. Zaključno, reprodukcija uz pomoć treće strane je složen proces koji zahtjeva razmatranje socioloških, etičkih i zakonskih pitanja.

Deskriptori: BANKA, SPERMA, ETIKA

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