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WOMEN'S HEALTH CARE PHYSICIANS

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Committee on Genetics Committee on Obstetric Practice

This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.

Umbilical Cord Blood Banking

ABSTRACT: Once considered a waste product that was discarded with the placenta, umbilical cord blood is now known to contain potentially life-saving hematopoietic stem cells. When used in hematopoietic stem cell transplantation, umbilical cord blood offers several distinct advantages over bone marrow or peripheral stem cells. However, umbilical cord blood collection is not part of routine obstetric care and is not medically indicated. Umbilical cord blood collection should not compromise obstetric or neonatal care or alter routine practice for the timing of umbilical cord clamping. If a patient requests information on umbilical cord blood banking, balanced and accurate information regarding the advantages and disadvantages of public and private umbilical cord blood banking should be provided. The routine storage of umbilical cord blood as “biologic insurance” against future disease is not recommended.

Recommendations

The American College of Obstetricians and Gynecologists makes the following recommendations regarding umbilical cord blood banking:

- Umbilical cord blood collection should not compromise obstetric or neonatal care or alter routine practice for the timing of umbilical cord clamping.
- If a patient requests information on umbilical cord blood banking, balanced and accurate information regarding the advantages and disadvantages of public and private umbilical cord blood banking should be provided.
- The current indications for cord blood transplant are limited to select genetic, hematologic, and malignant disorders.
- Patients should be aware that in certain instances, use of one's own stem cells is contraindicated. Most conditions potentially treated by a patient's own umbilical cord blood already exist in his or her own cells and, therefore, the stored blood cannot be used to treat the same individual.
- Counseling should include disclosure that the chance a child or family member develops a condition that could be treated with an autologous transfusion of umbilical blood is rare.
- The routine storage of umbilical cord blood as “biologic insurance” against future disease is not recommended.
- Directed cord blood banking is available through private and public umbilical cord blood banks for any pregnant patient who has a family member with a disease potentially treated by hematopoietic stem cell transplant.
- Some states have passed legislation requiring physicians to inform their patients about umbilical cord blood banking options. Obstetrician–gynecologists and other obstetric care providers should consult their state medical associations for more information regarding state laws.
- As a variety of circumstances may arise during the process of labor and delivery that may preclude adequate collection, it is important to obtain well-documented informed consent that various medical

circumstances of the mother or the neonate may prevent umbilical cord blood collection.

- Physicians or other professionals who recruit pregnant women and their families for for-profit umbilical cord blood banking should disclose any financial interests or other potential conflicts of interest.

Introduction

Once considered a waste product that was discarded with the placenta, umbilical cord blood is now known to contain potentially life-saving hematopoietic stem cells. When used in hematopoietic stem cell transplantation, umbilical cord blood offers several distinct advantages over bone marrow or peripheral stem cells. Biologically, a greater degree of human leukocyte antigen mismatch is tolerated by the recipient and the incidence of acute graft-versus-host reaction is decreased when umbilical cord blood is used compared with unrelated donor bone marrow (1, 2). The predominant disadvantage of umbilical cord blood use is that there is often a low yield of stem cells acquired per unit. Only 8–12% of umbilical cord blood units have sufficient cell volume for transplant to a person weighing 80 kg (176 lb) (3). However, the use of combined units of umbilical cord blood allows for the expansion of umbilical cord blood volume (and increased number of stem cells) to be used for adult hematopoietic transplants. Since the first successful umbilical cord blood transplant in 1988, it has been estimated that more than 30,000 transplants have been performed in children and adults for the correction of inborn errors of metabolism, hematopoietic malignancies, and genetic disorders of the blood and immune system (4). Umbilical cord blood stem cells also are being studied in the areas of regenerative medicine and infectious disease (www.clinicaltrials.gov).

Public Versus Private Umbilical Cord Blood Banking

Two types of banks have emerged for the collection and storage of umbilical cord blood: 1) public banks and 2) private banks. The first public bank was established at the New York Blood Center in 1991 and other public banks have since been established in various regions of the country. In December 2005, federal legislation, the C.W. Bill Young Cell Transplantation Act, was enacted that provides funding for continued growth of a national umbilical cord blood registry in the United States. Some states have passed legislation requiring physicians to inform their patients about umbilical cord blood banking options. Obstetrician–gynecologists and other obstetric care providers should consult their state medical associations for more information regarding state laws.

Public banks promote allogeneic (related or unrelated) donation, analogous to the current collection of whole blood units in the United States. These banks typically are associated with a local network of obstetric hos-

pitals that send their units of blood to a central processing facility. A minority of public banks will accept units through shipment by an overnight express courier (5). A list of participating hospitals is maintained by the National Marrow Donor Program (6). Public banks are supported through government grants, private donations, and compensation for cord blood units used for transplant. Units of umbilical cord blood collected for public banks must meet rigorous standards of donor screening and infectious disease testing as outlined by the U.S. Food and Drug Administration. As of October 20, 2011, every unrelated donor cord blood unit to be transplanted in the United States must be either licensed or covered under an investigational new drug application approved by the U.S. Food and Drug Administration (7). Initial human leukocyte antigen typing of these units allows them to be entered into computerized registries so that when the need arises, a specific unit can be rapidly located for a patient.

Private for-profit banks were initially developed to store stem cells from umbilical cord blood for autologous use (taken from an individual for subsequent use by the same individual) if the child develops disease later in life or for use by other family members. Private banks advertise directly to consumers often encouraging parents to bank their infants' cord blood as a form of "biological insurance." The routine storage of umbilical cord blood as biological insurance against future disease is not recommended by the American Academy of Pediatrics, given the lack of scientific data to support its use and availability of allogeneic transplantation (8). Physicians or other professionals who recruit pregnant women and their families for for-profit umbilical cord blood banking should disclose any financial interests or other potential conflicts of interest.

Considerations for Patients Regarding Umbilical Cord Blood Banking

If a patient requests information about umbilical cord blood banking, balanced and accurate information regarding the advantages and disadvantages of public and private banking should be provided. Patients should be aware that in certain instances, use of one's own stem cells is contraindicated. Most conditions potentially treated by a patient's own umbilical cord blood already exist in his or her own cells and, therefore, the stored blood cannot be used to treat the same individual. The chance of an autologous unit of umbilical cord blood being used for a child or a family member is remote, unless a family member is known to have a medical condition that could be treated with transplant, and this fact should be disclosed to the patient (9). Directed cord blood banking should be encouraged when there is knowledge of a full sibling in the family with a medical condition (malignant or genetic) that could potentially benefit from cord blood transplantation. Patients should be made aware of the financial obligation for processing and annual storage fees

related to for-profit umbilical cord blood banks. Minority populations are significantly underrepresented in public banks. Families may consider the societal benefit from public umbilical cord blood donation to increase the chance for all groups of finding a matched cord blood unit.

Technique and Informed Consent

To ensure that there will be enough cells for transplantation, at least 40 mL of cord blood must be collected. Collection can be performed before or after removing the placenta. In either case, thorough cleansing of a section of umbilical cord is performed, and blood is obtained from the umbilical vein by venipuncture and allowed to drain by gravity into a bag supplied by the bank. Blood should be collected as soon as feasible after birth to minimize coagulation and maximize volume (10). If the specimen is not sterile or is not of sufficient quantity, it will be discarded by the bank.

Umbilical cord blood collection is not part of routine obstetric care and is not medically indicated. Umbilical cord blood collection should not compromise obstetric or neonatal care or alter routine practice for the timing of umbilical cord clamping. A variety of circumstances may arise during the process of labor and delivery that may preclude adequate collection. Therefore, it is important to obtain well-documented informed consent that various medical circumstances of the mother or neonate may prevent umbilical cord blood collection.

For More Information

These resources are for information only and are not meant to be comprehensive. Referral to these resources does not imply the American College of Obstetricians and Gynecologists' endorsement of the organization, the organization's web site, or the content of the resource. The resources may change without notice.

ACOG has identified additional resources on topics related to this document that may be helpful for ob-gyns, other health care providers, and patients. You may view these resources at www.acog.org/More-Info/CordBloodBanking.

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