Swiss Blood Stem Cells: More than Just a Registry

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Keywords

Swiss Blood Stem Cells · Swiss Transfusion SRC ·
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Summary

Swiss Transfusion SRC, division Swiss Blood Stem Cells (SBSC), is an important national organization for all matters relating to blood stem cells. Not only has its name changed several times over the years but also its role has developed steadily and today goes beyond registry alone. For example, on order of and in close collaboration with transplant doctors, the organization searches for suitable donors worldwide. Searching for unrelated donors for Swiss patients and organizing the deliveries of the transplant tissues for Swiss and foreign patients are the most time-consuming procedures at SBSC. Additionally, the organization pays special attention to the problem of donor follow-up. Here it has made important contributions to the field of data collection (minimal data set) and helped to strengthen international coordination. As of January 2011, the organization has a new structure, because it has joined forces with the SRC Blood Transfusion Service. The new organization will be called Swiss Transfusion SRC, but SBSC remains as a main operational unit of the new organization. In 2009, SBSC implemented a successful new strategy to increase the numbers of donors: donors can now register online. This step led to a remarkable increase of donor numbers from 2009 to 2010.

Schlüsselwörter

Stiftung Blutstammzellen · Blutspende SRK Schweiz ·
Hämatopoetische Stammzelltransplantation ·
Spenderregistrierung · Spender-Follow-up

Zusammenfassung

Die Blutspende SRK Schweiz, Abteilung Swiss Blood Stem Cells (vorherige Stiftung Blut-Stammzellen), ist eine wichtige nationale Organisation in der Schweiz, die sich mit verschiedenen Aufgaben rund um Blutstammzellen beschäftigt. Nicht nur ihr Name hat seit ihrer Gründung mehrmals gewechselt, auch ihre Aufgaben haben sich über die Jahre stetig weiterentwickelt und gehen heute weit über die alleinige Registrierung hinaus. So sucht die Organisation im Auftrag und in enger Zusammenarbeit mit den Transplantateuren heute weltweit nach geeigneten Spendern für Schweizer Patienten. Diese Aufgabe sowie die Organisation der Transplantat-Transporte für Schweizer und ausländische Patienten sind die Hauptaufgaben der Organisation. Zudem engagiert sie sich im Bereich Spender-Follow-up. Hier hat sie mitgeholfen, ein Mindestdatenset zu erarbeiten und verfolgt nun das Ziel, dieses international zu etablieren. Seit Januar 2011 verfügt die Organisation über eine neue Struktur: Die beiden Organisationen Blutspendedienst SRK und die Stiftung Blut-Stammzellen sind nun eine Organisation mit dem neuen Namen Blutspende SRK Schweiz, wobei Swiss Blood Stem Cells als wichtige Abteilung erhalten bleibt. Seit dem Jahre 2009 verfolgt Swiss Blood Stem Cells eine neue, erfolgreiche Strategie, um die Anzahl der Blutstammzellspender zu erhöhen: Interessierte Personen können sich nun online registrieren. Diese Neuerung hat zwischen 2009 und 2010 zu einem markanten Anstieg der Spenderzahlen geführt.

Introduction

There was a long experimental phase before hematopoietic stem cell transplantation (HSCT) took off to become the standard therapy that it is today in developed countries [1]. An initial report on the use of bone marrow transplantation as a possible cancer treatment was published in 1957 [2]. The first HSCT with an international unrelated donor for a Swiss patient was achieved in 1988 in Basel. Four years later, the first unrelated donation for a foreign patient was accomplished in Switzerland. These operations marked the start of a successful development in the coming decades. Up to date, more than 700 HSCTs have been performed in Switzerland to treat leukemia, lymphomas, solid tumors, etc. [3]. Because HSCT is a complex, high-cost procedure that depends on a well established institutional infrastructure network, 4 Swiss hospitals have established specialized centers for allogeneic transplantations: Basel, Geneva, and Zurich (2×) (table 1). This also was the contribution of the Swiss Foundation Blood Stem Cells (SBSC). The SBSC is an important national organization for all matters relating to blood stem cells. Not only has its name changed several times over the years but also its role has developed steadily and today goes beyond registry alone. For example, on order of and in close collaboration with transplant doctors, the organization searches

for suitable donors worldwide. In addition to the international cooperation that is an important component of the performance mandate of the SBSC, the organization pays special attention to the problem of donor follow-up. Here it has made important contributions to the field of data collection (minimum data set) and helped to strengthen international coordination. As of January 2011, the Foundation has a new structure. It has joined forces with the Swiss Red Cross (SRC) Blood Transfusion Service with which it has worked closely for years. The new organization will be called Swiss Transfusion SRC ('Blutspende SRK Schweiz'), but SBSC remains as a main operational unit of the new organization. The merger of these 2 organizations will enable more efficient and better coordination between blood transfusion services and the blood stem cell registry.

A Look Back in History

In the 1980s, it became obvious that Switzerland needed an organization that would be in charge of the recruitment of unrelated blood stem cell donors. The Swiss National Foundation for Organ Donation and Transplantation (Swisstransplant) mandated a working group, 'Swisstransplant Arbeitsgruppe Blood and Marrow Transplantation' (STABMT), to deal with these challenges. The STABMT then created a commission for marrow transplantation from unrelated donors, which founded the registry ('Schweizer Register für Knochenmarkspender') in 1988. In that same year the recruitment of donors and the first searches for suitable donors for foreign patients began. In the beginning and during many years the registry was supported by the Central Laboratory of the SRC Blood Transfusion Service [4, 5]. In 2005, the registry was renamed 'Swiss Foundation Blood Stem Cells' for 2 reasons: i) Over the years, the collection of bone marrow has been gradually replaced by

Table 1. Allogeneic transplantation centers in Switzerland

<i>Adults</i>
University Hospital Zurich
University Hospital Geneva
University Hospital Basel
<i>Children</i>
University Children's Hospital Zurich
University Hospital Geneva
University Hospital Basel

Table 2. Milestones SBSC

Year	Action
1988	The 'Swiss Bone Marrow Donor Registry' is founded.
1988	First HSCT with an international unrelated donor for a Swiss patient.
1992	The first bone marrow donation by an unrelated donor is achieved in Switzerland. In the same year, the registry becomes a private foundation and changes its name to 'Foundation Swiss Bone Marrow Donor Registry'.
1994	For the first time, a bone marrow donation from an unrelated donor from the United States is provided to a Swiss patient.
1995	The first donation of PBSC is achieved in Switzerland.
1999	The 100th Swiss blood stem cell donation as well as the 100th blood stem cell transplantation with an unrelated donor in Switzerland is celebrated.
2005	The foundation changes its name to 'Swiss Foundation Blood Stem Cells'.
2009	SBST, which has replaced STABMT, becomes an integral part of SBSC. The SBST is the medical and scientific unit bringing together all specialists working in the field. It is also responsible for Jacie accreditations of the Swiss transplant and collection centers.
2010	Prof. Alois Gratwohl retires from his position as president of the Strategic Board.
2011	SRC Blood Transfusion Services and SBSC merge to become one organization.

Table 3. Partners of SBSC (extract)

<i>National</i>
Federal Office of Public Health
Donor centers: 13 Regional Blood Transfusion Services and 1 National Donor Center in Swiss Transfusion SRC
Transplantation Centers at the University Hospitals Basel, Geneva, and Zurich (2×)
Collection Centers at the University Hospitals Basel, Geneva, Zurich and at the regional blood transfusion service Zurich
Public cord blood banks (Basel and Geneva)
National Reference Laboratory for Histocompatibility (LNRH), Geneva
Laboratory of Virology, Geneva
Patient organizations
Swiss Society of Hematology
<i>International</i>
World Marrow Donor Association (WMDA)
Bone Marrow Donors Worldwide (BMDW)
European Group of Blood and Marrow Transplantation (EBMT)
Worldwide Network for Blood and Marrow Transplantation (WBMT)
National registries worldwide
Center for International Blood and Marrow Transplant Research (CIBMTR)
World Health Organization (WHO)

President of the Governing Board:	Eduard Belser
Chief Executive Officer:	Dr. Rudolf Schwabe
Annual Budget:	CHF 9 million in 2010
Staff:	21
SBSC works for all patients regardless of their nationality, ethnicity, religion, social position or political beliefs and respects the rights of patients and donors.	
Structure	
The new organization Swiss Transfusion SRC consists of six sections and the SBST. The two main sections are transfusion services and SBSC. Others include Finance/HR, Marketing/Communications, Innovation/IT as well as Planning/Controlling.	
SBST is responsible for medical policies that govern the activities of SBSC and for the accreditation of the Swiss transplant centers. SBST is supported by five Medical Boards, each having a well-defined area of action and reflection: autologous transplantation, allogenic transplantation, cord blood, quality control, and nursing.	
Financing	
Services that SBSC provides for Swiss patients are paid for by the health insurance companies. But private donations remain important.	

Fig. 1. Facts and figures.

that of peripheral blood stem cells (PBSC); ii) the Foundation has diversified its activities and has acted more as an interface and liaison between organizations working in the field of blood stem cells. One year later, the SRC Blood Transfusion Service and the SBSC agreed to strengthen ties between them by moving into the same premises in Bern. On July 1, 2007, the new Swiss Law on Transplantation came into force. It defined a clear mandate for the SBSC that focuses on 5 points: coordination of the registry, search for donors, allocation of

grafts, international collaboration, and information and consulting to the Federal Office of Public Health (FOPH). At the end of March 2010, Prof. Alois Gratwohl, a pioneer in transplanting blood stem cells, retired from his position as professor at the University Hospital in Basel as well as from his position as president of the Strategic Board of the SBSC, which he had held since 1992. It was the right moment to rethink the status of the SBSC, and it was decided to merge with the SRC Blood Transfusion Service. The new company that was launched on January 1, 2011 comprises 2 main sectors, blood transfusion and blood stem cell transplants, which are supported by shared back office services (tables 2 and 3, fig. 1). The Swiss Blood Stem Cell Transplantation (SBST) group (formerly STABMT) today acts as the medical scientific advisory body in the hematopoietic stem cell transplantation field in Switzerland. The group, which consists of blood stem cell experts, is responsible for scientific guidelines in Switzerland and grants the Jacie (Joint Accreditation Committee-ISCT and EBMT) accreditation to the Swiss transplant centers.

Our Vision: To Find a Donor for Every Patient

The ambitious vision set by the organization is to find a compatible donor for every patient. Although approximately 17.6 million donors are registered worldwide (Data Bone Marrow Donors Worldwide (BMDW), May 2011), this vision can only be achieved by motivating and recruiting new donors.

Our Goal: 50,000 New Donors in 5 Years

This leads to an important goal of the foundation: 50,000 new donors in 5 years or 70,000 registered donors by 2015. With

Fig. 2. Registered active donors in Switzerland until March 2011.

just 2.8 donors per 1,000 inhabitants, Switzerland is at the bottom of international rankings and is far behind Germany (37 donors per 1,000 inhabitants) or UK (12 donors per 1,000 inhabitants). The goal set in 2008 was to get back into the Top 10 by raising the number to 9 donors per 1,000 inhabitants by 2015. With more than 27,000 registered and active donors at the end of 2010, there is still a way to go, but on the positive side, there was a remarkable increase in donor numbers from 2009 to 2010 based on a new recruitment strategy (fig. 2): Donors can now become blood stem cell donors online; the website www.bloodstemcells.ch was set up for this purpose. In addition the website makes it easy to make donations; the ambitious goals require significant financial resources. The general strategy is based on various technological innovations which include machine-readable forms and novel sampling methods (filter papers or buccal swabs instead of fresh venous blood). The crucial advantage of the online method is that new donors can carry out their own sample collection for the tissue-typing at home. The typing kit with the cotton swabs is sent to donors by post and can be sent back to SBSC by post again. The kits are then forwarded to the laboratory. At registration, new donors are no longer tested for blood group and infection markers. These tests are only carried out if the person concerned is invited for a compatibility test. As only a small proportion of registered donors are ever invited for subsequent testing, this new process reduces costs. Of course, each donor has to fulfill medical criteria and sign an informed consent form. Besides this new online registration tool, another form of registration has been implemented in the last few years: group registrations, e.g., mutual registrations in enterprises. Another pillar of the new recruitment strategy was closer collaboration with the regional blood transfusion services, as

these organizations have a long history of recruiting and registering new donors, and with patient and other stakeholder organizations.

Activities: The Number of Searches Is Constantly on the Rise

Searching for unrelated donors for Swiss patients and organizing the deliveries of the transplant tissues for Swiss and foreign patients are the most time-consuming procedures at SBSC. The number of searches for unrelated donors has tripled in 10 years. In the last few years, on average 150 searches have been conducted per year. In 2010, SBSC conducted 162 searches for Swiss patients. On the other side, 4,958 requests for High Resolution Typing, DRB1 Typing, and Confirmatory Typing have been performed with Swiss donors since 1990, featuring a more or less constant level of requests during the last 10 years (fig. 3). This is reflected in the number of collections performed with Swiss donors (fig. 4). However, the effect of increased donor recruitment are expected in a few years.

Another number that has increased steadily over the years is the number of transplants done in Switzerland. In 2001, only 17 first transplants were performed, whereas in the last 3 years the number of first transplants rose to around 80 per year on average. In 2010, 81 first transplants of blood stem cells from unrelated donors were performed in Transplant Centers in Basel, Geneva, and Zurich. Since 1988, 733 total transplants (including donor lymphocyte infusions) from unrelated donors have been performed in Switzerland (as of 2010) (fig. 5), about 22% of them in children (less than 18 years). 2008 marked an important change: For the first

time, more unrelated than related transplantations were carried out (fig. 6). The same evolution is to be noted in Europe since 2009 [3].

The number of transplants is likely to remain at these levels or even to increase in the coming years, mainly because patients are getting older. Ten to 15 years ago, the age limit for a HSCT was 50–55 years. Today, patients at the age of 70 years and even beyond can be treated with blood stem cells because of the possibility of using reduced conditioning therapy. The

development of better prophylaxis against graft-versus-host disease (GVHD) and improved therapies against opportunistic infections also play a role. As older patients less often have a healthy brother or sister, this increases the number of searches for unrelated donors, a trend that is observed throughout Europe. Other factors for increasing transplant numbers are new indications that can be treated using blood stem cells and the fact that HLA mismatched transplants are feasible today. Swiss patients benefit greatly from interna-

Fig. 5. Total transplants for Swiss patients.

Fig. 6. Transplants related/unrelated in Switzerland.

tional collaboration, as around 95% of them receive blood stem cells from a donor abroad (fig. 7). On the other hand, about 90% of all Swiss donations go to patients abroad (fig. 3).

Donor Follow-Up: Focus on the Donor, Not the Patient

A next important activity of SBSC is the follow-up of donors. Until a few years ago, in some countries only little

follow-up care was provided to donors, in part due to the fact that only minor, well-known side effects are connected to bone marrow or PBSC harvesting. However, in very rare cases, serious complications may arise. The problem is that every registry has its own monitoring procedures and the results have not been sufficiently shared with others in the past, so the rare complications may have been underestimated. Switzerland and SBSC in particular have played a leading role in donor follow-up on a national and inter-

Fig. 7. Origin of products for Swiss patients.

national level. With the Swiss transplantation law, which came into force in 2007, a donor follow-up became obligatory for all donors. This follow-up includes a questionnaire at 1 month, 6 month, 1 year, 5 years after donation and afterwards every 5 years lifelong. For PBSC donors, a blood count is performed at 1 month and from the 1 year follow-up forward. In 2009, SBSC organized an international workshop for representatives of related donors as well as unrelated donor registries with the goal of developing a ‘minimal data set’ – an international data set, so that the results would become comparable worldwide. The set also states that donor follow-up should be performed at the following intervals after donation: 1 year, 5 years, 10 years, annual or biannual report optional. This set was later adopted by the Worldwide Network for Blood and Marrow Transplantation (WBMT). The current focus lies on expanding this data set further by informing the registries and by promotion and coordination work. Switzerland happens to be an important player in this environment of challenges again.

Cord Blood: 3,000 Units Available for All Patients

Another, more recent, field of action for SBSC is the collection of cord blood in Switzerland and its worldwide distribution. In Switzerland there are 2 public banks with which the organization works closely, 1 in Basel and 1 in Geneva. Currently, more than 3,000 units are stored there and are made available to patients. Cord blood donations may be performed in 10 maternity wards all over Switzerland. Stem cells from cord blood have significant advantages. They show a higher tolerance, which means that the tissues need to be less compatible compared to the transplantation of stem cells from bone marrow or peripheral blood, and cord blood can be stored easily. On the other hand, the donation and storage of

cord blood is much more expensive. And given the low volume of blood that can be harvested from the umbilical cord and placenta, this type of transplant is reserved mainly for children. However, in recent years there has been a significant increase in and promising clinical results with ‘double-cord’ transplants (transplants from 2 different cord blood donors) or even ‘multi-cord’ transplants for adults.

Future Challenges: A Look Ahead

HSCTs are done with PBSC or bone marrow stem cells. But within the bone marrow stroma there exists a subset of non-hematopoietic cells referred to as mesenchymal stem cells (MSC) which may be used increasingly to support engraftment after HSCT or to treat GVHD or even for other indications. MSC are multipotent stem cells that can differentiate into different cell types, including bone, cartilage, and fat cells. They are being clinically explored as a new therapeutic option for treating a variety of immune-mediated diseases. In recent years, SBSC has started to build up the knowledge that is needed to support this new type of treatment. This also includes coordination with regulatory authorities. Another field of research that is of interest to SBSC is regenerative medicine. Although developments are still years away from concrete medical applications, it is interesting to follow the research in this area. Stem cells could be used in the future to treat diseases such as diabetes or Parkinson’s disease. HSCT provides the ‘proof of principle’ that stem cells can replace a destroyed organ [6].

Disclosure Statement

The authors declared no conflict of interest.

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