response of blood donations during the hours and days following the events.

Keywords: blood; collection; components; distribution; donations; Israel; multicasualty events; processing; requirements; supplies; terrorist attacks
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Impact of War: Reflections on Blood Transfusion Services in BiH 1992–2002

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This presentation defines the basic problems with blood transfusion services in post-war Bosnia and Herzegovina. First, the pre-war context will summarised, then the situation during the war will be identified, and finally the post-war period will be examined. Comparisons between these three periods will highlight the impact of war on the organisation and function of blood transfusion institutions and services.

We explore difficulties in: (1) Motivating blood donors; (2) Setting one strategy for the whole country; (3) Developing common standards; (4) Having a lock on legislation, (5) The education and training of personnel; (6) Developing quality management and control; (7) The financing of services and institutions; (8) Having an increase in the demand for blood and blood components, but with fewer resources and an inefficient and ineffective country-wide organisation resulting in poor management.

Keywords: blood; Bosnia-Herzegovina; components, blood; demand; donors; education; effectiveness; efficiency; financing; legislation; management; quality; resources; standards; strategies; training; transfusion services; war
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A Model of Medical Measures for Blood Transfusion Services for Mass Casualties

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All the services of a country's public health system should be capable of rendering assistance to people affected during natural or man-made disasters, war, or other large events. Adequate blood transfusions and maintenance of medical measures for large groups of the population is possible only if there is a sufficient group of specialists in blood transfusion medicine who possess methods for emergency care and methods for the use of blood and its components in extreme conditions.

Within the last several years, a model for constant readiness to provide blood transfusions has been developed, and includes the conditions required to process a large number of the donors after notification of the occurrence of a disaster. The laboratory component of the blood transfusion crew ensures control of the main specifications for clinical analysis, homeostasis, and virus safety of the donated blood. At the same time, maintenance of the blood transfusion service demands organization of medical and donor plasmapheresis, which, because of the absence of a mobile point for donor plasmapheresis, currently is not being supplied up to an adequate level. For example, an injured person may require at least 1 liter of frozen plasma per day and 250 ml of packed red blood cells. Plasmapheresis is also necessary at the early stages of the development of acute renal failure, which may result following trauma-induced injuries.

Thus, the service of providing adequate blood transfusion services in Azerbaijan is in the formative stages (high-performance, portable, extracorporeal equipment and vehicles with centrifuges and freezers required for rapid cooling, all working on an autonomous power supply). This program is necessary for maintenance of the indispensable qualified blood transfusion service.

Keywords: analysis; blood; disasters; donors; fresh frozen plasma; plasmapheresis; processing; renal failure; safety; transfusions; trauma
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Netherlands Military Blood Supply System

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The Netherlands civilian blood supply organization—the Sanquin Blood Foundation— recruits and screens all donors, performs the donor testing and produces the usual array of blood products. The Netherlands military blood supply system is built on the civilian organization in that it procures liquid red cells, FFP, and platelets from its civilian partner. Because of long, vulnerable supply lines and unpredictable needs during missions abroad, we adopted the use of frozen blood products as developed in the United States. The lecture will address the organization and missions of the Netherlands Military Blood Bank, the use of liquid and frozen blood products, means of transportation, and quality control. This expertise was used during missions in Bosnia (SFOR) and Afghanistan (ISAF) and is now currently in use in Iraq (SFIR) Finally, some recent research and development issues will be mentioned.

Keywords: Afghanistan; blood supply; Bosnia; frozen blood products; Iraq; military; Netherlands Military Blood Bank; Sanquin Blood Foundation
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Military Support to Civil Blood Programs and vCJD Deferral

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The role of the United States Armed Services Blood Program and its support to the United States civilian blood programs is presented. The military blood program primarily is self-supporting. The major support role the Armed Services Blood Program provides access to donors on military installations to civilian blood programs. The vCJD deferral policy of volunteer blood donors of American Red Cross and that of the United States Food and Drug Administration are reviewed and contrasted including the impact on prospective donors. The vCJD donor deferral rate for the American Red Cross went from 0.06% in March 2001 to 0.88% average by the end of 2002. The rate continued to decline to 0.38% by December 2002.

Keywords: American Red Cross; civilian; deferral rate; onor; military; support; US Army Blood Services Program; volunteers
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Tuesday, 02 September

Session 3: Logistics of Blood Supply

Blood Supply in Slovenia

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Every year, 95,000 units of blood are collected in Slovenia (4.7% of the population of 2 million). All of the blood collected is processed in red blood cell concentrate and plasma. Some 30% of platelets are produced from random donors. All of the donations are tested for hepatitis B (HB), hepatitis C (HC), HIV, and syphilis. We use NAT testing for HC.

We have contract fractionation and a national self-sufficiency program. We use three units of factor VIII per inhabitant and 290 kg of albumin per million inhabitants. We have a unique quality assurance system and a unique information system supported by computers. We regularly supply 23 hospitals, and have an average stock of red blood cells for 14 to 21 days. We also have extra stock of albumin and blood bags for extraordinary circumstances.

Keywords: albumin; blood; factor VIII; plasma; platelets; processing; quality assurance; red blood cells; Slovenia; transfusion
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Clinical Perspective of Frozen Blood

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During the past 50 years, many different protocols were developed to freeze blood components. In this session, the experience of the Dutch Military Blood Bank (MBB) with several freezing protocols will be summarized, the modern production techniques using GLP, GMP, and GDP will be shown, and the resulting clinical application in theatre will be discussed.

With the current protocols (designed by Dr. C.R. Valeri) used by the MBB, frozen red cells can be stored for at least 10 years, frozen platelets for two years, and FFP for seven years at –80°C. These products can be transported at –80°C over five days, which should be enough for worldwide distribution. After thawing and resuspension in FFP (±30 min), the platelets are ready for transfusion. After thawing of the red cells (±30min), the cryoprotectant glycerol has to be removed using a cell-washer (±60 min) prior to transfusion. By using a sterile cellwasher, it now is possible to store the thawed washed red cells for an additional two weeks at 4°C before transfusion.

Different methods of freezing red cells were compared. The 40% glycerol/–80°C protocol not only was the most practical way to freeze red cells, but also the protocol that yields the most stable red cells after thawing and washing. This protocol now is FDA approved. In 1999 Dr. Valeri and collaborators showed that their freezing protocol did not deteriorate, but instead, improved the hemostatic properties of platelets both in vitro and in vivo. Although this method is not yet FDA approved, the need for platelets in the military setting, the impossibility to quickly send fresh platelets on demand and the danger of having to use fresh whole blood without complete repeated testing of the donor, in 2002, the MBB decided to supply the MTF with units of frozen platelets.

Thus, the MBB provides –80°C frozen red blood cells, platelet, and plasma to containerized frozen blood banks of role 2+ and role 3 MTF. Without re-supply, one frozen blood bank is able to provide enough blood products for two operating rooms non-stop for 48 hours. Several patients have been treated successfully with the frozen products, and to date, no patients have shown adverse effects from the transfusions.

Conclusion: Freezing blood components is a safe, effective, and easy way to provide blood products to remote areas. Thanks to the frozen blood module, the military now can be provided with leukodepleted, fully tested, blood products at the time when they need it.

Keywords: blood bank; blood products; freezing; military; plasma; platelets; protocols; red blood cells; safety; supplies; transfusions
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Vaccinia Immunoglobulin (VIG) Production in Israel

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In response to a possible threat of smallpox as a biological weapon, 21,000 previously immunized healthcare workers and "first responders:" were vaccinated in Israel, between August 2002-April 2003. Preparation of vacinnia immunoglobulin (VIG) was essential for treatment of serious, post-vaccination adverse events, in case of mass immunization.

The Magen David Adom (MDA) National Blood Services conducted blood and plasma collections sufficient to reach 2,500 liters of plasma. The VIG production process was granted to a local manufacturer (Omrix Biopharmaceuticals Ltd.), operating in an MDA fractionation plant. This manufacturer developed a quantitative ELISA assay, enabling in-process monitoring of anti-vaccinia antibodies in the product. Seven senior phlebotomists were trained intensively in aphaeresis procedures and joined the regular team of four technicians, thus quadrupling the unit performance. An additional six portable machines were purchased (MCS+, Hemonetics) to double the existing apheresis equipment. Mobile drives were conducted at workplaces to improve donor accessibility, and minimize time lost from work.

A surprisingly poor response to the donation appeal was noted. Only 37% (5,059/13,500 who had a successful vaccine "take") donated a total of 6,050 units (61% "jumbo" plasma units and 22% whole blood). This unsatisfactory reaction resulted from misinformation regarding plasmapheresis procedures, time lost from work, and the lowered alertness after the war in Iraq. Subsequently, 134 of the regular volunteer apheresis donors requested to be vaccinated.