

## When, why and how to order blood ?

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Efficient use of the limited resources of blood components depends not only on the administration of components but also on blood ordering behaviour.

As a matter of fact the right quantity of the proper blood component must be available at the right moment for a patient who needs it. But is it therefore necessary to order blood components for patients undergoing surgery during which generally no components are administered ? One should realize that each time a unit is reserved for a patient who does not use it, this unit is unavailable for other patients and its shelf life decreases.

Blood components should only be requested if the need for transfusion is likely. The prescribing physician should thereby adhere to the transfusion strategy developed in his institution.

One of the measures to reduce reservation and outdating of blood units is the establishment of Maximum Surgical Blood Ordering Schedules (MSBOS), which is current practice now in the USA for instance. Based on local previous records of blood ordering and blood administration for common elective surgical procedures surgeons, anaesthesiologists and the medical director of the blood bank develop blood ordering levels for the specific hospital. These blood orders are set to cover 90% of patients needs. Once the schedules are established, the blood bank routinely cross-matches the predetermined number of units for each patient undergoing the designated procedures. The routine orders are adapted in case of pre-existing anaemia, bleeding disorders or circumstances where increased blood use is anticipated.

In our country MSBOS are not widely introduced and are not mandatory. The Belgian health authorities state only (Royal Decree of April 16<sup>th</sup>, 2002) (1) that the hospital transfusion committee should edit a transfusion manual, which includes guidelines for the indications for transfusion and the accompanying prescription.

To prescribe blood components is considered to be a medical responsibility (2, 3, 4, 5, 6, 7). Completion of the request form and collection of samples for pretransfusion testing can be delegated

to a nurse or a midwife. The request form must at least include adequate patient identification, date and time the components are needed, number and type of the components required, any special requirements and the reason for request. When possible the form should also mention patient's sex and information concerning obstetric and recent transfusion history. The pretransfusion samples are taken after positive identification of the patient and the tubes are labeled at the patient's bedside after blood samples have been taken. This administrative work-up is necessary to avoid clerical and identification errors which are responsible for the majority of ABO-incompatible transfusions (8).

Pretransfusion testing can be performed following two different strategies : crossmatch or type and screen. In both cases the first step is the determination of the patient's ABO type and rhesus D. In order to be sure about the patient's identity blood grouping is valid only when it has been performed on two different samples. Because of practical problems "variants" of blood group determination are adopted in some centres : double testing on the same sample, automated bloodgrouping etc. In the crossmatch strategy the patient's serum sample is incubated with the donor's red cells (ABO identical or eventually ABO compatible with the patient) in the indirect antiglobulin test. This technique allows the detection of ABO incompatibility and the detection of clinical relevant antibodies against the donor cells. Crossmatch is performed just before the transfusion. As this test takes about one hour the red blood cell (RBC) units can not be released immediately. The crossmatched units are reserved for one patient and become thus unavailable for other patients. Moreover these units are often transported to the operation theatre and are brought back to the blood bank when they are not transfused. In the type and screen (T&S) strategy the patient's

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serum is screened for the presence of clinical relevant antibodies against test red cells selected for that purpose. If this screening is negative no units are reserved. In case of transfusion an immediate spin crossmatch or a computer crossmatch is performed and RBC concentrates (ABO identical or ABO compatible) can be made available in about 15 minutes. This T&S can not be used and a crossmatch in the indirect antiglobuline test is mandatory in the following settings : intra-uterine transfusions, neonates below the age of 3 months, patients with autoantibodies or clinical relevant antibodies, recipients of organ transplantation (until 3 months after transplantation), patients after allogeneic bone marrow transplantation. The immediate availability of the units, the fact that units are not reserved and don't leave the blood bank are some of the advantages of the T&S strategy. In our country there are some reimbursement restrictions which restrains some centers from introducing this strategy. Samples for the crossmatch as well as for T&S should not be older than 3 days unless the patient was not pregnant or did not receive a transfusion 3 months before testing.

In emergencies it is sometimes not possible to wait for the results of complete pretransfusion testing. Whenever possible the patient's ABO type and Rh-D should be determined and RBC of the patient's ABO D should be delivered. When it is not possible to determine the blood group before transfusion, type O RBC are delivered, Rh-D nega-

tive for women under the age of 45 years, Rh-D positive for older women and for men. As soon as the blood group is known the transfusion is continued with RBC of the patient's blood type. For transfusion of units without or with incomplete pretransfusion testing the clinician signs a special request.

Autologous predonation units are tested before transfusion : crossmatch or ABO control of the units.

## References

1. Belgisch Staatsblad, 2002-07-02 : Koninklijk besluit tot wijziging van het koninklijk besluit van 23 oktober 1964 tot bepaling van de normen die door de ziekenhuizen en hun diensten moeten worden nageleefd, 16 april 2002.
2. BCSH Blood Transfusion Task Force, *Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories*, TRANSFUSION MEDICINE, **6**, 273-283, 1996.
3. BCSH Blood Transfusion Task Force, *Guidelines. The administration of blood and blood components and the management of transfused patients*, TRANSFUSION MEDICINE, **9**, 227-238, 1999.
4. Gorlin J. B., ed. Standards for blood banks and transfusion services. 21<sup>st</sup> ed. Bethesda, M.D. : American Association of Blood Banks, 2002.
5. Brecher M. E., ed. Technical manual. 14<sup>th</sup> ed. Bethesda, M.D. : American Association of Blood Banks, 2002.
6. Sanquin Conceptrichtlijn Bloedtransfusie, 2002.
7. UCLA center for health sciences : Transfusion Medicine Manual, 2003.
8. Sazama K., *Reports of 355 transfusion-associated deaths : 1976 through 1985*, TRANSFUSION, **30**, 583-90, 1990.