MELBOURNE PATHOLOGY

"We take it personally"

AUTOLOGOUS BLOOD: MOVING WITH THE TIMES

SEPTEMBER 2006

insight

- Potential risks of autologous blood donation are now generally considered to outweigh possible benefits.
- The Australian Health Ministers' Advisory Council says autologous donation should not be promoted or funded through Medicare.
- Melbourne Pathology has changed its procedures for autologous donation.

With the advent of HIV in the 1980s, the world became acutely aware of our potential vulnerability - morbidity and mortality - from blood transfusion. Subsequent initiatives have reduced the risk, but most of these efforts, such as viral nucleic acid testing (NAT), have focused on infectious consequences of transfusion. In response to the assumed infectious risk of unknown volunteer donation, services providing opportunity for either autologous donation (patient's own blood) or directed donation (designated donor blood) emerged.

However, perspective in the medical community is changing. We now understand that the greatest risk to the patient does not come from the blood supply but from the primary event of exposure to blood itself.

SHOT (Serious Hazards of Transfusion) is a voluntary haemovigilance reporting program in the United Kingdom. Figures from this collaborative clearly demonstrate that the most common complication of transfusion is administration of the incorrect blood component (66 percent of reports). Transfusion-transmitted infections account for only 2 percent of all reports, and this includes infections for which no current screening is performed e.g. bacterial contamination. Incorrect blood transfusion (wrong blood into wrong patient) is commonly a result of inadequate patient identification, poor collection and labelling practice, transcription errors in the laboratory, errors at collection of blood from refrigerators or at administration to the patient[1]. Autologous donation does not protect the patient from these risks and the adverse outcomes are more acute and dramatic than viral infection.

What are the possible benefits of autologous donation?

1. Autologous donation negates the risk of transfusion-transmitted viral infection, but in Australia the residual risk estimates per unit of blood, of transmission of those viruses for which we currently test are very low[2].

HIV (antibody and NAT)	1 in 7.3 x 10^6
HCV (antibody and NAT)	1 in 3.6 x 10^6
HBV (antigen)	1 in 1.3 x 10^6
HTLV (antibody)	<< 1 in 1 x 10^6

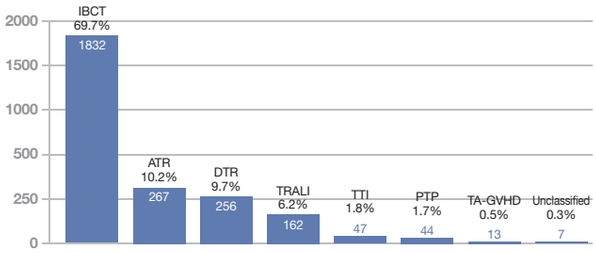
   On published risk scales, receiving a unit contaminated by HIV equates to the risk of being struck by lightning[3]. The risk of the operative procedure is usually higher!

2. Autologous donation is the best mechanism for prevention of allo-immunisation i.e. formation of antibodies to foreign red cells that may subsequently produce transfusion reactions. The true risk of allo-immunisation is small, the risk of recurrent blood exposure is also small and the ability to provide appropriately matched blood remains high even when allo-immunisation has occurred. However, patients with many preformed blood group antibodies, for whom cross-match compatible blood will be difficult to find, are perfect candidates for consideration of autologous donation.

3. Autologous blood may cause less immunomodulation, for instance, less post-surgical infection, but autologous blood, because it is stored as whole blood also has immunomodulatory effects.

Categories of adverse events reported to SHOT 1996 – 2004

Total sample = 2628



Incorrect blood component transfused: 69.7%
Transfusion transmitted infection: 1.8%

Legend: **IBCT** incorrect blood component transfused
ATR acute transfusion reaction
DTR delayed transfusion reaction
TRALI transfusion related acute lung injury
TTI transfusion transmitted infection
PTP post transfusion purpura
TA-GVHD transfusion associated graft versus host disease

What are the possible risks of autologous donation?

1. Autologous donation does not protect against the commonest errors, either 'near miss' scenarios or events actually leading to morbidity or mortality, as reported to haemovigilance programs such as SHOT. Errors of collection and/or administration can and do still occur.

2. Volume overload is the commonest side-effect of transfusion and autologous units, as whole blood units, subject the patient to a greater volume load than donor packed cells.

3. Stored blood has greater potential for bacterial infection. This is minimised in two ways: deferral of any patients with active infection, and the use of newer collection systems which contain a diversion pouch, preventing entry of the skin plug through the needle into the blood unit.

4. Autologous donation imposes a period of rapid volume depletion. This can be tolerated poorly by the autologous donor population who are older and have more serious medical co-morbidities, particularly cardiac.

5. Despite iron supplementation, donors become progressively anaemic through the process of multiple donation. The patient enters surgery with a lower haemoglobin and is subsequently at greater likelihood of needing a transfusion.

6. The risk of receiving any transfusion is increased. This relates to both the perceived safety of autologous blood and therefore the automatic return to the patient of all donated units, failure to impose strict transfusion triggers and the increased risk of pre-operative anaemia from donation. Each unit exposure is another opportunity for error, infection and fluid overload. Autologous donation does not negate the need for further homologous (volunteer donor) units in a proportion of patients.

In addition to these risks there are serious ethical issues surrounding the practice of autologous donation. Patients report feeling compelled by their surgeon to donate, are poorly informed about risks and benefits and are subjected to the additional and sometimes unexpected financial burden.

The need for any transfusion should be determined by the type of surgery, the predicted blood loss, the implementation of a standard transfusion trigger, the individual tolerance of anaemia (age and co-morbidity related) or the implementation of other blood conserving techniques. Where there is a low pre-donation likelihood of transfusion, autologous donation should not be pursued. Established Surgical Maximum Blood Order Schedules can be employed as a guide. The commonest appropriate indications continue to be hip and knee replacement, radical prostatectomy and major spinal surgery but the between-surgeon variation is enormous even for these procedures. Autologous blood continues to be ordered both reflexly and inappropriately and therefore is a drain on the resources of the patient and the health system.

For all these reasons the AHMAC (Australian Health Ministers' Advisory Council) recommends that although this service should be available to those who wish to use it, autologous donation should not be promoted and should not be funded through Medicare[4].

Note: Melbourne Pathology made several changes to its procedure for autologous blood donations from 1 July 2006. Key changes are that blood is collected only for procedures with an accepted transfusion requirement, specific referral/consent forms must be used and the service is no longer free.

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Footnotes:
1. www.shotuk.org
2. *Medilink* ARCBS volume 9, issue 1 May 2006
3. http://hazmat.dot.gov/riskmgmt/riskcompare.htm
4. AHMAC *Review of the Alternatives to Homologous Blood Donation*.