



CLINICAL PRACTICE

Administration of blood components — avoiding unnecessary costs

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Since there are several blood component filters currently available on the market, some of which are relatively expensive, this article serves to place in perspective the indications for their use.

Blood components must be transfused through a sterile, pyrogen-free transfusion set which has an in-line filter (170 μm pore size), drip chambers and tubing.^{1,2} The filter serves to remove potentially harmful clots and debris that may have formed during collection or storage. Although the Transfusion Services carefully inspect individual units before issuing, there is a slight chance that a small clot could go undetected and hence this filter is recommended for the administration of all components. The cost of the set is approximately R30. It should be emphasised that the chances of clot formation during storage are very low since red cells are mainly prepared as buffy coat-poor concentrates mixed with an additive solution and anticoagulant and contain very little plasma and are relatively depleted of white cells and platelets. Most manufacturers recommend that the set be changed after 24 hours or following a specified number of units. Trapped protein and debris provide a potential medium for bacterial growth; also, as filtered particles accumulate, the flow rate decreases. Platelets are given using a set containing a 170 μm filter although the surface area of the filter is smaller than that used for red cells. Fresh-frozen plasma and cryoprecipitate are also best given through this standard administration set in case small fibrin strands are present.

Second-generation microaggregate filters (MAFs) containing

filters of 40 μm made an appearance in the 1970s and were developed to remove very small aggregates of degenerating platelets, leucocytes and fibrin that may form during storage and pass through the standard filters. They are intended only for red cell component filtration. Early studies appeared to show a clinical benefit in respect of pulmonary function (prevention of pulmonary microemboli) but other studies did not confirm this benefit.³ Their use in cardiopulmonary bypass surgery may be prudent to reduce postoperative morbidity from arteriolar emboli, and specialised intra-arterial line MAFs are available for these procedures.⁴ Their role in reducing febrile non-haemolytic transfusion reactions (FNHTRs) has been supplanted by the more efficient leucocyte removal filters and the routine preparation of standard red cell concentrates with removal of the buffy coat which is rich in white cells and platelets. The MAFs cost approximately R160 and therefore add appreciably to the cost of a red cell concentrate and can be used only once. We do not recommend the routine use of these filters which we believe are being marketed as the filter of choice, particularly in the private sector.

During the last decade sophisticated leucocyte depletion filters have been developed which are able to remove 99.9% (log 3), or more, leucocytes. A more detailed discussion on these filters appeared in the October 2001 SAMJ — suffice to say they are considerably more expensive (over R300). A number of developed countries have elected to filter all red cell and platelet components routinely before storage, despite the lack of unequivocal evidence to support its universal application. The costs are considerable (\$400 million in the USA per annum) and therefore its universal introduction in South Africa needs to be considered carefully in view of the many competing health priorities. The transfusion services in South Africa have reviewed the subject carefully and believe there are selected indications for leucocyte-depleted blood components — these are outlined in the article referred to.⁵ Nevertheless they probably bear repeating:

- If FNHTRs occur repeatedly or patients are on chronic transfusion regimens.
- Platelets prepared from single donors by apheresis should be by a technique that incorporates leucocyte depletion (all modern cell separators have this capacity).
- Patients considered at risk for transfusion-transmitted cytomegalovirus.

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- Patients who are potential haemopoietic transplant recipients should receive leucocyte-depleted components from inception of transfusion support.
- Intrauterine transfusions and all transfusions to infants under 1 year of age.

It should also be noted that there is little clinical evidence to support the routine use of leucocyte depletion filters for plasma.

Filtration should be carried out within 48 hours of collection, i.e. by the transfusion service. Bedside filters are not recommended since consistent quality control is not possible and older units will accumulate cytokines, etc. which may be responsible for some of the side-effects attributed to white cells. Obviously if individual clinicians believe that their patients

would benefit from leucocyte-depleted components for indications other than those above, they should naturally request this and the Services will issue accordingly. By monitoring the usage and gearing up accordingly the Services will be in a position to meet any such demands.

We trust that this clarifies the role of filters in the administration of blood components.

1. Medical Directors, Blood Transfusion Services of South Africa. *Standards for the Practice of Blood Transfusion in South Africa*. 3rd ed. 1999: 48.
2. Medical Directors, Blood Transfusion Services of South Africa. *Clinical Guidelines For the Use of Blood Products in South Africa*. 2nd ed. 2001: 11.
3. Mollison PL, Engelfriet CP, Contreras M, Jones J. *Blood Transfusion in Clinical Medicine*. 10th ed. Oxford: Blackwell Science, 1997: 505-506.
4. Calhoun L. Blood product preparation and administration. In: Petz LD, Swisher S, Kleinman S, Spence RK, Strauss RG, eds. *Clinical Practice of Transfusion Medicine*. 3rd ed. New York: Churchill Livingstone, 1996: 323-324.
5. Bird AR. Leucocyte depletion of blood components. *S Afr Med J* 2001; **91**: 822-823.

PERSONAL VIEW

The payer and the piper – a view on evidence-based medicine

Hannes Loots

'He who pays the piper calls the tune' is a remark from the old German children's story *The Pied Piper of Hamelin*. Historically we can say that the tune has been 'the medical aid will pay'. Unfortunately, rising health care costs in the face of finite social resources have changed the tune to 'the medical scheme might not pay'. This tune might also signal the more important role of health cost management within the medical industry.

Until recently it was easy to view industry and medicine as separate entities. Medicine was a profession and industry a business. Medicine had patients and industry had customers. Today many consider medicine to be a business, the medical industry, with business rules applying. This has brought about sweeping changes. The number and intensity of clinical interventions is growing faster than ever before, and the expectations of a computer-literate society with its growing

concern for enhanced personal lifestyle are pressurising the primary aims of medicine. In a lecture presented at the Royal College of Physicians and Surgeons of Canada in Montreal during September 1999 the past president of the American Academy of Orthopedic Surgeons said the following: 'The medical profession is forced to consider medicine as the medical industry and areas such as medical education, research, hospitals, subspecialties, rehabilitation and investor-owned managed care have become branches of the medical-industrial complex.'

'Medicine has compromised professionalism to reap financial benefits. Physicians long considered that advertising and marketing themselves were inappropriate and demeaning. Today, many physicians freely use all available media to market themselves without shame or sanction. We have sold our birthright for a pot of porridge.'

Whether or not we as clinicians have sold our birthright to treat and cure patients is open to debate, but we need to accept and understand that the medical industry is indeed a new concept in many ways. This is an industry that talks about cost-effective health care, number needed to treat (NNT) as a

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