

Blood Transfusion Service Driving for Patient Blood Management – Outcome, Supply or Others?

By **Dr Cheuk-kwong Lee**, Chief Executive and Medical Director, Hong Kong Red Cross Blood Transfusion Service

Blood transfusion remains indispensable for management of many clinical conditions nowadays. In order to secure a stable supply chain and together with a steady buffer to meet clinical need, sustaining safe blood supply requires a concerted effort from public, donors and blood transfusion service (BTS). As in many developed countries, blood collected for clinical transfusion should only be given by voluntary non-remunerated blood donors who have undergone stringent eligibility and infectious diseases screening. Being no substitute, blood carries limited shelf life and its inventory is affected by day-to-day fluctuations in the clinical demand for different blood groups, type of blood components and quantities. Besides, the supply and demand balance can also significantly be affected by many unpredictable external conditions including weather, civil and natural disaster, infectious disease outbreak, and many issues happened in the society.

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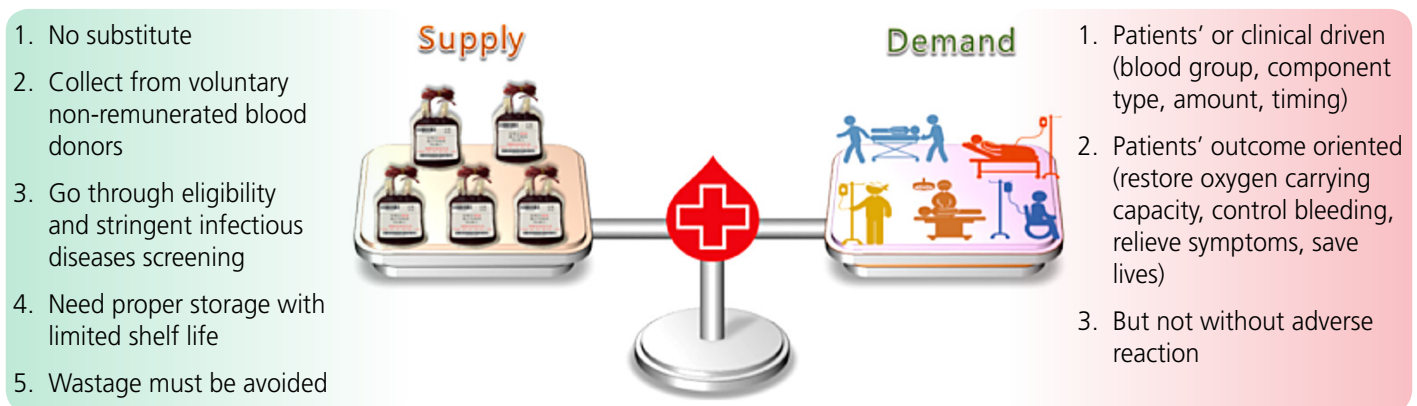


Figure 1: A simplified version of the blood supply and demand relationship in developed countries

To tackle the above, the BTS establishes and relies on a sophisticated network of donor recruitment and publicity strategies in mobilising public and donors to donate regularly, at the right time and at the convenient places. At the same time, it also requires the support of the clinical teams to provide an accurate account of patients' transfusion need. Moreover, judicious use of blood transfusion could not only benefit clinical management but also potentially avoid adverse event from transfusion. Therefore, everyone working in the healthcare system and the society should share the same commitment to secure a stable and safe blood supply and to improve patients' outcome through blood transfusion and clinical measures.

With an ageing population and hence, increasing demand on healthcare system, sustainability of safe blood supply is also a burning issue in Hong Kong. In addition to its primary roles and responsibilities to collect blood to meet clinical demand, the BTS has been working hard to drive for understanding and implementing Patient Blood Management (PBM) in both public and private healthcare sectors. Being medical professions and part of the system, the BTS affirms its commitment to meet patients' transfusion need and improve patients' outcome through PBM. Indeed, it is a win-win situation with

1. Patients benefit from the various PBM measures that could reduce their length of stay and in-hospital complications and improve their satisfaction; and
2. Clinicians could apply the state-of-the-art PBM practices in their specialties with better patients' outcome; and
3. BTS could better manage the blood supply in meeting transfusion demand.

With these, ongoing efforts with an ultimate objective to enhance patients' outcome are definitely necessary to drive Patient Blood Management into routine practices, enhance the blood collection capacity to meet clinical demand, and secure blood and transfusion safety towards the benefit to patients during their disease management.



Editorial Comments

Sustainability of blood supply is a burning issue. While blood is indispensable in some acute conditions and has no substitute, there is a way out. Patient blood management (PBM) is an evidence-based concept to conserve and manage a patient's blood. Not only does judicious use of blood transfusion save blood, but it also avoids many adverse events from transfusion, and hence better clinical outcomes.

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Thromboelastometry/Thromboelastography-guided Transfusion Therapy: A Powerful Tool in Patient Blood Management

By **Dr Rock Y Y Leung¹, Mr Tony K F Yan¹, Ms Annie W Y Yim², Dr Clarence C K Lam¹, Ms Melody L Y Wong³, Dr S N Cheang⁴, Dr S R Das⁴, Dr Y K Tang⁴, Dr Cally K L Ho³ and Dr Timmy W K Au³**

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Intra-operative management of coagulopathy is challenging because of the relatively long turnaround time of conventional plasma-based laboratory coagulation assay, rendering a real-time decision making on transfusion therapy impossible.

The introduction of viscoelastic assay (either using thromboelastometry- or thromboelastography-technology) has resulted in a revolutionary change in transfusion practice, especially in clinical setting which mandates early recognition and management of coagulopathy, e.g. cardiac surgery, liver transplantation, obstetric haemorrhage or trauma. The test is performed on patient's citrated whole blood sample interrogating different segments of the coagulation process, involving coagulation factors, platelets and fibrinogen. Most often as a Point-of-Care Test (POCT), it generates informative results in 5 to 10 minutes to guide transfusion therapy. Evidence showed that with a protocolised approach and the use of fibrinogen concentrate to replace cryoprecipitate transfusion, the need of transfusion was significantly reduced.

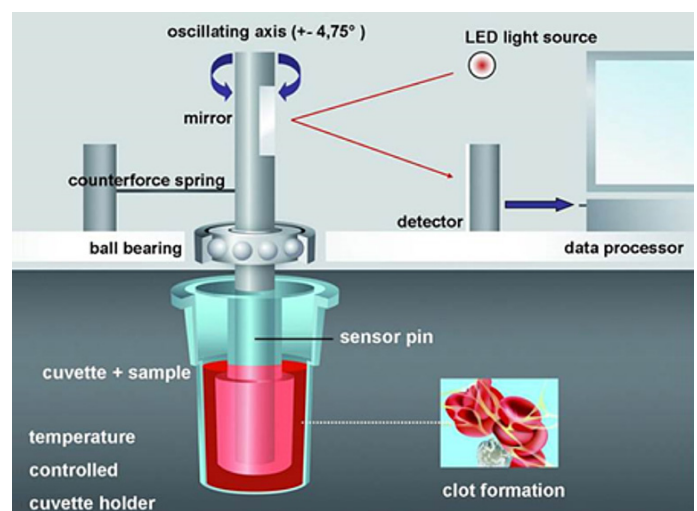


Figure 1. Monitoring of clot formation and lysis by viscoelastic assay

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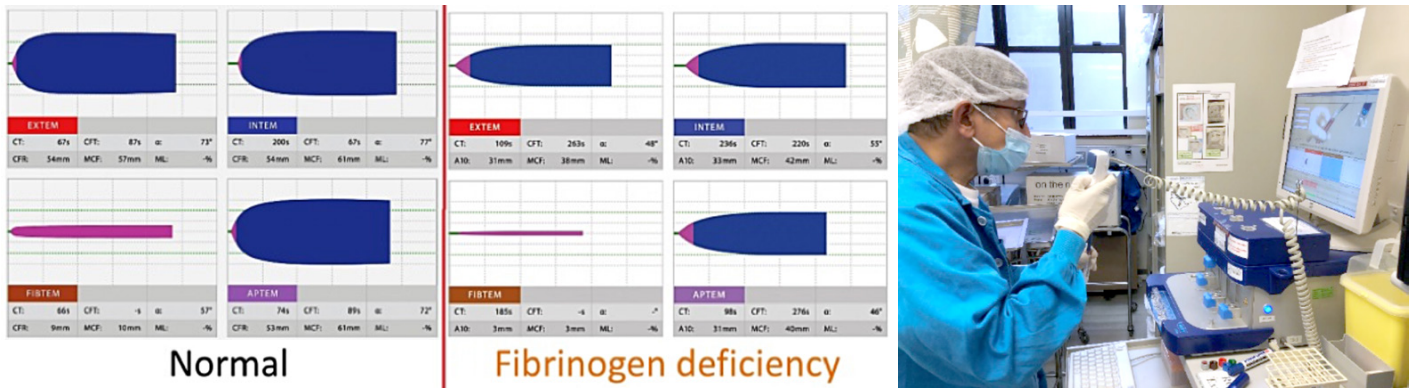


Figure 2. Differentiation of coagulation factor and platelet deficiencies by Thrombo-Visco-Elastograms

Evaluation of viscoelastic assay was started in Cardiothoracic Surgery of Queen Mary Hospital since October 2017. After establishment of viscoelastic test-guided transfusion protocol, there was an average monthly reduction of 17 units of each type of blood components, viz. red cells, random donor platelets and cryoprecipitate. On the other hand, the viscoelastic-guided use of cryoprecipitate and the introduction of fibrinogen concentrate have tremendously reduced the wastage of cryoprecipitate from 5.31% in 1Q 2019 to 0.82% in 3Q 2020.

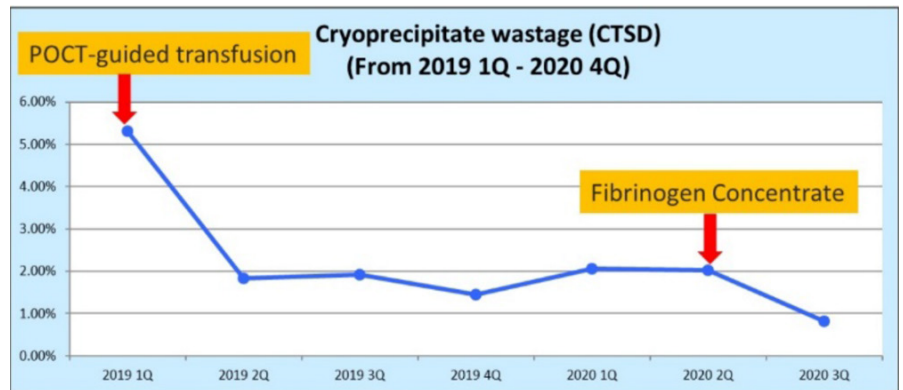


Figure 3. Reduction in cryoprecipitate wastage

Good clinical management is considered as one of the pillars in Hospital Authority Patient Blood Management (PBM) strategies. Thromboelastometry/thromboelastography-guided transfusion therapy is an excellent example to illustrate how new technology drives good clinical practice. More prevalent use of the technology in appropriate clinical setting through strategic service planning, together with the optimal use of other PBM tools, can further improve patient outcome.

Approach of Viscoelastic-guided PBM in Cardiothoracic Surgery

Rewarming on Cardiopulmonary Bypass

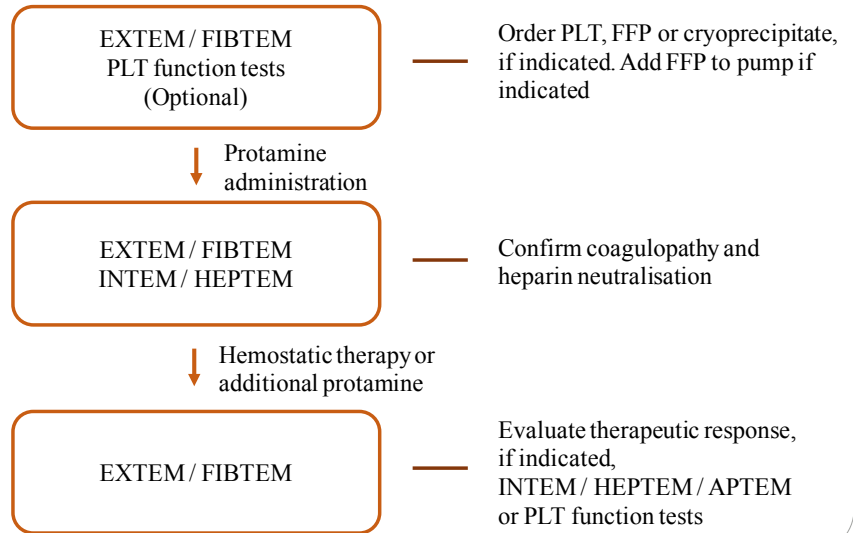


Figure 4. Approach of viscoelastic-guided PBM in cardiothoracic surgery

Editorial Comments

Thromboelastography assays allow for rapid and accurate assessment and diagnosis of coagulopathy at the point of care and provide clinicians with the information they need to correctly manage haemorrhage and reduce blood loss. This technology represents a valuable tool for reducing the need for allogeneic blood transfusion within a PBM framework.

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Management of Iron-deficiency Anaemia among Patients Suffering from Menorrhagia

By **Dr T W Leung**, Department of Obstetrics & Gynaecology, Kwong Wah Hospital

Patient blood management plays an increasingly important role in the management of menorrhagia. How to raise the haemoglobin level of patients suffering from menorrhagia safely and effectively, without unnecessary blood transfusions, is a challenge for the gynaecologists. Since October 2017, our department has adopted a dose-standardised protocol for intravenous (IV) iron therapy to treat severely-anaemic patients with menorrhagia, without complicated dose calculation or prolonged hospitalisation.

Haemodynamically stable patients suffering from menorrhagia, who had severe iron-deficiency anaemia (Hb level 6-8 g/dL), were treated by IV iron therapy, with two doses of 200mg iron (Ferric Sucrose), followed by oral iron supplement for at least 4 weeks. In a retrospective review on 114 patients with menorrhagia treated with IV iron therapy between October 2017 and October 2018 in our department, it was found that at 4 weeks after starting treatment, both the mean Hb level and the mean ferritin level increased significantly by 3.4 g/dL (Figure.1) and by 34.4 ng/mL (Figure. 2) respectively. Among the 103 patients who reported anaemic symptoms before treatment, anaemic symptoms resolved in 102 (99.0%) patients. Only one patient reported an adverse reaction with skin rash, which was treated with antihistamine. No anaphylaxis occurred among patients treated.

IV iron therapy using a simplified dose-standardised protocol followed by oral iron supplement seems to be a cost-effective, safe and well-tolerated treatment for patients suffering from menorrhagia with severe iron-deficiency anaemia.

Since the maximum single dose for Ferric Sucrose is only 200mg and each dose has to be separated by at least 24 hours apart, to further reduce the number of hospital admissions / duration of hospitalisation needed for IV iron therapy, especially at time of COVID-19 pandemic, our department has changed the IV iron therapy regime to a single dose of 500mg iron (Ferric Isomaltoside) followed by oral iron supplement, since February 2020. The efficacy of such regime is currently under review.

Figure. 1 Hb levels before and after IV iron therapy

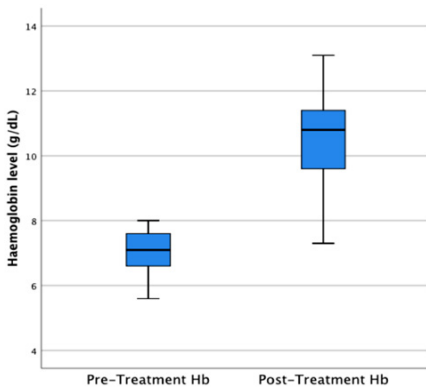
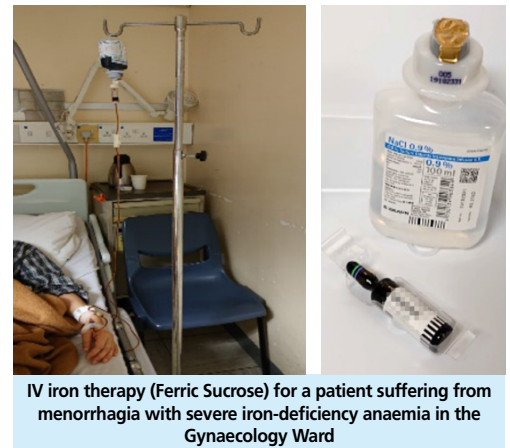
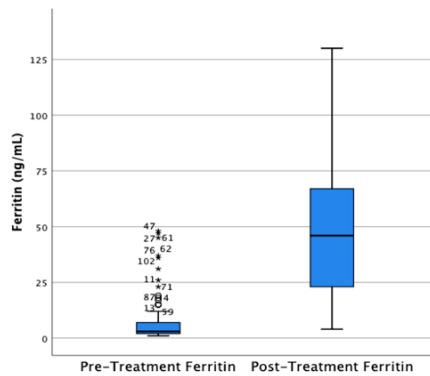


Figure. 2 Ferritin levels before and after IV iron therapy



IV iron therapy (Ferric Sucrose) for a patient suffering from menorrhagia with severe iron-deficiency anaemia in the Gynaecology Ward

Editorial Comments

Facing the challenges of blood management for menorrhagia patients, dose-standardised protocol for intravenous (IV) iron therapy is a cost-saving and secure way to solve the problem. With observed improvement in the treatment outcome, future exploration is suggested to enhance service quality and patient care.

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