

## Peri-Operative Blood Management and Platelet Mapping



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### INTRODUCTION

In response to changes in legislation and the UK's strategy on 'Better Blood Transfusion', we at the London Bridge Hospital have undertaken to reduce unnecessary transfusion of blood products. A systematic and multi-disciplinary approach to achieve this has seen us implement a variety of changes in cardiac surgical components.

### CONSIDERATIONS

- Fully coated, non metallic circuits
- Non metallic cardioplegia systems
- Routine use of centrifugal pumps
- High flow, low velocity cannulae
- Minimised prime volumes (not yet introduced mini-bypass)
- Avoidance of temperature reduction below 32 degrees for routine cases
- Routine use of Intra-Operative Cell Salvage
- ANH and intra-operative pre-donation
- Anti-fibrinolytic agents (Aprotinin and Tranexamic Acid)
- Fibrin sealants
- Point of Care Hb Analysers
- Point of Care Coagulation Analysers
- Post-Operative Cell Salvage where necessary
- Clinical audit of wound drainage
- Clinical audit of transfusion practice

### RESULTS

Audit results on 175 consecutive patients undergoing cardiac surgery. These results show that we have reduced transfusion requirements steadily. Further developments will include better monitoring of coagulation. Our program has therefore begun to introduce technology that will assist in this respect.

Coagulation monitoring is essential in

providing an evidence based approach to transfusion requirements. Thrombelastography has rapidly become the clinical tool of choice for many blood reduction programs. With increased numbers of patients presenting for surgery on anti-

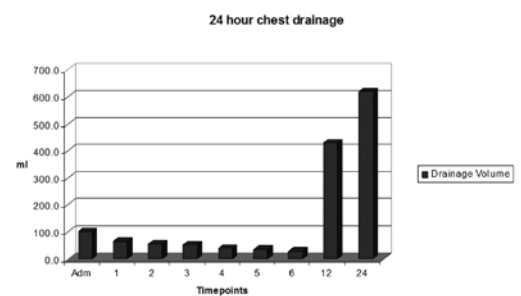


Figure 1. 24 hours chest drainage

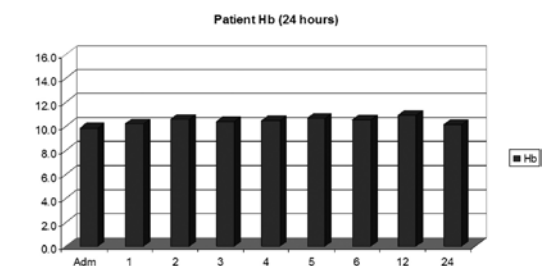


Figure 2. Patient Hb (24 hours)

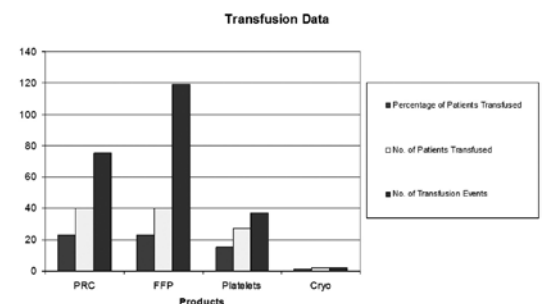


Figure 3. Transfusion Data

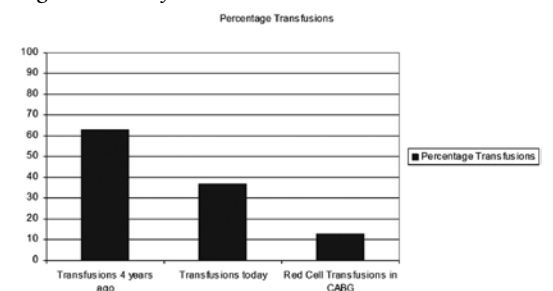


Figure 4. Percentage Transfusions

platelet agents there is a need for a reliable screen for the affects of these agents at the point of care. Platelet Mapping is a recently introduced assay that utilises TEG technology to access the degree to which the ADP and COX2 pathways are inhibited by these agents. An assessment of such inhibition will facilitate better coagulation management at the time of surgery.

**PRINCIPLE OF PLATELET MAPPING**

A baseline, Thrombin influenced TEG trace is compared to a sample with complete platelet suppression and a sample influenced by either ADP or Arachidonic Acid (AA). The Thrombin activated sample assumes complete platelet activation (i.e. 100 % platelet function). P1, the platelet suppressed trace assumes no platelet activity in the overall clot strength. P2 (ADP) and P3 (AA) assume activation of those platelets that are not influenced by inhibiting agents such as Clopidogrel and Aspirin. Other influencing factors cannot be discounted and non compliance to drug prescription needs to be considered. This technology requires a multidisciplinary collaboration. It is essential that

Surgeon, Anaesthetist, Perfusionist and Haematologist understand all aspects of the result and that careful attention to validation, Quality Control and clinical implications are followed. The evidence for this as a clinical tool is being generated monthly. Platelet Mapping could have a significant part to play in the management of peri-operative coagulation, and therefore transfusion requirements. Anti-platelet therapy has a significant role in cardiac surgery. What is not presently understood is the individual affect that these agents have on patients. With better understanding of the individual patient response we hope to reduce further our transfusion requirements. There is still work to be done on the clinical significance of inhibition, in terms of the benefits and consequences for surgery.

**FUTURE DEVELOPEMENTS**

Future developments include point of care platelet count analysis, pre-operative optimisation strategies, mini-bypass, better patient warming systems and a more aggressive approach to post-operative cell salvage.

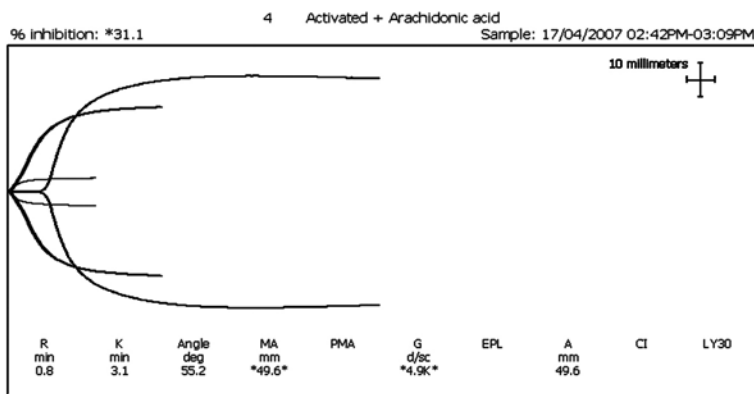


figure 5..