Use of ROTEM®: does surgical specialty influence transfusion practice?

Dr Cameron Dunn, Dr Ronald Kam Kai Fung, Dr David Hassell, Dr Mary Hoang, Prof. Michael Bennett, Dr Catherine Downs
(Prince of Wales Hospital, Sydney Children's Hospital & Royal Women's Hospital, Prince of Wales Private Hospital, Randwick, NSW, Australia)

Introduction

ROTEM® is a point-of-care coagulation test used at our four-hospital campus to guide transfusion practice.

In 2015, the Randwick campus was the first site in Australia to introduce ROTEM® sigma for this purpose. The implementation of a cardiovascular ROTEM® transfusion algorithm in 2016 significantly reduced our use of FFP and platelets [1]. A general surgical and obstetric ROTEM® algorithm was developed in 2017, continuing our rational and individualised approach to transfusion practice.

This audit examines our campus ROTEM® transfusion algorithms and practice by surgical speciality.

Methods

We examined ROTEM® data between August 2018 to November 2019 including indication for testing, surgical specialty and the use of blood products.

Surgical specialties included were cardiothoracic, general surgical, musculoskeletal, and obstetric/ gynaecological (O&G).

Results were entered into Excel and classified in accordance with our ROTEM® algorithms. We identified ROTEM® results as "GREEN" (normal coagulation profile suggesting need for surgical haemostasis); "YELLOW" (abnormal result but wait and re-test) or "RED" (abnormal result requiring immediate treatment).

Results

A total of 401 ROTEMs® were performed in 261 individual patients across the campus during the study period.

238 ROTEMs® (144 patients) were performed in cardiothoracic, 74 (42 patients) in general surgery patients), 41 (29 patients) in musculoskeletal and 48 (46 patients) in O&G (Table 1).

66% of ROTEMs® (266) returned results in the RED range, 20% (79) in the YELLOW range and 14% (56) in the GREEN range (Figure 1).

Table 1: Classified ROTEM test results (number and %) for each surgical speciality.

Specialty	RED	YELLOW	GREEN
Cardiothoracics	169 (71%)	43 (18%)	26 (11%)
General Surgery	46 (62%)	17 (23%)	11 (15%)
Musculoskeletal	35 (85%)	4 (10%)	2 (5%)
Obstetrics & Gynaecology	16 (33%)	15 (31%)	17 (35%)

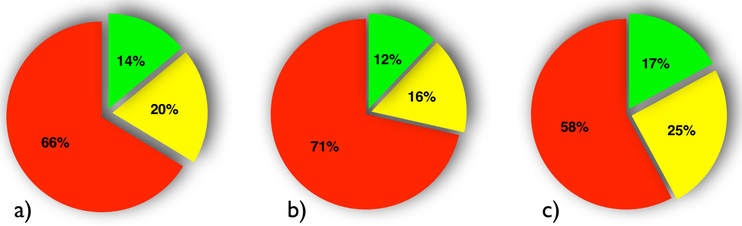

Figure 1: ROTEM® test results "GREEN", "YELLOW", & "RED" for a) ALL ROTEMS®, b) Initial ROTEM®, c) Repeat ROTEM®

Conclusion

Coagulopathy is present at first ROTEM® testing in the majority (86%) of cases when there is clinically significant bleeding. Only a single ROTEM® was required in most cases, indicating resolution of clinically significant bleeding. In cases where repeat testing was required the coagulopathy was due to ongoing requirements for tranexamic acid or fibrinogen. In all cases of obstetric bleeding where a coagulopathy was identified, fibrinogen was deficient.

Patients undergoing musculoskeletal surgery (eg spinal, orthopaedic, craniofacial) had the highest prevalence of coagulopathy contributing to clinically significant bleeding. In contrast, patients undergoing O&G surgery had the highest prevalence of bleeding requiring surgical haemostasis.

References

1. Jain M, Chamberlen E, Santifort K, Malhotra S, Downs C. Introducing viscoelastic haemostatic assay-guided blood product transfusion into your hospital. Australian Anaesthesia, 2017. ANZCA 77-93

Ethics committee approval was obtained across all 4 hospitals. No conflicts of interest to declare.