

Point-of-care coagulation testing in cardiac surgery: a UK national survey

R Davies, S McCorkell

Guy's and St Thomas' Hospital, London, UK

Cardiac surgery is associated with rapid changes in coagulation status. The long turnaround times associated with laboratory based coagulation testing often necessitates empiric therapy of this coagulopathy. Blood product therapy is known to increase morbidity, mortality and hospital costs [1]. Modern point-of-care (POC) devices provide rapid bedside monitoring of coagulation, which along with transfusion algorithms have been shown to reduce transfusion requirements and blood loss [2]. Little is known of the availability and use of point-of-care (POC) coagulation devices in the UK, we conducted the first national survey to investigate this.

Methods

We conducted an email survey using survey monkey of all members of the association of cardiothoracic anaesthetists (ACTA). All 480 members were contacted and 119 responses received, representing a 24.8% response rate. Two were discarded, and 116 were analysed. We received at least one response from all 37 centres performing cardiac surgery in the UK.

Results

All 37 institutions have activated clotting time (ACT) available, however 6/116 (5.2%) of respondents use the thromboelastogram (TEG) to test heparin effect/reversal and one respondent uses rotational thromboelastometry (ROTEM®) in this way. Only 4/37 (10.8%) of institutions have heparin/protamine dose-response assays available. All but one of the institutions have some form of visco-elastic test of clot formation available; of these one institution has both TEG and Sonoclot, four (11.1%) have TEG and ROTEM® available and two (5.6%) use ROTEM® alone. Only eighteen institutions (48.6%) use some form of platelet function testing; of these half use a TEG modification (platelet mapping assay®), and half use a dedicated assay eg multiplate. Only 72/116 respondents (62.1%) said that they use POC testing in conjunction with a transfusion protocol to guide therapy in the UK.

Discussion

Although methods to detect heparin effect and whole blood clotting are widely available in UK cardiac anaesthetic practice, POC tests of heparin/protamine dose-response and of platelet function are not yet in widespread use. Despite strong evidence that transfusion algorithms incorporating POC coagulation testing reduce exposure to blood products and improve clinical outcomes [1, 2], this does not yet appear to be standard practice.

References

1. Enriquez LJ, Shore-Lesserson L. Point-of-care coagulation testing and transfusion algorithms. *British Journal of Anaesthesia* 2009; **103** Suppl 1: i 14-22.
2. Weber CF, Gorlinger K et al. Point-of-care testing: a prospective, randomized clinical trial of efficacy in coagulopathic cardiac surgery patients. *Anesthesiology* 2012; **117**(3): 531-547.

POINT-OF-CARE COAGULATION TESTING IN CARDIAC SURGERY:

A UK NATIONAL SURVEY

R Davies, S McCorkell



Introduction

- Cardiac surgery is associated with rapid changes in coagulation status which can exacerbate perioperative blood loss.
- Long turnaround times inherent in laboratory based coagulation testing often necessitates empiric therapy with blood product transfusion.
- Blood product therapy is known to increase morbidity, mortality and hospital costs [1], and should be avoided unless necessary.
- Modern point-of-care (POC) devices provide rapid bedside monitoring of coagulation and along with transfusion algorithms, have been shown to reduce transfusion requirements and blood loss [2].
- Little is known of the availability and use of these devices in the UK, we conducted the first national survey to investigate this.

Methods

- We conducted an email survey using survey monkey of all members of the association of cardiothoracic anaesthetists (ACTA).
- 480 members were contacted, 119 responses received.
- Three responses were discarded due to incomplete data and 116 analysed, representing 24.2% of members.
- We received at least one response from all 37 centres performing cardiac surgery in the UK.

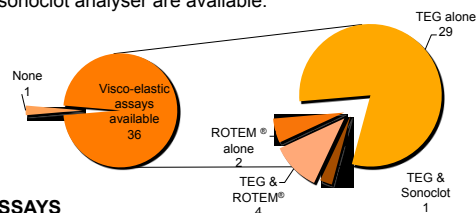
Results

HEPARIN MONITORING ASSAYS

- All 37 institutions have activated clotting time (ACT) assays available, however;
 - 6/116 (5.2%) of respondents use the thromboelastogram (TEG) to test heparin effect/reversal, either with heparinase or in conjunction with ACT.
 - one respondent uses rotational thromboelastometry (ROTEM®) in this way.
- Only 4/37 (10.8%) of institutions have heparin/protamine dose-response assays available.

VISCO-ELASTIC TESTS OF WHOLE BLOOD CLOTTING

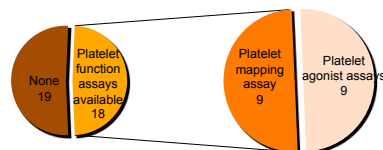
- All but one (97.3%) of institutions has some form of visco-elastic test of clot formation available.
- TEG, ROTEM® and the sonoclot analyser are available.



PLATELET FUNCTION ASSAYS

- 18/37 (48.6%) institutions have some form of dedicated platelet function testing for patients on anti-platelet therapy, of these;

- 9/18 (50%) use a TEG modification (platelet mapping assay®),
- 9/18 (50%) use a separate platelet agonist assay eg multiplate or PFA-100



USE OF TRANSFUSION ALGORITHM

- Only 72/116 of respondents (62.1%) said that they use POC testing in conjunction with a transfusion protocol to guide blood product therapy.

Discussion

- POC assays to detect heparin effect and whole blood clotting are widely available in UK cardiac anaesthetic practice.
- TEG is the most common visco-elastic assay used, and has emerged as a useful adjunct in testing heparin effect.
- Increasing numbers of patients are on one or more anti-platelet drugs and often present for complex or redo cardiac surgery with high risk of blood loss, but less than half of UK institutions use dedicated assays to test for their effect.
- Heparin-protamine dosing assays allow more individualised drug dosing and have been reported to significantly reduce transfusions and chest tube drainage [1], however these are available in a minority of institutions.
- Despite strong evidence that transfusion algorithms incorporating POC coagulation testing reduce exposure to blood products and improve clinical outcomes [1,2], this does not yet appear to be standard practice in the UK.

References

1. Enrique LJ, Shore-Lesserson L. Point-of-care coagulation testing and transfusion algorithms. BJA 2009;103 Suppl 1 : I 14 – 22.
2. Weber CF, Gorlinger K et al. Point-of-care coagulation testing; a prospective, randomised clinical trial of efficacy in coagulopathic cardiac surgery patients. Anaesthesiology 2012; 117 (3): 531 - 547



Department of perioperative medicine, Guys and St Thomas' Hospital NHS Foundation Trust, London, UK