

# ROTEM Guided Cryoprecipitate Dose: An Audit of Compliance and Efficacy

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## Background

Rotational thromboelastometry (ROTEM) is a rapid viscoelastic haemostatic assay that assesses patient coagulation and guides targeted transfusion with an evidence-based algorithm<sup>1</sup>. The FIBTEM A5 parameter of a ROTEM test correlates with a patient's blood fibrinogen level, correction of which can help to control a critical bleed<sup>2,3</sup>. To achieve this, the Randwick ROTEM algorithm's FIBTEM step advises tiered cryoprecipitate dosing.

Clinician compliance is essential to utilise the potential benefits of a ROTEM-guided transfusion, however, there is a relative lack of literature in this area. Existing ROTEM efficacy studies often do not account for compliance, obscuring the true benefits of ROTEM-guided care. This study **aimed** to:

1. Audit **clinician compliance** with the FIBTEM step of the Randwick ROTEM algorithm.
2. Assess the **efficacy** of the Randwick FIBTEM step at increasing FIBTEM A5 through tiered apheresis cryoprecipitate dosing recommendations.

## Methods

This was a retrospective cross-sectional study of ROTEM tests conducted at the cardiothoracic surgical unit and cardiothoracic intensive care unit from 01 January 2024 to 13 February 2025.

This Randwick ROTEM algorithm recommends a weight-adjusted apheresis cryoprecipitate dose when a critically bleeding patient's FIBTEM A5 drops below 12mm (Figure 1).

FIBTEM A5	Dose Cryo	Dose FibConc
	per 70 kg	
≥12mm	NONE	NONE
10-11mm	2 U	1g
8-9mm	5 U	2g
6-7mm	8 U	3g
4-5mm	10 U	4g
0-3 mm	12 U	5g

Figure 1: The FIBTEM step of the Randwick ROTEM Algorithm

**COMPLIANCE:** 276 ROTEM tests met the following inclusion criteria: measured FIBTEM A5 level below 12mm, recorded patient weight (kg) and had a cryoprecipitate transfusion to the patient within 4 hours.

There were 42 voluntary REDCap surveys where clinicians reported whether they believed their transfusion was algorithm-compliant.

3 dose ratio transfusion categories were defined by dividing the units of cryoprecipitate transfused by units recommended by the algorithm.

- Excessive Transfusion: >1.25 (non-compliant)
- Compliant Transfusion: 0.75 - 1.25.
- Insufficient Transfusion: <0.75 (non-compliant)

**EFFICACY:** Of the 276 ROTEM tests, 108 were linked to a subsequent ROTEM test within 12 hours. Only the first pairs were analysed.

A cryoprecipitate transfusion response was defined as **"corrected"** if the subsequent FIBTEM A5 normalised to 12mm or greater. It was defined as **"non-corrected"** if the FIBTEM A5 remained below 12mm.

## Results: Compliance

Figure 2 displays the percentage proportion of transfusions that were excessively, insufficiently or compliantly dosed at various FIBTEM A5 ranges. The **majority, 177/294 (60.2%)**, of ROTEM tests received a compliant transfusion response at the 2 locations audited.

### Cardiothoracic Intensive Care Unit

- Excessive: 30.4% (45/148).
- Compliant: 58.1% (86/148).
- Insufficient: 11.5% (17/148).

### Cardiothoracic Surgical Unit

- Excessive: 23.3% (34/146).
- Compliant: 62.3% (91/146).
- Insufficient: 14.4% (21/146).

There was a **strong concordance** between a clinician's belief of their compliance (subjective) with compliance as defined by the dose ratio (objective). (Figure 3)

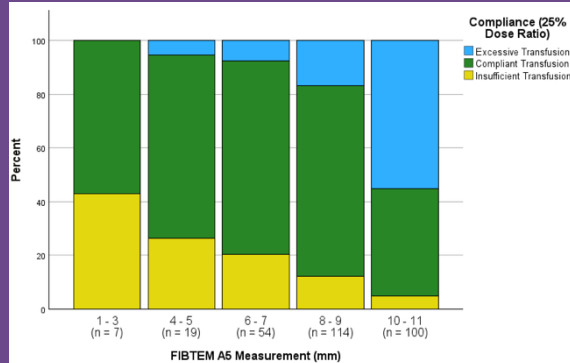


Figure 2: Histogram Showing the Percentage Proportions of Three Dose Ratio Transfusion Categories at Various FIBTEM Ranges

## Results: Efficacy

Figure 4 displays whether subsequent FIBTEM A5 measurements corrected in response to transfusion responses at the three dose ratios. Compliant transfusions led to FIBTEM A5 correction in the majority, **65.2% (45/69)**, of the subsequent test. No corrected FIBTEM A5 exceeded 25mm.

### Excessive Transfusions

- FIBTEM A5 correction occurred in **92.3% (24/26)** of the subsequent test.
- Relative to a compliant transfusion response, the odds of FIBTEM A5 normalisation **increased by 6.30 times** (95% CI, 0.53 – 33.90, **p = 0.013**).

### Insufficient Transfusions

- FIBTEM A5 correction occurred in only **38.5% (5/13)** of the subsequent test.
- Relative to a compliant transfusion response, the odds of FIBTEM A5 normalisation **decreased by 0.71 times** (95% CI, 0.05 – 0.92, **p = 0.06**).

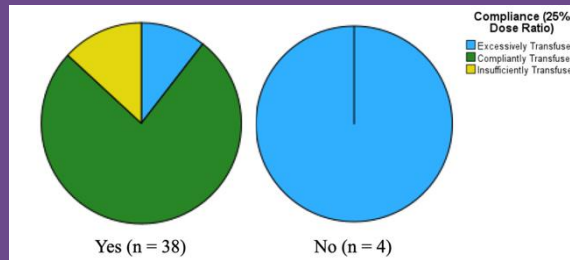


Figure 3: Pie Graphs Comparing Subjective and Objective Compliance

## Conclusions

**Compliance:** Randwick campus clinicians at the CTICU and CTSU were **mostly compliant** with their transfusions. Other studies reported **lower compliance rates** where the endpoint for compliance was only the correct blood product given, without consideration of the dose<sup>4</sup>.

**Efficacy:** This study found that the FIBTEM step was **effective**. Compliant transfusions, using the tiered algorithm, corrected most FIBTEM A5 in a **single dose** intervention. **Relative safety** was observed as no FIBTEM A5 corrected beyond 25mm, even with excessive dosing.

**Future Directions:** This study was limited by the **small sample sizes** in ROTEM tests with lower FIBTEM A5, as well as REDCap responses. To address this, the REDCap survey should be **simplified** and a **continuing audit** of the new Randwick algorithm should be conducted.

Future studies should also review **complications** related to ROTEM usage and analyse efficacy through investigation of bleeding cessation as a **clinical endpoint**. The trends underpinning excessive and insufficient transfusions should be identified and targeted to improve transfusion practice.

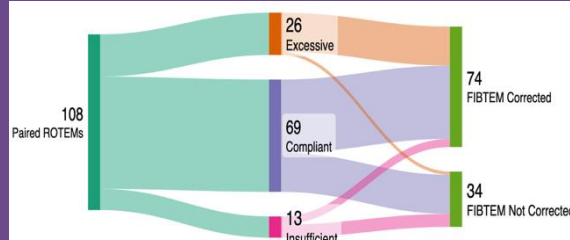


Figure 4: Sankey Diagram Displaying FIBTEM A5 Correction Rates at the Three Dose Ratio Transfusion Categories

## References

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