

CADTH Reference List

Rotational Thromboelastometry in Adult Patients Presenting With Trauma

October 2021

Authors: Camille Santos, Aleksandra Grobelna

Cite As: *Rotational thromboelastometry in adult patients presenting with trauma.* (CADTH reference list). Ottawa: CADTH; 2021 Oct.

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Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

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Key Messages

- Two non-randomized studies were identified regarding the diagnostic accuracy of rotational thromboelastometry in adult patients presenting with trauma.
- Two non-randomized studies were identified regarding the clinical utility of rotational thromboelastometry in adult patients presenting with trauma.
- No evidence was identified regarding the cost-effectiveness of rotational thromboelastometry in adult patients presenting with trauma.
- No evidence-based guidelines were identified regarding the use of rotational thromboelastometry in adult patients presenting with trauma.

Research Questions

1. What is the diagnostic accuracy of rotational thromboelastometry in adult patients presenting with trauma?
2. What is the clinical utility of rotational thromboelastometry in adult patients presenting with trauma?
3. What is the cost-effectiveness of rotational thromboelastometry in adult patients presenting with trauma?
4. What are the evidence-based guidelines regarding the use of rotational thromboelastometry in adult patients presenting with trauma?

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the international HTA database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were rotational thromboelastometry and trauma. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2017 and September 28, 2021. Internet links were provided, where available.

Selection Criteria

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. Open access full-text versions of evidence-based guidelines were reviewed when abstracts were not available.

Table 1: Selection Criteria

Criteria	Description
Population	Adult patients presenting with trauma
Intervention	Rotational thromboelastometry (ROTEM)
Comparators	Q2 to Q3: Standard coagulation assays (e.g., prothrombin time ratio or international normalized ratio, activated partial prothrombin time, fibrinogen concentration); Ratio-based empiric transfusion strategies Q4: Not applicable
Reference standard	Q1: Standard coagulation assay Q2 to Q4: Not applicable
Outcomes	Q1: Diagnostic accuracy (e.g., sensitivity, specificity, positive predictive value, negative predictive value) Q2: Clinical utility (e.g., blood utilization, patient outcomes [mortality, duration of hospitalization, length of ICU stay, duration of mechanical ventilation, estimated blood loss], safety and harms) Q3: Cost-effectiveness (e.g., cost per quality-adjusted life-year [i.e., incremental cost-effectiveness ratio]) Q4: Recommendations regarding the use of ROTEM in adult patients presenting with trauma
Study designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

Results

Two non-randomized studies^{1,4} were identified regarding the diagnostic accuracy of rotational thromboelastometry (ROTEM) in adult patients presenting with trauma. Two non-randomized studies^{2,3} were identified regarding the clinical utility of ROTEM in adult patients presenting with trauma. No literature was identified regarding the cost-effectiveness of ROTEM in adult patients presenting with trauma. No evidence-based guidelines were identified regarding the use of ROTEM in adult patients presenting with trauma.

Additional references of potential interest that did not meet the inclusion criteria are provided in Appendix 1.

References

Health Technology Assessments

No literature identified

Systematic Reviews and Meta-analyses

No literature identified

Randomized Controlled Trials

No literature identified

Non-Randomized Studies

1. Tsantes AG, Trikoupi IG, Papadopoulos DV, et al Higher coagulation activity in hip fracture patients: a case-control study using rotational thromboelastometry *Int. J. Lab. Hematol.* Jun 2021; 43(3): 477-484. [PubMed](#)
2. Rimaitis M, Bilskiene D, Tamosuitis T, Vilcinis R, Rimaitis K, Macas A Implementation of thromboelastometry for coagulation management in isolated traumatic brain injury patients undergoing craniotomy *Med. Sci. Monit.* Jul 04 2020; 26(): e922879. [PubMed](#)
3. Smith AR, Karim SA, Reif RR, et al ROTEM as a predictor of mortality in patients with severe trauma *J. Surg. Res.* 07 2020; 251(): 107-111. [PubMed](#)
4. Cohen J, Scorer T, Wright Z, et al A prospective evaluation of thromboelastometry (ROTEM) to identify acute traumatic coagulopathy and predict massive transfusion in military trauma patients in Afghanistan *Transfusion* 04 2019; 59(S2): 1601-1607. [PubMed](#)

Economic Evaluations

No literature identified

Guidelines and Recommendations

No literature identified

Appendix 1: References of Potential Interest

Previous CADTH Reports

5. Thromboelastography or rotational thromboelastography for trauma: a review of the clinical and cost-effectiveness and guidelines. (*CADTH rapid response report: summary with critical appraisal*). Ottawa (ON): CADTH; 2017: https://www.cadth.ca/sites/default/files/pdf/htis/2017/RC0924_TEG%20and%20ROTEM_Final.pdf. Accessed 2021 Oct 1.

Systematic Reviews and Meta-analyses

Not Specific to Trauma Patients

6. Brown W, Lunati M, Maceroli M, et al Ability of thromboelastography to detect hypercoagulability: a systematic review and meta-analysis *J. Orthop. Trauma* Jun 2020; 34(6): 278-286. [PubMed](#)

Not Specific to ROTEM

7. Sharp G, Young CJ Point-of-care viscoelastic assay devices (rotational thromboelastometry and thromboelastography): a primer for surgeons *ANZ J. Surg.* 04 2019; 89(4): 291-295. [PubMed](#)

Non-Randomized Studies

Not Specific to Adult Patients

8. Bainbridge FJ, Sinha R, Tocchetti R, et al Introduction of point-of-care ROTEM testing in the emergency department of an Australian level 1 trauma centre and its effect on blood product use *Emerg. Med. Australas.* Oct 2021; 33(5): 893-899. [PubMed](#)
9. Lonic D, Heidekrueger PI, Bosselmann T, et al Is major burn injury associated with coagulopathy? The value of thromboelastometry in the detection of coagulopathy in major burn injury: A prospective observational study *Clin. Hemorheol. Microcirc.* 2020; 76(2): 299-308. [PubMed](#)

Alternative Population

10. Barea-Mendoza JA, Terceros-Almanza LJ, Garcia-Fuentes C, et al Rotational thromboelastometry (ROTEM) profile in a cohort of asystole donors *Med. Intensiva* Oct 2019; 43(7): 410-415. [PubMed](#)
11. Deng Q, Hao F, Wang Y, Guo C Rotation thromboelastometry (ROTEM) enables improved outcomes in the pediatric trauma population *J. Int. Med. Res.* Dec 2018; 46(12): 5195-5204. [PubMed](#)

Guidelines and Recommendations

Methods Not Specified

12. Deaconess Trauma Services. ROTEM: practice guideline. 2018; <https://www.deaconess.com/For-You/HealthCare-Professionals/Deaconess-Regional-Trauma-Center/Documents-Trauma/Clinical-Patient-Management-Guidelines/ROTEM-Guideline#:~:text=BACKGROUND%3A%20ROTEM%20is%20a%20method,%E2%80%8Bclot%20firmness%2C%20and%20clot%20fibrinolysis>. Accessed 2021 Oct 1.

Not Specific to ROTEM

13. Bugaev N, Como JJ, Golani G, et al Thromboelastography and rotational thromboelastometry in bleeding patients with coagulopathy: Practice management guideline from the Eastern Association for the Surgery of Trauma *J Trauma Acute Care Surg* 12 2020; 89(6): 999-1017. [PubMed](#)
14. British Curry NS, Davenport R, Pavord S, et al. The use of viscoelastic haemostatic assays in the management of major bleeding: A British Society for Haematology Guideline. *Br J Haematol.* 2018;182(6):789-806. https://b-s-h.org.uk/media/16489/curry_et_al-2018-british_journal_of_haematology.pdf. Accessed 2021 Oct 1.

Review Articles

15. Brill JB, Cotton BA, Brenner M, et al The Role of TEG and ROTEM in Damage Control Resuscitation Shock Mar 25 2021; 25(): 25. [PubMed](#)
16. Görlinger K, Pérez-Ferrer A, Dirkmann D, et al. The role of evidence-based algorithms for rotational thromboelastometry-guided bleeding management. *Korean J Anesthesiol.* 2019;72(4):297-322. <https://ekja.org/upload/pdf/kja-19169.pdf>. Accessed 2021 Oct 1. [PubMed](#)
17. Akay OM. The double hazard of bleeding and thrombosis in hemostasis from a clinical point of view: a global assessment by rotational thromboelastometry (ROTEM). *Clin Appl Thromb Hemost.* 2018;24(6):850-858. [PubMed](#)

Additional References

18. Dixon A, Underwood S, Schreiber M Implementing thromboelastography: experiences from a level I trauma institution *Transfusion* 10 2020; 60 Suppl 6(): S29-S32. [PubMed](#)
19. Hoang R. ROTEM in trauma: blood is thicker with wine – part 1. Ottawa (ON): University of Ottawa, Department of Emergency Medicine; 2020: <https://emottawablog.com/2020/09/rotem-in-trauma-blood-is-thicker-with-wine-part-1-the-evidence/>. Accessed 2021 Oct 1.
20. Sakai T Comparison between thromboelastography and thromboelastometry *Minerva Anesthesiol.* 12 2019; 85(12): 1346-1356. [PubMed](#)