



ENDORSEMENT: The European guideline on management of major bleeding and coagulopathy following trauma: fifth edition (joint endorsement with the Trauma Association of Canada)

Prepared by: Andrew Shih, MD, FRCPC, DRCPSC, MSc
Chair, NAC Endorsement Subcommittee

Provincial Ministry Representative: Thomas A. Smith (Ontario)

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Hemorrhagic shock from post-traumatic bleeding is still the leading cause of potentially preventable deaths among injured patients. One third of these patients have coagulopathies at hospital admission requiring aggressive resuscitation, including massive transfusion to correct these coagulopathies and maintain end-organ function. To inform best practice on massive transfusion, NAC held a Massive Transfusion Consensus Conference with a document drafted in 2011. Multiple studies have been published to advance the treatment strategies of these severely injured patients since then. NAC agreed in November 2019 that endorsement of the European guidelines could serve as a complementary document. This European guideline was originally published in 2007 and was updated in 2016 before this fifth edition was published in 2019.

NAC reviewed this practice guidance document for endorsement in accordance with the process detailed in the *NAC Guideline Endorsement Framework*. The guideline achieved scores using the AGREEII tool deemed acceptable by NAC membership, achieving at least 50% in all Domains and a minimum score of 70% in the Domain of Rigour of Development (Domain 3).

NAC thus endorses the European guidelines with caveats below to reflect Canadian practice and other recommendations made by NAC. NAC has also engaged the Trauma Association of Canada Board of Directors, who are in agreement with this endorsement statement.

Caveats regarding testing:

- The review working group agrees with the guideline recommending a strategy of early and repeated monitoring of hemostasis. However, evidence is developing for use of viscoelastic hemostatic assays, but is not definitive for its superiority over conventional laboratory testing. The working group suggests the strategy take into consideration local resources, availability, and expertise.
- Institutional practice for transfusion targets may be different given lack of specific evidence to guide practice.
- The review working group felt that the value and evidence for benefit in using platelet function testing to guide platelet transfusion management is unclear at this time.



- Measurement of factor XIII is also not standard of care in Canada, with limited testing capability that would make this not feasible in bleeding patients.

Caveats regarding product practice:

- Evidence is emerging regarding plasma therapy versus clotting factor concentrate resuscitation strategies*. (Innerhofer et al., 2017; Schochl et al., 2010; Schochl et al., 2011)
- The working group felt that more randomized controlled trial evidence supporting initial resuscitation with fibrinogen empirically in massive hemorrhage is needed*. The group felt that empiric fibrinogen replacement currently may be a reasonable approach.
- Treatment using factor XIII is not standard of care in any centres in Canada or broadly across North America. NAC has also made a specific recommendation that Canadian Blood Services issue factor XIII concentrate to hospitals only for named patients with factor XIII deficiency.

* A Canadian randomized control trial is underway to study these elements at the time of the writing of this document.

Limitations noted by the review group:

- Practices for particular patient cohorts are not well defined in this guideline nor the literature, notably for pediatric massive hemorrhage, and it is unclear if recommendations can be extrapolated to all bleeding patients.
- Pre-hospital transfusion is not covered in this guideline.
- Large sections of these guidelines are expert opinion due to lack of evidence, with noted industry support of guideline authors.
- Feasibility of implementation/cost-benefit is not explored and would not be applicable to Canada.

Many centres in Canada already have adopted practices described in these guidelines; and have also produced excellent local resources. Clinical teams are encouraged to consult their jurisdictional resources, where some examples as of writing include:

- Alberta Health Services – Edmonton Zone Massive Hemorrhage Protocol: <https://www.albertahealthservices.ca/assets/wf/lab/wf-lab-clin-tm-ez-mhp-pandp.pdf>
- SaskBlood Massive Hemorrhage Protocol Resources: <https://saskblood.ca/mhp/>
- Ontario Regional Blood Coordinating Network Provincial Massive Hemorrhage Toolkit: <https://transfusionontario.org/en/category/massive-hemorrhage-protocol/toolkit/>
- Canadian Blood Services' Clinical Guide to Transfusion: <https://professionaleducation.blood.ca/en/transfusion/clinical-guide-transfusion>



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References

- Innerhofer, P., Fries, D., Mittermayr, M., Innerhofer, N., von Langen, D., Hell, T., . . . Oswald, E. (2017). Reversal of trauma-induced coagulopathy using first-line coagulation factor concentrates or fresh frozen plasma (RETIC): a single-centre, parallel-group, open-label, randomised trial. *Lancet Haematol*, 4(6), e258-e271. doi:10.1016/S2352-3026(17)30077-7
- Schochl, H., Nienaber, U., Hofer, G., Voelckel, W., Jambor, C., Scharbert, G., . . . Solomon, C. (2010). Goal-directed coagulation management of major trauma patients using thromboelastometry (ROTEM)-guided administration of fibrinogen concentrate and prothrombin complex concentrate. *Crit Care*, 14(2), R55. doi:10.1186/cc8948
- Schochl, H., Nienaber, U., Maegele, M., Hochleitner, G., Primavesi, F., Steitz, B., . . . Solomon, C. (2011). Transfusion in trauma: thromboelastometry-guided coagulation factor concentrate-based therapy versus standard fresh frozen plasma-based therapy. *Crit Care*, 15(2), R83. doi:10.1186/cc10078