Use of Tourniquets for Control of Extremity Bleeding

Clinical Significance Extremity injuries with uncontrolled blood loss are a known cause of preventable death. Application of tourniquets has been shown to reduce blood loss and the associated morbidity and mortality.

Populations Applies to the adult population

Translation Into Practice: Use of Tourniquets for Control of Extremity Bleeding

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Recommended Clinical Practice

Tourniquet application is recommended when direct pressure does not control blood loss from an extremity.[1-4]

[Level A Recommendation]

Time of tourniquet application should be noted clearly on the device and should not exceed 2-hour intervals before reassessment of bleeding. Use of a pressure dressing is indicated once bleeding is controlled.[4-7]

[Level B Recommendation]

A second tourniquet may be applied if there is insufficient control of bleeding.[4,7-9] **[Level B Recommendation]**

Tourniquets properly applied in the pre-hospital setting should not be removed unless there is adequate team support present to manage bleeding that may occur.[1,3,4,6] **[Level B Recommendation]**

A commercially available tourniquet that is at least 2 inches in width with a windlass, ratcheting device that will occlude arterial flow is recommended.[2,6,10] **[Level A Recommendation]**

There is insufficient evidence to provide a clear recommendation for use in the pediatric population, although extrapolation from adult data indicates these devices when properly applied may be lifesaving.[1,6,10,11]

[Level C Recommendation]

Supporting Rationale: Use of Tourniquets for Control of Extremity Bleeding

Use of Tourniquets for Control of Extremity Bleeding

Multiple studies have shown that commercially available tourniquets are an effective method to manage uncontrolled life-threatening extremity hemorrhage.[1-10] Injury site should be reassessed frequently to ensure that bleeding remains controlled.

Application of tourniquets in combat settings has proven effective in management of uncontrolled extremity bleeding prior to the onset of shock.[2-4,6,7]

Release of an applied tourniquet should be done cautiously at the recommended 2-hour time limit to evaluate for bleeding. Duration of tourniquet application in excess of 2 hours has been associated with increased morbidity. Time of tourniquet application should be noted clearly on the device.[1,4-7]

Commercially available tourniquet devices have a windlass or barlike device that is turned to tighten (ratchet) the tourniquet and then locked into place.[10-11] There is less evidence regarding the use of pneumatic tourniquets.

References

1. Bulger, E. M., Snyder, D., Schoelles, K., Gotschall, C., Dawson, D., Lang, E., ... McSwain, N. (2014). An evidence-based prehospital guideline for external hemorrhage control: American College of Surgeons Committee on Trauma. *Prehospital Emergency Care, 18*(2), 163-173.
2. Kragh J. F., O'Neill, M. L., Walters, T. J., Jones, J. A., Baer, D. G., Gershman, L. K., ... Holcomb, J. B. (2011). Minor morbidity with emergency tourniquet use to stop bleeding in severe limb trauma: Research, history, and reconciling advocates and abolitionists. *Military Medicine, 176*(7), 817-823.
3. Lewis, P. C. (2013). Tourniquets: Translating military knowledge into civilian care. *Journal of Emergency Nursing, 39*(6), 595-601.
4. Lee, C., Porter, K. M., & Hodgetts, T. J. (2007). Tourniquet use in the civilian pre-hospital setting. *Emergency Medical Journal, 24*(8), 584–587.
5. Kragh, J. F., Walters, T. J., Baer, D. G., Fox, C. J., Wade, C. E., Salinas, J., & Holcomb, J. B. (2008). Practical use of emergency tourniquets to stop bleeding in major limb trauma. *The Journal of Trauma, 64*(2 Suppl), S38-349.
6. Doyle, G. S., & Taillec, P. P. (2008). Tourniquets: A review of current use with proposals for expanded prehospital use. *Prehospital Emergency Care, 12*(2), 241-256.
7. Kragh, J. F. Jr. (2010). Use of tourniquets and their effects on limb function in the modern combat environment. *Foot and Ankle Clinics, 15*(1), 23–40.
8. Wall, P. L., Duevel, D. C., Hassan, M. B., Welander, J. D., Sahr, S. M., & Buising, C. M. (2013). Tourniquets and occlusion: The pressure of design. *Military Medicine, 178*(5), 578-587.
9. Brodie, S., Hodgetts, T. J., Ollerton, J., McLeod, J., Lambert, P., & Mahoney, P. (2007). Tourniquet use in combat trauma: UK military experience. *J R Army Med Corps, 153*(4), 310-313.
10. Walters, T. J., Wenke, J. C., Kauvar, D. S., McManus, J. G., Holcomb, J. B., & Baer, D. G, (2005). Effectiveness of self-applied tourniquets in human volunteers. *Prehospital Emergency Care, 9*(4), 416-422.
11. Kragh, J. F., Cooper, A., Aden, J. K., Dubick, M. A., Baer, D. G., Wade, C. E., & Blackbourne, L. H. (2012). Survey of trauma registry data on tourniquet use in pediatric war causalities. *Pediatric Emergency Care, 28*(12), 1361-1365.

Key for Level of Evidence Recommendation

A	**Level A (High) Recommendation:**	Based on consistent and good quality of evidence; has relevance and applicability to emergency nursing practice.
B	**Level B (Moderate) Recommendation:**	There are some minor inconsistencies in quality evidence; has relevance and applicability to emergency nursing practice.
C	**Level C (Weak) Recommendation:**	There is limited or low-quality patient-oriented evidence; has relevance and applicability to emergency nursing practice.
NR	**Not Recommended:**	Based upon current evidence.
	I/E:	Insufficient evidence upon which to make a recommendation.
	N/E:	No evidence upon which to make a recommendation.

Disclaimer

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