

# **An Evidence-Based Guideline for Prehospital Hemorrhage Control**

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# Tourniquets are Good, It's Official! (Hemostatic Guaze, Too)

- What's this Leviticus thing, Paul?
  - “For the life of the flesh is in the blood...”  
Leviticus 17:11



# An Evidence-based Guideline for External Hemorrhage Control in the Prehospital Setting

## **Steering Committee:**

ACS EMS Committee  
ECRI Institute  
NHTSA EMS office  
TCCC Committee  
NAEMSP  
PHTLS  
State EMS officials

## **Lead Agency:**

*American College of Surgeons: Committee on Trauma*

## **Funding:**

*National Highway Traffic Safety Administration*

## **Purpose**

To develop a evidence-based guideline for civilian prehospital management of external hemorrhage using systematic literature review and the GRADE methodology

*Includes role of tourniquets and hemostatic dressings  
Addresses extremity and junctional hemorrhage*

# Guideline Development



- ACS COT EMS Committee identified stakeholders to establish Expert Panel April 2013
- Panel convened via teleconference to define key questions to guide literature review (PICOTS)
- NHTSA EMS office funded ECRI institute to do comprehensive literature review
- Expert panel met Oct 2013 with facilitator to discuss literature review and apply GRADE methodology to generate recommendations
- Manuscript drafted to summarize evidence and recommendation (submitted to Prehospital Emergency care Jan 2014)

# Members of the Expert Panel

- Michael J. Betzner, MD
  - Flight service director
- Eileen M. Bulger, MD
  - Chair ACS-COT EMS Committee
- Frank Butler, MD
  - Chair Committee on Tactical Combat Casualty Care
- Drew Dawson & Cathy Gotschall
  - NHTSA Office of EMS
- Mary Fallat, MD
  - Pediatric Surgery
- Jay Johannigman, MD
  - ACS COT & TCCC
- Eddy Lang, MD
  - GRADE methodology expert
- Norman McSwain, MD
  - ACS COT & PHTLS
- Jeffrey Salamone, MD
  - ACS-COT, NREMT
- Karen Schoelles, MD & David Snyder, PhD
  - ECRI Institute
- Nels Sanddal, PhD
  - ACS COT
- Peter Taillac, MD
  - NASEMSO
- Lynn White
  - Director of Resuscitation, AMR

# What is the GRADE methodology?



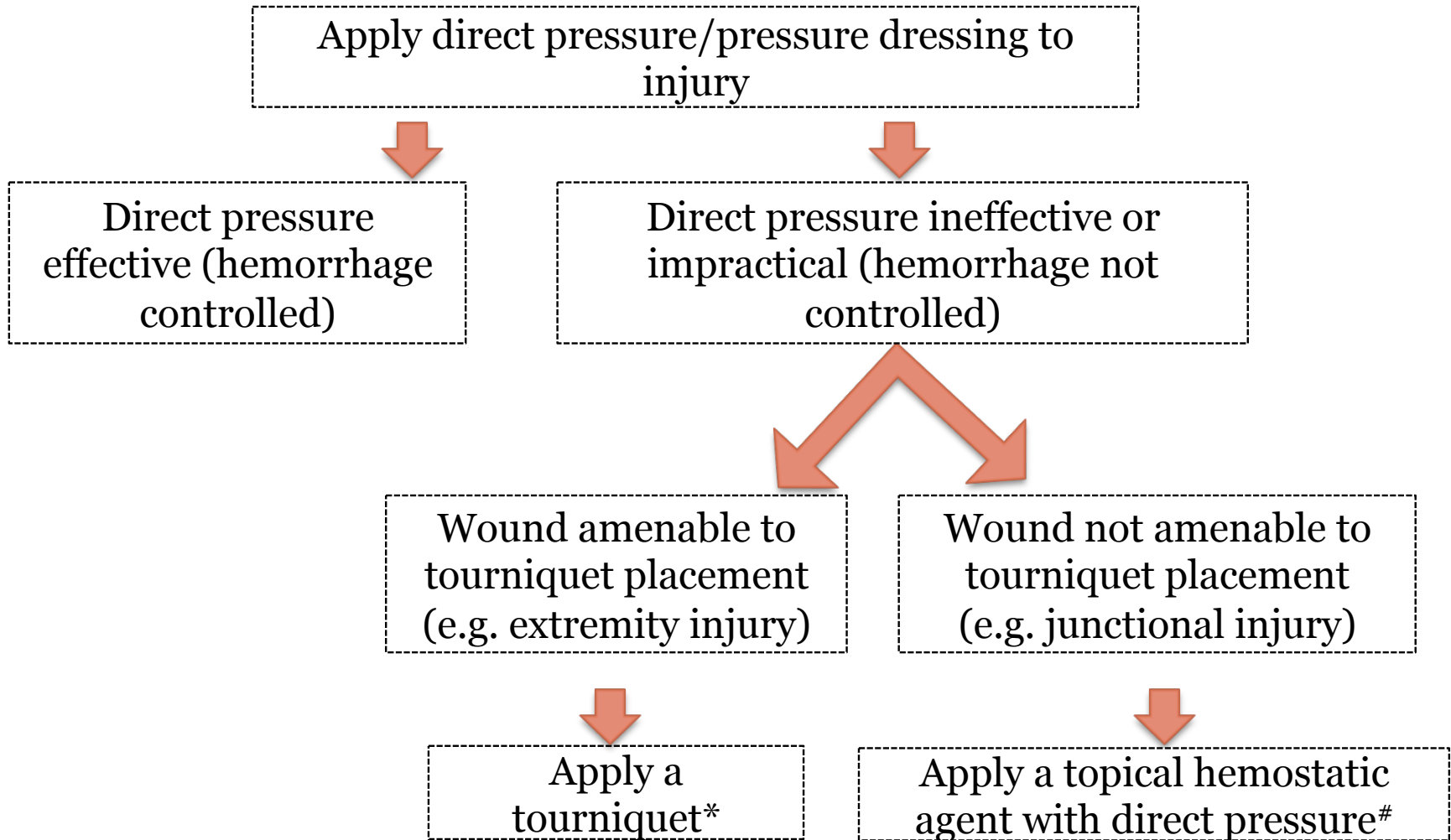
- Consistent with the National Prehospital Evidence-based Guideline model approved by FICEMS and the National EMS Advisory Council
- Grading of Recommendations Assessment, Development and Evaluation methodology
  - A priori development of key clinical questions
  - Systematic literature review
  - Evaluation of the strength and applicability of the evidence
  - Recommendations graded based on both quality of evidence and balance between risk, benefit, burden and cost

# Systematic Literature Review



- Inclusion: studies of traumatic hemorrhage treated by EMS personnel in the prehospital setting with tourniquets and/or hemostatic dressings currently available on the US market.
- Animal studies also reviewed for hemostatic agents
- Meta-analysis performed when feasible
- 1,598 citations reviewed
  - 27 clinical studies met inclusion criteria
  - 38 animal model studies also reviewed

# Prehospital External Hemorrhage Control Protocol





# Recommendations



- We recommend the use of tourniquets in the prehospital setting for the control of significant extremity hemorrhage if direct pressure is ineffective or impractical.
  - Strong Recommendation
  - Moderate quality of evidence , upgraded based on large effect size

# Additional Recommendations: Tourniquets



- We suggest using commercially produced windlass, pneumatic, or ratcheting devices that have been demonstrated to occlude arterial flow.
- We suggest *against* the use of narrow, elastic, or bungee-type devices.
- We suggest that improvised tourniquets be applied only if no commercial device is available.
- We suggest *against* releasing a tourniquet that has been properly applied in the prehospital setting until the patient has reached definitive care.

# Recommendations: Topical Hemostatics



- We suggest the use of topical hemostatic agents, in combination with direct pressure, for the control of significant hemorrhage in the prehospital setting in anatomic areas where tourniquets cannot be applied and where sustained direct pressure alone is ineffective or impractical.
- We suggest that topical hemostatic agents be delivered in a gauze format that supports wound packing.
- Only products determined effective and safe in a standardized laboratory injury model should be used.

## Recommendations for Implementation/Training



- We advise that tourniquets and topical hemostatic agents be used under clinical practice guidelines and following product specific training.
- We advise that hemostatic agent training for prehospital personnel include proper wound packing and pressure application techniques.
- We advise that tourniquets and topical hemostatic agents use be expanded to include all prehospital personnel, including emergency medical responders (in concordance with the Hartford Consensus Statement<sup>7</sup>).

# Limitations



- Tourniquet data based on mostly military patients
  - Young, buff, healthy folks
  - Does this apply to kids? Geriatrics? Pregnant women?
- Hemostatic guaze data based mostly on animal studies
- **Need civilian EMS research to better define safe and effective tourniquet and hemostatic guaze use for all populations**

# Prehospital External Hemorrhage Control Protocol

