

ADVERSE EVENTS ASSOCIATED WITH PREHOSPITAL TOURNIQUET USE

A systematic review

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Introduction

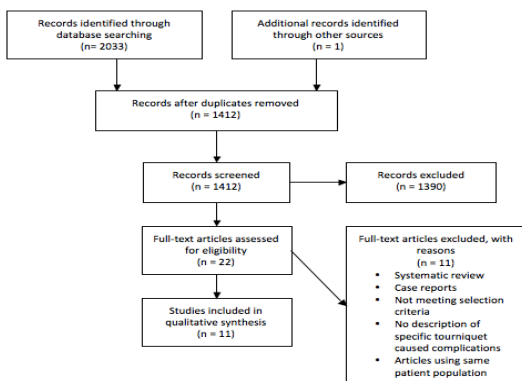
A significant part of civilian trauma related mortality is caused by haemorrhage and 33-56% of these deaths occur during the prehospital period.¹ Prehospital tourniquet use can be life-saving but is also associated with complications. The purpose of this systematic review is to evaluate adverse events associated with prehospital tourniquet use.



Tourniquet applied in the prehospital phase

Methods

A systematic literature review was performed using the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.



The databases PubMed, EMBASE and Cochrane were searched for eligible studies describing complications of tourniquet use in the prehospital setting. Due to substantial heterogeneity in study design and study population no data pooling was performed.

Results

A total of 11 articles were included, with a total of 1,656 patients treated with 2,087 tourniquets. The total complication rate ranged from 0% to 86%. The most frequent listed complications were amputation, acute compartment syndrome necessitating fasciotomy, acute kidney insufficiency and neurological sequelae.

Study	Total complication rate (n)	Amputation	ACS/ Fasciotomy	AKI	Neurological sequelae	Other
Scherho (2017)	0% (0)	None	None	None	None	None
Shlaifer (2017)	11.7% (10)	3.8%	10.1%	None	7%	None
Leonard (2016)	18% (11)	11.5%	6.5%	1.6%	None	6.5% infection
Kuo (2015)	2.1% (2)	None	None	None	1%	1% intimal wall tear
Inaba (2015)	32.2% (28)	17.2%	2.3%	2.3%	None	1.3% bleeding 1.1% hepatic failure 1.1% shock 2.3% wound infection 1.1% ARDS 2.3% coagulopathy
Kraugh (2009)	65% (427)	35%	23%	1%	1.4%	3% blood clot 1.5% myonecrosis
Clasper (2009)	86% (19)	13.6%	None	None	None	31% deep infection 50% superficial infection 4.5% flap failure
Lakslein (2002)	7.7% (7)	None	None	None	7.7%	None
Schraffl (2015)	32.4% (64)	18.3%	8.6%	None	6.1%	3.6% ischemia/reperfusion injury 8.6% secondary infection
Ode (2015)	0% (0)	None	None	None	None	None
Teixeira (2018)	32% (58)	1.1%	None	None	None	7.2% thromboembolic complication 7.2% pulmonary complication 2.8% cardiac complication 13.8% infectious complication

Discussion

The heterogeneity in complication definition led to difficulty in comparing outcomes. Moreover, the causal relationship between tourniquet use and the scored complication was not always indicated.

Conclusion

The wide range in complication rates is likely due to heterogeneity in study design. Also, whether a complication can be attributed to tourniquet use or due to the primary injury is not independently reported. Future prospective studies on complications should focus on discriminating the effects of prehospital tourniquet use from the result of the primary injury²

References: 1. Kauvar J Trauma 2006, 2. Kauvar J Trauma 2018

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