TRAUMATICKÁ ZÁSTAVA OBĚHU UP-TO-DATE 2022

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GUIDELINES 2021

ERC Guidelines 2021 | cprguidelines.eu

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Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

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European Resuscitation Council Guidelines 2021: Cardiac arrest in special circumstances

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Obsah sdělení

- Prevence traumatické zástavy oběhu (TCA*)
- Léčebný algoritmus TCA | ERC Guidelines 2021 vs. 2015
- Nové léčebné metody | přednemocniční transfuze a REBOA

*TCA | traumatic cardiac arrest


Paříž, 31. srpna 1997


PARIS

The SAMU team spent nearly an hour, until 1:30 a.m. treating Diana in the tunnel. Then the ambulance drove her at a snail's pace to Piete-Salpetriere hospital, 6.15 kilometers away. At that time of night, it would normally take five or 10 minutes to do that drive along the riverfront expressway. But Diana's driver, applying standard French emergency procedures, drove extremely slowly so as not to subject the fragile patient to shocks and bumps. As a result, it took them some 40 minutes to make the drive, and the ambulance stopped within a few hundred yards of the hospital to treat a sharp drop in blood pressure.

By the time Diana reached the emergency room, it was nearly an hour and 45 minutes after the crash.

Přednemocniční čas: hlavní nepřítel

- **Lepší klinický výsledek při příjezdu do TC během 60 minut**

  Cowley RA et al. An economical and proved helicopter program for transporting the emergency critically ill and injured patient. J Trauma 1973

- **Advanced care necessarily extends on-scene interval**

  Smith J et al. Prehospital stabilization of critically injured patients: a failed concept. Trauma 1985

- **On-scene and dispatch times associated with increased mortality**

  Pham H et al. Faster on-scene times associated with decreased mortality in HEMS transported trauma patients. Trauma Surg Acute Care Open 2017

- **Time is the enemy | critical nature of prehospital time in patients with non-compressible torso hemorrhage**
- **Efforts should be directed toward the development of therapies to increase the window of survival in the prehospital environment**

  Alarhayem AQ et al. Mortality in trauma patients with hemorrhage from torso injury occurs long before the "golden hour". Am J Surg 2016

Zdravotnická záchranná služba
Královéhradeckého kraje

XABCDE

Hypovolémie: zástava zevního krvácení

Amputační poranění. Boston, USA, 15. dubna 2013

Otevřená zlomenina pánve. Fotografie: Truhlář A. 2018

Hypovolémie: zástava vnitřního krvácení (?)

Hypovolémie: současné možnosti léčby

Slaná voda

Plazma

Erytrocyty

Plná krev

Zdravotnická záchranná služba Královéhradeckého kraje

2012 | London‘s Air Ambulance, Velká Británie

Přednemocniční aplikace erytrocytů

Pre-Trauma Center Red Blood Cell Transfusion Is Associated with Improved Early Outcomes in Air Medical Trauma Patients

Joshua B Brown, MD, Jason L Sperry, MD, MPH, FACS, Anisleidy Fombona, BS,
Timothy R Billiar, MD, FACS, Andrew B Peitzman, MD, FACS, Francis X Guyette, MD, MPH

BACKGROUND: Hemorrhage is the leading cause of survivable death in trauma and resuscitation strategies including early RBC transfusion have reduced this. Pre-trauma center (PTC) RBC transfusion is growing and preliminary evidence suggests improved outcomes. The study objective was to evaluate the association of PTC RBC transfusion with outcomes in air medical trauma patients.

STUDY DESIGN: We conducted a retrospective cohort study of trauma patients transported by helicopter to a Level I trauma center from 2007 to 2012. Patients receiving PTC RBC transfusion were matched to control patients (receiving no PTC RBC transfusion during transport) in a 1:2 ratio using a propensity score based on prehospital variables. Conditional logistic regression and mixed-effects linear regression were used to determine the association of PTC RBC transfusion with outcomes. Subgroup analysis was performed for scene transport patients.

RESULTS: Two-hundred and forty treatment patients were matched to 480 control patients receiving no PTC RBC transfusion. Pre-trauma center RBC transfusion was associated with increased odds of 24-hour survival (adjusted odds ratio [AOR] = 4.92; 95% CI, 1.51−16.04; p = 0.01), lower odds of shock (AOR = 0.28; 95% CI, 0.09−0.85; p = 0.03), and lower 24-hour RBC requirement (Coefficient −3.6 RBC units; 95% CI, −7.0 to −0.2; p = 0.04). Among matched scene patients, PTC RBC was also associated with increased odds of 24-hour survival (AOR = 6.31; 95% CI, 1.88−21.14; p < 0.01), lower odds of shock (AOR = 0.24; 95% CI, 0.07−0.80; p = 0.02), and lower 24-hour RBC requirement (Coefficient −4.5 RBC units; 95% CI, −8.3 to −0.7; p = 0.02).

CONCLUSIONS: Pre-trauma center RBC was associated with an increased probability of 24-hour survival, decreased risk of shock, and lower 24-hour RBC requirement. Pre-trauma center RBC appears beneficial in severely injured air medical trauma patients and prospective study is warranted as PTC RBC transfusion becomes more readily available. (J Am Coll Surg 2015; 220:797−808. © 2015 by the American College of Surgeons)

J Am Coll Surg 2015

Přednemocniční aplikace plazmy

Plasma-first resuscitation to treat haemorrhagic shock during emergency ground transportation in an urban area: a randomised trial

Hunter B Moore, Ernest E Moore, Michael P Chapman, Kevin McVaney, Gary Bryskiewicz, Robert Blechar, Theresa Chin, Clay Cothren Burlew, Fredric Pieracci, F Bernadette West, Courtney D Fleming, Arsen Ghasabyan, James Chandler, Christopher C Silliman, Anirban Banerjee, Angela Sauaia

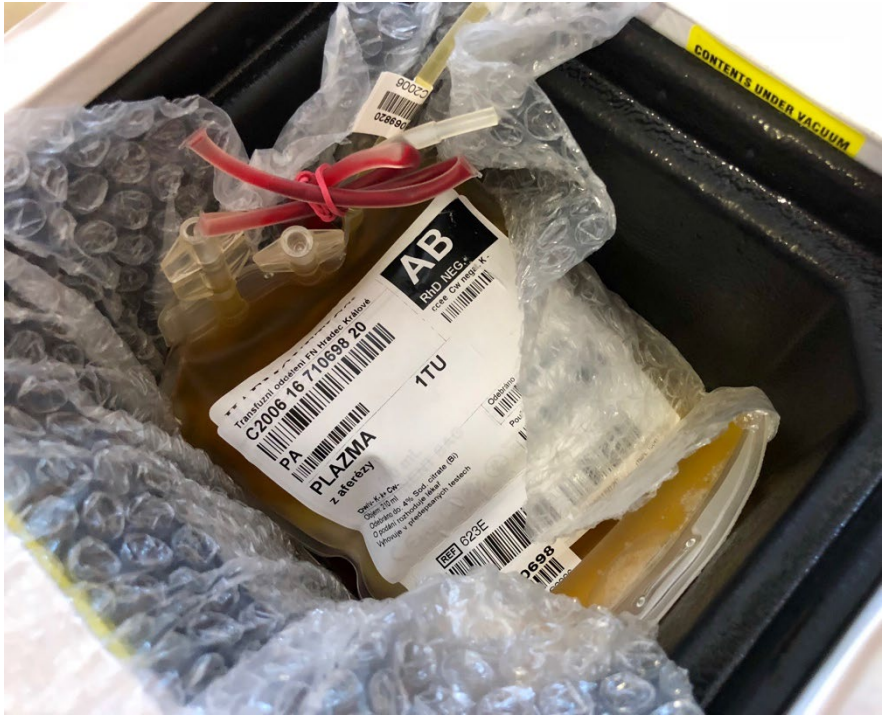
Moore HB et al. The Lancet 19 July 2018

Prehospital Plasma during Air Medical Transport in Trauma Patients at Risk for Hemorrhagic Shock

J.L. Sperry, F.X. Guyette, J.B. Brown, M.H. Yazer, D.J. Triulzi, B.J. Early-Young, P.W. Adams, B.J. Daley, R.S. Miller, B.G. Harbrecht, J.A. Claridge, H.A. Phelan, W.R. Witham, A.T. Putnam, T.M. Duane, L.H. Alarcon, C.W. Callaway, B.S. Zuckerbraun, M.D. Neal, M.R. Rosengart, R.M. Forsythe, T.R. Billiar, D.M. Yealy, A.B. Peitzman, and M.S. Zenati, for the PAMPer Study Group*

Sperry JL et al. NEJM 26 July 2018

2018 | LZS Hradec Králové, Česká republika



Zdravotnická záchranná služba Královéhradeckého kraje

Průtokový ohřívač

Zdravotnická záchranná služba Královéhradeckého kraje

Přednemocniční transfuze | 138 pacientů

Plná krev deleukotizovaná univerzální (PKDU)

Aditiva a antikoagulantia

Krevní složky 1:1:1

- 6 TU ERY = 6 x 120 ml = 720 ml
- 6 TU FFP = 6 x 50 ml = 300 ml
- 1 TU trombo = 1 x 35 ml = 35 ml

Celkem 1055 ml (!)

Htk 29 % | trombo 80–90 tis./ml

Koagulační aktivita 65 %

Plná krev

- 6 TU PKDU = 6 x 63 ml = 378 ml

Celkem 378 ml

Htk 38-50 % | trombo 150–400 tis./ml

Koagulační aktivita 100 %

Spinella PC. J Trauma 2009 | Kauvar DS et al. J Trauma 2006

Trauma Surgery & Acute Care Open

Prehospital tranexamic acid: what is the current evidence?

Lena M Napolitano

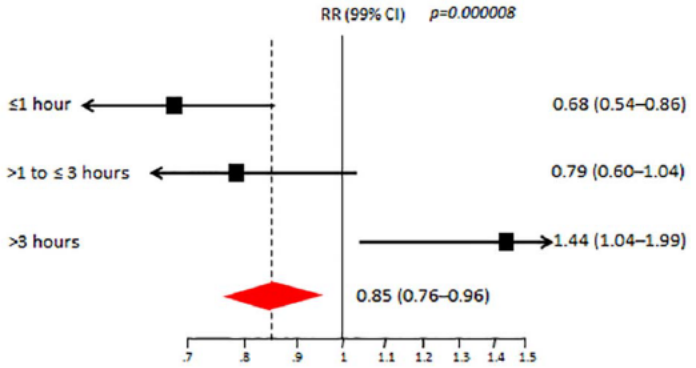


Figure 1 CRASH-2 trial results; RR all-cause in-hospital mortality based on timing of TXA administration. Early TXA (≤1 hour from injury) is associated with survival benefit. From Shakur *et al.*[1]

- Significant limitations of CRASH-2
- **Difficulty to translate results into large civilian trauma centres and trauma systems of care**

V. Initial management of bleeding and coagulopathy

Antifibrinolytic agents

Recommendation 22 We recommend that TXA be administered to the trauma patient who is bleeding or at risk of significant haemorrhage as soon as possible and within 3 h after injury at a loading dose of 1 g infused over 10 min, followed by an i.v. infusion of 1 g over 8 h. (Grade 1A)

We recommend that protocols for the management of bleeding patients consider administration of the first dose of TXA en route to the hospital. (Grade 1C)

Spahn et al. Crit Care 2019

Crewdson *et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* (2019) 27:6
https://doi.org/10.1186/s13049-018-0554-6

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

GUIDELINE Open Access

Best practice advice on pre-hospital emergency anaesthesia & advanced airway management

Kate Crewdson*, David Lockey, Wolfgang Voelckel, Peter Temesvari, Hans Morten Lossius and EHAC Medical Working Group

- **Praxe >12 měsíců v anesteziologii a >12 měsíců v urgentní medicíně**
- **Preoxygenace > 3 min**
- **Fentanyl 3–1 ucg/kg | ketamin 2–1 mg/kg | rocuronium 1 mg/kg**

Lyon L et al. Significant modification of traditional RSI improves safety and effectiveness of pre-hospital trauma anaesthesia. Crit Care 2015


LIFEPAK 15 MONITOR/DEFIBRILÁTOR
117
34
60
27
12 SVODŮ
PŘENOS
TISK
MEDSOL

Doporučené indikace PHEA*

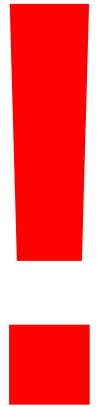
1 | hrozící nebo přítomná hypoxie

2 | hrozící nebo přítomná akutní hyperkapnie

3 | hrozící nebo vzniklá neprůchodnost dýchacích cest

4 | významná agitovanost následkem poranění hlavy

5 | významná porucha vědomí



*PHEA | pre-hospital emergency anaesthesia | přednemocniční urgentní anestezie

TCA

Traumatická zástava oběhu (TCA)

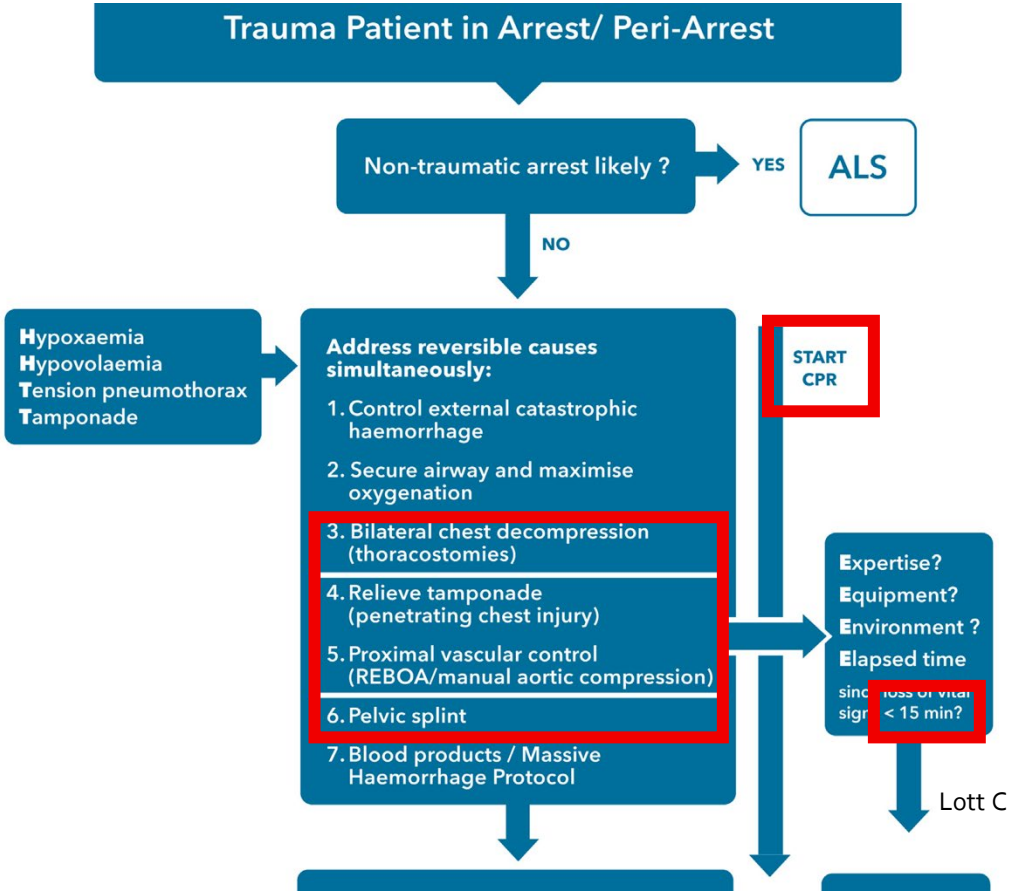
- **Velmi nepříznivá prognóza | přežití 1,6 %**

Zwingmann J et al. Critical Care 2012

- **Iniciální rytmus | nedefibrilovatelný**

- **Hypovolémie nejčastější příčinou TCA**
- **Většina přeživších nemá hypovolémii**
- **Prioritou postupu simultánní léčba reverzibilních příčin TCA**
- **Úloha KPR není přesně známá, ale srdeční masáž nesmí být upřednostněna před léčbou reverzibilních příčin**

Léčebný algoritmus ERC 2021



Lott C et al. Resuscitation 2021


PAX

TORAKOTOMIE

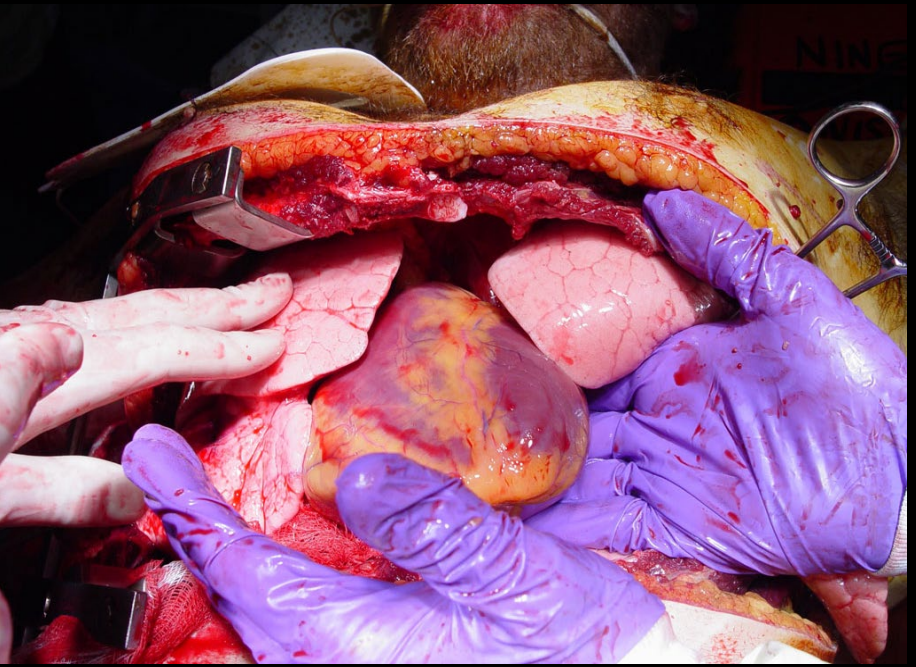
and 13 survivors of traumatic cardiac arrest vived who might not have been resuscitated had these guidelines been followed. Eight of these unexpected survivors had pre-hospital thoracotomies.

Which EMS systems should consider introducing this intervention into routine practice? Those with high rates of penetrating trauma and physicians working in the pre-hospital environment are likely to be most suitable. A system that has the same elements required for other complex pre-hospital interventions such as pre-hospital anaesthesia is essential.[13] These include a system of audit and quality assurance and adequate training and resource. When contemplating introduction of pre-hospital thoracotomy pre-hospital services will need to develop firm links with their receiving

Lockey D et al. Resuscitation 2007

Third of London's Air Ambulance calls to victims of shootings or knife crime

VIEW COMMENTS



Pravidlo 4P = prodleva max. 15 minut od vzniku zástavy | praxe | pomůcky | prostředí

Marius Rehn | London Air Ambulance


OK-DSE
EC 135
KRYSTOF 6
155
eurocopter
OSA
LETECKÁ ZÁCHRANNÁ SLUŽBA
HRADEC KRÁLOVÉ

Zdravotnická záchranná služba Královéhradeckého kraje

Tamponáda: praktický výcvik personálu

A practical approach to resuscitative thoracotomy

Marius Rehn
Gareth Davies
David Lockey

Abstract
The survival after traumatic cardiac arrest is similar to out-of-hospital cardiac arrest of any cause. Potential reversible pathologies must be addressed immediately, regardless of patient location at the time of diagnosis. Resuscitative thoracotomy is a well-established surgical intervention that may result in a neurologically good outcome for some patients in traumatic cardiac arrest. This paper describes a simple approach to resuscitative thoracotomy that can be used by a doctor in the pre-hospital environment and in the emergency department.

Keywords Blunt trauma; emergency medical service; emergency thoracotomy; penetrating trauma; resuscitation; resuscitative thoracotomy

Resuscitative thoracotomy is an important resuscitative intervention that has been used to treat traumatic cardiac arrest or peri-arrest in the emergency department (ED) or operating theatre for many years.[1] The outcome of traumatic cardiac arrest (TCA) is poor in all reported series although in the best series similar to out-of-hospital cardiac arrest of any cause.[2–5] The potential place of resuscitative thoracotomy is shown in one TCA algorithm in Figure 1.[6] Guidelines have questioned the value of thoracotomy after cardiac arrest and have recommended concentrating on patients with penetrating trauma with short duration of cardiac arrest as the group who are most likely to benefit.[7,8] In the UK although the rate of penetrating trauma is relatively low it has been recognized that resuscitative thoracotomy is occasionally required in all major trauma centres and rarely in trauma units. Because any delay rapidly reduces the chances of survival the intervention may need to be performed by junior surgeons and non-surgeons. This article describes a straightforward technique for resuscitative thoracotomy that has been used successfully by non-surgeons in the ED and in the pre-hospital phase of care. It builds on a previous article that has been used in the standard operating procedures of several trauma services.[9]

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Gareth Davies *is a Consultant Emergency Physician and Medical Director for London's Air Ambulance, Barts Health NHS Trust, London, UK. Conflicts of interest: none declared.*

David Lockey *is a Consultant Anaesthetist, Research Lead for London's Air Ambulance, Barts Health NHS Trust, London and Hon. Professor of Trauma & Pre-hospital Emergency Medicine, UK. Conflicts of interest: none declared.*

Resuscitative thoracotomy indications and contraindications

Immediate resuscitative thoracotomy is a well-established surgical intervention that may result in a neurologically good outcome for some patients in TCA.[10] For blunt trauma patients who have received cardiopulmonary resuscitation for over 10 minutes, resuscitative thoracotomy is likely to be futile as injuries are often more complicated and less amenable to treatment by less-experienced surgeons.[8,11] However, for penetrating trauma victims with definite loss of cardiac output for less than 10 minutes, the procedure has proven effective and should be carried out without any delay for less effective interventions.[12] When the penetrating wound is in the epigastrium, chest or between the scapulae, the cardiac arrest is usually caused by cardiac tamponade and obstructive shock or hypovolaemia. The chances of success increase when the cardiac arrest caused by cardiac tamponade and a simple cardiac wound. As the majority of tamponades are clotted, needle pericardiocentesis is unlikely to be effective.[13]

Resuscitative clamshell thoracotomy

The indications are:

- penetrating injury to the chest or epigastrium with peri or cardiac arrest
- penetrating trauma to other body regions for aortic compression and haemorrhage control
- blunt trauma for aortic compression and haemorrhage control.

Indications for resuscitative thoracotomy in children should be the same as those used for adult trauma patients.

The contraindications are:

- no cardiac output for greater than 10 minutes.

Provider competence, equipment required and technique

Ideally, patients with severe penetrating chest trauma should have their operations done by a cardiothoracic surgeon in the controlled environment of the operating theatre. Unfortunately, with only minutes to relieve cardiac tamponade after the onset of cardiac arrest this standard of care is not possible for many patients and the procedure may need to be performed in the ED or (where physician-led pre-hospital services are available) in the field. Although resuscitative thoracotomy is normally performed by surgeons, the procedure can also be performed successfully by non-surgeons such as emergency physicians or anaesthetists.[10,13] When the resuscitative thoracotomy procedure is performed on the roadside or in the ED a simple technique is essential. The technique should be rapid, give excellent exposure, and the provider can only be expected to address a limited number of pathologies. The equipment required should be minimal, lightweight, and familiar to operators (Table 1). The aims of the procedure are to rapidly decompress pericardial tamponade, control haemorrhage, perform open cardiac massage and temporarily occlude the aorta.[9]

London's Air Ambulance resuscitative clamshell thoracotomy technique

1) Position the patient supine in an area where there is 360 degrees of access. Intubation, ventilation, intravenous

Equipment required for resuscitative thoracotomy

Instrument	Role
Skin preparation materials	Aseptic spray
Large scalpel	Incision of skin and soft tissues
Blunt forceps	Dissection the intercostal muscles and parietal pleura
Large scissors	General dissection
Serrated wire and handles	Cutting through sternum
Rib spreaders	Self-retaining. Maximizing the exposure and aiding identification of anatomy (adult and paediatric size)
Clamps	Haemorrhage control (small and large size)
Blunt forceps	Haemorrhage control and testing the pericardium (curved and straight)
Scissors	General dissection (small and large)
Skin stapler and suture	

Table 1

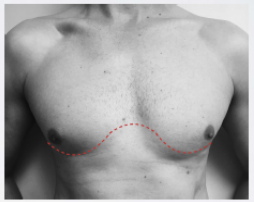


Figure 2 Thoracotomy incision.

opening in a 'clamshell' fashion. The self-retaining rib spreader is then inserted and used to maximize the exposure and aid identification of anatomy.

7) The blunt forceps are then used to raise a 'tent' of pericardium on the anterior surface of the heart. The pericardium is incised vertically and the incision extended to expose the heart. Vertical incision minimizes the risk of damage to the phrenic nerve, which run in the lateral walls of the pericardial sac.
8) Evacuate blood clots by hand. The heart may fibrillate or beat spontaneously as this happens.
9) If the heart makes no spontaneous movement, it can be stimulated by flicking with a finger. If this is ineffective begin cardiac massage. A two-handed technique should be used ensuring that the heart is flat in its bed and not kinked on its vascular pedicle. Blood is 'milked' from the apex upwards at a rate of 80 beats per minute. Simultaneously get an assistant to compress the descending aorta against the spinal column. This will raise aortic root pressure, enhance coronary blood flow and limit subdiaphragmatic haemorrhage.
10) Control bleeding: cardiac holes which are bleeding should be sutured or stapled with skin staples or occluded with a finger. Wounds adjacent to coronary arteries should be sutured with caution to avoid occlusion.
    For larger defects, a Foley urinary catheter can be passed through the hole then inflated with a small amount of water and gently pulled back. Use the forceps to clamp the catheter under slight tension. If a catheter is used in this way, a 'giving set' can be attached to permit rapid volume infusion directly into the heart. Disadvantages of this technique include reducing volume for cardiac filling and the potential for the balloon to pull out and enlarge the hole.
11) Ventricular fibrillation (VF): coarse VF – should this occur, the rib spreader should be removed, the chest closed, electrodes applied to the chest wall and defibrillation carried out as normal.
    Fine VF – continue quality internal massage until coarse VF or spontaneous activity starts. Defibrillate for coarse VF as above.
    Ensure there are no blood pools/fluids around the patient that may are.
12) Either peripheral intravenous access or central venous access must be established, especially for patients with hypovolaemia.
13) If the procedure is successful the patient may begin to wake up so be prepared to provide immediate anaesthesia. An anaesthetic agent with minimal cardiac depression should be used and ketamine is frequently the agent of choice.
14) Restoration of circulation will be associated with bleeding, particularly from the internal mammary and intercostal vessels. Larger bleeding vessels may require control with haemostatic clamps.
15) Once perfusion has been restored the patient should be moved to a hospital operating theatre for definitive repair.

Risk to providers: Providers are at risk for sharps injuries from fractured ribs, needles, surgical instruments and splash contamination from bleeds. Cautious approach and the use of personal protective equipment are recommended.

Outcomes

Following resuscitative thoracotomy in the ED, the overall survival rates for victims presenting with no vital signs after penetrating trauma are around 8%.[2] The survival rate for blunt trauma is approximately 1%.[11] A study reporting the London's Air Ambulance experience with pre-hospital thoracotomy after knife injury to the chest or epigastrium included 71 patients. Thirteen of these patients (18%) survived to hospital discharge. At hospital discharge, neurological outcome was good in 11 patients and poor in two. At operation, all survivors had cardiac tamponade. Good neurological outcome was more likely when thoracotomy was performed soon after the onset of cardiac arrest.[12] Experiences from the military environment in Iraq found

Rehn M et al. Surgery (Oxford) 2015. 6;33(9):455–8

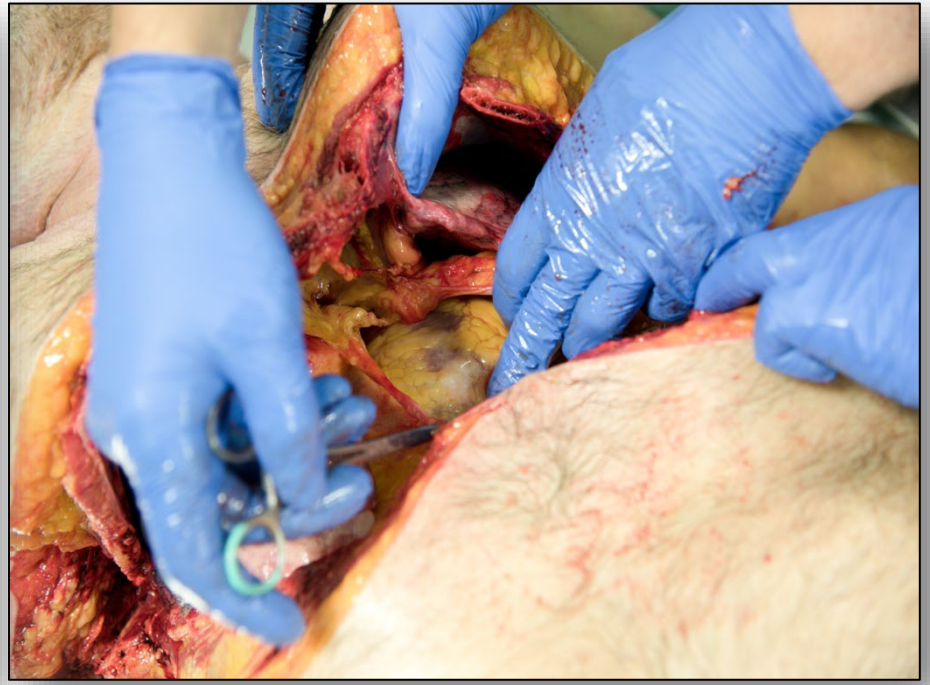
LONDON'S AIR AMBULANCE

NORSK LUFTAMBULANSE
NORWEGIAN AIR AMBULANCE

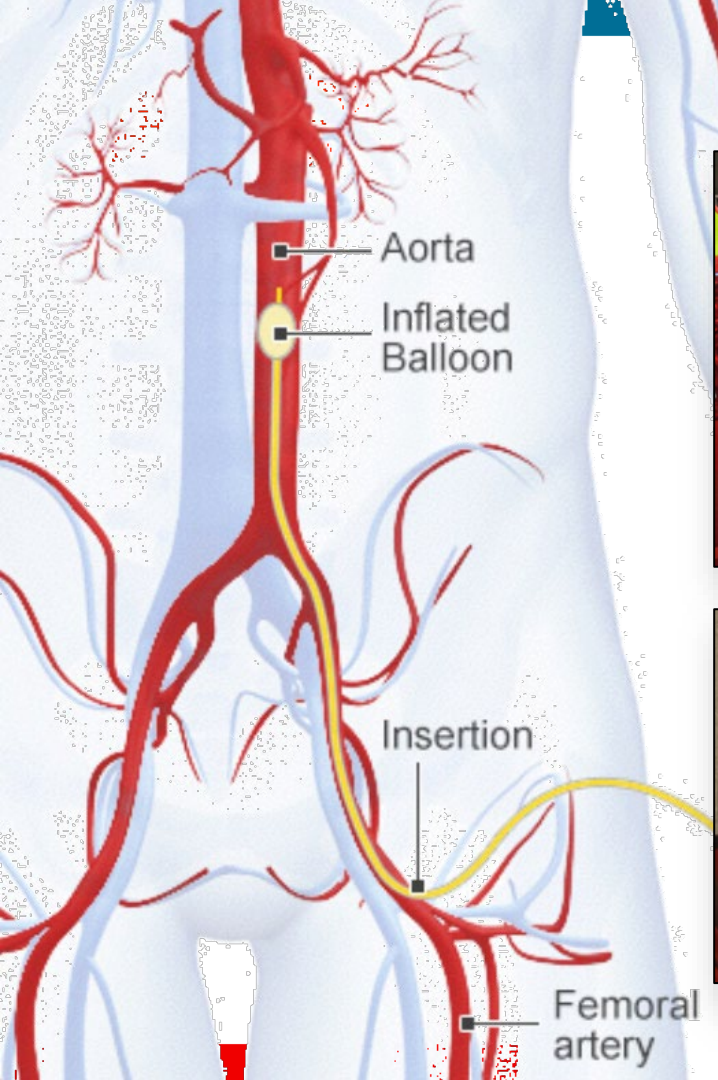
Tamponáda: praktický výcvik personálu

Zdravotnická záchranná služba Královéhradeckého kraje

Tamponáda: praktický výcvik personálu



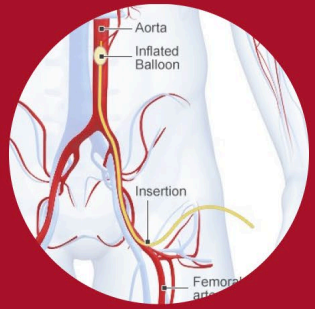
REBOA



REBOA | Resuscitative Endovascular Balloon Occlusion of the Aorta

World's first pre-hospital REBOA performed

Monday 16th June 2014



- World's first pre-hospital REBOA carried out by London's Air Ambulance
- Pioneering new technique to prevent trauma patients bleeding to death
- Control of severe pelvic haemorrhage, an injury most commonly associated with cycling incidents and falls from height
- 2 years of development with The Royal London Hospital
- Boris, "stunning advances in medical care are helping people survive serious injury in London"

We have performed the world's first roadside balloon surgery to control internal bleeding. Use of pre-hospital Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA), a technique used first in the UK at The Royal London Hospital, to control haemorrhage in trauma patients is a ground breaking move by London's Air Ambulance.

On average the charity is called five times a day to deliver its life-saving medical interventions to people seriously injured in the Capital. Many of these patients are suffering from catastrophic bleeding. Tragically some die at the

REBOA: alternativa manuální komprese aorty?

- 19 pacientů ISS 34 s exsanguinačním poraněním pánve
- 13 úspěšných vs. 6 neúspěšných zavedení v PNP

- Pre-REBOA TK_{sys} 57 vs. Post- REBOA TK_{sys} 114 (P<0,001)
- Nižší riziko vzniku přednemocniční zástavy: 0 % vs. 50 % (P=0,021)
- Nižší riziko úmrtí z vykrvácení: 0 % vs. 67 % (P=0,004)
- Lepší výsledky přežití: REBOA 62 % vs. no REBOA 33 % (P=0,350)
- Distální arteriální uzávěr vyžadující troembektomii 10/13 (77 %)

Lendrum R et al. Pre-hospital REBOA for exsanguinating pelvic haemorrhage. Resuscitation 2019

REBOA: alternativa manuální komprese aorty?

Trauma Surgery & Acute Care Open

PREHOSPITAL USE OF REBOA

- Due to the limited evidence to support the safe duration of aortic occlusion, the difficulty in identifying in the prehospital environment the appropriate patient for REBOA, and the uncertainty of the safety of prehospital REBOA placement for both the patient and the care team, the general adoption of prehospital placement of REBOA in the USA is not recommended. Delays in transport and definitive hemorrhage control are life-threatening and emphasis should remain on en-route resuscitation and rapid transport to definitive care.
- The limited existing experience with prehospital REBOA (case reports only) involves systems with physician-led teams outside of the USA. This does not directly translate to the majority of current US EMS systems.
- Prehospital REBOA should only be considered in the *extremely rare* circumstance in which a physician experienced in REBOA placement is on scene and the EMS system in partnership with the trauma system can meet the recommended time windows from aortic occlusion to the initiation of an in-hospital definitive hemorrhage control procedure (<15 min Zone 1, <30 min Zone 3). Ideally, this should only occur as part of a clinical trial where such patients would be entered into a database to capture time to definitive treatment and outcomes.

ovascular balloon
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rian Beldowicz,[4] Megan Brenner,[5]
Kang,[8] Jennifer Gurney,[9]
sta Kaups,[13] Vidor E Friedman,[14]

Zdravotnická záchranná služba Královéhradeckého kraje

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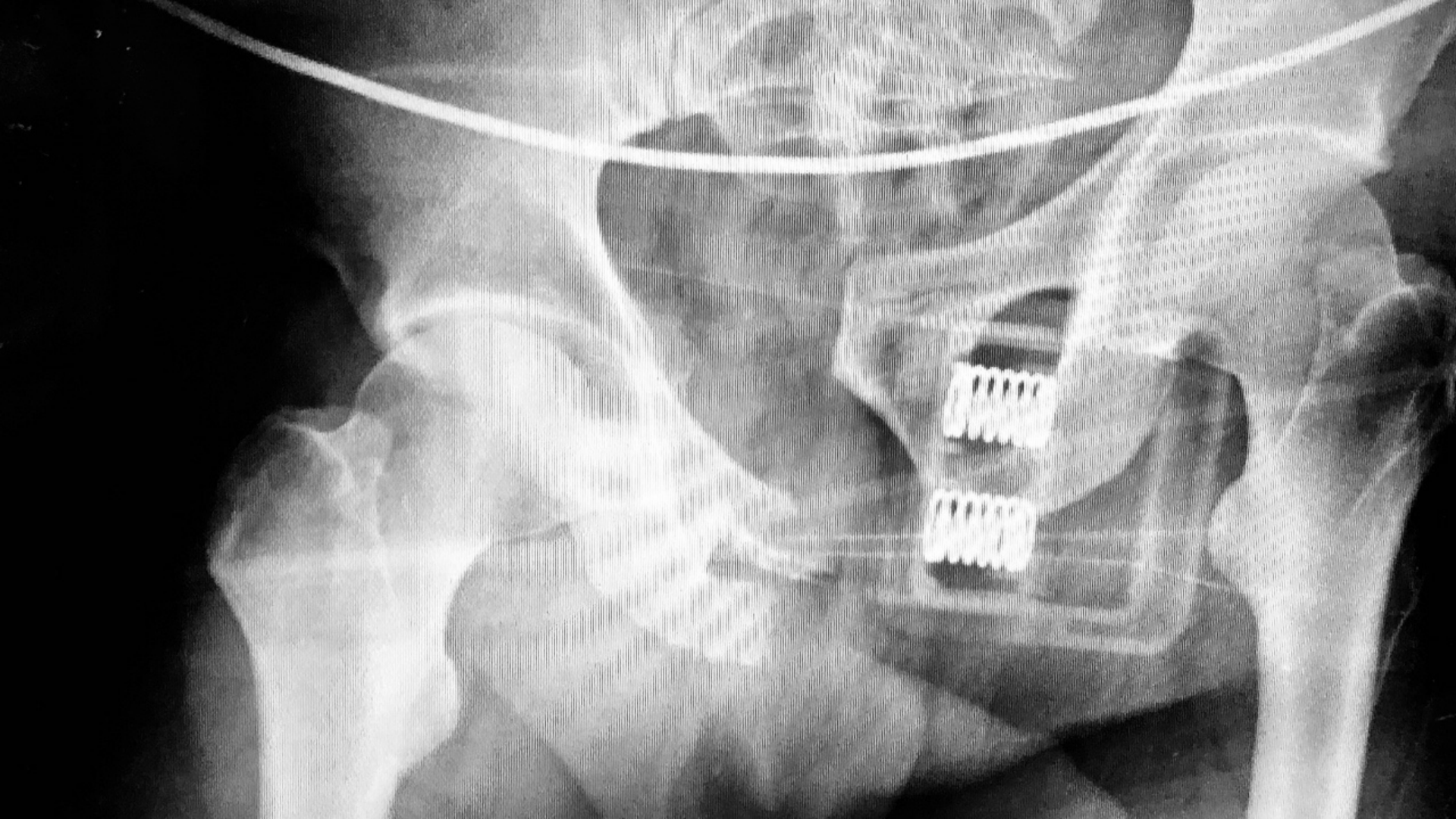


MTP

"Do not pump an empty heart!"

No benefit in hypovolemic animals: chest compressions in addition to fluid did not reverse signs of shock better than fluid alone

Jeffcoach DR et al. J Trauma Acute Care Surg 2016

Improvements in blood pressure with chest compressions in normovolaemic cardiac arrest were not reproduced in hypovolaemic arrest, and there was a **further depression of diastolic pressure**

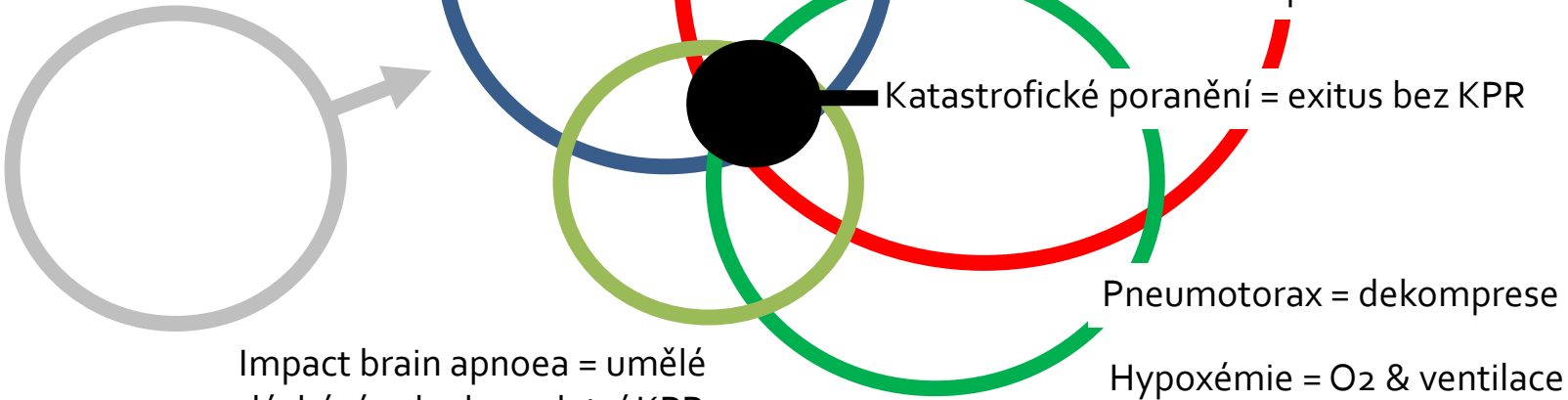
Luna GK et al. J Trauma 1989

CPR-related injuries may cause additional, and significant harm

No animal or human evidence to support the use of external chest compressions in patients with traumatic cardiac arrest

Smith JE et al. Journal of the Royal Society of Medicine 2015

TCA není "single disease"



Shrnutí

Přednemocniční čas je klíčovým faktorem pro přežití kritického úrazu

Přednemocniční aplikace transfuzních přípravků pacientům s traumaticko-hemoragickým šokem prodlužuje časové okno

Při traumatické zástavě oběhu prioritou cílená léčba reverzibilních příčin

Nutnost přípravy personálu na vysoce invazivní život zachraňující výkony

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