

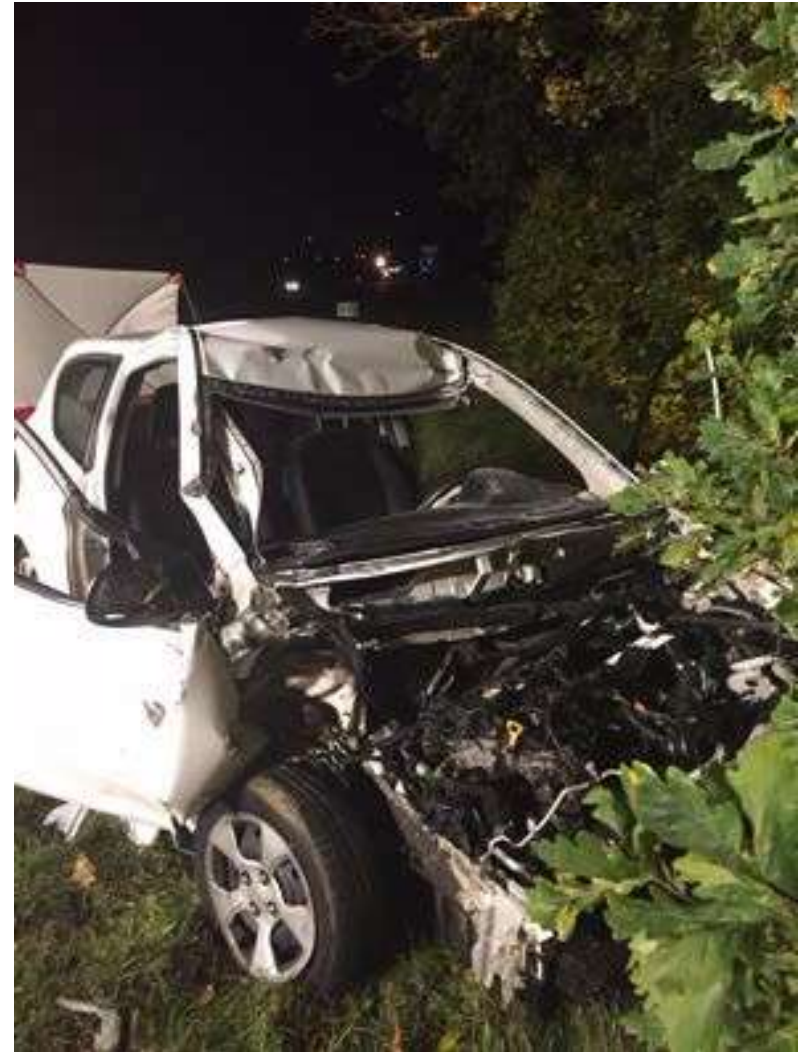
Christian Beekers
Verpleegkundige MMT Nijmegen-Lifeline 3
Ambulanceverpleegkundige

Inhoud:

- Laatste inzichten
- Behandelbare oorzaken
- Concept LPA protocol Traumatische reanimatie

Casus

- Melding: auto in bosjes met bewusteloos s.o
- Primaire MMT inzet
- Auto blijkt achterop aanhanger van tractor gereden
- Brandweer heeft BLS opgestart net vóór aankomst ambulance



Casus

- Ter plaatse:
 - Reanimatie
 - Echo: geen 'sliding sign'
 - Thoracostomie -> spanningspneumothorax
- Fijnmazig VF waarvoor 1 x def.
- Reanimatie
- Impressie# schedel



bron: 1Limburg.nl

Casus

- Aanleggen T-POD
- Infusie
- Echo cor: nauwelijks contracties, geen vulling
- Vrij vocht abdominaal
- Reanimatie gestaakt



Mindset...



Oorzaken TCA ?

European Resuscitation Council Guidelines for Resuscitation 2015

Section 4. Cardiac arrest in special circumstances

Anatolij Truhlář^{a,b,*}, Charles D. Deakin^c, Jasmeet Soar^d, Gamal Eldin Abbas Khalifa^e, Annette Alfonzo^f, Joost J.L.M. Bierens^g, Guttorm Brattebø^h, Hermann Bruggerⁱ, Joel Dunning^j, Silvija Hunyadi-Antičević^k, Rudolph W. Koster^l, David J. Lockey^{m,w}, Carsten Lottⁿ, Peter Paal^{o,p}, Gavin D. Perkins^{q,r}, Claudio Sandroni^s, Karl-Christian Thies^t, David A. Zideman^u, Jerry P. Nolan^{v,w}, on behalf of the Cardiac arrest in special circumstances section Collaborators^l

- Bloedverlies 48 %
- Spanningspneumothorax 13 %
- Hypoxie 13%
- Pericard Tamponade 10%
- Overig



Resuscitation 95 (2015) 148–201

Behandelbare oorzaken

- Hypovolemia h [redacted]
 - Oxygenation ([redacted]
 - Tension pneumothorax [redacted]
 - Tamponade [redacted]
- Preload reductie !!**

Hypovolemia

- Uitwendig bloedverlies
- Inwendig bloedverlies
 - 4 x B

Hypovolaemia. Uncontrolled haemorrhage is the cause of traumatic cardiac arrest in 48% of all TCA.⁹⁷ The treatment of severe hypovolaemic shock has several elements. The main principle is to achieve 'haemostasis without delay', usually with surgical or radiological intervention. Temporary haemorrhage control can be lifesaving:



Resuscitation 95 (2015) 148-201

Hypovolemia

- Uitwendig bloedverlies
 - **Identificeren en behandelen**
- Inwendig bloedverlies
 - **Identificeren en behandelen**

Identificeren...

Requirement for a structured algorithm in cardiac arrest following major trauma: Epidemiology, management errors, and preventability of traumatic deaths in Berlin[☆]

C. Kleber^{a,b,*}, M.T. Giesecke^a, T. Lindner^c, N.P. Haas^a, C.T. Buschmann^d

^a Center for Musculoskeletal Surgery, AG Polytrauma, Charité – Universitätsmedizin, Berlin, Augustenburger Platz 1, 13353 Berlin, Germany

^b Berlin-Brandenburg Center for Regenerative Therapies, Charité – Universitätsmedizin, Berlin, Augustenburger Platz 1, 13353 Berlin, Germany

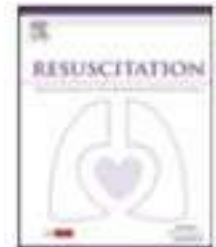
^c Department of Emergency Medicine, Charité – Universitätsmedizin Berlin, Augustenburger Platz 1, 13353 Berlin, Germany

^d Institute of Legal Medicine and Forensic Sciences, Charité – Universitätsmedizin Berlin, Turmstrasse 21 (Building N), 10559 Berlin, Germany



3.9. External pelvic stabilization

20 unstable pelvic injuries were observed (39%). No PH external stabilization was performed in 19 out of 20 patients (95%) with unstable pelvic injuries.



Resuscitation 85 (2014) 405–410

Bekkenletsel

The prehospital management of pelvic fractures: initial consensus statement*

I Scott¹, K Porter², C Laird³, I Greaves⁴ and M Bloch¹



- Diagnostisch comprimeren niet langer aanbevolen
- Ongevalsmechanisme impliceert bekkenletsel -> aanwenden bekkendevice



Trauma , Jaargang:17 , Uitgave:2 , Pagina(s):151

Oxygenation (hypoxie)

- Vrije ademweg
- Masker-ballon beademing
- OXYGENATIE en VENTILATIE zijn een must !
- Intubatie / SGA is een hulpmiddel

Hypoxaemia. Hypoxaemia due to airway obstruction and traumatic asphyxia has been reported as cause of traumatic cardiac arrest in 13% of all cases.⁹⁷ Effective airway management and



Resuscitation 95 (2015) 148-201

Tension pneumothorax

Requirement for a structured algorithm in cardiac arrest following major trauma: Epidemiology, management errors, and preventability of traumatic deaths in Berlin[☆]

C. Kleber^{a,b,*}, M.T. Giesecke^a, T. Lindner^c, N.P. Haas^a, C.T. Buschmann^d

^a Center for Musculoskeletal Surgery, AG Polytrauma, Charité – Universitätsmedizin, Berlin, Augustenburger Platz 1, 13353 Berlin, Germany

^b Berlin-Brandenburg Center for Regenerative Therapies, Charité – Universitätsmedizin, Berlin, Augustenburger Platz 1, 13353 Berlin, Germany

^c Department for Emergency Medicine, Charité – Universitätsmedizin Berlin, Augustenburger Platz 1, 13353 Berlin, Germany

^d Institute of Legal Medicine and Forensic Sciences, Charité – Universitätsmedizin Berlin, Turmstrasse 21 (Building N), 10559 Berlin, Germany

- Prehospitaal:
 - 37% (n=19) patienten heeft Tension Pneumothorax
 - Geen decompressie uitgevoerd



Resuscitation 85 (2014) 405–410

Tension pneumothorax

Clinical Presentation of Patients With Tension Pneumothorax *A Systematic Review*

Derek J. Roberts, MD,†‡§ Simon Leigh-Smith, MBChB,¶ Peter D. Faris, PhD,†|| Christopher Blackmore, MD,*
Chad G. Ball, MD, MSc,*§** Helen Lee Robertson, MLIS,†† Elijah Dixon, MD, MSc,***
Matthew T. James, MD, PhD,††† Andrew W. Kirkpatrick, MD, MHSc,*†§ John B. Kortbeek, MD,*†§
and Henry T. Stelfox, MD, PhD††††*

- 5 cohort study's -> 310 patiënten
- 156 case series -> 183 TPX (86 zelfstandig / 97 ondersteuning)



Issue: Volume 261(6), June 2015, p. 1068-1078

TABLE 5. Semiquantitative Summary of Reported Signs and Symptoms of Tension Pneumothorax Stratified by Patient Ventilatory Status

Variable	Unassisted Breathing	Assisted Ventilation
Most common
Shortness of breath
Dyspnea
Respiratory distress
Vital signs
More delay of hypotension
Jugular venous distention
Contralateral tracheal deviation
Subcutaneous emphysema
Decreased air entry
Percussion hyperresonance
Thoracic hyperexpansion

Where, ' ', ' ' and ' ' indicate that the sign or symptom was reported in 0% to 10%, 10% to 30%, 30% to 41%, or > 41% of included observations. I, S, U, or C indicate that the sign or symptom was reported in 1, 2, 3, or 4 cases, respectively.



Tension pneumothorax

T 1.19

Spoedthoraxdrainage

leerboek
handelingschema's

ten behoeve van de SOSA-opleiding



INDICATIES

Patiënten bij wie een spanningspneumothorax is vastgesteld en die respiratoir en circulatoir instabiel worden.

- Traumatische reanimatie bij (verwacht) thoraxletsel

Tamponade

European Resuscitation Council Guidelines for Resuscitation 2015 Section 4. Cardiac arrest in special circumstances

Cardiac tamponade and resuscitative thoracotomy. Cardiac tamponade is the underlying cause of approximately 10% of cardiac arrest in trauma.⁹⁷ Where there is TCA and penetrating trauma to the chest or epigastrium, immediate resuscitative thoracotomy (RT) via a clamshell incision¹⁸⁸ can be life saving.¹⁸⁹ The chance of survival is about 4 times higher in cardiac stab wounds than in gunshot wounds.¹⁹⁰



Resuscitation 95 (2015) 148–201

Reanimatie richtlijnen



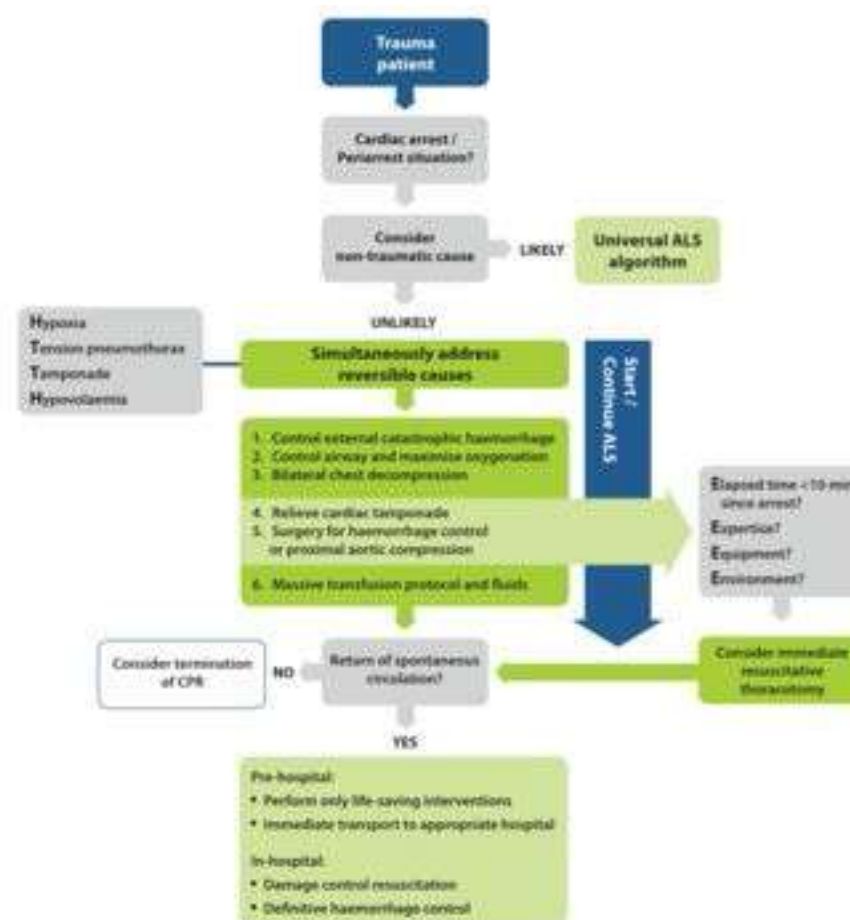
Richtlijnen Reanimatie
in Nederland **2015**

uitvoering van reanimatie bij volwassenen, kinderen en pasgeborenen. Als in de Nederlandse richtlijnen niets wordt gezegd over een specifiek onderwerp, volgt de NRR in principe de ERC richtlijnen welke in het Engels beschikbaar zijn ^[1].




Nederlandse Reanimatie Raad

Algoritme ERC 2015





Cardiac arrest /
Periarrest situation 1

Consider
non-traumatic cause

LIKELY

Universa! ALS
algor th m



Resuscit. 1uon 9 '(IOIS) 148-201

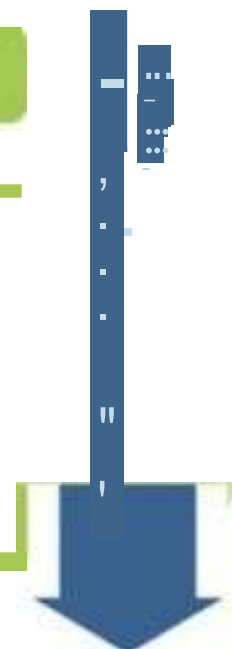
- Hypoxia
- Tension pneumothorax
- Flail chest
- Hypovolemia

UNLIKELY

Simultaneously address reversible causes

1. Control bleeding
2. Control airway
3. Decompress
4. Relative cardiac tamponade
5. Surgery for haemorrhage control or proximal aortic compression

6. Massive transfusion protocol and fluids



Elap...t time < 10min
since arrest
Expertise!
Equipment!
Environ, ...ntl

Consider termination of CPR

NO

Return of spontaneous circulation?

Consider Immediate termination



Resuscitation 9 (2015) 148-201



Consider termination
of CPR

Return of spontaneous
circulation?

YES

Pre-hospita!:

- Perform only life-saving interventions
- Immediate transport to appropriate hospita!

In-hospita!:

- Damage control resuscitation
- Definitive haemorrhage control



ReSUKit.1bon 95 (ILCJS) 148-J:Ot

Starten / niet starten / stoppen ?

Consider withholding resuscitation in TCA in any of the following conditions:

- no signs of life within the preceding 15 min;
- massive trauma incompatible with survival (e.g. decapitation, penetrating heart injury, loss of brain tissue).

We suggest termination of resuscitative efforts should be considered if there is:

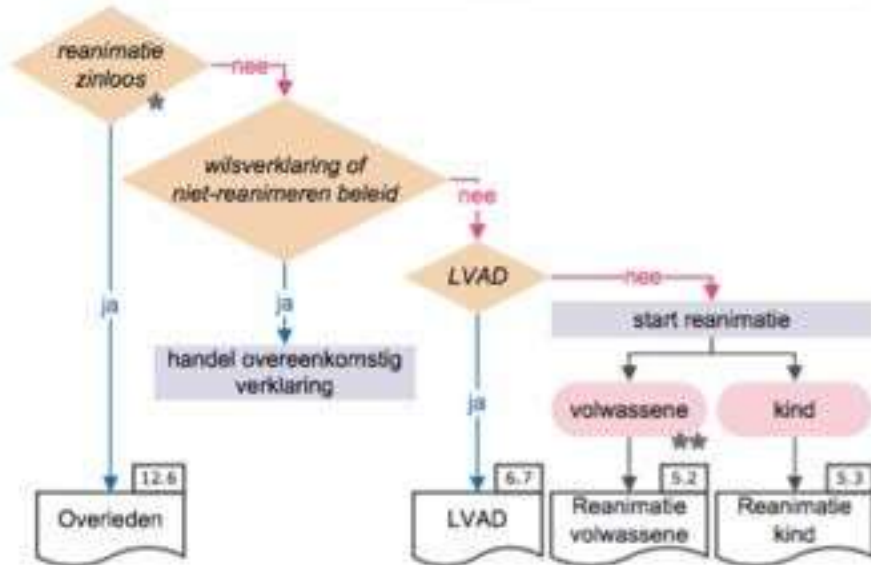
- no ROSC after reversible causes have been addressed;
- no detectable ultrasonographic cardiac activity.



Resuscitation 95 (2015) 148–201

Traumatische reanimatie en LPA

5.1 Reanimatie



- ★
- verschijnen biologische dood of
 - arrest > 15 minuten zonder BLS en
 - geen hypothermie
 - geen drenkeling
 - geen trauma met PEA

- ★★
- bij drenkeling 5 initiële beademingen

overweeg reversibele oorzaken
4x H

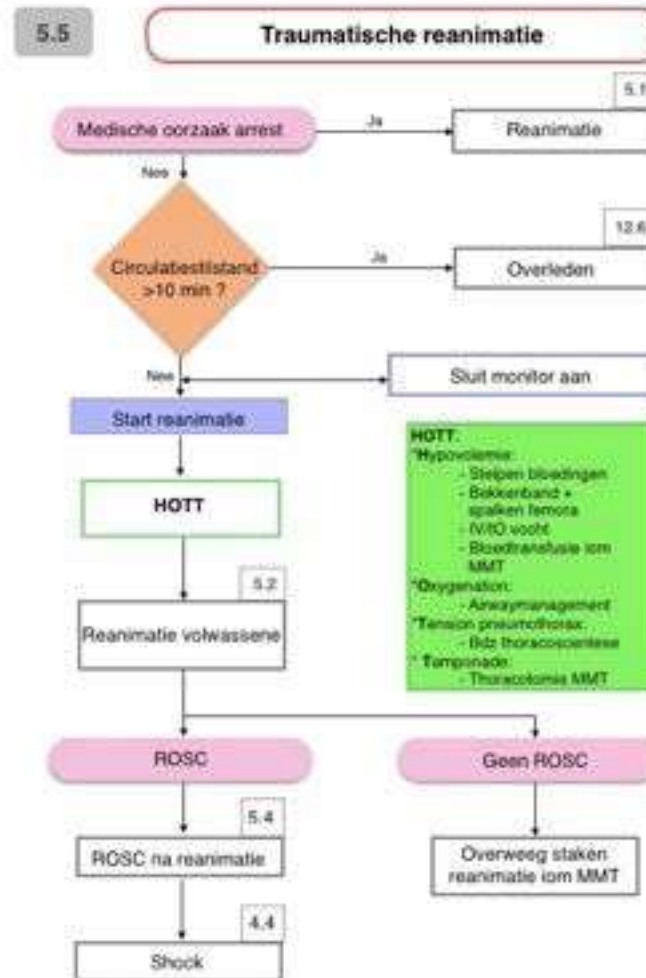
- hypoxie
- hypovolaemie
- hypo-/hyperkaliëmie/metabole afwijkingen
- hypothermie

4x T

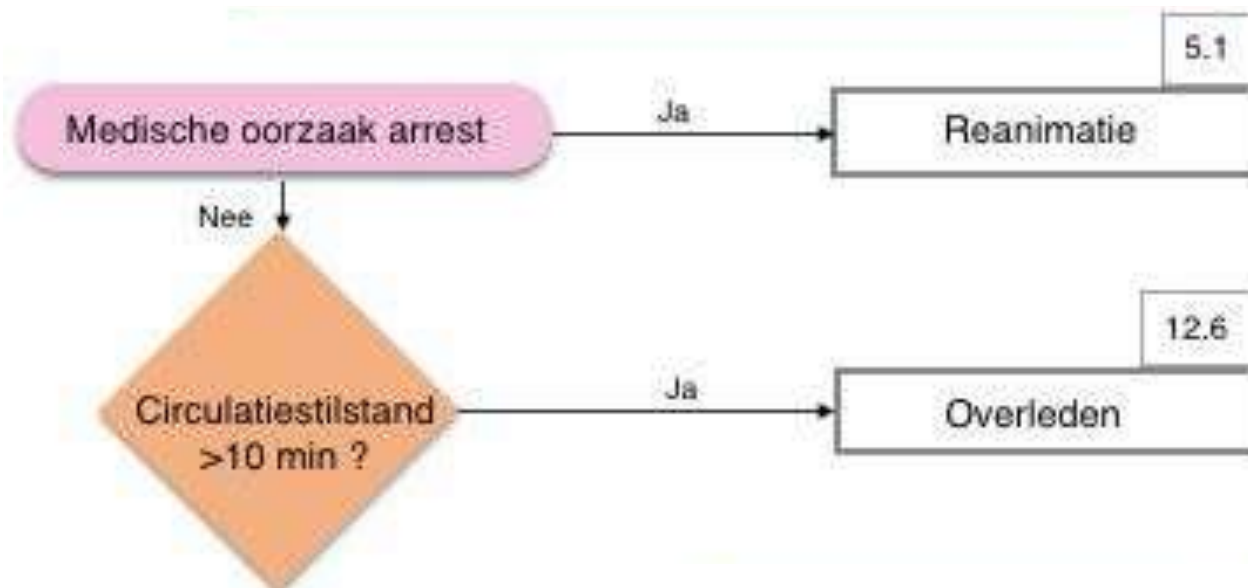
- spanningspneumothorax
- tamponade
- trombo-embolie
- toxinen

- bij cyanide-intoxicatie:
hydroxocobalamine 10 g i.v.
(indien beschikbaar)

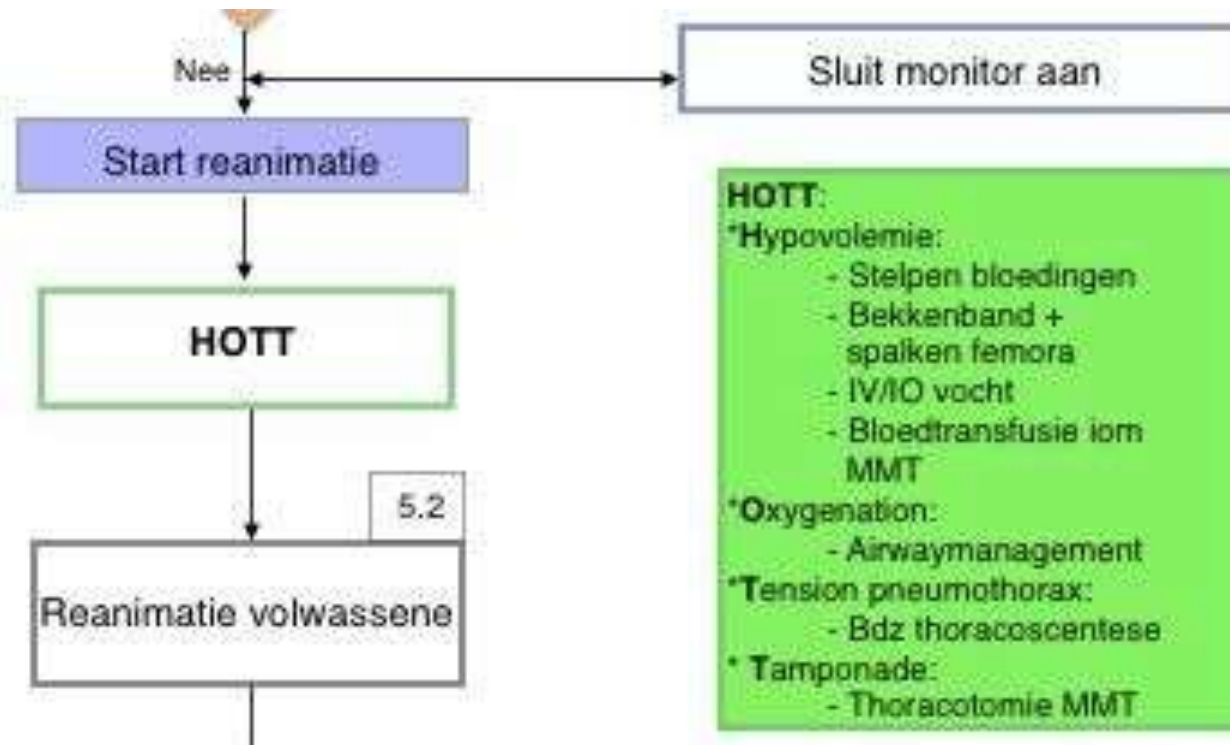
Concept LPA protocol



Concept LPA protocol

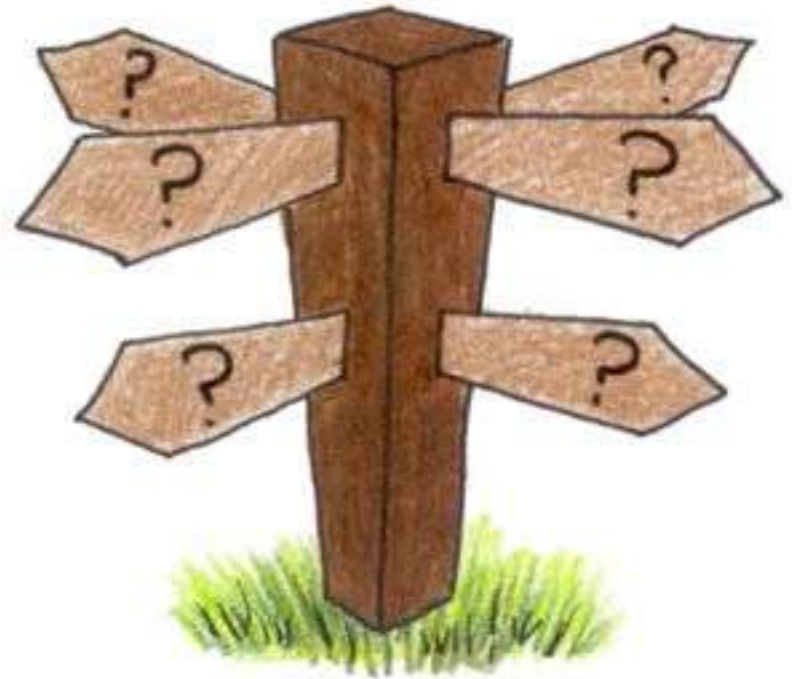


Concept LPA protocol

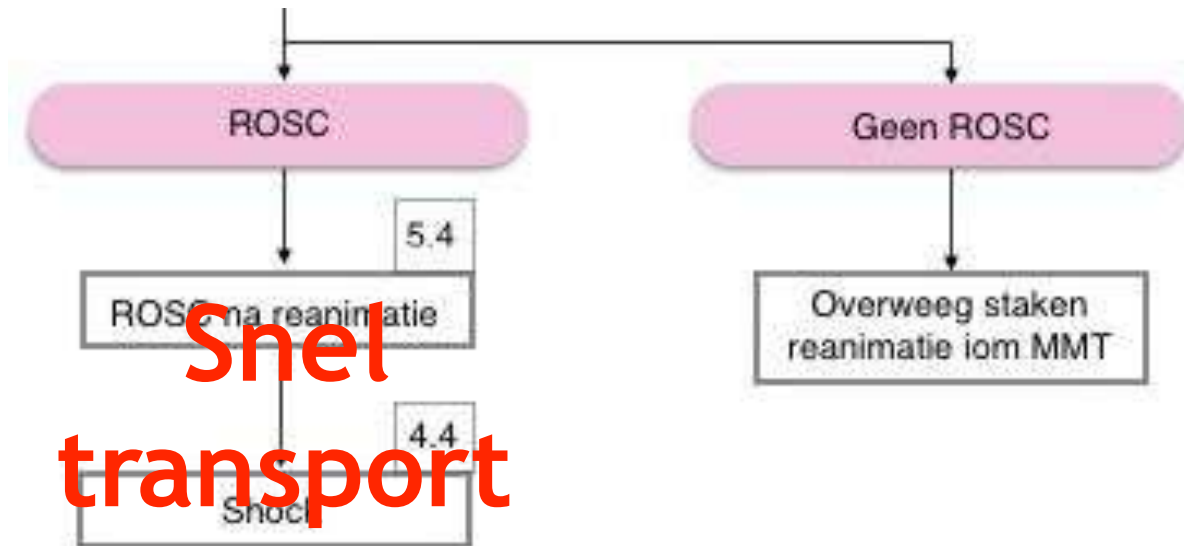


Prioriteit ??

- Thoraxcompressies <-> Behandelbare oorzaken



Concept LPA protocol

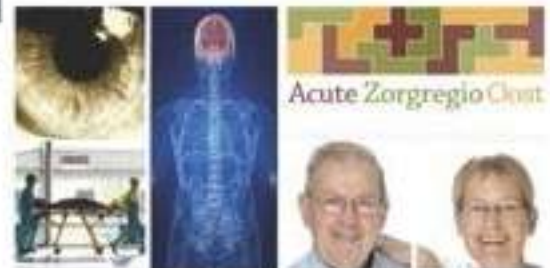


**Snel
transport**

Stoppen met reanimatie
=
Nadenken over donatie



19



En casus ...



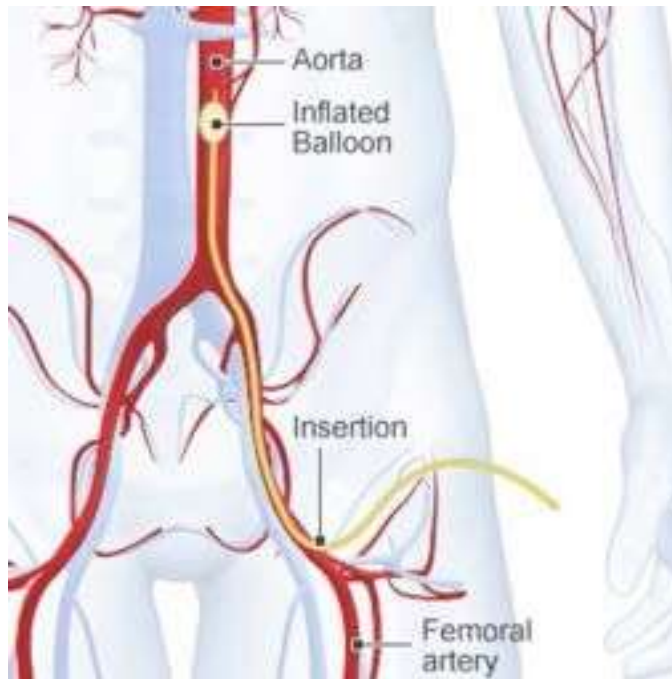
Toegevoegde waarde MMT

- Ervaring
- Decision making
- Skills



Toekomst

- MMT heeft bloed bij ?
- Orgaandonatie ?
- REBOA ?



Take home message

- Gebruik je mindset
- Standaard ALS richtlijnen NIET voor opstarten traumatisch arrest
- Behandelbare oorzaken hebben prioriteit boven thoraxcompressies
- Traumatische reanimatie is teamwork.



<http://ambulancezorg.venvn.nl/Portals/14/HOTT-rect.pdf>

Traumatische reanimatie ...



HOTT:

*Hypovolemie:

- Stelpen bloedingen
- Bekkenband + spalken femora
- IV/IO vocht
- Bloedtransfusie iom MMT

*Oxygenation:

- Airwaymanagement

*Tension pneumothorax:

- Bdz thoracoscentese

*Tamponade:

- Thoracotomie MMT

???