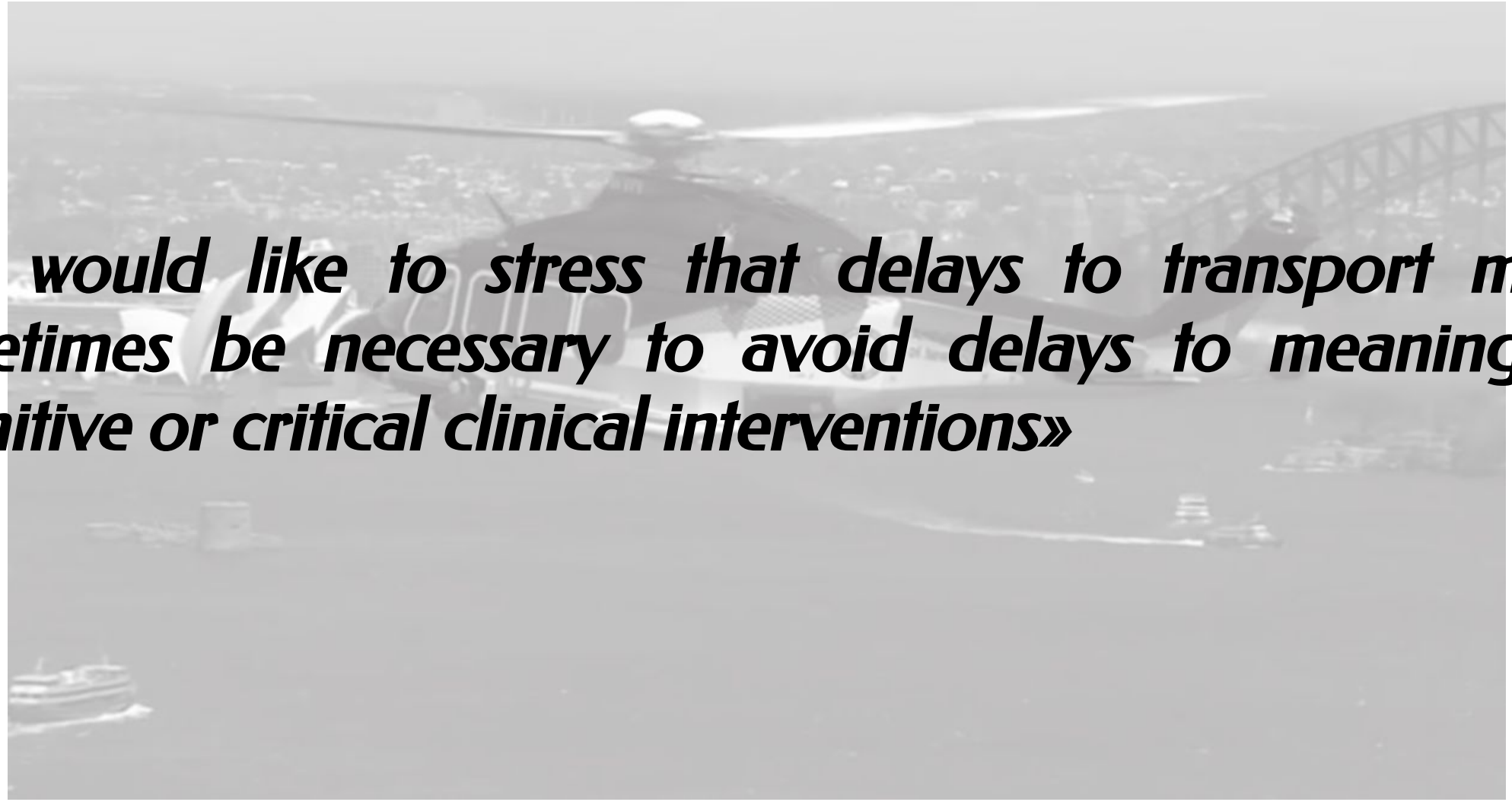
REBOA, Toracotomia & co
Esiste il silver bullet?

Dott. Giacomo Magagnotti
Centrale Operativa SUEM
Azienda Ospedale-Università Padova

GIVE ‘EM DIESEL!

Meaningful Interventions in Prehospital and Retrieval Medicine

Cliff Reid, Brian Burns



«We would like to stress that delays to transport may sometimes be necessary to avoid delays to meaningful definitive or critical clinical interventions»

A

B

C


REBOA
SANGUE
TORACOTOMIA

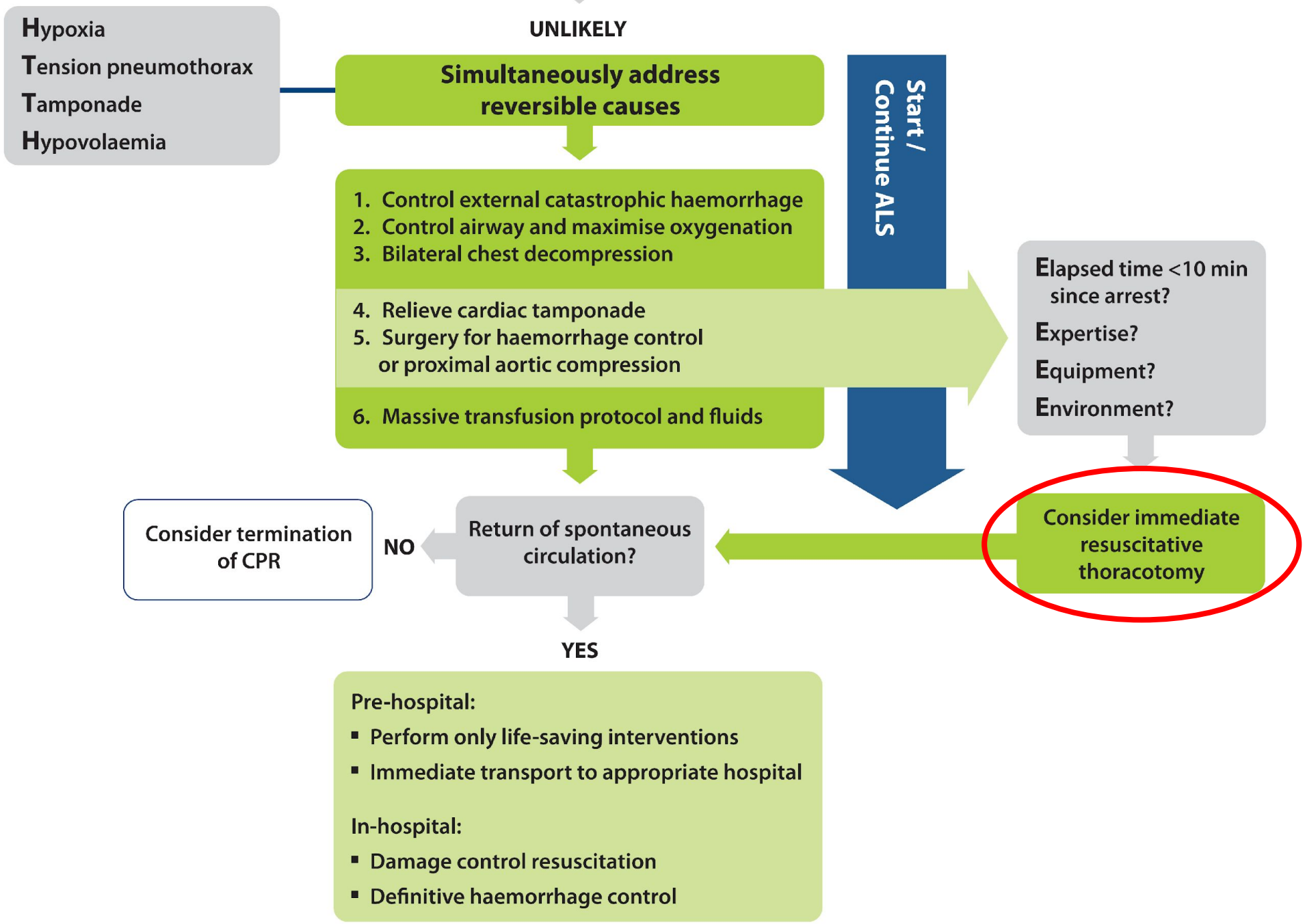


Fig. 4.3. Traumatic cardiac arrest algorithm.

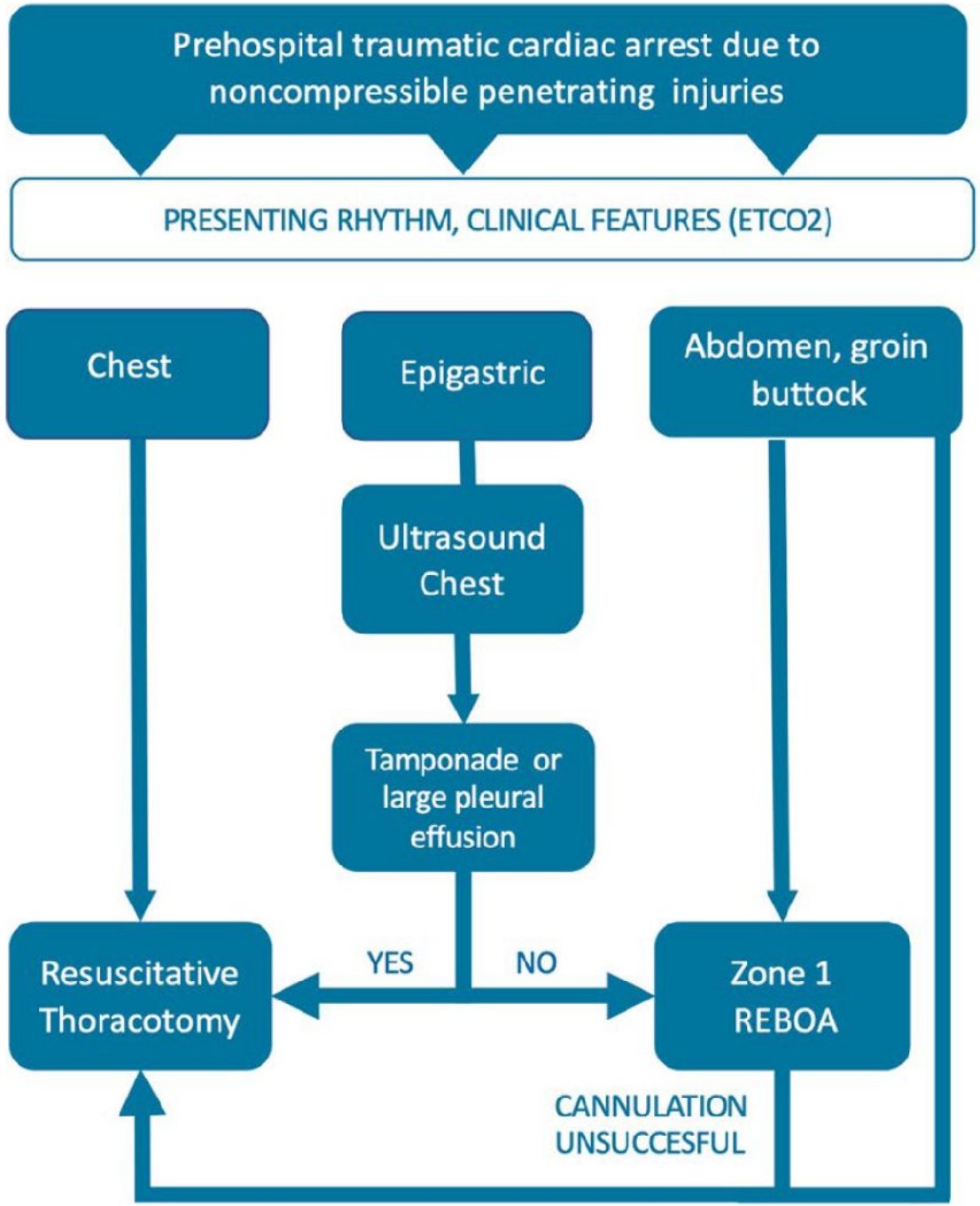
ter Avest *et al. Critical Care* (2022) 26:184
https://doi.org/10.1186/s13054-022-04052-7

Critical Care

REVIEW Open Access

Advanced interventions in the pre-hospital resuscitation of patients with non-compressible haemorrhage after penetrating injuries

E. ter Avest[1,2,3*], L. Carenzo[1,4], R. A. Lendrum[1,5], M. D. Christian[1,6,14], R. M. Lyon[2,7], C. Coniglio[8], M. Rehn[9,10,11], D. J. Lockey[1,12] and Z. B. Perkins[1,13]


Prehospital traumatic cardiac arrest due to noncompressible penetrating injuries
PRESENTING RHYTHM, CLINICAL FEATURES (ETCO2)
Chest
Epigastric
Abdomen, groin buttock
Ultrasound Chest
Tamponade or large pleural effusion
YES
NO
Resuscitative Thoracotomy
Zone 1 REBOA
CANNULATION UNSUCCESFUL

Emergency Resuscitative Thoracotomy for Civilian Thoracic Trauma in the Field and Emergency Department Settings: A Systematic Review and Meta-Analysis

Amy Liu, B.S,[a] *Jackie Nguyen, B.S,*[a] *Haley Ehrlich, B.S,*[a] *Charles Bisbee, B.S,*[a] *Luis Santiesteban, B.S,*[a] *Radleigh Santos, PhD,*[b] *Mark McKenney, MD, MBA, FACS,*[a,c] *and Adel Elkbuli, MD, MPH*[a,*]

JOURNAL OF SURGICAL RESEARCH • MAY 2022 (273) 44–55

Results: A total of 49 studies met the criteria for qualitative analysis, and 43 for quantitative analysis. 43 studies evaluated ED-RT and 5 evaluated PH-RT. Time from arrival on scene to PH-RT >5 min was associated with increased neurological complications and time from the initial encounter to PH-RT or ED-RT >10 min was associated with increased mortality. ISS ≥ 25 and absent signs of life were also associated with increased mortality. There was higher mortality in all PH-RT (93.5%) versus all ED-RT (81.8%) ($P = 0.02$). Among ED-RTs, a significant difference was found in mortality rate between patients with blunt (92.8%) versus penetrating (78.7%) injuries ($P < 0.001$). When considering only blunt or penetrating injury types, no significant difference in RT mortality rate was found between ED-RT and PH-RT ($P = 0.65$ and $P = 0.95$, respectively).

Almond *et al.*
Scand J Trauma Resusc Emerg Med (2022) 30:8
https://doi.org/10.1186/s13049-022-00997-4

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

ORIGINAL RESEARCH

Open Access

A 6-year case series of resuscitative thoracotomies performed by a helicopter emergency medical service in a mixed urban and rural area with a comparison of blunt versus penetrating trauma

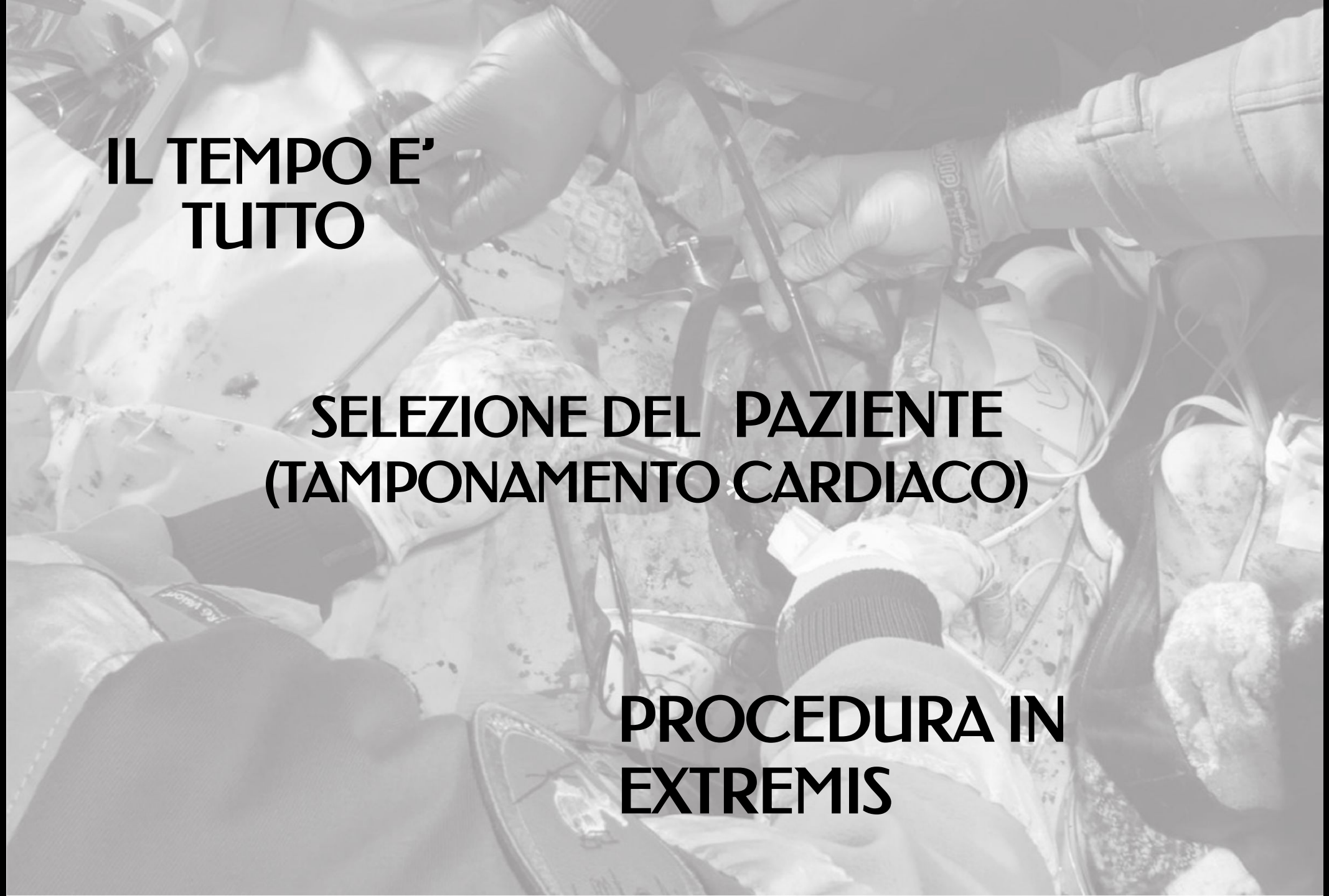
Phillip Almond, Sarah Morton*, Matthew OMeara and Neal Durge

Results: Forty-four RTs were preformed within the 6 years (26 for blunt trauma). Eleven ROSCs were achieved (nine blunt, two penetrating) but no patient survived to discharge. In contrast to RTs for penetrating trauma, twelve of the RTs for blunt trauma had a cardiac output present on arrival of the prehospital team ($p = 0.01$). Two patients had an RT performed in a helicopter (one ROSC) and two on a helipad (both achieving ROSC), likely due to the longer transfer times seen in a more rural setting. Four of the RTs for blunt trauma (15%) were found to have a cardiac tamponade versus seven (39%) of the penetrating trauma RTs.


DOCTOR
CROSS
HATCH

Traumatic Cardiac Arrest (TCA) is an umbrella term that encompasses a range of conditions that result in an unconscious, unresponsive patient with no palpable pulses. Broadly, TCA can be divided into three clinically relevant stages:

ter Avest *et al. Critical Care* *(2022) 26:184*
https://doi.org/10.1186/s13054-022-04052-7



IL TEMPO E' TUTTO

SELEZIONE DEL PAZIENTE (TAMPONAMENTO CARDIACO)

PROCEDURA IN EXTREMIS

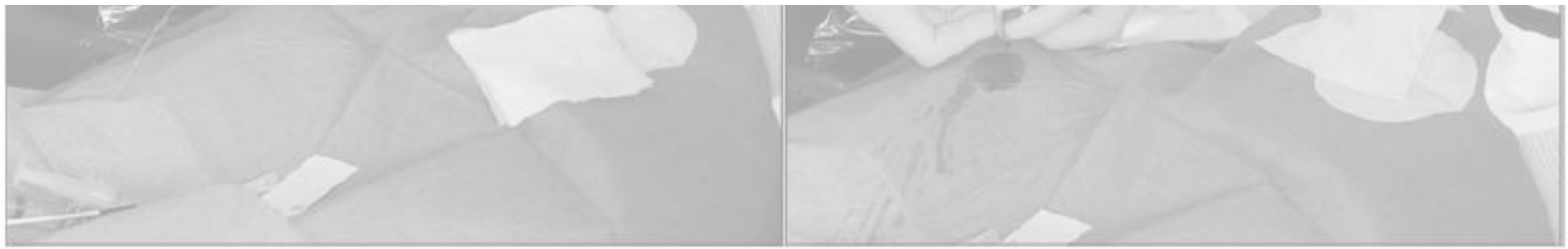
Brede and Rehn
Scand J Trauma Resusc Emerg Med (2023) 31:69
https://doi.org/10.1186/s13049-023-01142-5

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

UK REBOA TRIAL
RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA FOR TRAUMA

UK-REBOA trial

Jostein Rødseth Brede[1,2,3*] and Marius Rehn[2,4,5]



Imbriaco © 2022 Prehospital and Disaster Medicine

Causes of death

	SC+REBOA	SC
Death within 3 hours, n	11	2
Bleeding, n (%)	6 (55)	0 (0)
Traumatic brain injury, n (%)	2 (18)	0 (0)
Unknown, n (%)	3 (27)	2 (100)
Death within 90 days (primary outcome), n	25	18
Bleeding, n (%)	8 (32)	3 (17)
Traumatic brain injury, n (%)	9 (36)	8 (44)
Multi-organ failure, n (%)	2 (8)	3 (17)
Respiratory, n (%)	0 (0)	1 (6)
Spinal cord injury, n (%)	1 (4)	0 (0)
Unknown, n (%)	5 (20)	3 (17)

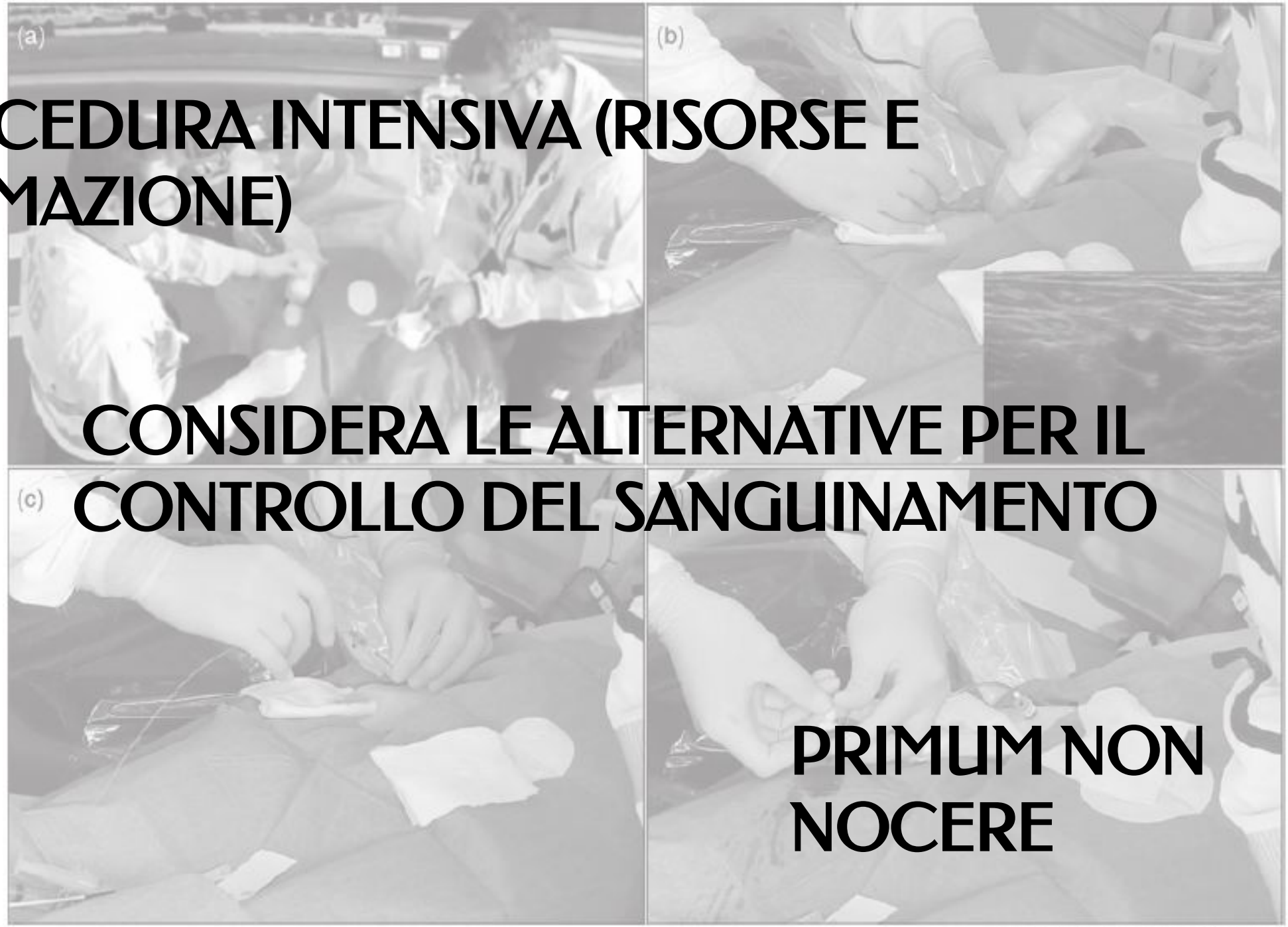
(Time to) haemorrhage control procedure

	SC+REBOA (n=46)	SC (n=44)
Underwent haemorrhage control procedure (of all patients)		
Yes, n (%)	14 (30)	19 (43)
No, n (%)	32 (70)	25 (57)
Time from randomisation to haemorrhage control procedure (minutes) (all patients)		
mean (SD)	42 (121)	28 (41)
median [Q1, Q3]	0 [0, 42]	0 [0, 55]
Time from randomisation to haemorrhage control procedure (minutes) (for those that had a haemorrhage control procedure)		
mean (SD)	155 (197)	65 (40)
median [Q1-Q3]	83 [56, 156]	64 [34, 83]
Type of haemorrhage control procedures, n (%)		
Haemorrhage control laparotomy	7 (50)	12 (63)
Extremity vascular ligation, shunting or repair	2 (14)	4 (21)
Pelvic packing	4 (29)	1 (5)
Angioembolisation	2 (14)	2 (11)
Haemorrhage control thoracotomy	1 (7)	0 (0)

Has the REBOA balloon popped?

St Emlyn's

PROCEDURA INTENSIVA (RISORSE E FORMAZIONE)



CONSIDERA LE ALTERNATIVE PER IL CONTROLLO DEL SANGUINAMENTO

PRIMUM NON NOCERE

DOI: 10.1111/acem.14882

Academic Emergency Medicine

SYSTEMATIC REVIEW

Assessing the one-month mortality impact of civilian-setting prehospital transfusion: A systematic review and meta-analysis

David W. Schoenfeld MD, MPH[1] | Carlo L. Rosen MD[1] | Tim Harris MBBS[2] | Stephen H. Thomas MD, MPH[1,2]

TABLE 2 Overall logistics, acuity, and fluid administration highlights in three PHT trials.

Study	Prehospital time[a]	Acuity	Prehospital crystalloid (mL)	Early blood products[a]
			(437); as part of study controls received up to 1 L additional crystalloid	controls (RBC 4.4, plasma 3.4)

TABLE 1 Prehospital civilian transfusion RCTs.

First author (study name)	Location (year)	General inclusion criteria (all were non-arrest adults with trauma)	Total *n* (% died)	Transfusate in PHT arm
Moore[27] (COMBAT)	United States (2018)	Shock defined as SBP < 70 *or* SBP 71–90 with HR > 107	130 (12.3)	Thawed plasma (2 units)
Sperry[16] (PAMPer)	United States (2018)	At least one episode of SBP < 70 *or* SBP < 90 with HR > 108	309[a] (27.8)	Thawed plasma (2 units)
Crombie[28] (RePHILL)	England (2022)	Shock defined as SBP < 90, *or* no radial pulse	423 (43.7)	Up to 2 units each of RBCs and lyophilized plasma

We believe that our most important finding is that CivPHT, a resource-intensive therapy with nonzero risk, has only been assessed in three RCTs—two of which were negative for CivPHT effect on arguably the most patient-centered endpoint of survival to at least 1 month postinjury. The belief that mortality benefit of civilian EMS transfusion is settled science[29] requires revisitation. We do believe that in selected cases—using a selection process not yet fully elucidated—CivPHT is highly likely to improve survival. However, we are not sanguine about the ability to use existing RCT data as a basis for a strong stance favoring widespread CivPHT.

Association of red blood cells and plasma transfusion versus red blood cell transfusion only with survival for treatment of major traumatic hemorrhage in prehospital setting in England: a multicenter study

Harriet Tucker[1], Karim Brohi[1,2], Joachim Tan[3], Christopher Aylwin[4], Roger Bloomer[5], Rebecca Cardigan[6], Ross Davenport[1,2], Edward D. Davies[7], Phillip Godfrey[8], Rachel Hawes[9,10], Richard Lyon[11], Josephine McCullagh[2], Simon Stanworth[6,12], Julian Thompson[13,14], James Uprichard[15], Simon Walsh[4,16], Anne Weaver[2] and Laura Green[1,2,6*]

Tucker *et al. Critical Care* (2023) 27:25
https://doi.org/10.1186/s13054-022-04279-4

Critical Care

Faster Refill in an Urban EMS System Saves Lives: A Prospective Preliminary Evaluation of a Prehospital Advanced Resuscitative Care Bundle

ARC = 2u PRBC's + 2g TXA + 2g Ca

Hospital Mortality ARC vs Usual Care 2021- 2023

	Usual Care (*n* = 149)	ARC (*n* = 61)
Shock Index Scene	1.21	1.44
Shock Index ED	0.87	0.73
Transport	13 minutes	16 minutes
EMS Intubation	12%	1.6%

In-Hospital Mortality

Usual Care	25.5%
ARC	11.5%

Lives Saved

Broome J et al. *Journal of Trauma and Acute Care Surgery*.
DOI: 10.1097/TA.0000000000004239

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STUDY PROTOCOL Open Access

The SWiFT trial (Study of Whole Blood in Frontline Trauma)—the clinical and cost effectiveness of pre-hospital whole blood versus standard care in patients with life-threatening traumatic haemorrhage: study protocol for a multi-centre randomised controlled trial

Jason E. Smith[1,2*], Ed B. G. Barnard[1,3], Charlie Brown-O'Sullivan[4], Rebecca Cardigan[5,6], Jane Davies[5], Annie Hawton[7], Emma Laing[8], Joanne Lucas[4], Richard Lyon[9,10], Gavin D. Perkins[11], Laura Smith[4], Simon J. Stanworth[5,12,13], Anne Weaver[14], Tom Woolley[15] and Laura Green[5,16,17]

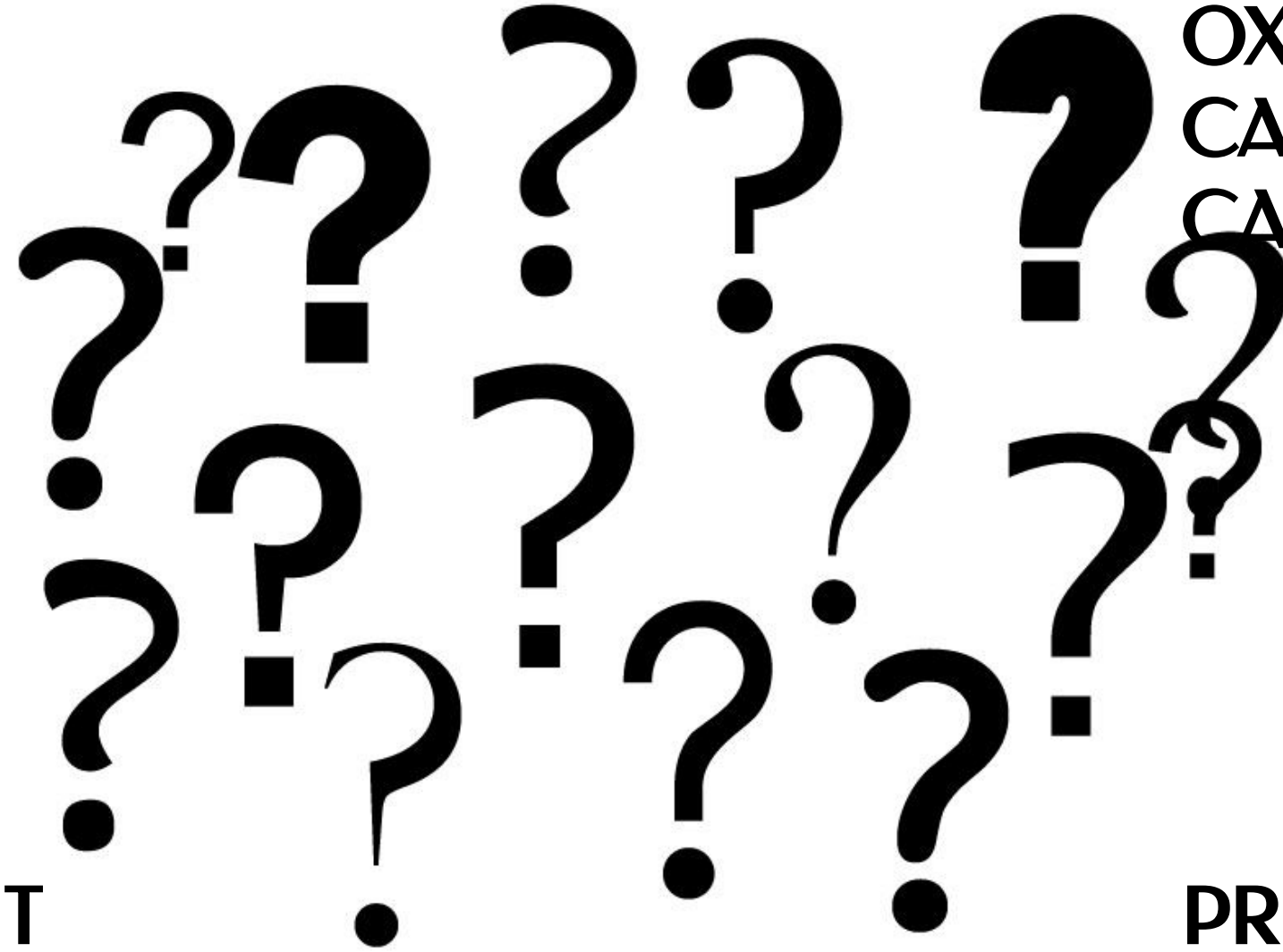
SWiFT
Study of Whole blood in Frontline Trauma

DOI: 10.1111/trf.17718

Results and Discussion: We describe the IDF-MCs' efforts to bring LTOWB to the front lines and present four cases in which LTOWB was administered. All patients were young male, with significant blood loss following penetrating injuries. One patient died in the operating room, following hospital arrival and emergency thoracotomy. The others survived. Our initial experience with bringing LTOWB as close as possible to the point of injury during high intensity fighting is encouraging, showing patient benefit along with logistic feasibility. After action reports and data collection will continue.

SUPPORTO VOLEMICO?

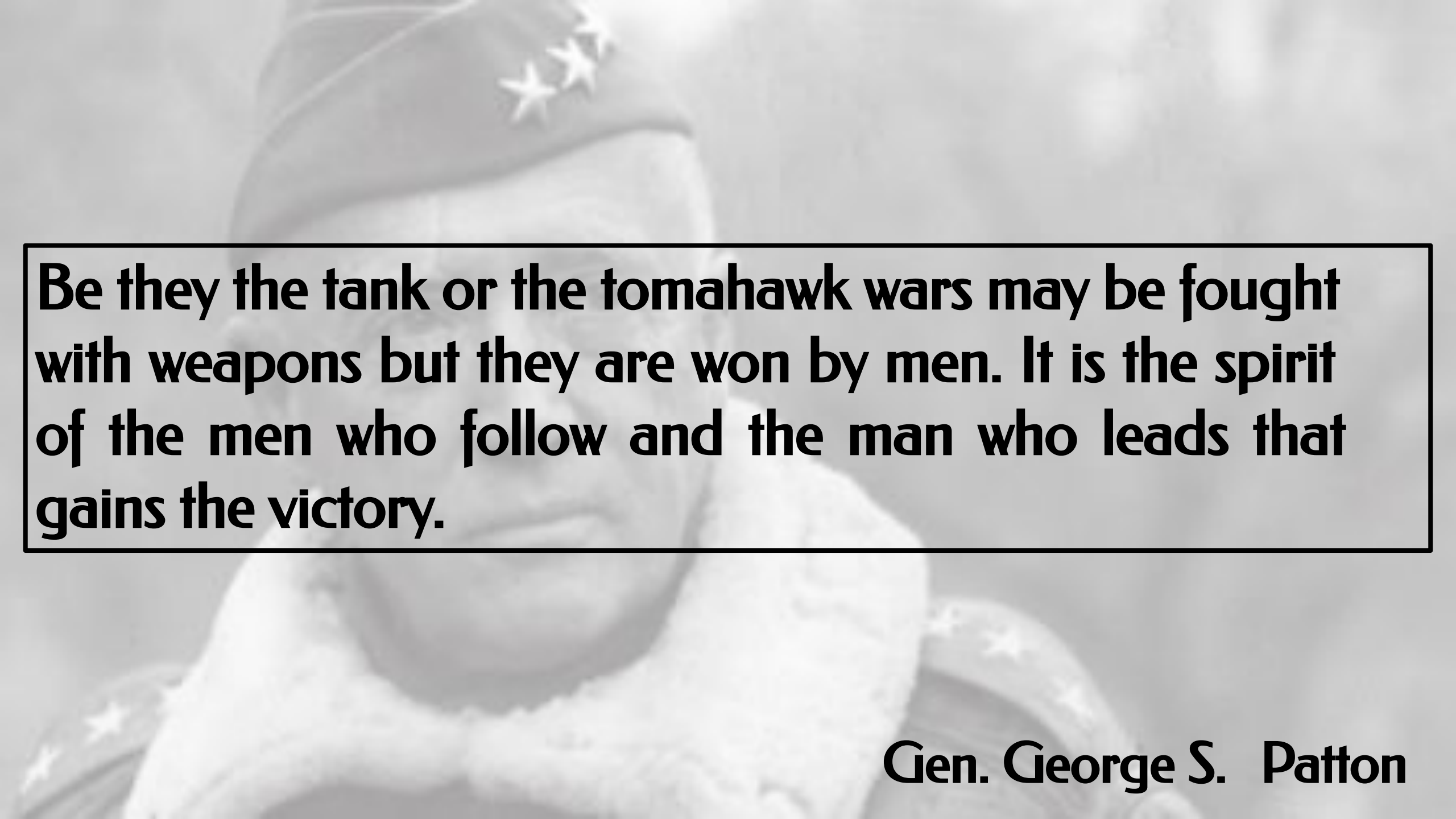
OXYGEN CARRYING CAPACITY?



TRATTAMENTO COAGULPATI

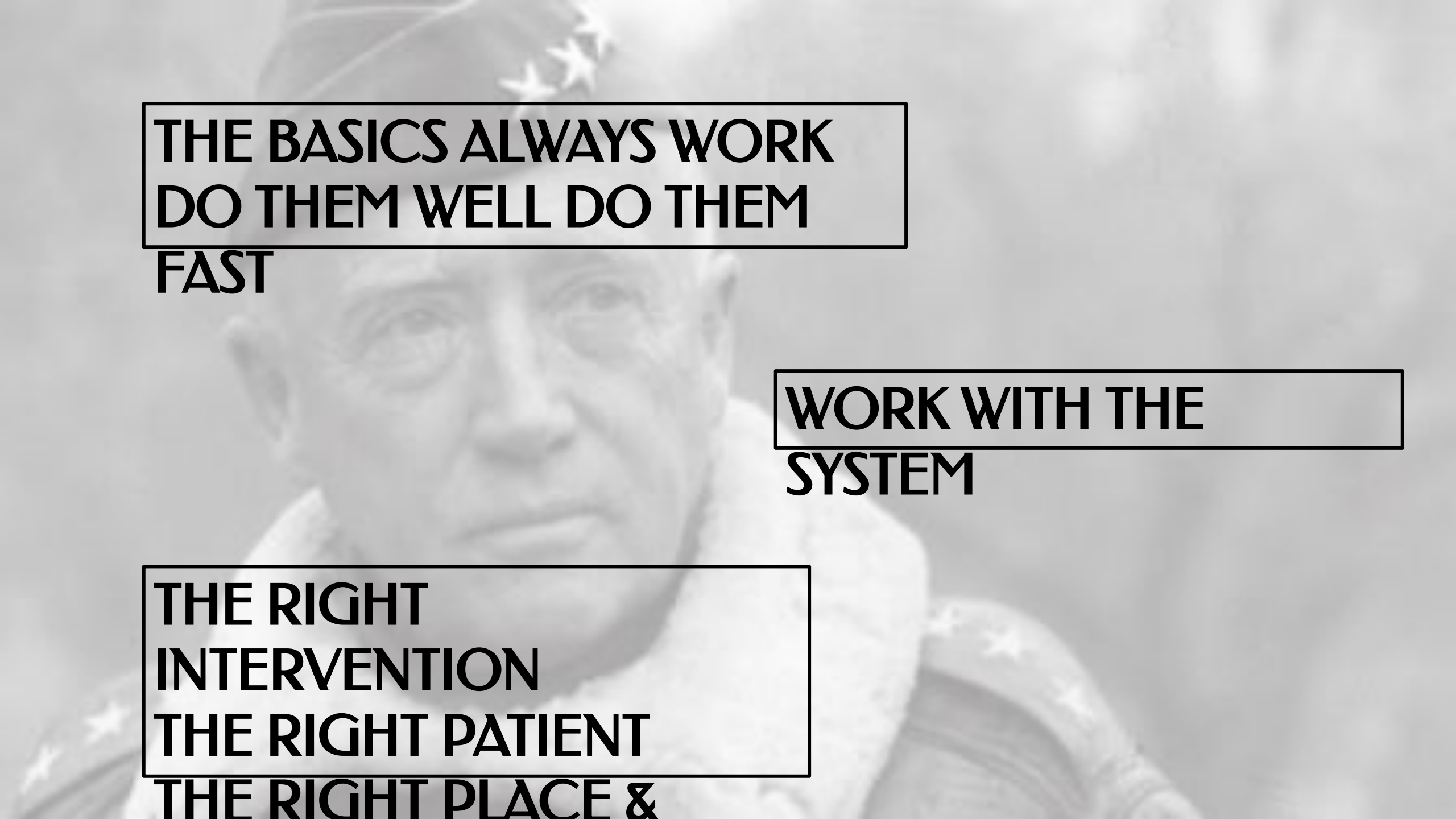
PREVENZIONE COAGULPATI

When Samson took the fresh jawbone of an ass and slew a thousand men he probably started such a vougue for the weapon that for years no prudent donkey dared to bray. History is replete with countless other instances of military implements each in its day heralded as the last word – the key to victory – yet each in its turn subsiding to it useful but incospicuous niche.



Be they the tank or the tomahawk wars may be fought with weapons but they are won by men. It is the spirit of the men who follow and the man who leads that gains the victory.

Gen. George S. Patton


THE BASICS ALWAYS WORK
DO THEM WELL DO THEM FAST
WORK WITH THE SYSTEM
THE RIGHT INTERVENTION
THE RIGHT PATIENT
THE RIGHT PLACE &

IT IS THE SPIRIT OF THE MEN WHO FOLLOW AND THE MAN WHO LEADS THAT GAINS THE VICTORY

Dott. Giacomo Magagnotti
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