

SPECIAL OPERATION FORCES COMBAT MEDICAL CARE CONFERENCE

REBOA in the SOF setting

Paris, Ecole du Val-de-Grâce, october 12th 2022









Liberté Égalité Fraternité





WHY?



Death on the battlefield (2001–2011): Implications for the future of combat casualty care

Brian J. Eastridge, MD, Robert L. Mabry, MD, Peter Seguin, MD, Joyce Cantrell, MD, Terrill Tops, MD, Paul Uribe, MD, Olga Mallett, Tamara Zubko, Lynne Oetjen-Gerdes, Todd E. Rasmussen, MD, Frank K. Butler, MD, Russell S. Kotwal, MD, John B. Holcomb, MD, Charles Wade, PhD, Howard Champion, MD, Mimi Lawnick, Leon Moores, MD, and Lorne H. Blackbourne, MD





(*J Trauma Acute Care Surg.* 2012;73: S431–S437.



Figure 4. Injury/physiologic focus PS acute mortality (n = 976).

WHY?



Injury Severity and Causes of Death From Operation Iraqi Freedom and Operation Enduring Freedom: 2003–2004 Versus 2006

Joseph F. Kelly, MD, Amber E. Ritenour, MD, Daniel F. McLaughlin, MD, Karen A. Bagg, MS, Amy N. Apodaca, MS, Craig T. Mallak, MD, Lisa Pearse, MD, Mary M. Lawnick, RN, BSN, Howard R. Champion, MD, Charles E. Wade, PhD, and COL John B. Holcomb, MC

Tourniquetable extremities

Non tourniquetable axilla/groin/neck

Non compressible torso





THE ROLE OF THORACIC AORTIC OCCLUSION FOR MASSIVE HEMOPERITONEUM

ANNA M. LEDGERWOOD, M.D., MARIS KAZMERS, M.D., AND CHARLES E. LUCAS, M.D. From the Department of Surgery, Wayne State University School of Medicine, Detroit, Michigan

Ledgerwood AM, et al. J Trauma. 1976







Kenneth L. Mattox, MD Mary K. Allen, BA David V. Feliciano, MD





RESUSCITATIVE **ENDOVASCULAR** BALLOON **OCCLUSION OF THE** AORTA







USE OF AN INTRA-AORTIC BALLOON CATHETER TAMPONADE FOR CONTROLLING INTRA-ABDOMINAL HEMORRHAGE IN MAN LIETTENANT COLONEL CARL W. HUGHES, MEDICAL CORPS, UNITED STATES ARMY, WASHINGTON, D. C.







Surgery 1954;36(1):65-68



The elective use of balloon obstruction in aortic surgery

Robicsek F, Daugherty HK, Mullen DC.

SURG

A MONTHLY JOURNAL DEVOTED TO THE ART AND SCIENCE OF SURGER'

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JANUARY 2020

Volume 167 Number 1

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OCIETY OF UNIVERSITY SURGEONS





www.SurgJournal.com







Surgery. 1970 Nov;68(5):774-7







Preliminary Report on the Use of the Percluder® Occluding Aortic Balloon in Human Beings

Low RB, Logmore W, Rubinstein R, Flores L, Wolvek S.

Ann Emerg Med. 1986 Dec;15(12):1466-9.

There were **15 trauma cases**, five cases of ruptured abdominal aortic aneurysm, and three others. Only nine of **23 patients** (39%) had vital signs when the balloon was inserted; all showed an increase in arterial blood pressure of about 50% to 100% (P less than .0001). **Two of 15** trauma victims (13%) and four aneurysm patients in whom the balloon was used were long-term survivors. One trauma victim lived for two weeks before dying of ischemic complications after 90 minutes of balloon aortic occlusion. **Overall survival rate was 26%**.



The Role of Intra-aortic Balloon Occlusion in Penetrating Abdominal Trauma

Gupta BK, Khaneja SC, Flores L, Eastlik L, Longmore W, Shaftan GW.

J Trauma. 1989 Jun;29(6):861-5.

Intra-aortic balloon occlusion (IABO) of the thoracic aorta was attempted in **21** consecutive hemodynamically unstable patients with missile injuries of the abdomen. (...) IABO was successful in occluding the thoracic aorta in 20 patients with a resultant rise of BP; one patient required thoracotomy for aortic clamping. Operative control of hemorrhage was accomplished in 11 patients; seven patients survived and were discharged in a functional status. (...)

An Endoluminal Method of Hemorrhage Control and Repair of Ruptured Abdominal Aortic Aneurysms

RK Greenberg, SD Srivastava, K Ouriel, D Waldman, K Ivancev, K A Illig, C Shortell, RM Green

J Endovasc Ther 2000;7:1–7

Balloon Occlusion of the Aorta During Endovascular Repair of Ruptured Abdominal Aortic Aneurysm

Martin Malina, MD, PhD¹; Frank Veith, MD²; Krasnodar Ivancev, MD, PhD¹; and Bjorn Sonesson, MD, PhD¹

J Endovasc Ther 2005;12:556–559







Intra-Aortic Balloon Occlusion to Salvage Patients With Life-Threatening Hemorrhagic Shocks From Pelvic Fractures

Thomas Martinelli, MD, Frédéric Thony, MD, Philippe Decléty, MD, Christian Sengel, MD, Christophe Broux, MD, Jérôme Tonetti, MD, PhD, Jean-François Payen, MD, PhD, and Gilbert Ferretti, MD, PhD

METHODS : Of 2,064 patients treated for PF, **13** underwent IABO (...) **RESULTS** : All balloons were successfully placed, and a significant increase in **systolic blood pressure** ((...) p = 0.001) was observed (...). Angiography performed after IABO was positive for arterial injury in 92% of patients(...). Survival rate was 46% (6 of 13) and was inversely related to the length of inflation (p = 0.026) and the mean Injury Severity Score (p = 0.011).





J Trauma **2010**;68: 942-948





A clinical series of resuscitative endovascular balloon occlusion of the aorta for hemorrhage control and resuscitation

Megan L. Brenner, MD, Laura J. Moore, MD, Joseph J. DuBose, MD, George H. Tyson, MD, Michelle K. McNutt, MD, Rondel P. Albarado, MD, John B. Holcomb, MD, Thomas M. Scalea, MD, and Todd E. Rasmussen, MD (J Trauma Acute Care Surg. 2013;75: 506–511.

Demographics and Summary of REBOA Use in TABLE 1. Six Patients

Patient	1	2	3	4	5	6
SBP before REBOA, mm Hg	70	70	0	60	70	85
Cardiac arrest before REBOA	No	No	Yes	No	No	No
SBP after REBOA, mm Hg	135	122	100	110	130	125
Complication of REBOA	No	No	No	No	No	No
Outcome	Alive	Alive	Alive	Alive	Brain death	Death (care withdrawn)





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L N	JS National Library of Medicine lational Institutes of Health		Create RSS	Create alert	Advanced	
						1.0
Se	arch results					16
lte	ms: 1 to 20 of 132		<< First < Prev	Page 1 of 7 Ne	xt > Last >>	
1	Filters activated: Publication da	te from 2019/01/01 to 2019/	12/31. <u>Clear all</u> to	show 1309 items.		
	Novel Methods for Hemorrh	age Control: Resuscitative	Endovascular B	alloon Occlusio	n of the	12
1.	Aorta and Emergency Prese	ervation and Resuscitation	<u>).</u>			
	Anesthesiol Clin. 2019 Mar;37(1)	iunan R, Inada K, Duπon F	רד. 1.2018.09.003. Revi	ew.		
	PMID: 30711230	-				
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2.	Trauma Patients: A Systema	atic Literature Review.				
	Am Sura, 2019 Jun 1:85(6):654-	, Rodríguez-Perdomo M, 662.	Brathwaite CEM,	Joseph DK.		
	PMID: 31267908					4
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	Chen L, Wang X, Wang H, L	i Q, Shan N, Qi H.	612884 010 2175 (D		
	PMID: 30646863 Free PMC A	rticle	1312004-019-2113-(υ.		
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Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) as an Adjunct for Hemorrhagic Shock

Adam Stannard, MRCS, Jonathan L. Eliason, MD, and Todd E. Rasmussen, MD

Zone - Descending thoracic aorta from origin of left subclavian to celiac artery

Zone - Paravisceral aorta between celiac and lowest renal artery

Zone II - Infrarenal abdominal aorta to the bifurcation





HoW?

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Prunet B., Travers S., Pasquier P.

Common fermoral artery Under sonography Seldinger technique 7fr. sheath access

Surgical cut-down in case of bilateral failure

French military health service Clinical Practice Guidelines, 2022

- 7 Fr sheath compatible
- 0.025 inch Guide Wire Compatible
- Compliant balloon (16-40 mm)
- Above balloon pressure monitoring

Integrated A-line for above balloon pressure monitoring

Fixed-Distance Model for Balloon Placement During Fluoroscopy-Free Resuscitative Endovascular Balloon **Occlusion of the Aorta in a Civilian Population**

Pierre Pezy, MS; Alexandros N. Flaris, MD, MSc; Nicolas J. Prat, MD, PhD; François Cotton, MD, PhD; Peter W. Lundberg, MD; Jean-Louis Caillot, MD, PhD; Jean-Stéphane David, MD, PhD; Eric J. Voiglio, MD, PhD

JAMA Surgery Published online December 14, 2016

A Left femoral artery

Zone 1: ~ 46 cm

Zone 3: ~ 28 cm

Joint statement from the American College of Surgeons Committee on Trauma (ACS COT) and the American College of Emergency Physicians (ACEP) regarding the clinical use of Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA)

Megan Brenner,¹ Eileen M Bulger,² Debra G Perina,³ Sharon Henry,¹ Christopher S Kang,⁴ Michael F Rotondo,⁵ Michael C Chang,⁶ Leonard J Weireter,⁷ Michael Coburn,⁸ Robert J Winchell,⁹ Ronald M Stewart¹⁰

 \blacktriangleright (...) Zone 1(...) if the anticipated time to start of operation is less than 15 min. \blacktriangleright (...) Zone 3 (...) longer periods of time (...).

The balloon should be deflated as soon as possible, and 1 catheter and sheath removed as soon as possible.

Zone 1: ~ 30 min.

Zone 3: ~ 90 min.

The pitfalls of resuscitative endovascular balloon occlusion of the aorta: Risk factors and mitigation strategies

Anders J. Davidson, MD, MAS, Rachel M. Russo, MD, MAS, Viktor A. Reva, MD, Megan L. Brenner, MD, Laura J. Moore, MD, Chad Ball, MD, Eileen Bulger, MD, Charles J. Fox, MD, Joseph J. DuBose, MD, Ernest E. Moore, MD, Todd E. Rasmussen, MD, and the BEST Study Group, Sacramento, California

J Trauma Acute Care Surg. 2018;79

"Start 2, Start 8, Don't **Overinflate**."

Start small, then check

Monitor arterial waveform feedback

- Look for increase in blood pressure above balloon
- Feel for loss of contralateral pulse
- Mark time of inflation

Resuscitative endovascular balloon occlusion of the aorta management guided by a novel handheld pressure transducer

Torbjorg Holtestaul, MD, Ian Jones, MD, Jeffrey Conner, MD, Daniel Lammers, MD, Jessica Weiss, MD, Jason Bingham, MD, FACS, Matthew J. Martin, MD, FACS, and Matthew Eckert, MD, FACS, Chapel Hill, North Carolina

J Trauma Acute Care Surg Volume 92, Number 4

The ER-REBOA[™] Catheter Quick Reference Guide 6 REBOA Steps: ME-FIIS (Pronounced ME-FIZZ)

Get Access Early

1. Measure

4. Insert

Obtain access using standard techniques

Attach & flush arterial line
Use standard techniques
Ensure all air is purged

5. Inflate^{1,2,3,4,5,6}

Start small then check

"2 or 8, don't overinflate."

Remove

Fully deflate balloon Hold vacuum for 5 seconds Close stopcock with vacuum held

Monitor arterial waveform feedback
Look for change in blood pressure above balloon

Use other standard techniques

- Flush & deflate balloon

 Ensure balloon is fully deflated Hold vacuum for 5 seconds · Close stopcock with vacuum held
 - Advance & twist peel-away to cover captured

Provide Definitive Treatment

- Provide definitive hemorrhage control Mark time of inflation
- The clock is ticking!
 Move quickly to definitive control

www.prytimemedical.com

This instruction is not a replacement for the instruction for use (IFU). The ER-REBOA™ Catheter IFU should be read in its entirety before using the device

read in its entirety before using the device
 in the transformation of the second second

ADV-006 | Revision F

Remove catheter Corkscrew twist the catheter to facilitate removal • If necessary, remove catheter and introducer sheath as a unit

Advance catheter into vessel

- Hold orange sheathAdvance blue Catheter
- Remove sheath after balloon passes valve

6. <mark>S</mark>ecure

Secure Catheter close to the introducer sheath

Caution

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Prunet B., Travers S., Pasquier P.

French military health service Clinical Practice Guidelines, 2022

- Proximal SBP 80-100 mmHg

Distal SBP 30-60 mmHg

or femoral pulse

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Prunet B., Travers S., Pasquier P.

French military health service Clinical Practice Guidelines, 2022

- Proximal SBP 80-100 mmHg
 - Distal SBP 30-60 mmHg
 - or femoral pulse
- Complete occlusion 15 min.
- if SBP < 80 mmHg before 3 min = Inflation 30 min.
- if SBP < 80 mmHg after 3 min. = Inflation 10 min.

Not Ready for Prime Time: Intermittent versus Partial REBOA for Prolonged Hemorrhage Control In a Highly Lethal Porcine Injury Model

M Austin Johnson, MD, PhD, Guillaume L. Hoareau, DVM, PhD, Carl A. Beyer, MD, Lucas P. Neff, MD Timothy K. Williams, MD

Clinical technique and rationale

Joseph J. DuBose, MD, and The EVAC Study Group, Sacramento, California

The REBOA Company[™]

Next-Generation REBOA (Resuscitative Endovascular Balloon Occlusion of the Aorta) Device Precisely Achieves Targeted Regional Optimization in a Porcine Model of Hemorrhagic Shock

Α

mHg)

Distal MAP at FA (mr

Partial Occlusion -Ф-Complete Occlusion

Jeanette E. Polcz, MD,^a Alley E. Ronaldi, MD,^a Marta Madurska, MD,^{a,b} Peter Bedocs, MD,^a Lai Yee Leung, PhD,^{a,c} David M. Burmeister, PhD,^a Paul W. White, MD,^a Todd E. Rasmussen, MD,^a and Joseph M. White, MD^{a,*}

JOURNAL OF SURGICAL RESEARCH \bullet DECEMBER 2022 (280) I –9

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

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French military health service Clinical Practice Guidelines, 2022

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Prunet B., Travers S., Pasquier P.

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Prunet B., Travers S., Pasquier P.

Arterial access

Abdominal and/or pelvic penetrating trauma

-SBP < 90 mmHg- HR > 110 mmHg - Fluids and/or transfusion

French military health service Clinical Practice Guidelines, 2022

OR

SBP < 70 mmHg

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Prunet B., Travers S., Pasquier P.

REBOA

Abdominal and/or pelvic penetrating trauma

- Transfusion

French military health service Clinical Practice Guidelines, 2022

Norepinephrine > 3mg/h

WHERE?

DEATH OF FRENCH WAR WAR CASUALTIES IN AFGHANISTAN: A RETROSPECTIVE STUDY OF 450 PATIENTS BETWEEN 2010 AND 2012

Adapted from Clément Hoffman, Thesis, Pierre and Marie Curie University, Paris VI, 2014, N° 2014PA06S081

Balloon Occlusion of the Aorta in Austere Conditions Course

Effectiveness of Short Training in Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) by Emergency Physician

Oscar Thabouillot, MD¹*; Guillaume Boddaert, MD²; Stéphane Travers, MD³; Christophe Dubecq, MD⁴; Clément Derkenne, MD⁵; Romain Kedzierewicz, MD⁶; Kilian Bertho, MD⁷; Bertrand Prunet, MD⁸

SYNTHETIC MODEL

CADAVER MODEL

JSOM Volume 21, Edition 3 / Fall 2021

BIOLOGICAL MODEL

TABLE 1 Workshop Timetable

			Principles and indications
	9.30–11.00	Theoretical session 1	Vascular accest techniques
			Devices and set techniques
			Withdrawal a complications
T" (1	11 15_12 15	Theoretical	Civilian preho point of view
First day	11.13-12.13	session 2	Military preho point of view
			French militar guidelines pro
			Demonstratio
	1.30–5.30	TT 1	Handling the
		Hands-on session 1 on model	US-guided vas access
			Balloon set-up inflation
		TT1	Physiological consequences
	8.00–9.00	session 3	Deflation, into and partial RI
			Register data
Second day	9.00–12.30	Hands-on session 2 on cadavers and pigs	
	2.00-5.30	Hands-on session 3 on cadavers and pigs	

REBOA = resuscitative endovascular balloon occlusion of the aorta, US = ultrasound.

Occlusion of the Aorta (REBOA) by Emergency Physician

Oscar Thabouillot, MD¹*; Guillaume Boddaert, MD²; Stéphane Travers, MD³; Kilian Bertho, MD⁷; Bertrand Prunet, MD⁸

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Brunet B., Travers S., Pasquier P.

Only praticians who :

- have a regular emergency activity (prehospital, Emergency Department, critical care, anesthesia, surgery)
- are specifically trained to REBOA

French military health service Clinical Practice Guidelines, 2022

Forward Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for casulaties in hemorrhagic shock

Thabouillot O., Boddaert G., Brunet B., Travers S., Pasquier P.

Only praticians who :

- have a regular emergency activity (prehospital, Emergency Department, critical care, anesthesia, surgery)
- are specifically trained to REBOA

REBOA can only be conceived in coordination with the downstream surgical team

French military health service Clinical Practice Guidelines, 2022

Resuscitative endovascular balloon occlusion of the aorta in combat casualties: The past, present, and future

Sarah C. Stokes, MD, Christina M. Theodorou, MD, Scott A. Zakaluzny, MD, Joseph J. DuBose, MD, and Rachel M. Russo, MD, Sacramento, California

Article	Year	No. Patients	Country	Femoral Access	REBOA Provider	REBOA Zone	Mort
Hughes ²	1954	2	US	Cutdown	NS	Zone 1	1
Glaser et al. ²⁷	2017	1	US	Cutdown	Surgeon	Zone 1	
Manley et al. ²⁸	2017	4	US	Perc	Surgeon (n = 2), EM (n = 2)	Zone 1 $(n = 3)$ Zone 3 $(n = 1)$	
Manley et al. ²⁹	2018	2	US	Perc	Surgeon ($n = 1$), EM ($n = 1$)	Zone 1	
de Schoutheete et al. ³⁰	2018	3	Belgium	Perc ($n = 1$), cutdown ($n = 2$)	Surgeon	Zone 1	
Northern et al. ³¹	2018	20	US	Perc (n = 14), cutdown (n = 6)	Surgeon (n = 14), EM (n = 6)	Zone 1 $(n = 17)$ Zone 3 $(n = 3)$	
Campbell et al. ³²	2019	8	UK	Cutdown	NS	Zone 1]
Brown et al. ³³	2020	1	US	Perc	NS	Zone 1	1
Knipp et al. ³⁴	2020	2	US	Perc	Surgeon	Zone 1 $(n = 1)$ Zone 3 $(n = 1)$	
Lewis et al. ³⁵	2020	1	US	Perc	NS	Zone 3	
Reva et al. ³⁶	2020	3	Russia	Perc (n = 2), cutdown (n = 1)	Surgeon ($n = 2$), NS ($n = 1$)	Zone 1	3

EM, emergency medicine; NS, not stated; Perc, percutaneous; UK, United Kingdom; US, United States.

J Trauma Acute Care Surg Volume 91, Number 2, Supplement 2

0 0

N = 41

Resuscitative endovascular balloon occlusion of the aorta in combat casualties: The past, present, and future

Sarah C. Stokes, MD, Christina M. Theodorou, MD, Scott A. Zakaluzny, MD, Joseph J. DuBose, MD, and Rachel M. Russo, MD, Sacramento, California J Trauma Acute Care Surg Volume 91, Number 2, Supplement 2

Article	Year	No. Patients	Country	Femoral Access	REBOA Provider	REBOA Zone	Mort
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de Schoutheete et al. ³⁰	2018	3	Belgium	Perc ($n = 1$), cutdown ($n = 2$)	Surgeon	Zone 1	
Northern et al. ³¹	2018	20	US	Perc (n = 14), cutdown (n = 6)	Surgeon (n = 14), EM (n = 6)	Zone 1 $(n = 17)$ Zone 3 $(n = 3)$	
Campbell et al. ³²	2019	8	UK	Cutdown	NS	Zone 1]
Brown et al. ³³	2020	1	US	Perc	NS	Zone 1	1
Knipp et al. ³⁴	2020	2	US	Perc	Surgeon	Zone 1 $(n = 1)$ Zone 3 $(n = 1)$	
Lewis et al. ³⁵	2020	1	US	Perc	NS	Zone 3	
Reva et al. ³⁶	2020	3	Russia	Perc (n = 2), cutdown (n = 1)	Surgeon ($n = 2$), NS ($n = 1$)	Zone 1	3

EM, emergency medicine; NS, not stated; Perc, percutaneous; UK, United Kingdom; US, United States.

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0

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NS 1000

Recent advances in austere combat surgery: Use of aortic balloon occlusion as well as blood challenges by special operations medical forces in recent combat operations

David Marc Northern, MD, Justin D. Manley, MD, Regan Lyon, MD, Daniel Farber, MD, Benjamin J. Mitchell, MD, Kristopher J. Filak, MD, Jonathan Lundy, MD, Joe J. DuBose, MD, Todd E. Rasmussen, MD, and John B. Holcomb, MD, Pensacola, Florida

- Hypotensive (<80 SBP)
- E-FAST to rule out chest trauma or bilat. chest tubes
- Immediate IV/IO access, femoral A-line access
- 2U whole blood, TXA
- Upsize to 7fr sheath
- E-FAST + = Zone 1
- Pelvic fx or junctional = Zone 3

J Trauma Acute Care Surg. 2018

Recent advances in austere combat surgery: Use of aortic balloon occlusion as well as blood challenges by special operations medical forces in recent combat operations

David Marc Northern, MD, Justin D. Manley, MD, Regan Lyon, MD, Daniel Farber, MD, Benjamin J. Mitchell, MD, Kristopher J. Filak, MD, Jonathan Lundy, MD, Joe J. DuBose, MD, Todd E. Rasmussen, MD, and John B. Holcomb, MD, Pensacola, Florida

	Time from injury	44 min.	15-90 min.	
	Initial GCS	10	7-15	
N = 20	Initial SBP	70 mmHg	50-90 mmHg	
14 USound 17 Zone I	Initial HR	1129	110-153	
	Rise in BP	57 mmHg	30-142 mmHg	
	Occlusion time	21 min.	7-34 min.	
	Blood prducts	10U	2-21U	
N = 20 14 USound 17 Zone I	Initial SBP Initial HR Rise in BP Occlusion time Blood prducts	70 mmHg 1129 57 mmHg 21 min. 10U	 50-90 mmHg 110-153 30-142 mmHg 7-34 min. 2-21U 	

All patients survived transport to the next level of care.

Damage control resuscitation and surgery for indigenous combat casualties: a prospective observational study

Kieran Campbell,¹ D N Naumann,² K Remick,³ C Wright⁴

Table 1 Medical interventions during the study period							
Medical interventions	n	n/week	n/week (pre-NGO)	n/week (post-NGO)	P value		
All patients	680	57	70	32	<0.001*		
Damage control resuscitation	203	17	19	13	0.081		
POCUS	132	11	NA	NA			
REBOA	8	<1	NA	NA			
Massive transfusions	24	2	2	2	>0.999		
Surgical intervention							
Thoracotomy	27	2	3	<1	0.099		
Surgery (including DCS)	182	15	17	12	0.136		

J R Army Med Corps 2019;**0**:1–5. doi:10.1136/jramc-2019-001228

Pre-hospital Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for exsanguinating pelvic haemorrhage

Robbie Lendrum^{*a, b, c, **}, Zane Perkins^{*a, b, d*}, Manik Chana^{*e*}, Max Marsden^{d, f}, Ross Davenport^{a, d}, Gareth Grier^{a, b, e}, Samy Sadek^{a,b}, Gareth Davies^{a,b,d}

aorta

Pre-hospital Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for exsanguinating pelvic haemorrhage

Robbie Lendrum^{a, b, c, *}, Zane Perkins^{a, b, d}, Manik Chana^e, Max Marsden^{d, f}, Ross Davenport^{a, d}, Gareth Grier^{a, b, e}, Samy Sadek^{a,b}, Gareth Davies^{a,b,d}

Results: REBOA was attempted in **19 trauma patients (13**) successful, six failed attempts) and two non-trauma patients (both successful) (...). REBOA significantly improved blood pressure (...). Successful REBOA was associated with improved **survival** (REBOA 8/13 [62%] versus no REBOA 2/6 [33%]; P = 0.350). Distal arterial thrombus requiring thrombectomy (..) (10/13, 77%).

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aorta

CONCLUSION

REBOA in the SOF setting

A temporary hemostastis tool Scarce indications Major complications The sooner is the better A clear need of training

