Perioperační hemodynamická optimalizace

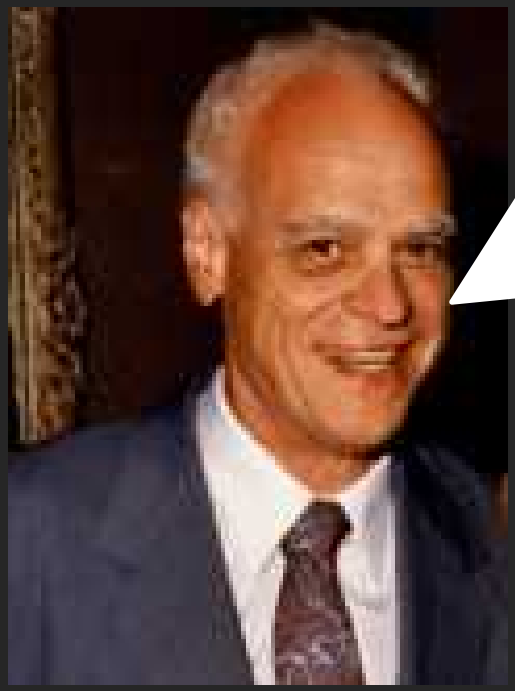
Beneš Jan

Klinika anesteziologie, resuscitace a intenzivní medicíny,
Fakultní nemocnice a Lékařská Fakulta v Plzni Univerzity Karlovy v Praze

BACK TO THE 80s

Like a virgin…

BACK TO THE 80s



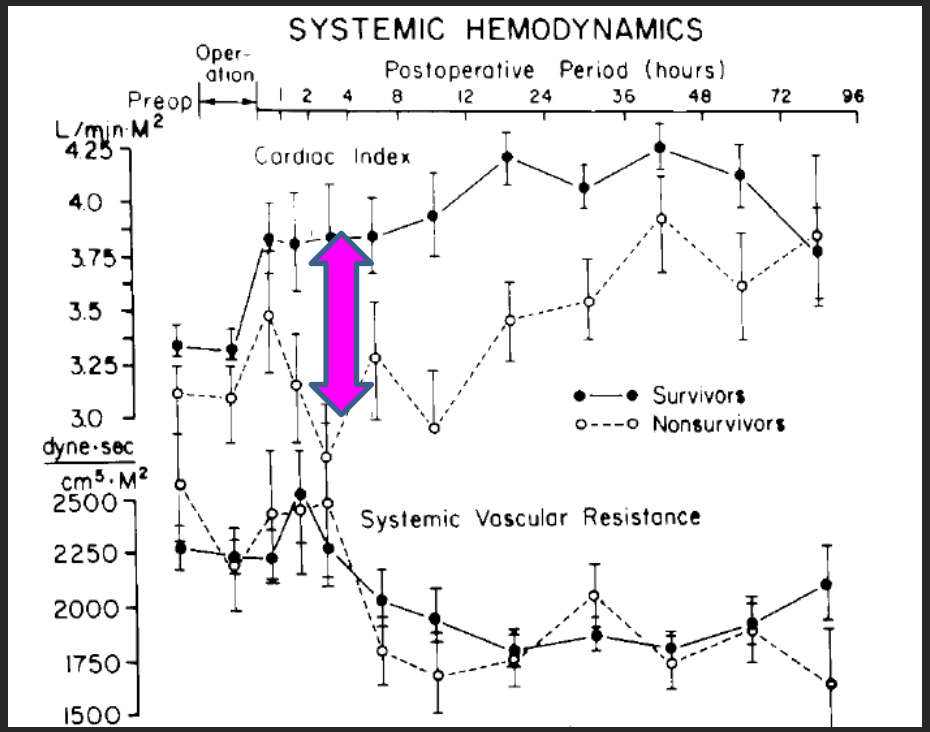
Postoperative deaths may be due to anatomic problems including surgical technical errors, judgment errors and the severity of the patients' illness as well as inadequate physiologic compensations. It follows that therapeutic goals include surgical correction of the anatomic problems, followed by supplementation of those physiologic compensations that are determinants of survival. Thus, the physiologic goals of therapy are not the normal values of unstressed, healthy volunteer subjects, but rather the values of survivors of a life-threatening surgical illness.[17]

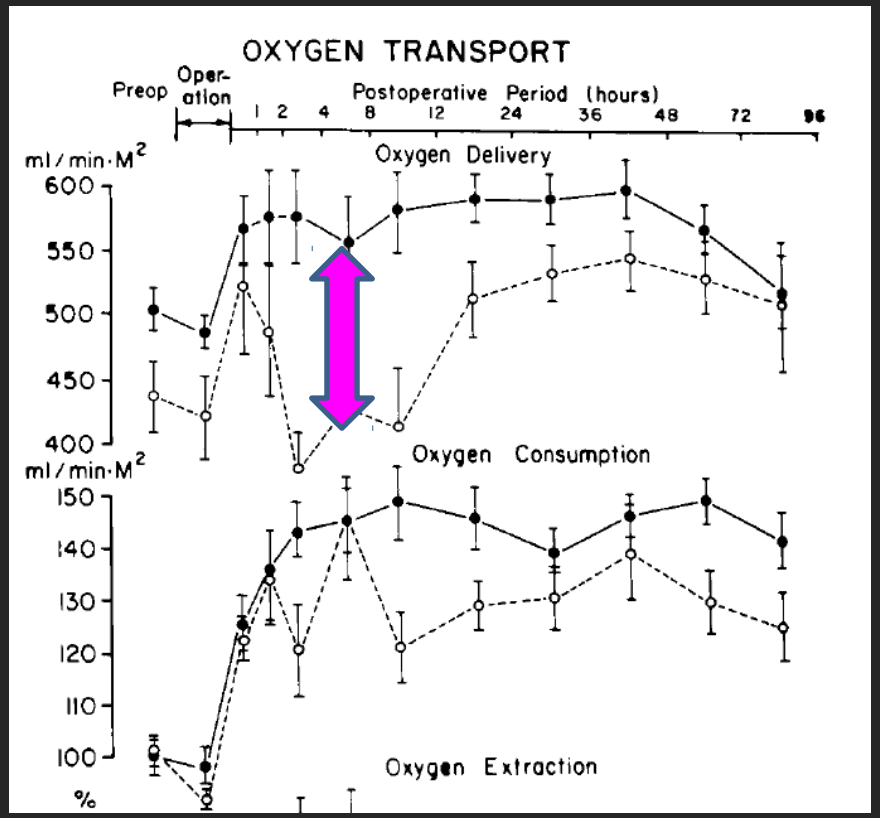
0090-3493/85/1302-0085$02.00/0
CRITICAL CARE MEDICINE

Vol. 13, No. 2
Printed in U.S.A.

Hemodynamic and oxygen transport patterns in surviving and nonsurviving postoperative patients

RICHARD D. BLAND, MD; WILLIAM C. SHOEMAKER, MD; EDWARD ABRAHAM, MD; JUAN CARLOS COBO, MD



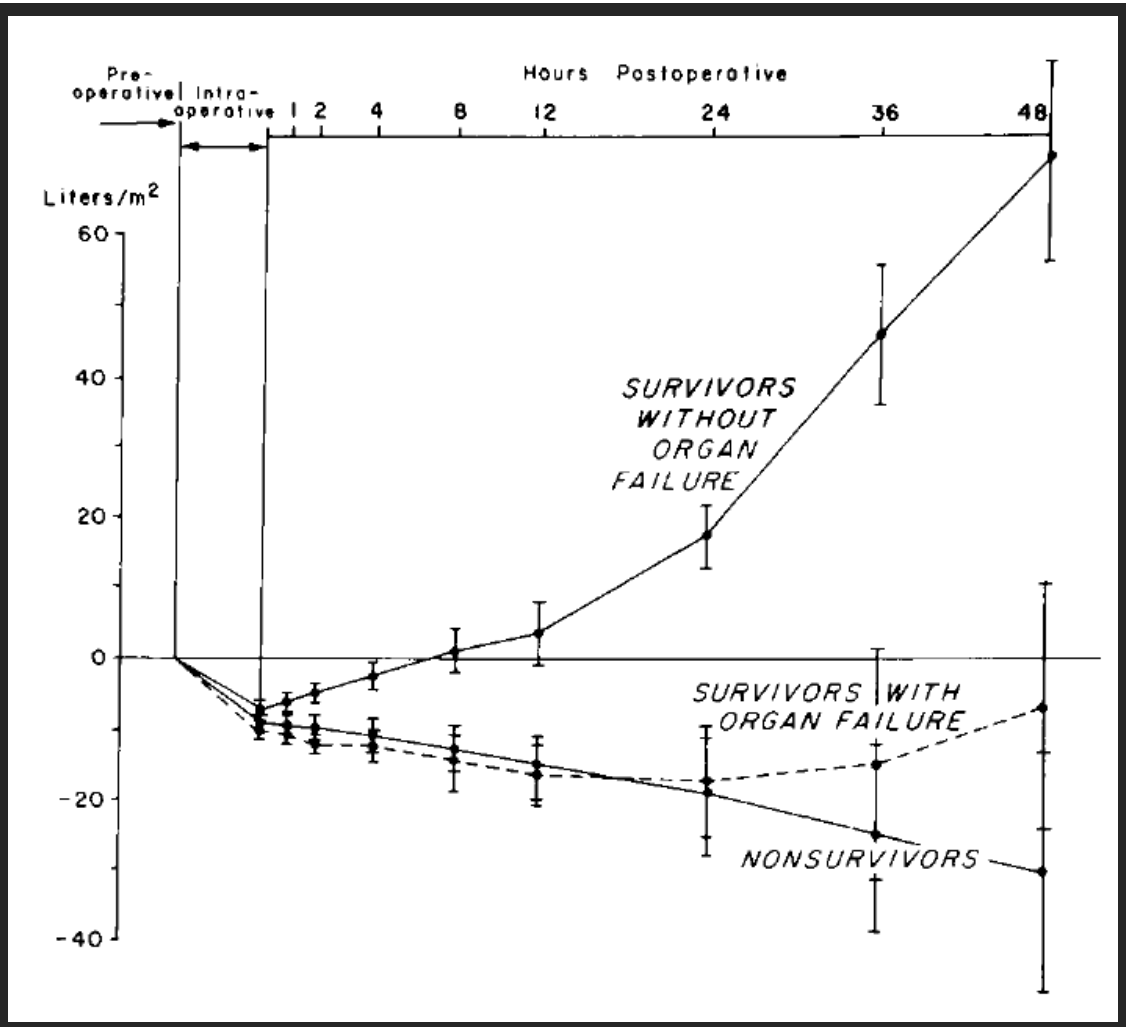


0090-3493/88/1611-1117$02.00/0
CRITICAL CARE MEDICINE

Vol. 16, No. 11
Printed in U.S.A.

Tissue oxygen debt as a determinant of lethal and nonlethal postoperative organ failure

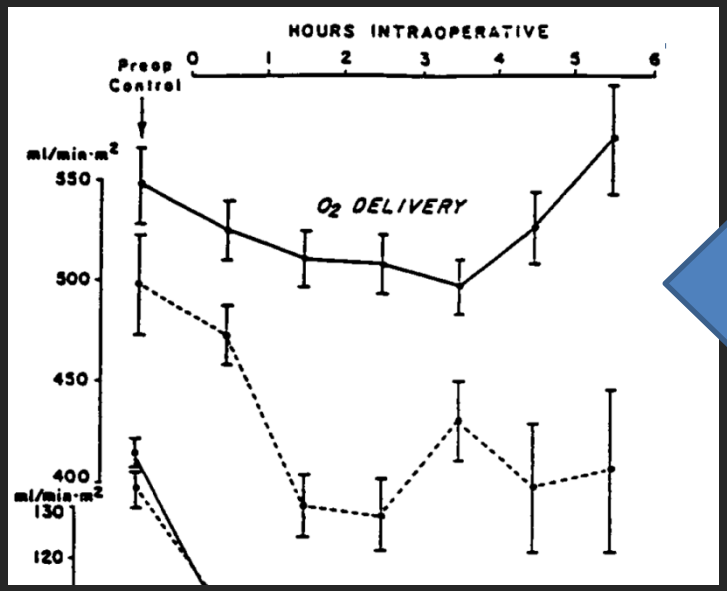
WILLIAM C. SHOEMAKER, MD; PAUL L. APPEL, MPA; HARRY B. KRAM, MD



Prospective Trial of Supranormal Values of Survivors as Therapeutic Goals in High-Risk Surgical Patients*

William C. Shoemaker, M.D.; Paul L. Appel, M.P.A.; Harry B. Kram, M.D.; Kenneth Waxman, M.D.; and Tai-Shion Lee, M.D., F.C.C.P.

(Chest 1988; 94:1176-86)



DO_2I 600 ml/min/m²

CI 4,5 l/min/m²

VO_2I 170 ml/min/m²

Prospective Trial of Supranormal Values of Survivors as Therapeutic Goals in High-Risk Surgical Patients*

William C. Shoemaker, M.D.; Paul L. Appel, M.P.A.; Harry B. Kram, M.D.; Kenneth Waxman, M.D.; and Tai-Shion Lee, M.D., F.C.C.P.

(Chest 1988; 94:1176-86)

Table 9—*Summary of Mortality of the Prospective Series*

		Control		Protocol	
Series	Date	Number	Deaths	Number	Deaths, %
Series 1	1/78-6/80	168	57 (34%)	108	21 (19%)
Control period between trials	6/80-5/83	239	66 (28%)	. . .	. . .
Series 2	5/83-5/84	105	34 (32%)	28	1 (4%)
Control period after trials	5/84-5/85	160	40 (25%)	. . .	. . .
Total		672	197 (29%)	136	22 (16%)

Prospective Trial of Supranormal Values of Survivors as Therapeutic Goals in High-Risk Surgical Patients*

William C. Shoemaker, M.D.; Pa
Harry B. Kram, M.D.; Kenneth
Tai-Shion Lee, M.D., F.C.C.P.

Shoemaker W., 1988

Swan-Ganz catheter

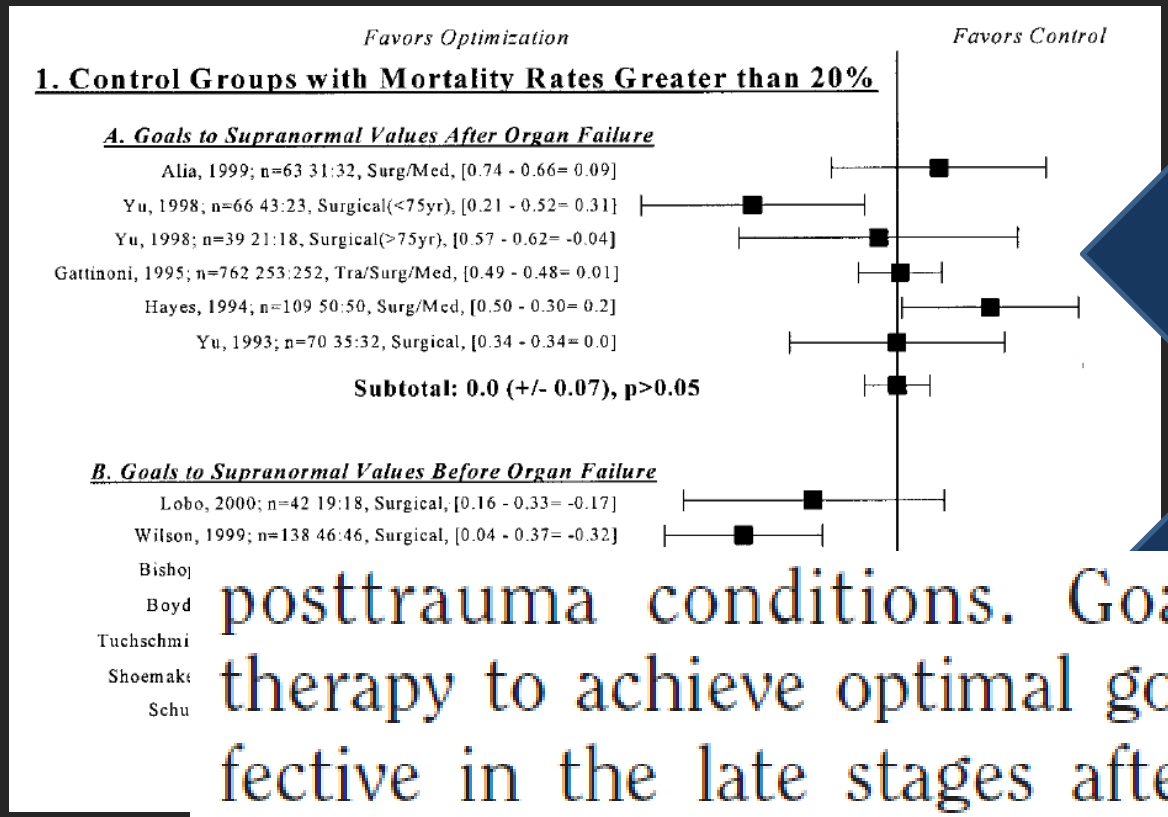
Mythen M., 1995

Esophageal Doppler

Meta-analysis of hemodynamic optimization in high-risk patients*

Jack W. Kern, PharmD; William C. Shoemaker, MD

(Crit Care Med 2002; 30:1686–1692)



JIP

posttrauma conditions. Goal-directed therapy to achieve optimal goals is ineffective in the late stages after onset of organ failure because no amount of extra oxygen will restore irreversible oxygen debts, failed organs, or dead cells. In the

Meta-analysis of hemodynamic optimization in high-risk patients*

Jack W. Kern, PharmD; William C. Shoemaker, MD

(Crit Care Med 2002; 30:1686–1692)

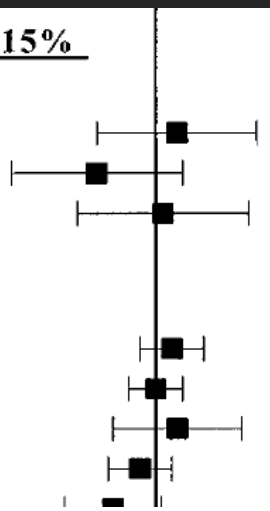
2. Control Groups with Mortality Rates Less than 15%

A. Goals to Supranormal Values

Velmahos, 2000; n=75 40:35, Trauma, [0.15 - 0.11= 0.04]
Ueno, 1998; n=34 16:18, Cirrhosis, [0.0 - 0.11= -0.11]
Durham, 1996; n=60 27:27, Tra/Med, [0.11 - 0.10= 0.01]

B. Goals to Normal Values

Valentine, 1998; n=126 60:60, Aortic Surg, [0.05 - 0.02= 0.03]
Bender, 1997; n=104 51:53, Aortic/Limb Salvage, [0.02 - 0.02= 0.0]
Ziegler, 1997; n=72 32:40, Aortic/Limb Salvage, [0.09 - 0.05= 0.04]
Mythen, 1995; n=60 30:30, CABG/Valve Repl, [0.0 - 0.03= -0.03]
Berlauk, 1991; n=89 68:21, Periph Vas, [0.01 - 0.10= -0.09]



OP

Furthermore, outcome differences may be extremely difficult to demonstrate when the patient population is not very ill, as indicated by control mortalities of <15%. Finally, no effect should be ex-


OL' DIRTY BASTARD
THE 2000s
REVIVAL

Shoemaker W., 1988

Lobo S., 2006

Swan-Ganz catheter

Mythen M., 1995

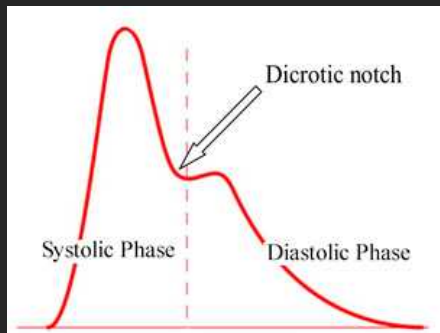
Chytra I., 2007

Esophageal Doppler

Lopes M., 2007

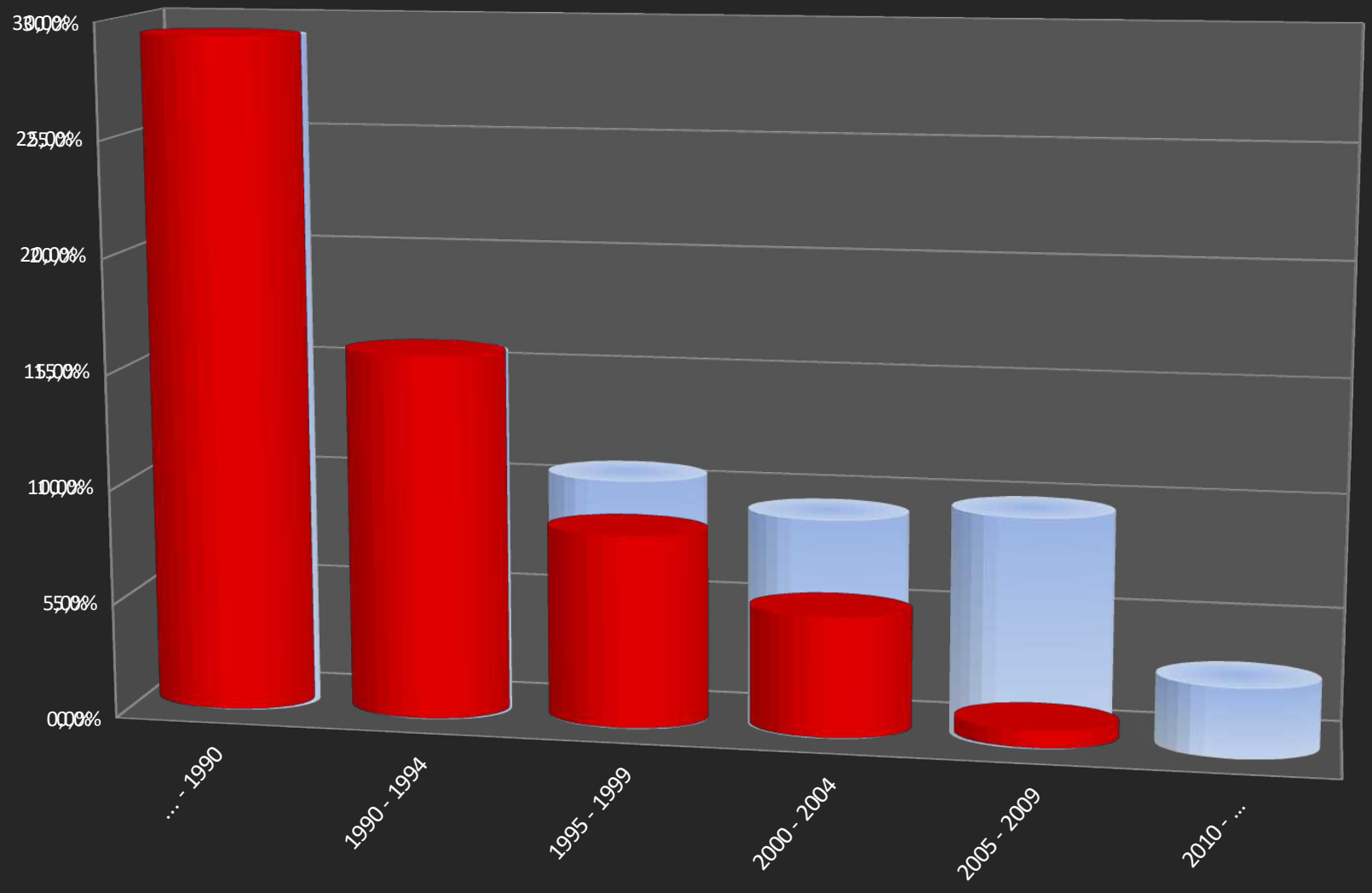
Pearse R., 2005

Arterial Wave analysis

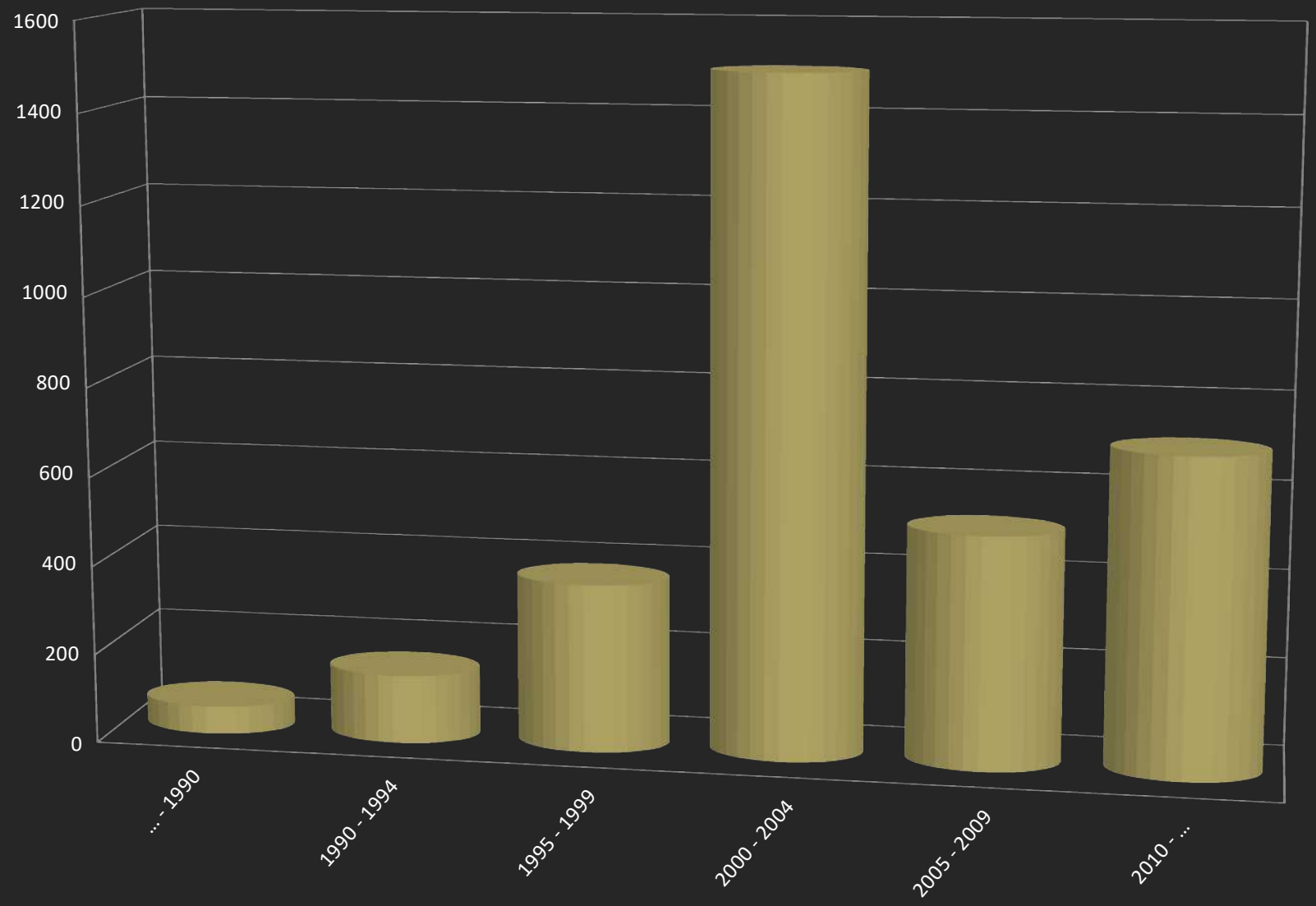



PLUG
&
PLAY

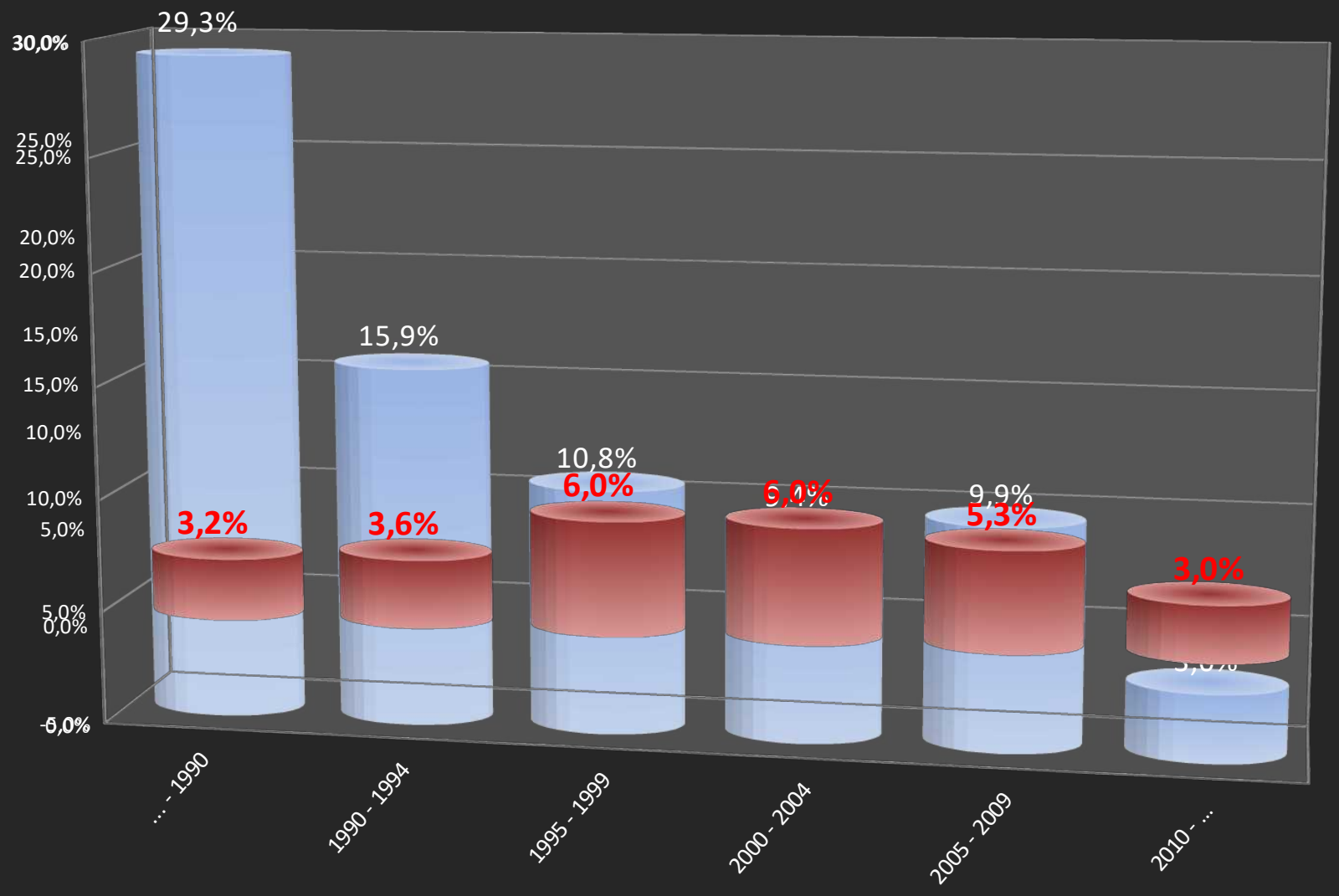
GDT NENÍ (JEN) PAC ?



POČET PACIENTŮ V pGDT STUDIÍCH (pGDT větve)

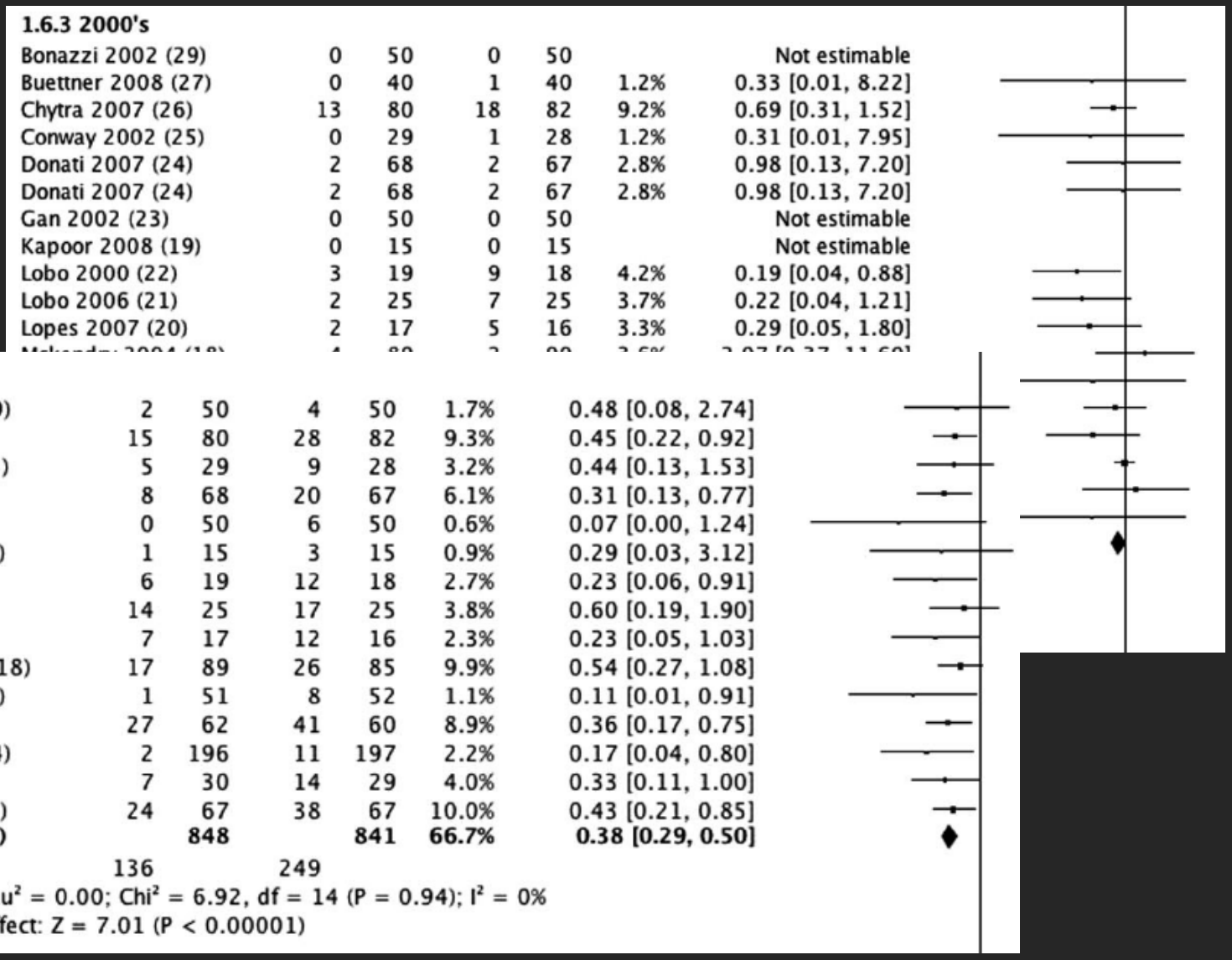


VÝVOJ MORTALITY v pGDT studiích



A Systematic Review and Meta-Analysis on the Use of Preemptive Hemodynamic Intervention to Improve Postoperative Outcomes in Moderate and High-Risk Surgical Patients

Mark A. Hamilton, MRCP, FRCA, Maurizio Cecconi, MD, and Andrew Rhodes, FRCP, FRCA



1.6.3 2000's

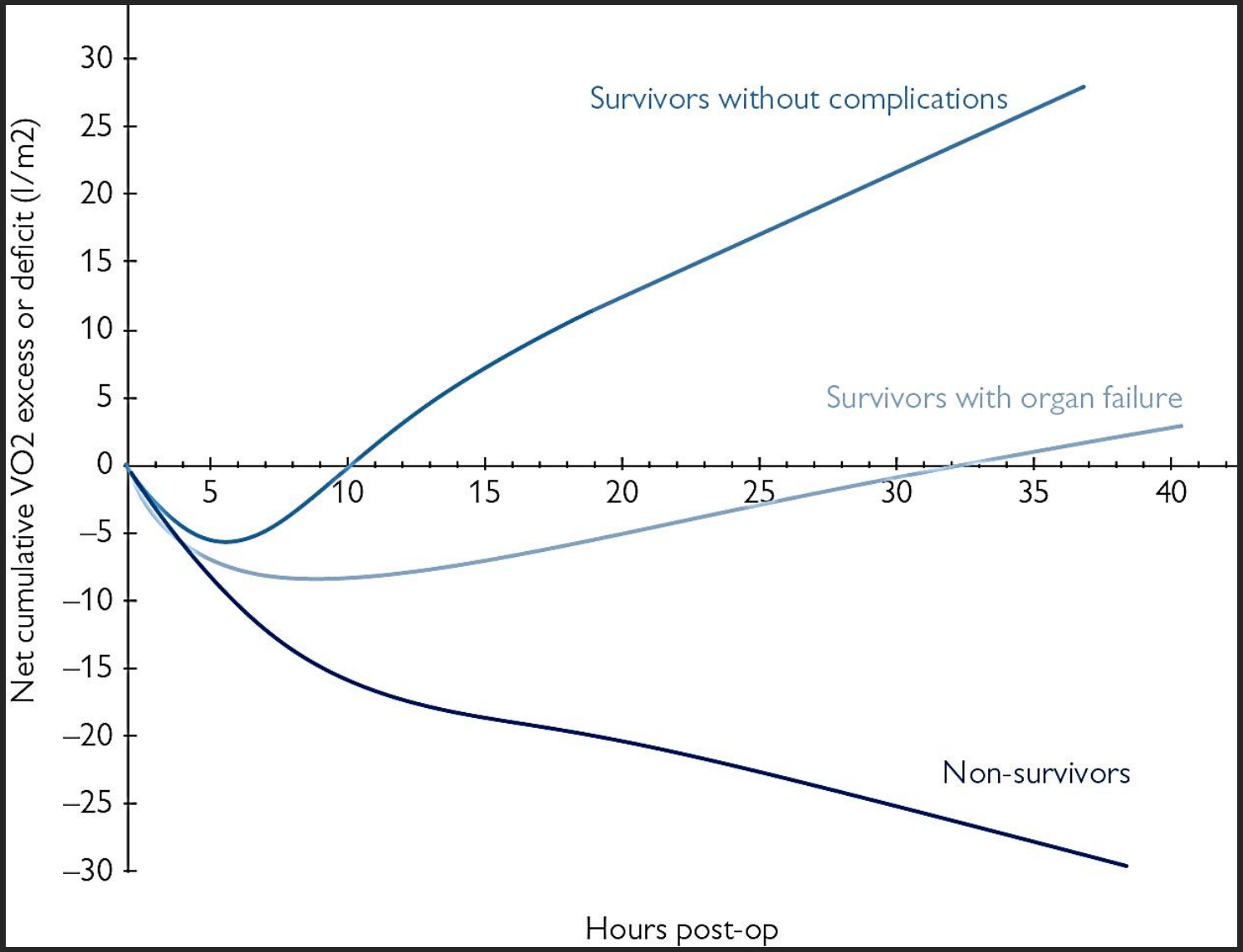
Bonazzi 2002 (29)	0	50	0	50		Not estimable
Buettner 2008 (27)	0	40	1	40	1.2%	0.33 [0.01, 8.22]
Chytra 2007 (26)	13	80	18	82	9.2%	0.69 [0.31, 1.52]
Conway 2002 (25)	0	29	1	28	1.2%	0.31 [0.01, 7.95]
Donati 2007 (24)	2	68	2	67	2.8%	0.98 [0.13, 7.20]
Donati 2007 (24)	2	68	2	67	2.8%	0.98 [0.13, 7.20]
Gan 2002 (23)	0	50	0	50		Not estimable
Kapoor 2008 (19)	0	15	0	15		Not estimable
Lobo 2000 (22)	3	19	9	18	4.2%	0.19 [0.04, 0.88]
Lobo 2006 (21)	2	25	7	25	3.7%	0.22 [0.04, 1.21]
Lopes 2007 (20)	2	17	5	16	3.3%	0.29 [0.05, 1.80]

2.6.3 2000

Bonazzi 2002 (29)	2	50	4	50	1.7%	0.48 [0.08, 2.74]
Chytra 2007 (26)	15	80	28	82	9.3%	0.45 [0.22, 0.92]
Conway 2002 (25)	5	29	9	28	3.2%	0.44 [0.13, 1.53]
Donati 2007 (24)	8	68	20	67	6.1%	0.31 [0.13, 0.77]
Gan 2002 (23)	0	50	6	50	0.6%	0.07 [0.00, 1.24]
Kapoor 2008 (19)	1	15	3	15	0.9%	0.29 [0.03, 3.12]
Lobo 2000 (22)	6	19	12	18	2.7%	0.23 [0.06, 0.91]
Lobo 2006 (21)	14	25	17	25	3.8%	0.60 [0.19, 1.90]
Lopes 2007 (20)	7	17	12	16	2.3%	0.23 [0.05, 1.03]
Mckendry 2004 (18)	17	89	26	85	9.9%	0.54 [0.27, 1.08]
Noblett 2006 (16)	1	51	8	52	1.1%	0.11 [0.01, 0.91]
Pearse 2005 (15)	27	62	41	60	8.9%	0.36 [0.17, 0.75]
Polonen 2000 (14)	2	196	11	197	2.2%	0.17 [0.04, 0.80]
Venn 2002 (7)	7	30	14	29	4.0%	0.33 [0.11, 1.00]
Wakeling 2005 (6)	24	67	38	67	10.0%	0.43 [0.21, 0.85]
Subtotal (95% CI)		**848**		**841**	**66.7%**	**0.38 [0.29, 0.50]**
Total events	136		249			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 6.92$, df = 14 (P = 0.94); $I^2 = 0\%$

Test for overall effect: Z = 7.01 (P < 0.00001)


Survivors without complications
Survivors with organ failure
Non-survivors
Net cumulative VO2 excess or deficit (l/m2)
Hours post-op
30
25
20
15
10
5
0
–5
–10
–15
–20
–25
–30
5
10
15
20
25
30
35
40

Determinants of Long-Term Survival After Major Surgery and the Adverse Effect of Postoperative Complications

(*Ann Surg* 2005;242: 326–343)

Shukri F. Khuri, MD,†‡ William G. Henderson, PhD,§ Ralph G. DePalma, MD,¶ Cecilia Mosca, MSPH,§ Nancy A. Healey, BS,* Dharam J. Kumbhani, MD, SM,* and the Participants in the VA National Surgical Quality Improvement Program*

Methods: NSQIP data were merged with BIRLS to determine the vital status of 105,951 patients who underwent 8 types of operations performed between 1991 and 1999, providing an average follow up of 8 years. Logistic and Cox regression analyses were performed to identify the predictors of 30-day mortality and long-term survival, respectively.

Results: The most important determinant of decreased postoperative survival was the occurrence, within 30 days postoperatively, of any one of 22 types of complications collected in the NSQIP. *Independent of preoperative patient risk*, the occurrence of a 30-day complication in the total patient group reduced median patient survival by 69%. The adverse effect of a complication on patient survival

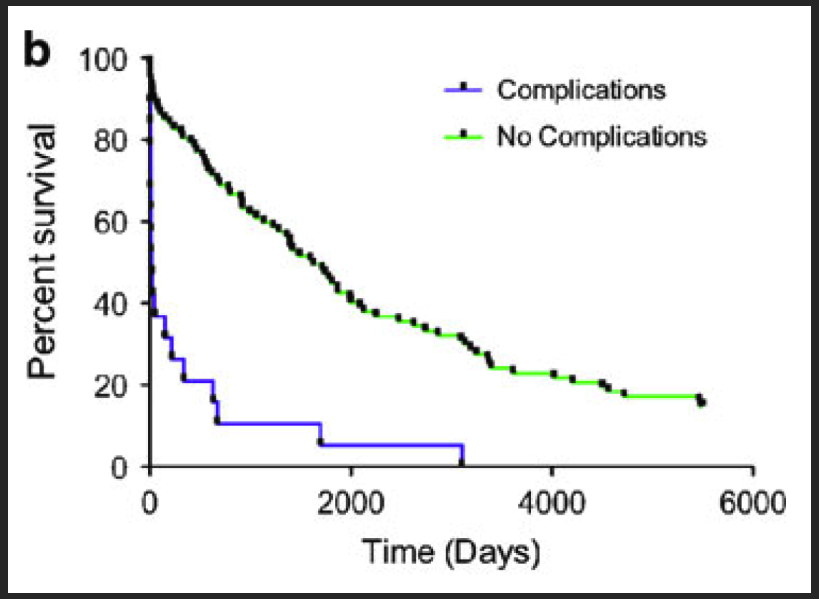
Intensive Care Med (2010) 36:1327–1332
DOI 10.1007/s00134-010-1869-6

ORIGINAL

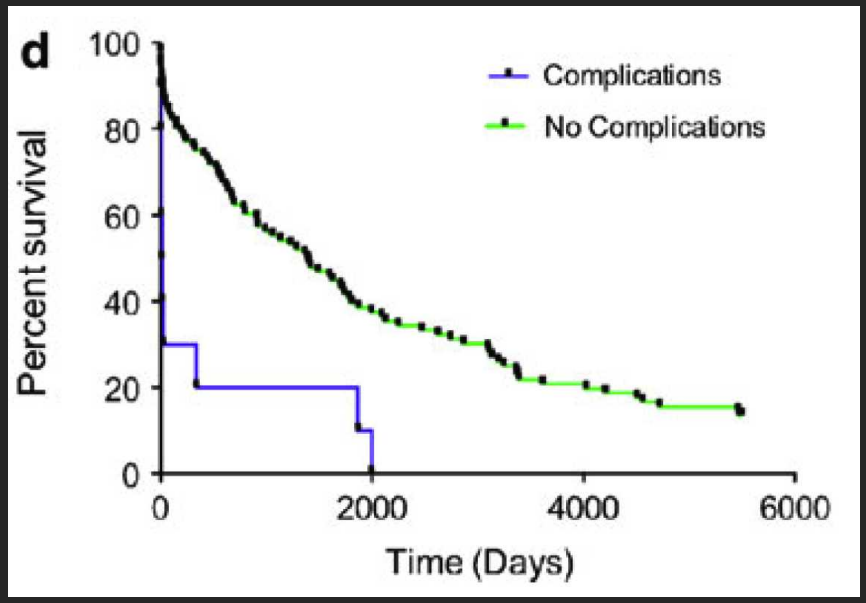
Andrew Rhodes
Maurizio Cecconi
Mark Hamilton
Jan Poloniecki
Justin Woods
Owen Boyd
David Bennett
R. Michael Grounds

Goal-directed therapy in high-risk surgical patients: a 15-year follow-up study

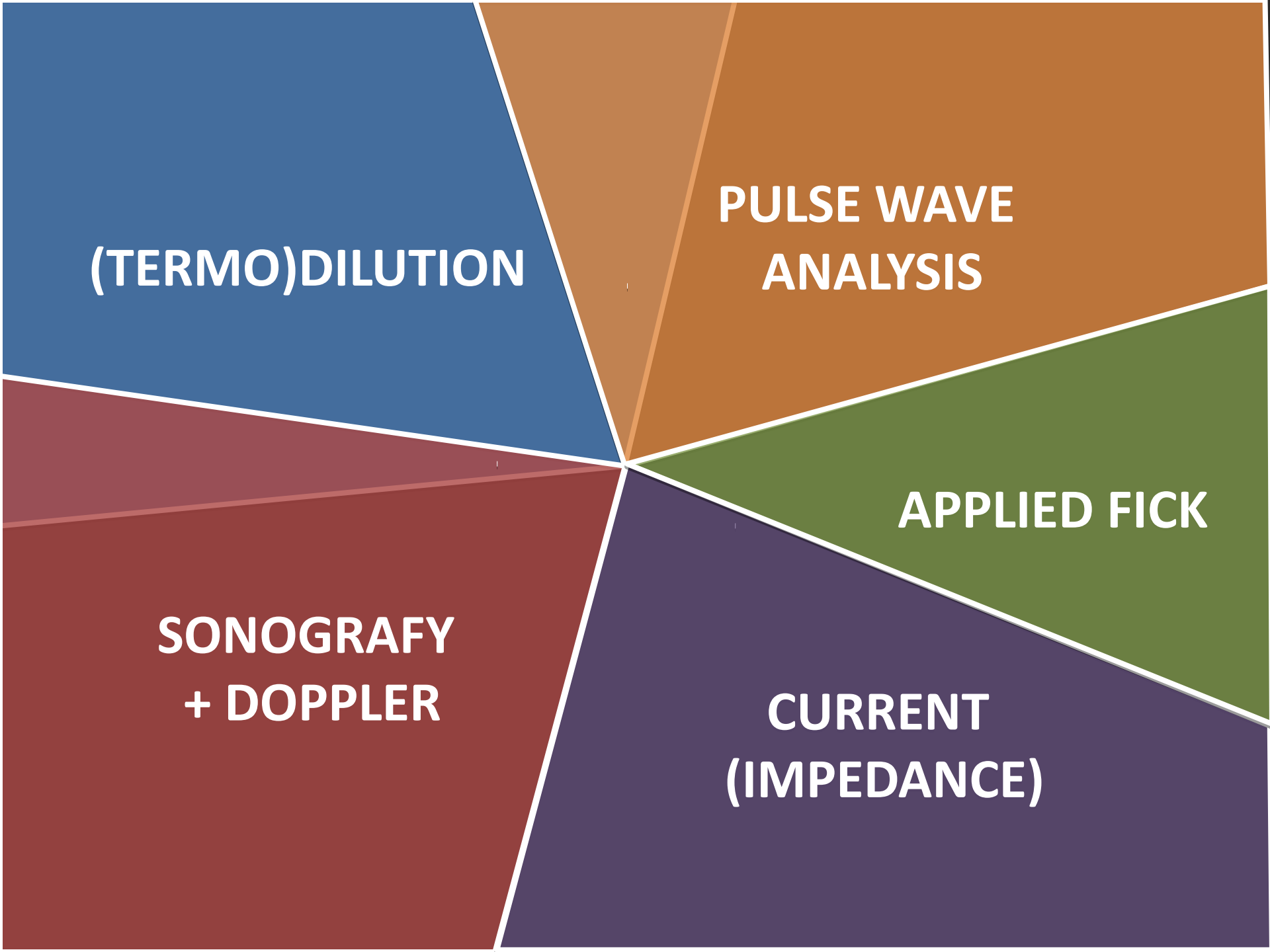
Srdeční komplikace

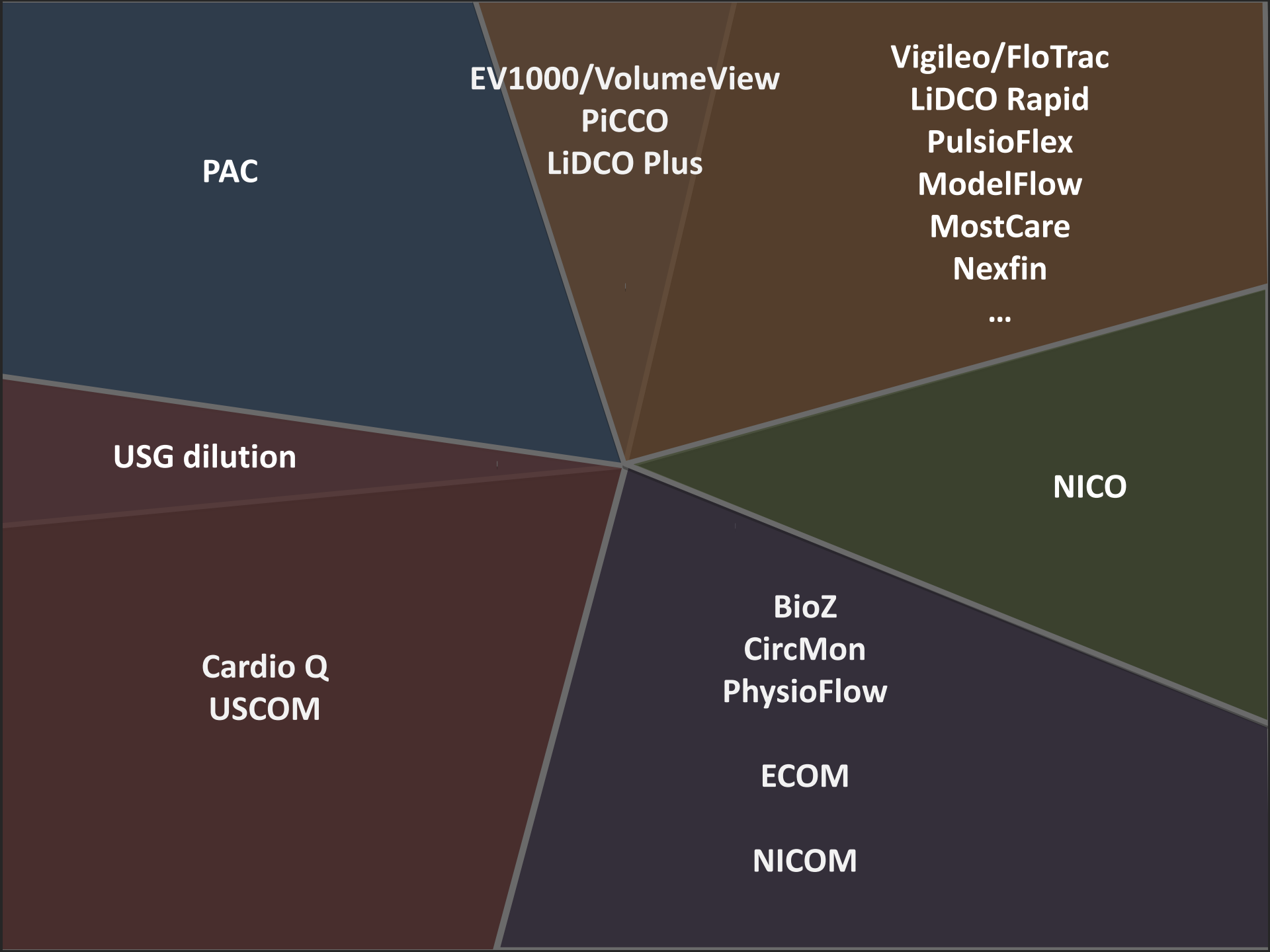


Renální komplikace



Enhanced Surgical Recovery program

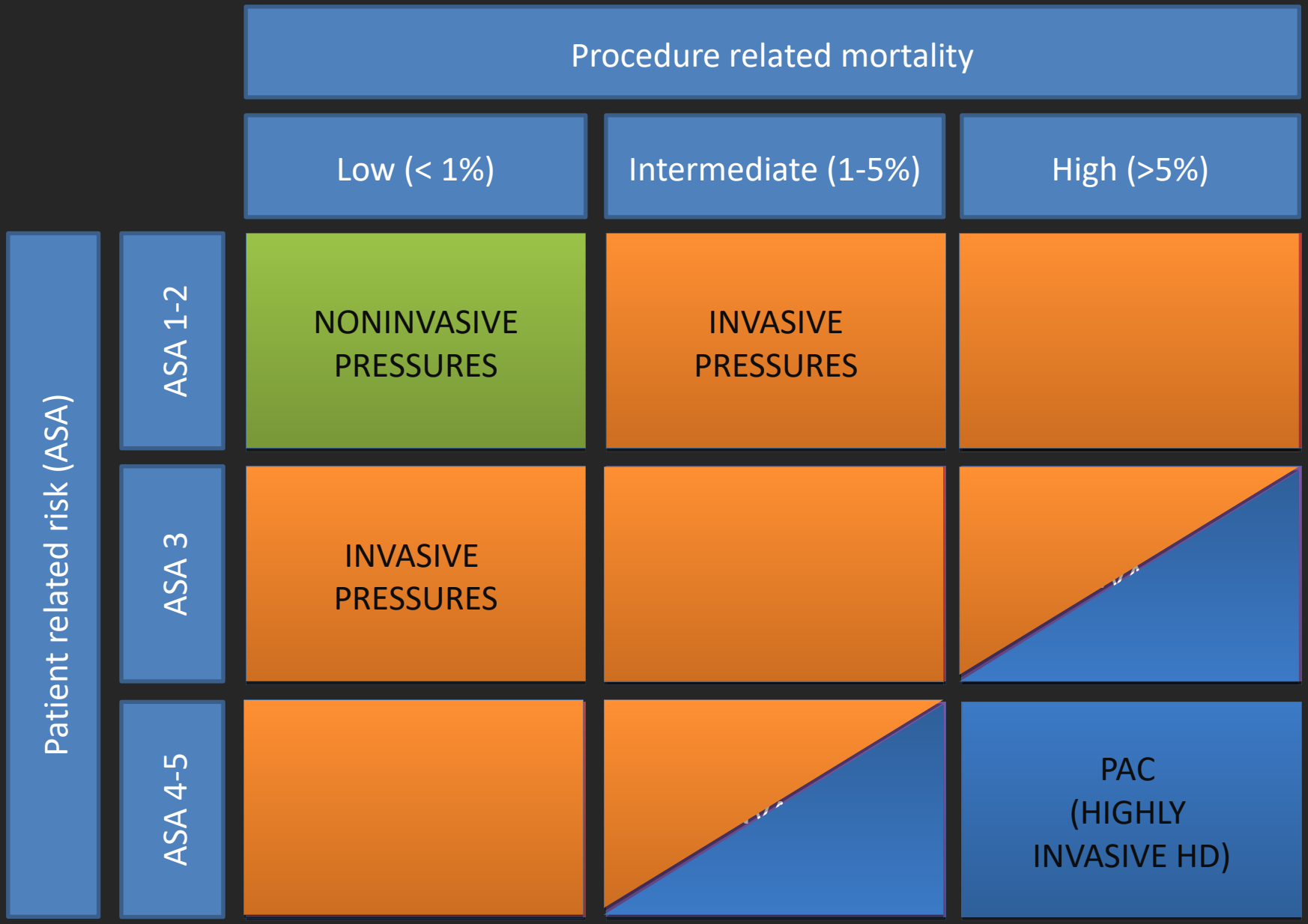

(TERMO)DILUTION
PULSE WAVE ANALYSIS
APPLIED FICK
CURRENT (IMPEDANCE)
SONOGRAFY + DOPPLER


PAC
EV1000/VolumeView
PiCCO
LiDCO Plus
Vigileo/FloTrac
LiDCO Rapid
PulsioFlex
ModelFlow
MostCare
Nexfin
…
USG dilution
NICO
Cardio Q
USCOM
BioZ
CircMon
PhysioFlow
ECOM
NICOM

Perioperative haemodynamic therapy

Mikhail Y. Kirov[a,b], Vsevolod V. Kuzkov[a] and Zsolt Molnar[c]

Current Opinion in Critical Care 2010, 16:384–392



Shoemaker W., 1988

Lobo S., 2006

Swan-Ganz catheter

Mythen M., 1995

Challand, 2012

Esophageal Doppler

Pearse R., 2005

Salzwedel, 2013

Arterial Wave analysis

Forget, 2010

NON INVASIVE HD

V ROCE 2009 VYDÁN REMAKE SINGLU FROZEN Z R. 1998

Cannesson et al. Critical Care 2011, 15:R197
http://ccforum.com/content/15/4/R197

CRITICAL CARE

RESEARCH Open Access

Hemodynamic monitoring and management in patients undergoing high risk surgery: a survey among North American and European anesthesiologists

Maxime Cannesson[1*], Gunther Pestel[2], Cameron Ricks[1], Andreas Hoeft[3] and Azriel Perel[4]

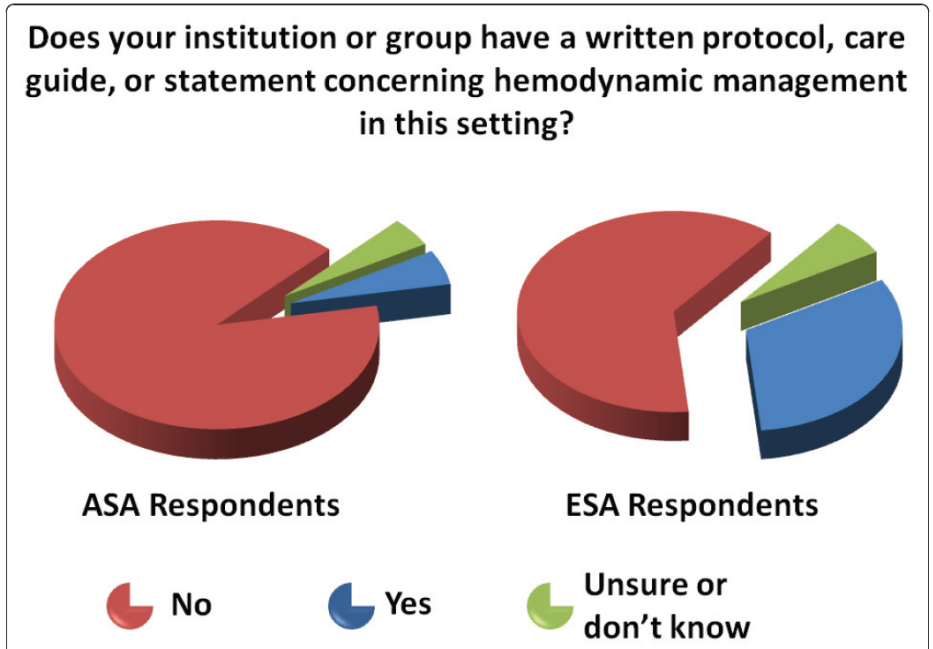


Figure 2 Incidence of institutional guidelines concerning hemodynamic management in this setting?

Cannesson et al. Critical Care 2011, 15:R197
http://ccforum.com/content/15/4/R197

CRITICAL CARE

RESEARCH Open Access

Hemodynamic monitoring and management in patients undergoing high risk surgery: a survey among North American and European anesthesiologists

Maxime Cannesson[1*], Gunther Pestel[2], Cameron Ricks[1], Andreas Hoeft[3] and Azriel Perel[4]

Table 3 What are your indicators for volume expansion in this setting (diagnostic tools)?

	ASA Respondents (*n* = 209)	ESA Respondents (*n* = 165)
Answer Options	**Response Percent**	**Response Percent**
Blood pressure	88.5%	77.6%
Urine output	83.3%	77.0%
Clinical experience	77.5%	64.8%
Central venous pressure	70.8%	64.2%
Cardiac output	49.3%	53.3%
Pulse Pressure Variation or Systolic Pressure Variation	45.0%	55.8%
Transesophageal echocardiography	43.5%	28.5%
Pulmonary capillary wedge pressure	38.8%	24.2%
Plethysmographic Waveform Variation	25.4%	25.5%
Stroke Volume Variation	19.1%	36.4%
Mixed venous saturation (ScvO2)	18.7%	21.8%
Global end diastolic volume	10.5%	17.0%
Central venous saturation (SvO2)	10.0%	34.5%

ASA, American society of anesthesiology respondents; ESA, European society of anaesthesiology respondents.

72%

Srinivasa et al. BMC Anesthesiology 2013, 13:5
http://www.biomedcentral.com/1471-2253/13/5

BMC Anesthesiology

RESEARCH ARTICLE Open Access

Goal-directed fluid therapy- a survey of anaesthetists in the UK, USA, Australia and New Zealand

Sanket Srinivasa[1*], Arman Kahokehr[1], Mattias Soop[2], Matthew Taylor[3] and Andrew

I NEVER DO !!!

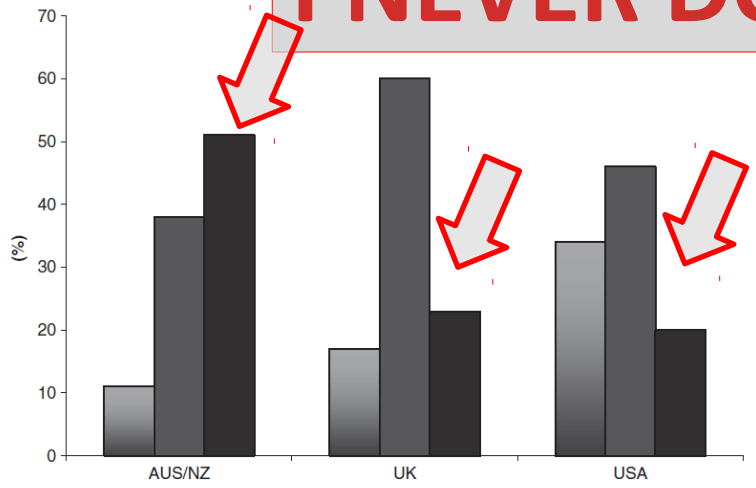


Figure 1 Do you use Goal-directed fluid th).
Always/Sometimes: USA vs. UK, p = 0.36; USA v

I´D LOVE TO …

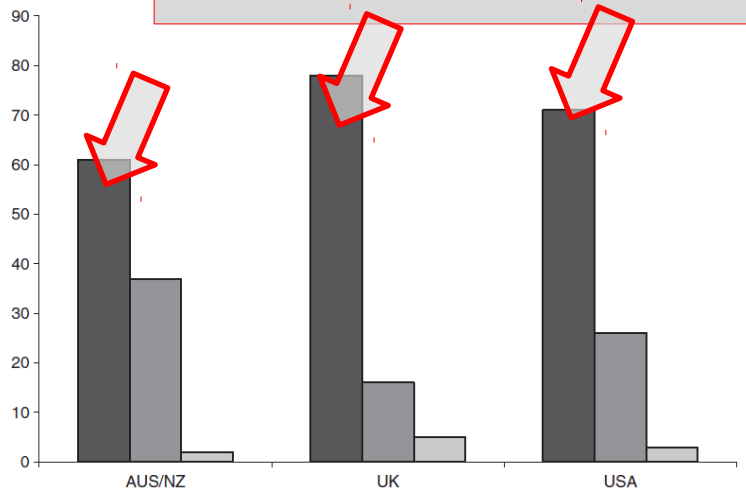


Figure 2 Would you like to use Goal-Directed Fluid Therapy? (Columns from left to right respectively: Yes/No/Undecided).

Schultz[337]	1985	PAC
Shoemaker[5]	1988	PAC
Berlauk[338]	1991	PAC
Fleming[339]	1992	PAC
Boyd[31]	1993	PAC
Bishop[340]	1995	PAC
Mythen[278]	1995	ED
Durham[341]	1996	PAC
Bendo[342]	1997	PAC
Sinclair[87]	1997	ED
Ziegle[343]	1997	PAC
Ueno[344]	1998	PAC
Valentine[345]	1998	PAC
Wilson[312]	1999	PAC
Lobo[27]	2000	PAC
Polonen[302]	2001	PAC
Velmahos[346]	2002	PAC
Bonazzi[347]	2002	PAC
Conway[348]	2002	ED
Gan[28]	2002	ED
Venn[95]	2003	PAC
Sandham[164]	2003	PAC
McKendry[349]	2004	PAC
Pearse[33]	2005	LiDCO
Szakmany[350]	2005	PiCCO
Wakeling[351]	2005	ED
Lobo[167]	2006	PAC
Noblett[88]	2006	ED

...

...

Donati[264]	2007	CŽK
Chytra[40]	2007	ED
Lopes[113]	2007	IBPplus, Dixtal
Buettner[115]	2008	PiCCO
Harten[114]	2008	LiDCO
Kapoor[117]	2008	FloTrac
Senagore[352]	2009	ED
Benes[172]	2009	PiCCO+CeVOX
Forget[118]	2010	Flotrac
Jhanji[131]	2010	Masimo
Van Der Linden[353]	2010	LiDCO
Wenkui[305]	2010	LiDCO + CŽK
Cecconi[32]	2011	Laktát
Ramsingh[123]	2012	Flotrac
Goepfert[76]	2013	FloTrac
Scheeren[121]	2013	PiCCO
Zhang Ji[122]	2013	FloTrac
Zheng[124]	2013	FloTrac
Bartha[354]	2013	FloTrac
Srinvasa[269]	2013	LiDCO
Yu[355]	2014	ED
Pearse[265]	2014	Masimo
Pestana[266]	2014	LiDCO Rapid
		NICOM

56 studií (6 multi-centrických)

7 712 pacientů (3 891 v pGDT)

Mortalita: 5% vs. 9% (OR 0,52)

Morbidita: 29% vs. 43% (OR 0,63)

EVIDENCE

EXPERIENCE

?

Drahý přístroj
Drahý spotřebák
Extra práce

Snížení komplikací
Snížení mortality
Zkrácení hospitalizace

NHS England

NICE National Institute for Health and Care Excellence

British Journal of Anaesthesia **108** (1): 53–62 (2012)
Advance Access publication 26 August 2011 · doi:10.1093/bja/aer273

BJA

Randomized controlled trial of intraoperative goal-directed fluid therapy in aerobically fit and unfit patients having major colorectal surgery

C. Challand[1,3], R. Struthers[2,3], J. R. Sneyd[2,3], P. D. Erasmus[2], N. Mellor[1], K. B. Hosie[1] and G. Minto[2,3]*

Conclusions. Intraoperative SV optimization conferred no additional benefit over standard fluid therapy. In an aerobically fit subgroup of patients, GDT was associated with detrimental effects on the primary outcome.

In an aerobically fit subgroup

Randomized clinical trial

British Journal of Surgery 2013; **100**: 66–74

Randomized clinical trial of goal-directed fluid therapy within an enhanced recovery protocol for elective colectomy

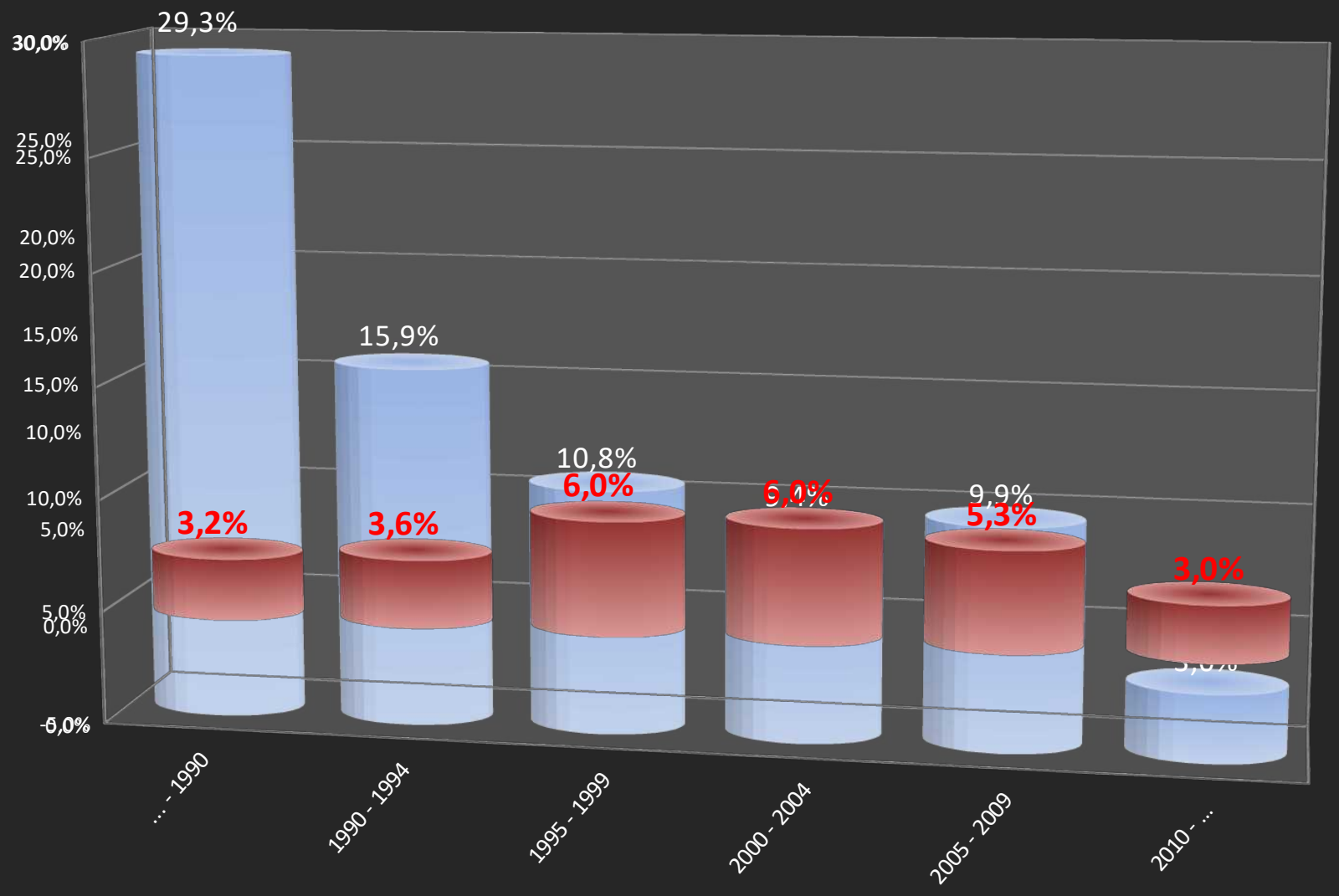
S. Srinivasa[1], M. H. G. Taylor[2], P. P. Singh[1], T.-C. Yu[1], M. Soop[3] and A. G. Hill[1]

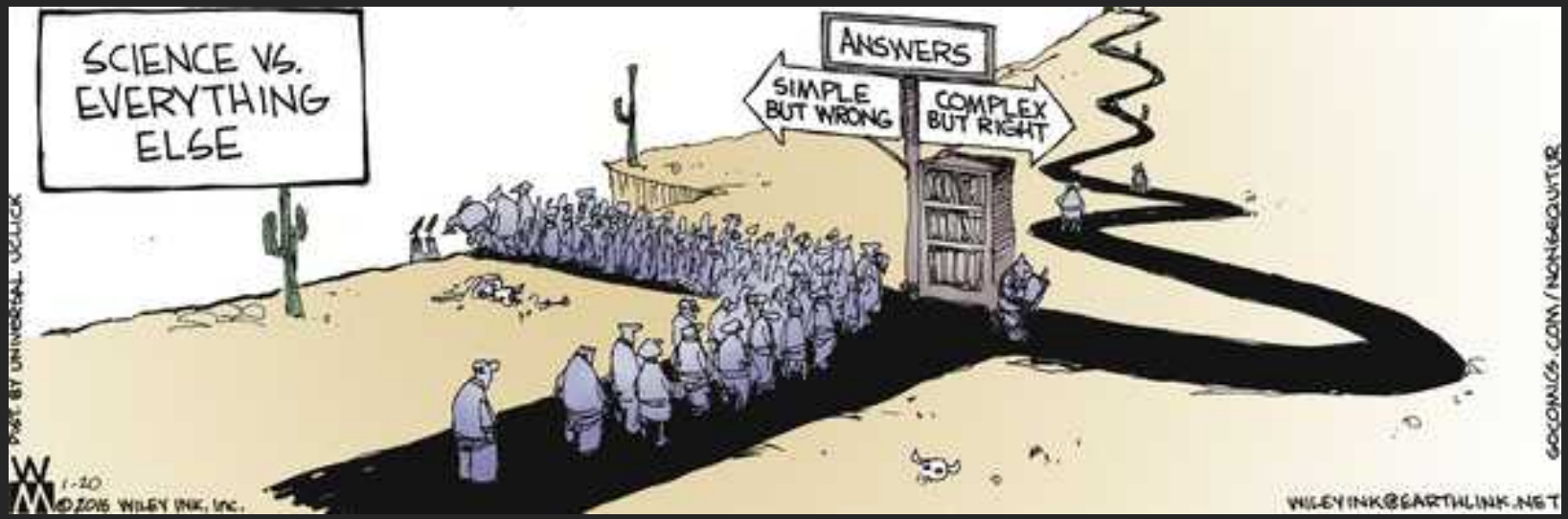
[1]Department of Surgery, South Auckland Clinical School, Middlemore Hospital, University of Auckland, [2]Department of Anaesthesia, Middlemore Hospital, and [3]Department of Surgery, University of Auckland, Auckland, New Zealand
Correspondence to: Dr S. Srinivasa, PO Box 93311, Otahuhu, Auckland, New Zealand (e-mail: sanketsri@gmail.com)

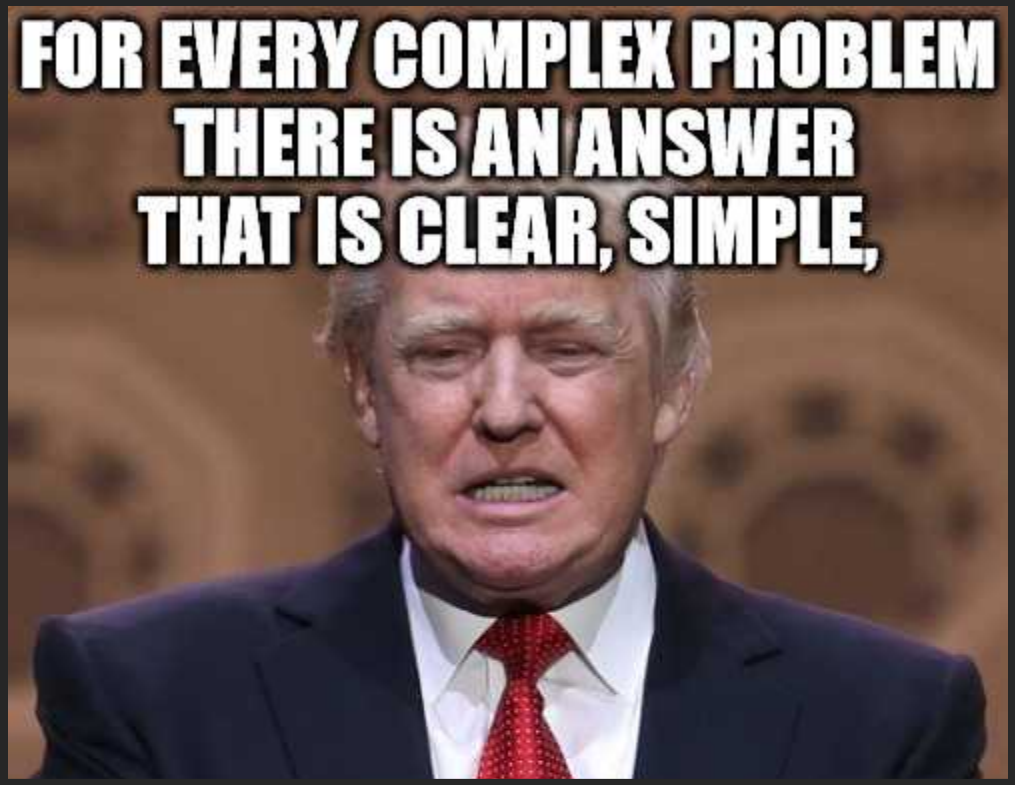
This randomized trial has demonstrated no effect of GDFT on recovery in patients undergoing elective colectomy within an ERAS protocol incorporating fluid restriction.

ERAS protocol

VÝVOJ MORTALITY v pGDT studiích




SCIENCE VS. EVERYTHING ELSE
ANSWERS
SIMPLE BUT WRONG
COMPLEX BUT RIGHT
POST BY UNIVERSAL UCLICK
1-20
©2016 WILEY INK, INC.
WILEYINK@EARTHLINK.NET
GOCOMICS.COM/NONSEQUITUR


FOR EVERY COMPLEX PROBLEM
THERE IS AN ANSWER
THAT IS CLEAR, SIMPLE,

Review

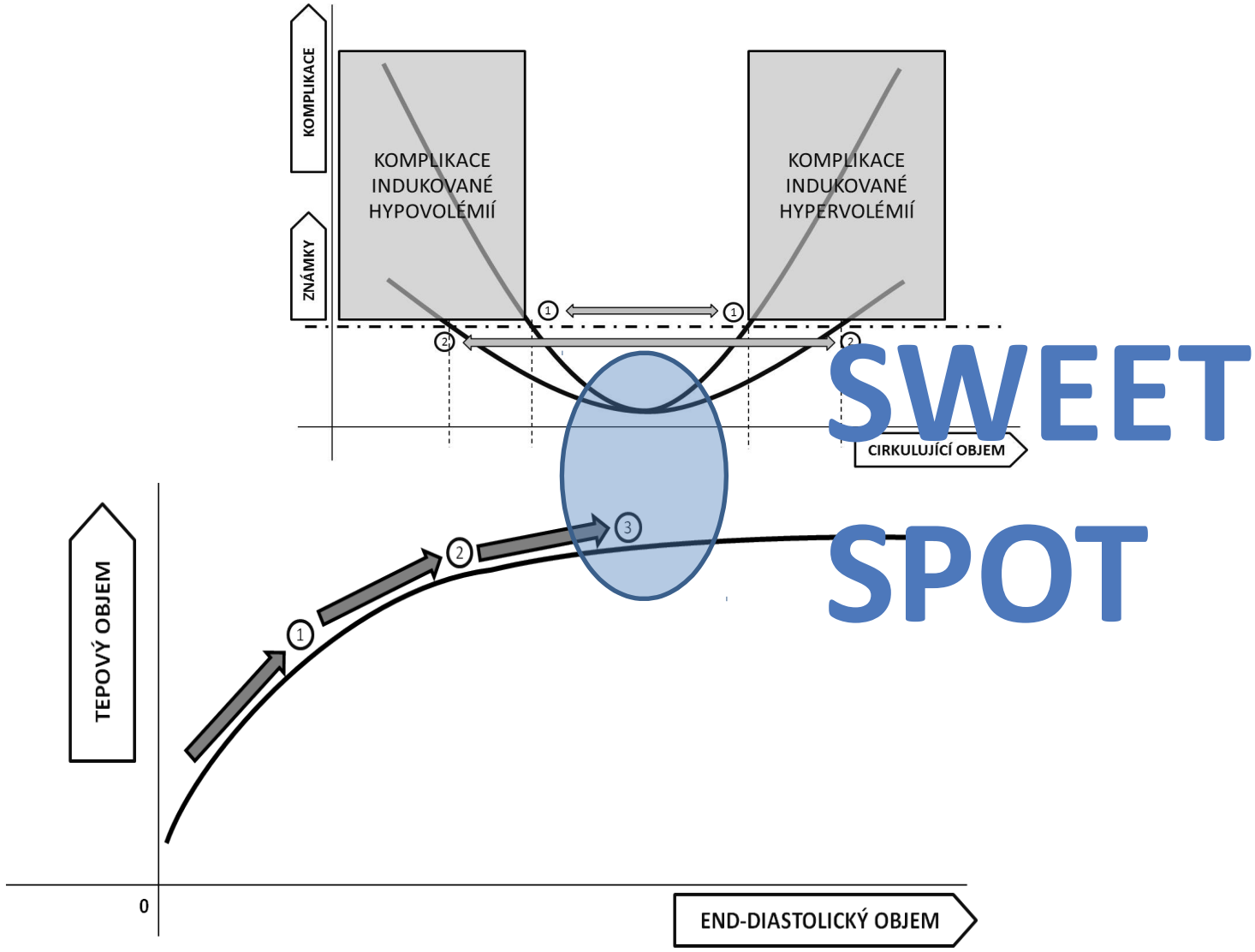
Clinical review: Goal-directed therapy in high risk surgical patients

Critical Care 2009, **13**:231 (doi:10.1186/cc8039)

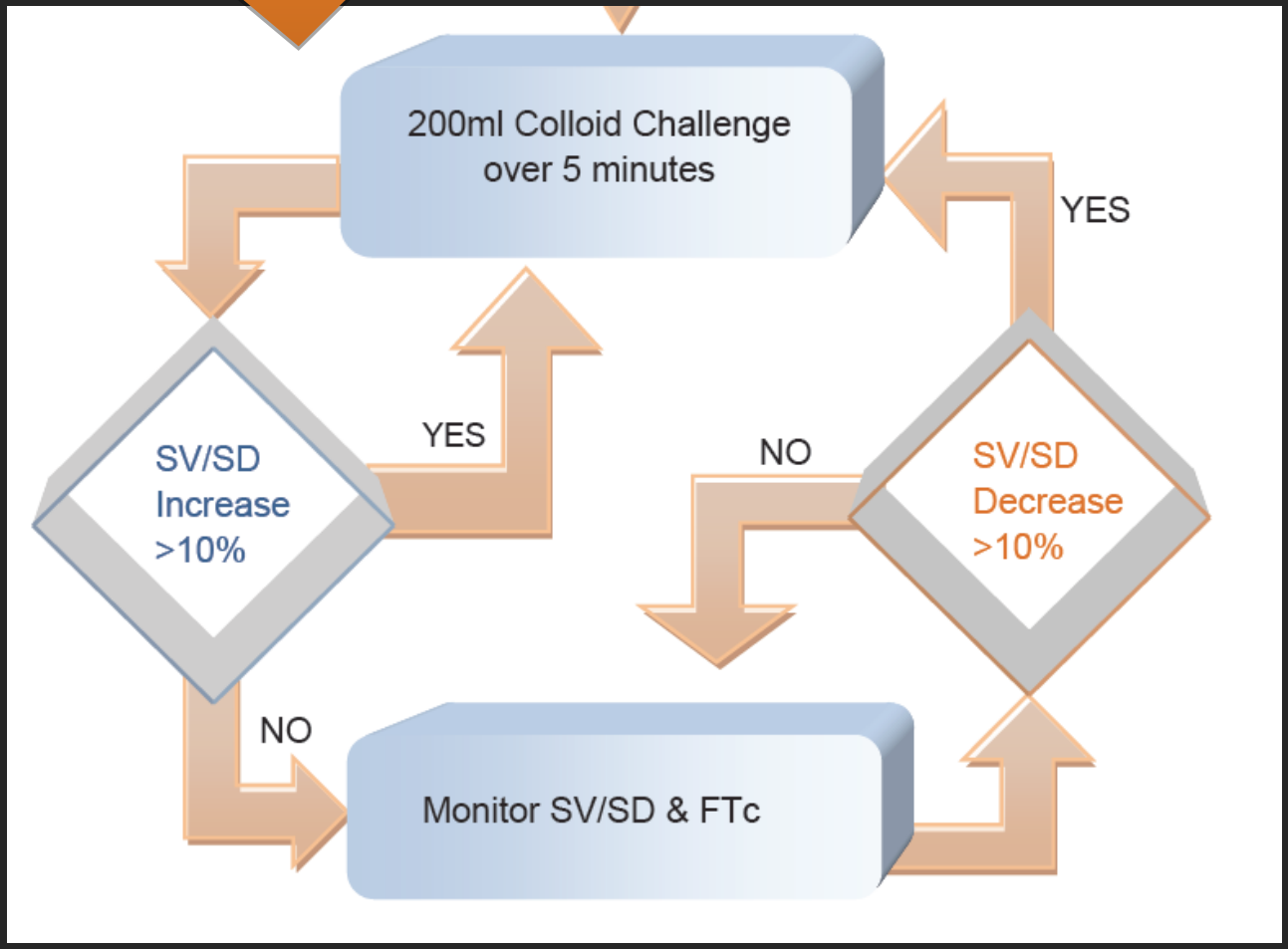
Nicholas Lees, Mark Hamilton and Andrew Rhodes

1. **Vyhledat OPTIMÁLNÍ INTRAVASKULÁRNÍ OBJEM !**
2. **Zajistit dostatečnou globální DODÁVKU KYSLÍKU !**
3. **Sledovat a reagovat na známky poruchy ORGÁNOVÉ PERFUZE !**

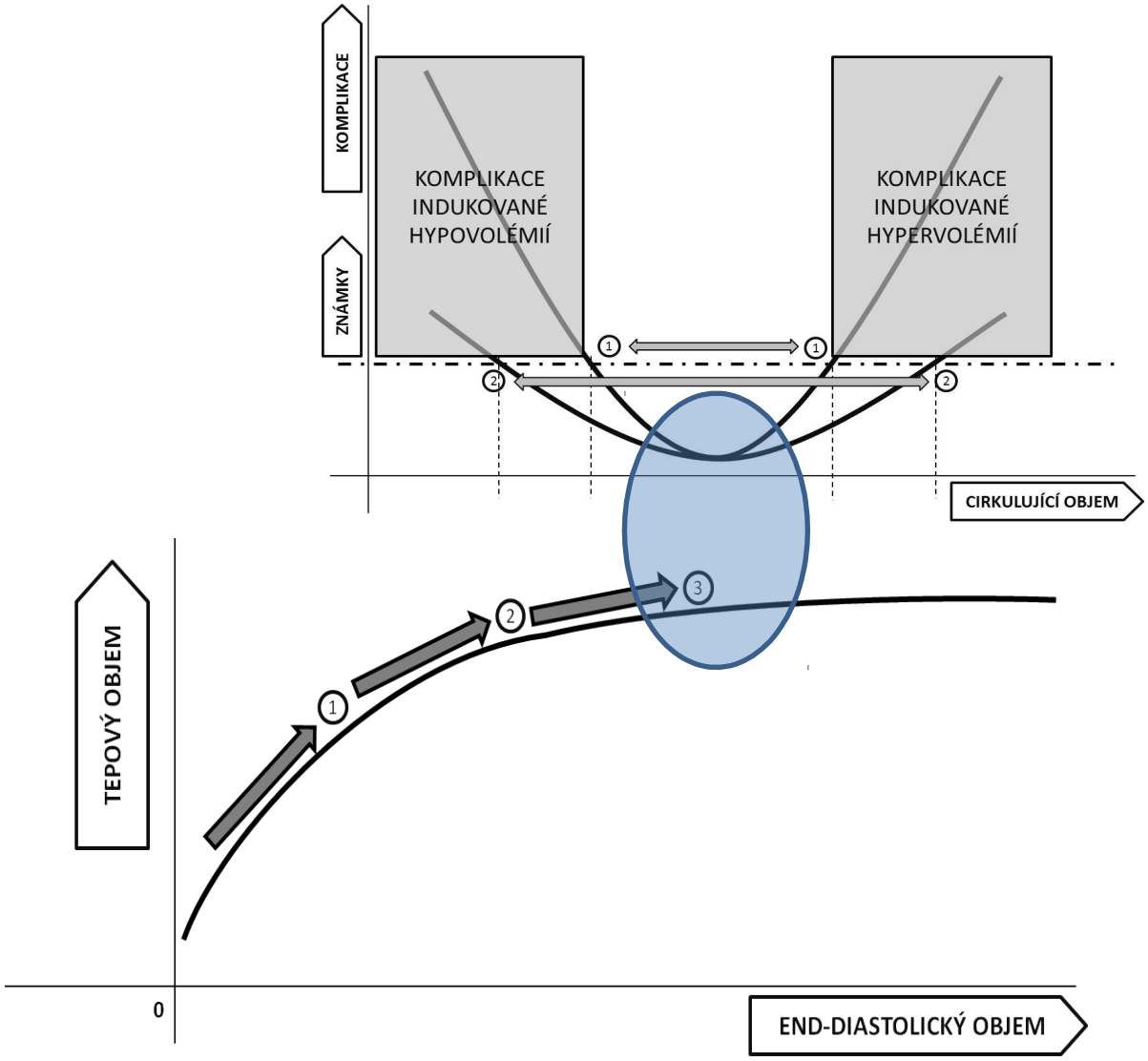
Optimální cíl tekutinové léčby



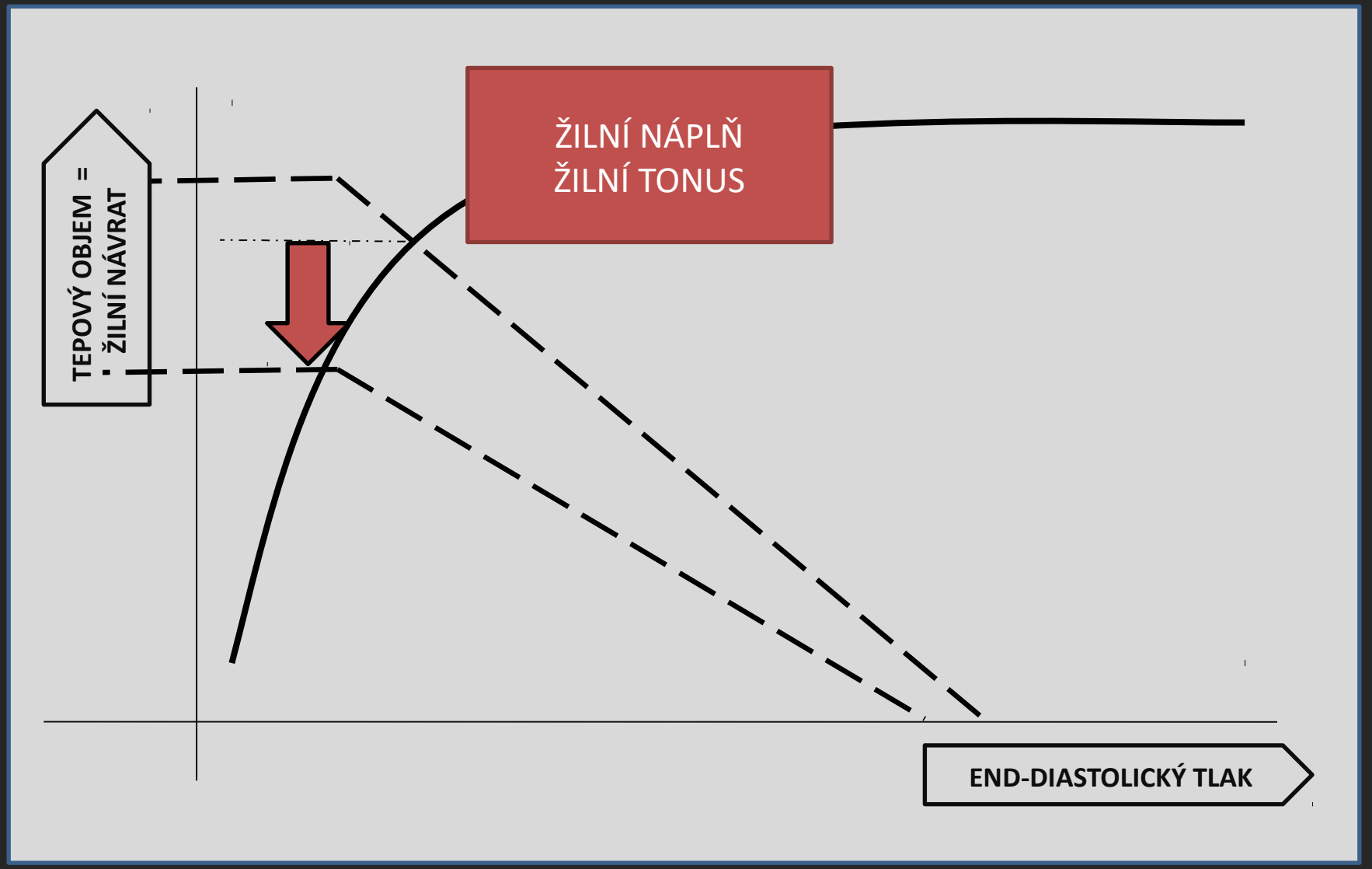
Maximalizace SV

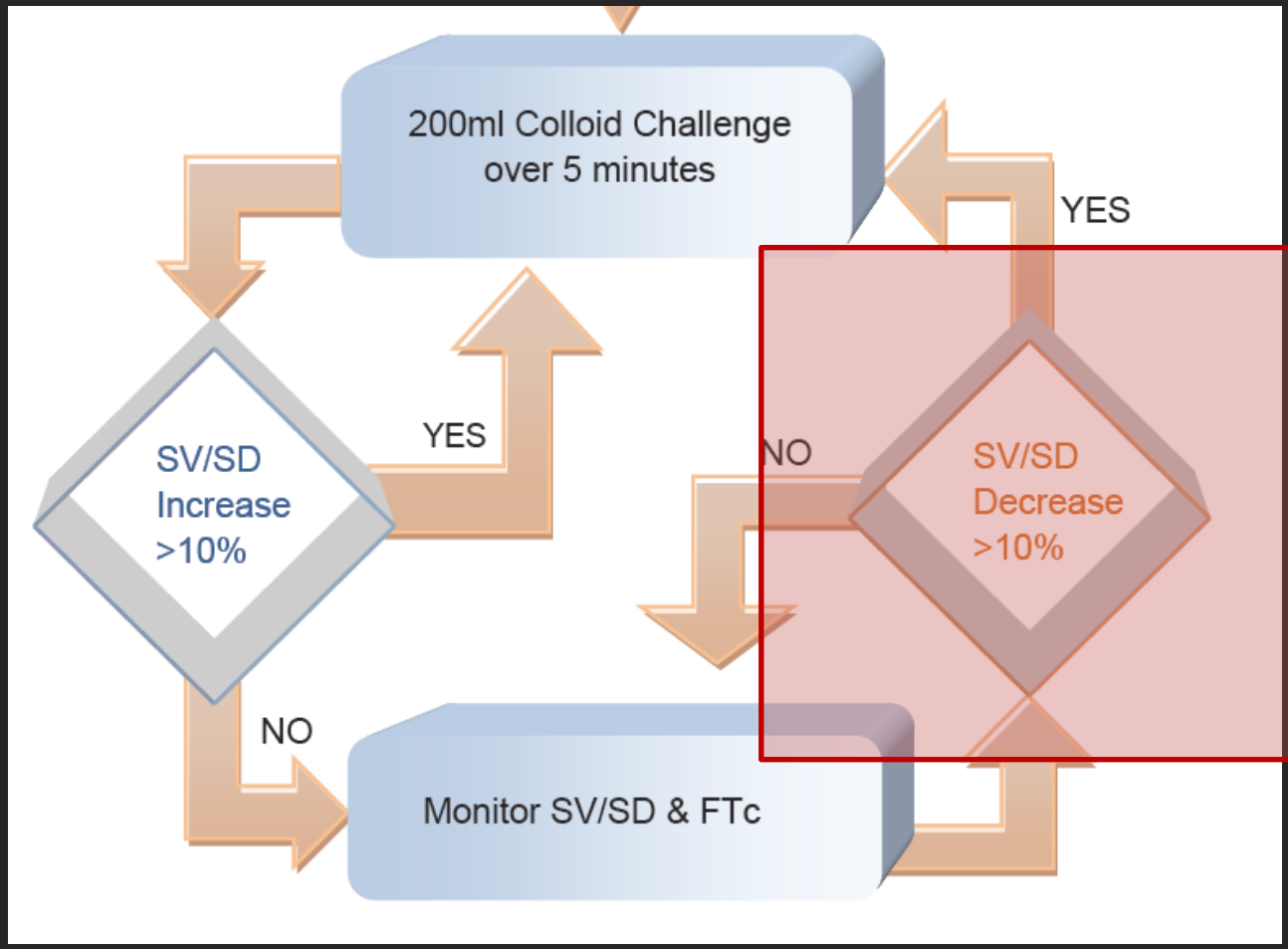


Optimální cíl tekutinové léčby



MUSÍ SI TO ODNÉST /
MUSÍ SE TOHO ZBAVIT


ŽILNÍ NÁPLŇ
ŽILNÍ TONUS
TEPOVÝ OBJEM =
ŽILNÍ NÁVRAT
END-DIASTOLICKÝ TLAK



OPRAVDU JE KAŽDÁ ZMĚNA SV PODMÍNĚNÁ JEN ZMĚNOU PRELOADU???

Review

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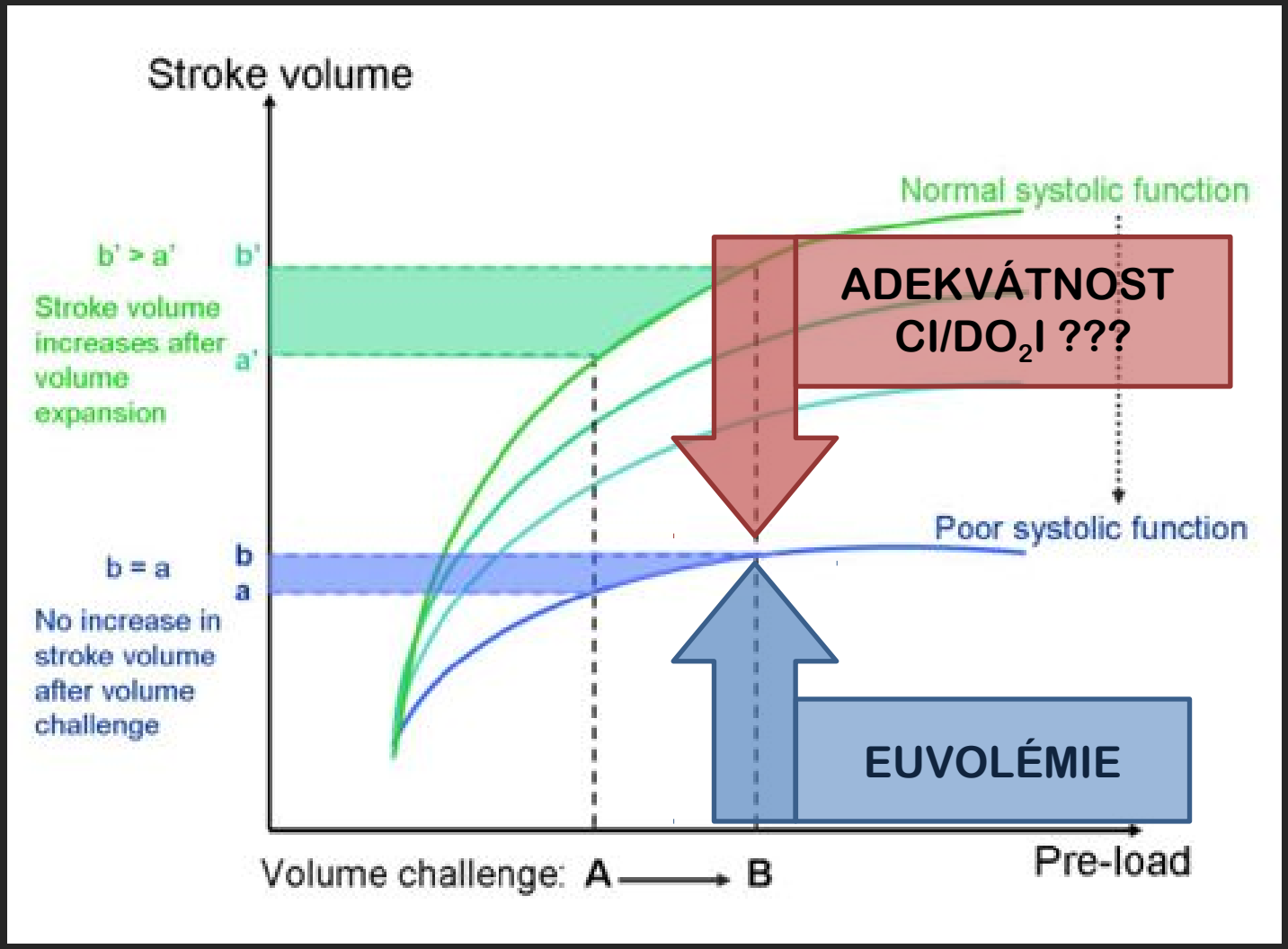
Dosažení adekvátní dodávky kyslíku



Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of a Perioperative, Cardiac Output–Guided Hemodynamic Therapy Algorithm on Outcomes Following Major Gastrointestinal Surgery

A Randomized Clinical Trial and Systematic Review

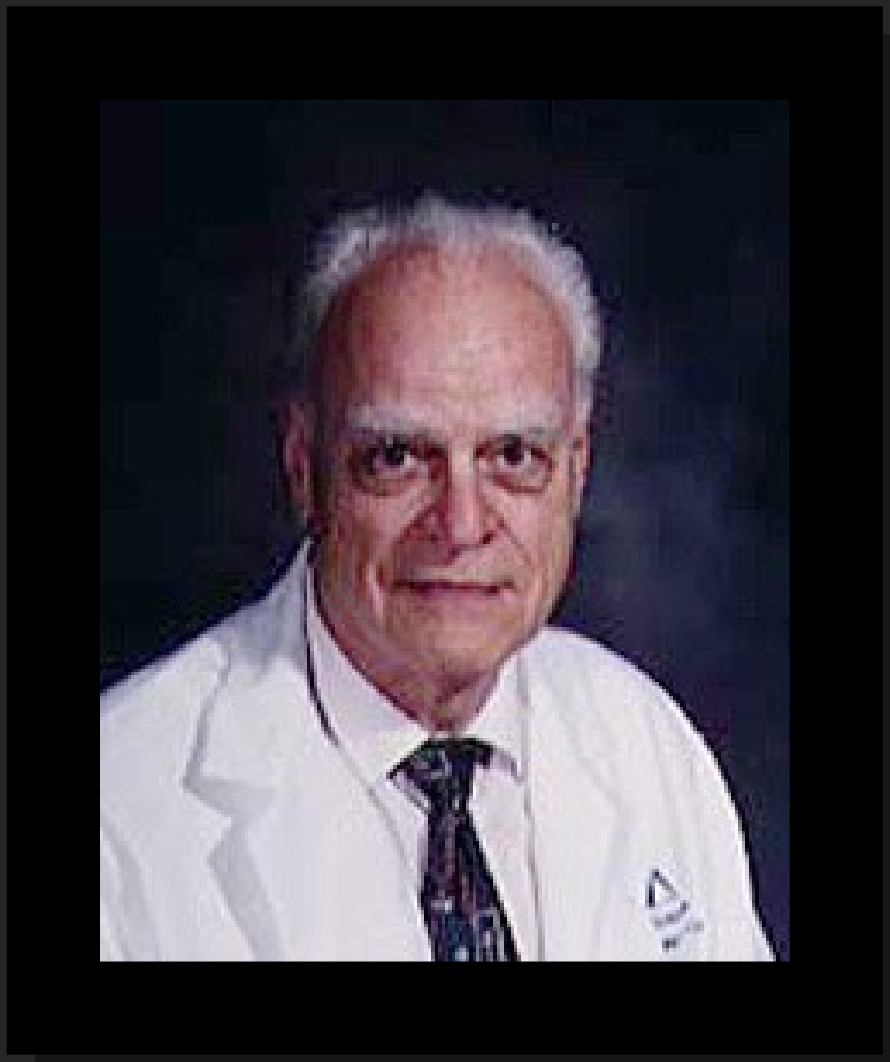
Rupert M. Pearse, MD; David A. Harrison, PhD; Neil MacDonald, FRCA; Michael A. Gillies, FRCA; Mark Blunt, FRCA; Gareth Ackland, PhD; Michael P. W. Grocott, MD; Aoife Ahern, BSc; Kathryn Griggs, MSc; Rachael Scott, PhD; Charles Hinds, FRCA; Kathryn Rowan, PhD; for the OPTIMISE Study Group

17 CENTRES
UK
733 pts

in order to achieve and maintain a maximal value of stroke volume; no attempt was made to standardize choice of colloid. Dopexamine was administered at a fixed, low dose of 0.5 $\mu g\ kg^{-1}\ min^{-1}$ either through a peripheral, or central venous catheter (Cephalon Ltd, Welwyn Garden City, UK).

pGDT
často nebyla
OPTIMALIZACÍ,
ale
„INDIVIDUALIZOVANOU“
MAXIMALIZACÍ

pGDT
navíc abdikovala na
TKÁŇOVÉ CÍLE



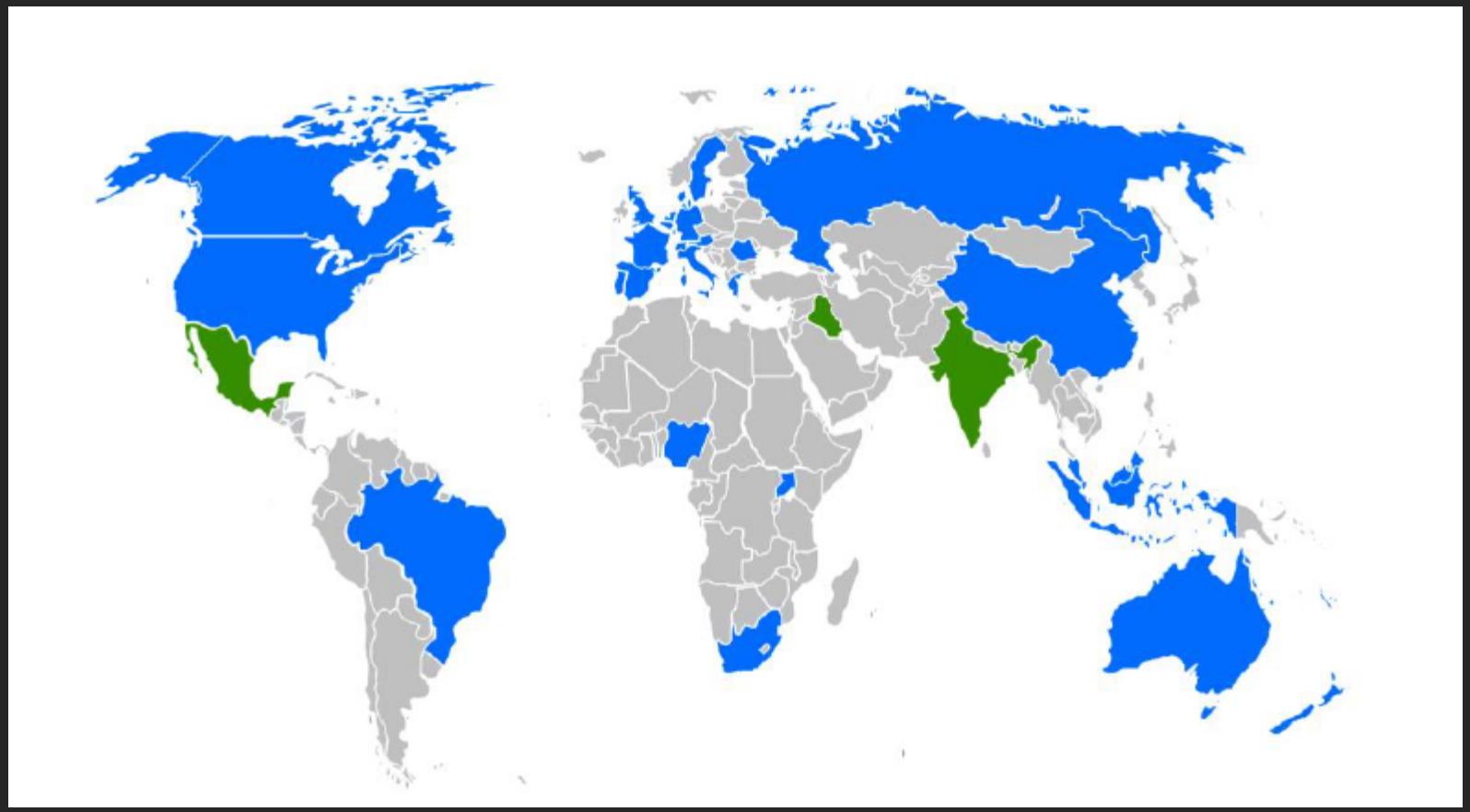
WILL
BE
REMEMBERED
???

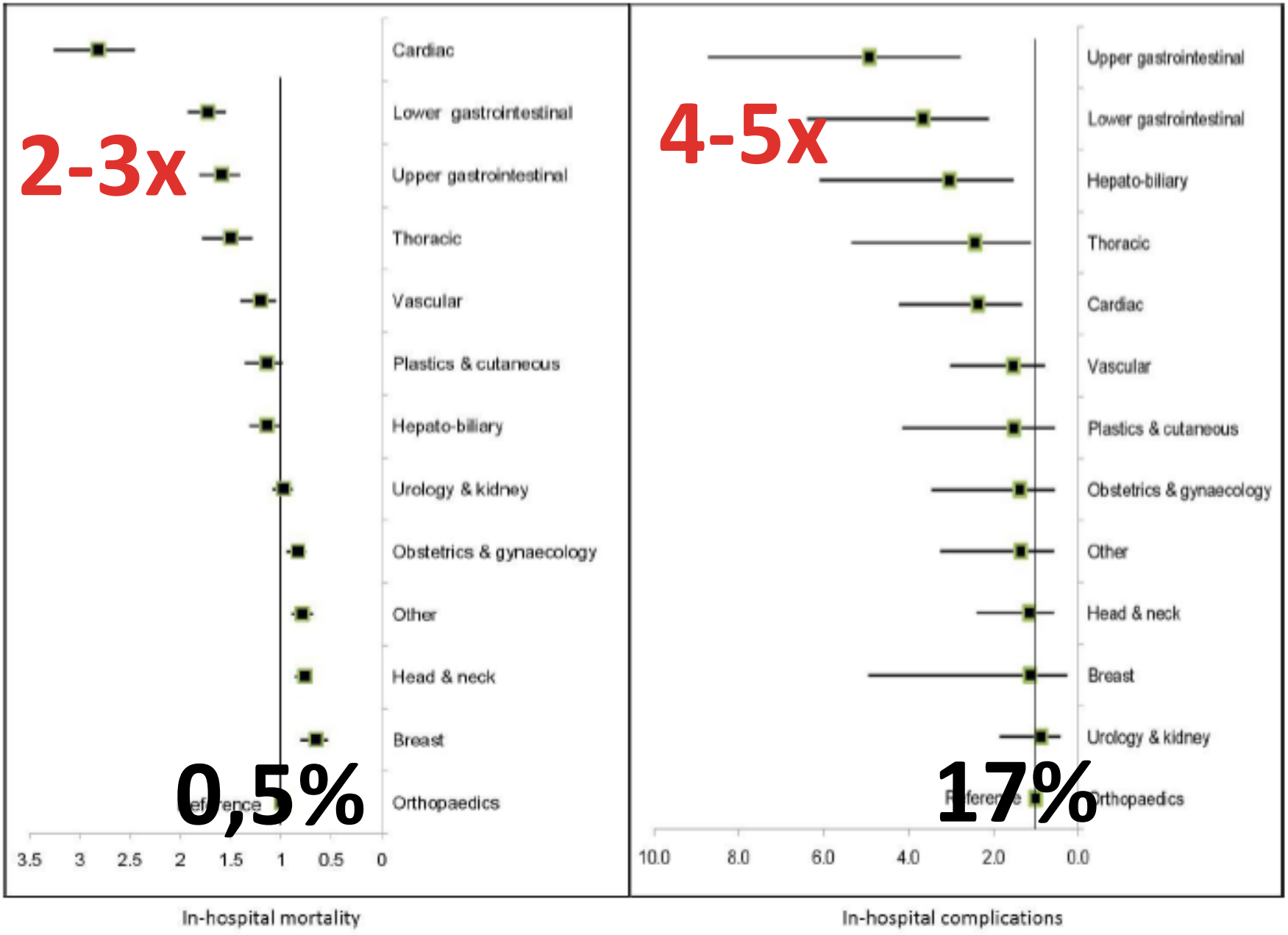
Global patient outcomes after elective surgery: Prospective cohort study in 27 low, middle and high income countries

Running title: Global patient outcomes after elective surgery

International Surgical Outcomes Study (ISOS) group*

44 814 pts




2-3x
Cardiac
Lower gastrointestinal
Upper gastrointestinal
Thoracic
Vascular
Plastics & cutaneous
Hepato-biliary
Urology & kidney
Obstetrics & gynaecology
Other
Head & neck
Breast
Orthopaedics
0,5%
3.5
3
2.5
2
1.5
1
0.5
0
In-hospital mortality
4-5x
Upper gastrointestinal
Lower gastrointestinal
Hepato-biliary
Thoracic
Cardiac
Vascular
Plastics & cutaneous
Obstetrics & gynaecology
Other
Head & neck
Breast
Urology & kidney
Orthopaedics
17%
10.0
8.0
6.0
4.0
2.0
0.0
In-hospital complications

Mortality after surgery in Europe: a 7 day cohort study

*Rupert M Pearse, Rui P Moreno, Peter Bauer, Paolo Pelosi, Philipp Metnitz, Claudia Spies, Benoit Vallet, Jean-Louis Vincent, Andreas Hoeft, Andrew Rhodes, for the European Surgical Outcomes Study (EuSOS) group for the Trials groups of the European Society of Intensive Care Medicine and the European Society of Anaesthesiology**

Lancet 2012; 380: 1059–65

	All patients (n=46 539)	Died in hospital (n=1864)	Survived to hospital discharge (n=44 657)	Odds ratio (95% CI)	p value
Age (years)	56·7 (18·5)	61·0 (18·7)	56·6 (18·5)	1·01 (1·01–1·02)	<0·0001
Men	22 607	968	21 629	1·15 (1·05–1·26)	0·003
Present smoker	9872	363	9503	0·90 (0·80–-1·01)	0·07
ASA score					
1	11 642	362	11 280	Reference	..
2	21 582	633	20 944	0·94 (0·83–1·07)	0·36
3	11 574	539	11 025	1·51 (1·32–1·73)	<0·0001
Minor	12 041	431	11 608	Reference	..
Intermediate	22 231	741	21 483	0·93 (0·82–1·05)	0·22
Major	12 170	685	11 476	1·59 (1·40–1·80)	<0·0001
Urgency of surgery					
Elective	35 049	1129	33 908	Reference	..

ASA 4 3,5% 18%
ASA 5 54%

Emergency 5,5% 10%

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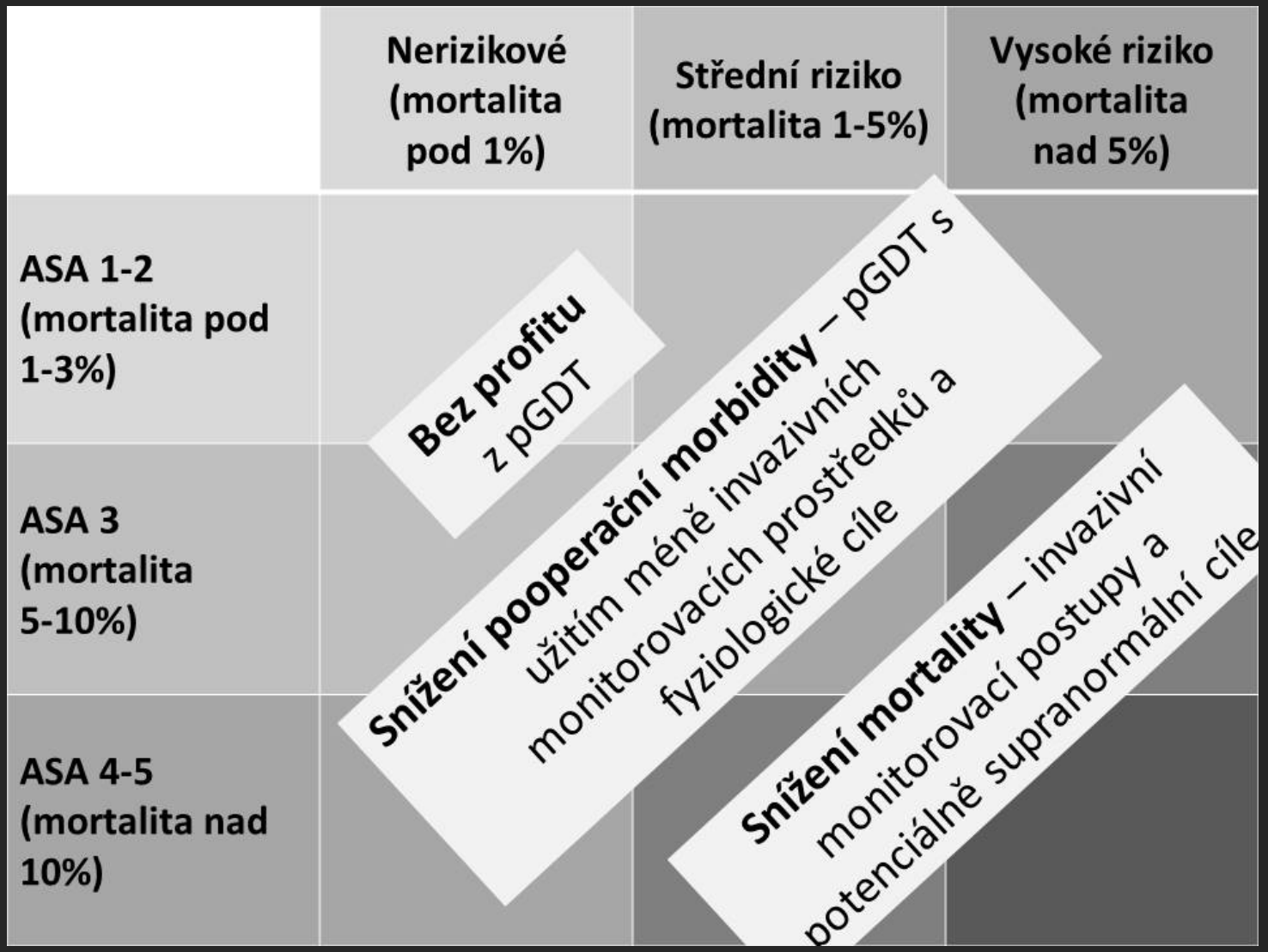
ASA score					
1	11 642	362	11 280	Reference	..
2	21 582	633	20 944	0·94 (0·83–1·07)	0·36
5	90	49	41	35·61 (23·23–54·59)	<0·0001
Grade of surgery					
Minor	12 041	431	11 608	Reference	..
Intermediate	22 231	741	21 483	0·93 (0·82–1·05)	0·22
Elective	35 049	1129	33 908	Reference	..

ASA 3 25% 5%

Major 26% 6%

Urgent 19% 5%

POPULACE


Nerizikové (mortalita pod 1%)
Střední riziko (mortalita 1-5%)
Vysoké riziko (mortalita nad 5%)
ASA 1-2 (mortalita pod 1-3%)
ASA 3 (mortalita 5-10%)
ASA 4-5 (mortalita nad 10%)
Bez profitu z pGDT
Snížení pooperační morbidity – pGDT s užitím méně invazivních monitorovacích prostředků a fyziologické cíle
Snížení mortality – invazivní monitorovací postupy a potenciálně supranormální cíle

PROGRAM

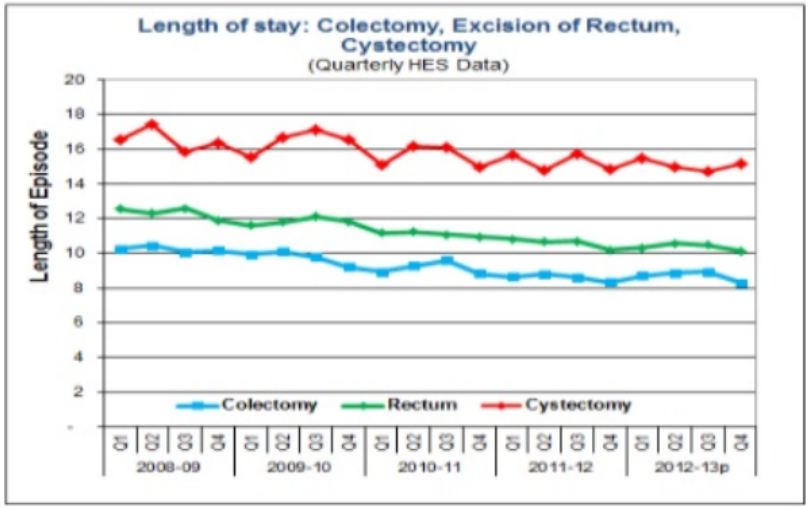
Enhanced Recovery Care Pathway: a better journey for patients seven days a week and better deal for the NHS

Sue Cottle
Improvement Manager
Acute care and seven day services
NHS Improving Quality

Health and Care Innovation EXPO 2014

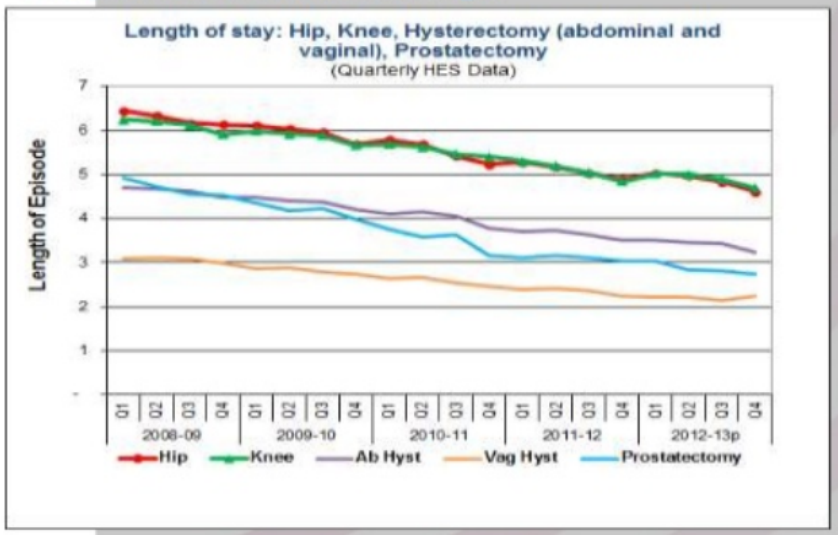
NHS Improving Quality

Progress: ER reduces length of hospital stay



Falling length of stay

170,000 fewer bed days



Increasing day of surgery admissions

No increase in readmissions

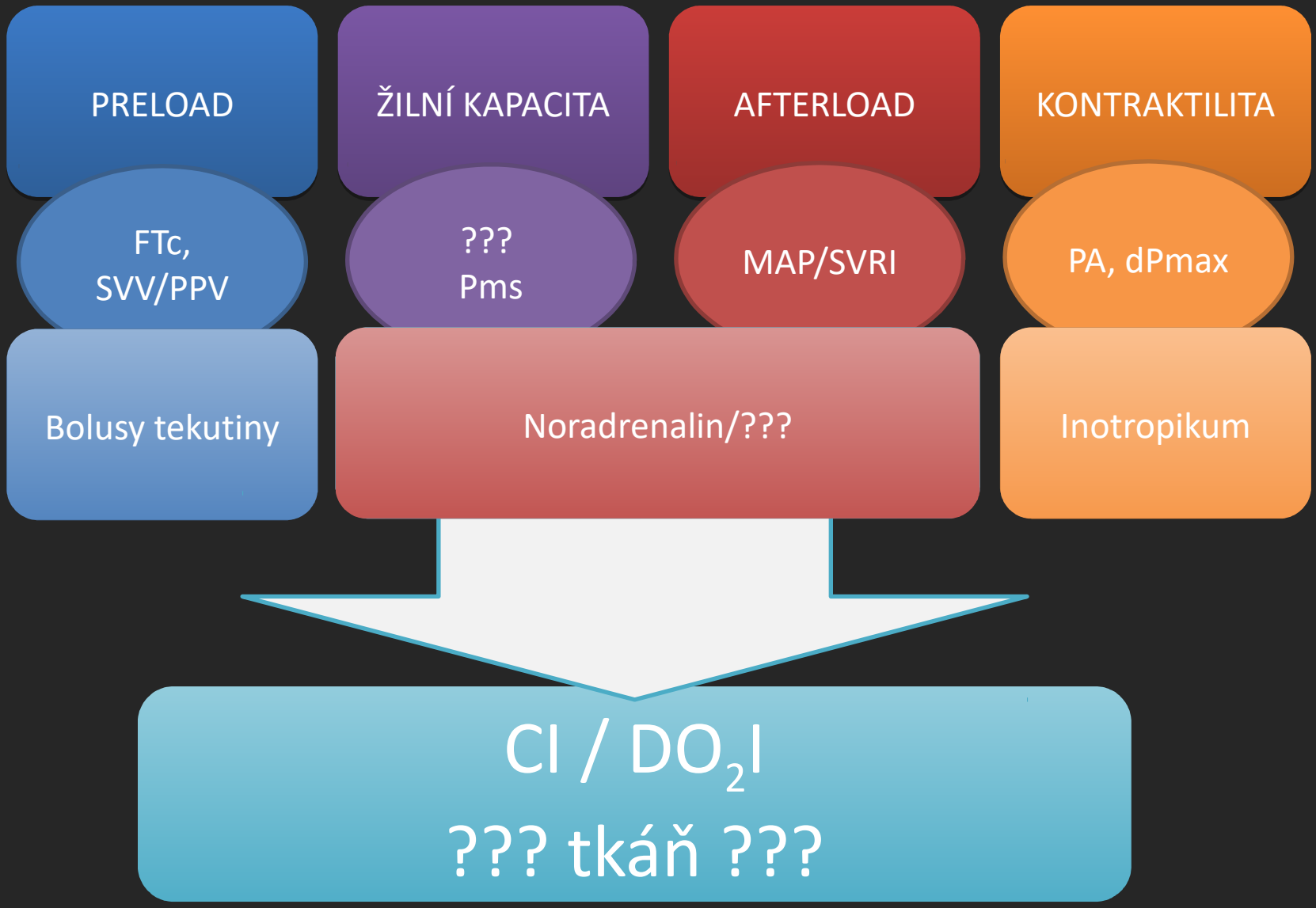
INTERVENCE

FIRST NO HARM

PŘEDOPERAČNÍ OPTIMALIZACE/ERAS
RACIONÁLNÍ TEKUTINOVÁ TERAPIE (1-2 ml/kg/h udržovací infuze)
PROTEKTIVNÍ VENTILACE

PRELOAD	ŽILNÍ KAPACITA	AFTERLOAD	KONTRAKTILITA
SV	SV	SV-RI	SV
Bolusy tekutiny	Noradrenalin/???		Inotropikum

INTERVENCE


PRELOAD
ŽILNÍ KAPACITA
AFTERLOAD
KONTRAKTILITA
FTc,
SVV/PPV
???
Pms
MAP/SVRI
PA, dPmax
Bolusy tekutiny
Noradrenalin/???
Inotropikum
CI / DO_2I
??? tkáň ???


IN GOD WE TRUST

Prophylactic LEvosimendan in major NOn-cardiac suRgery patients

LENOR CLINICAL TRIAL

http://lenor.healthregistry.org/

DĚKUJI ZA POZORNOST

Práce byla podpořena
VZ MSM0021620819 a projektem P36 „PRVOUK“