

Peroperační hypotenze je jen špičkou ledovce



Beneš Jan

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... case ...

- **74letá pacientka indikovaná pro zlomeninu krčku femuru**
 - **Arteriální hypertenze (TK doma - 130/80)**
 - **Ischemická choroba srdeční (st.p.CABG)**
 - **Mírná chronická renální insuf.**
 - **Žije v domově důchodců – Clinical frailty score 5**

JAK
BUDETE MONITOROVAT
KREVNÍ TLAK??



≈ 50 %

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 Pestel², Cameron Ricks¹, Andreas Hoefft³ and Azriel Perel⁴

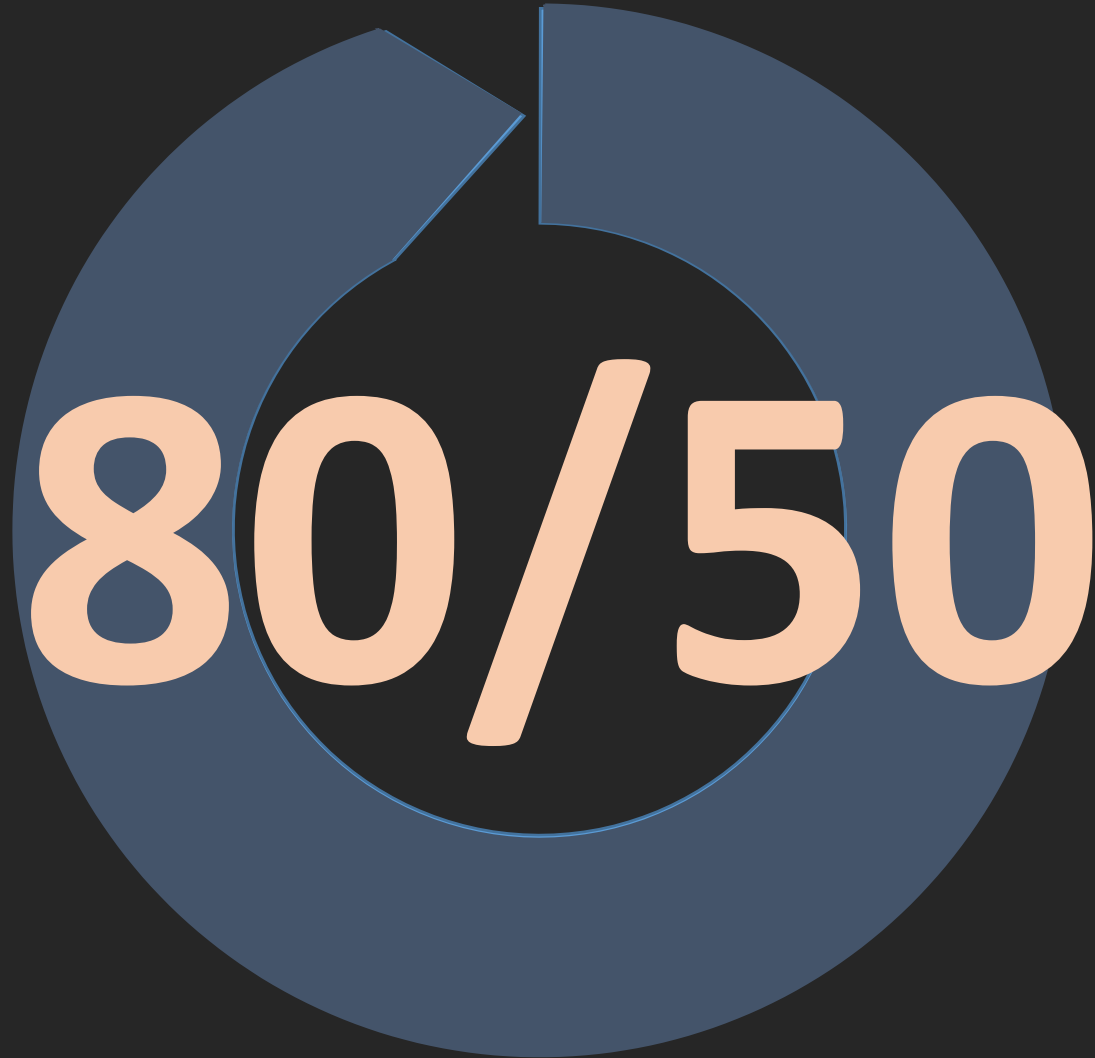
Table 1 Hemodynamic monitoring used for the management of high-risk surgery patients?.

	ASA respondents (n = 237)	ESA respondents (n = 195)
Answer options	Response percent	Response percent
Invasive arterial pressure	95.4%	89.7%
Central venous pressure	72.6%	83.6%
Non-invasive arterial pressure	51.9%	53.8%
Cardiac output	35.4%	34.9%

150/90



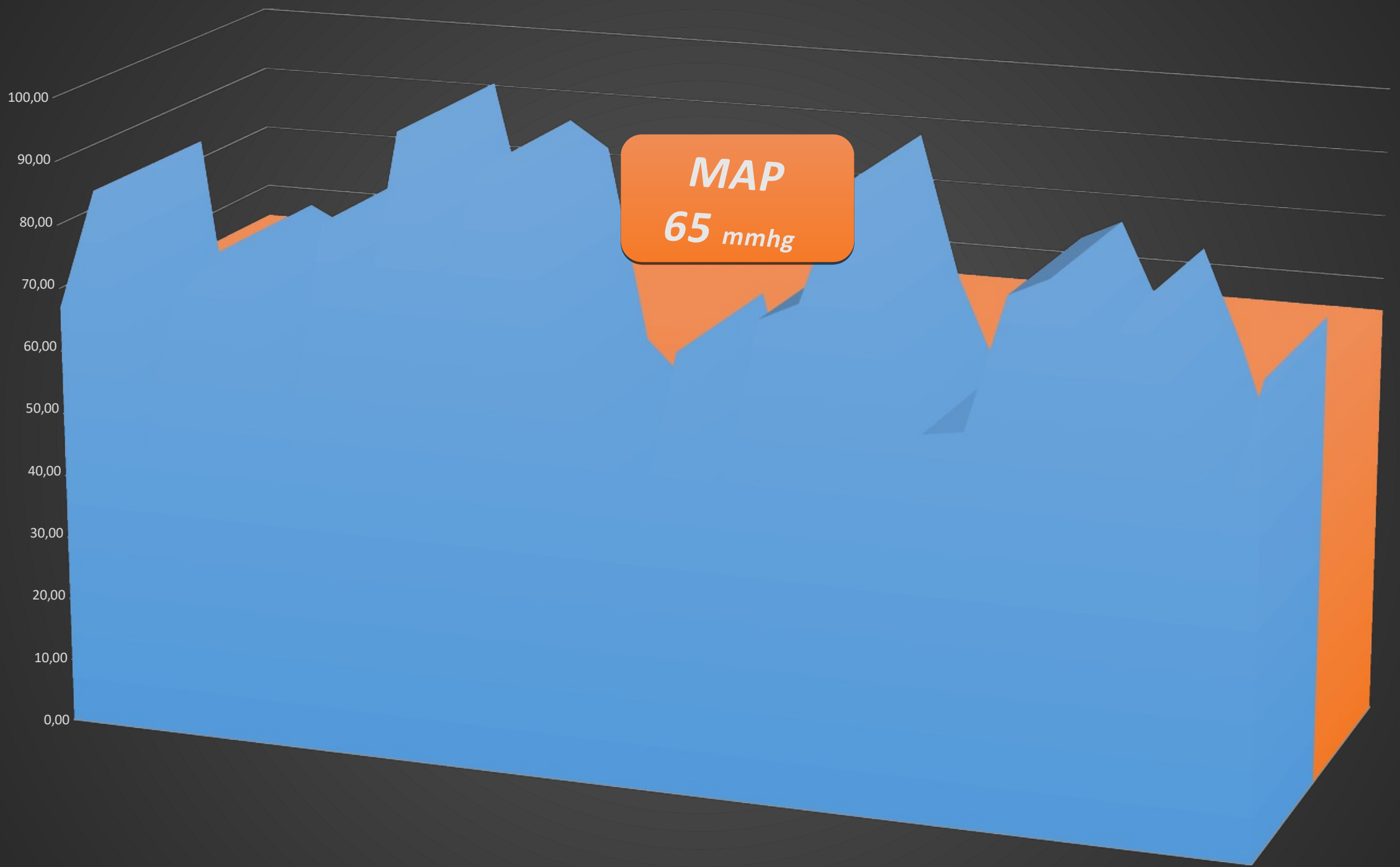
90/55



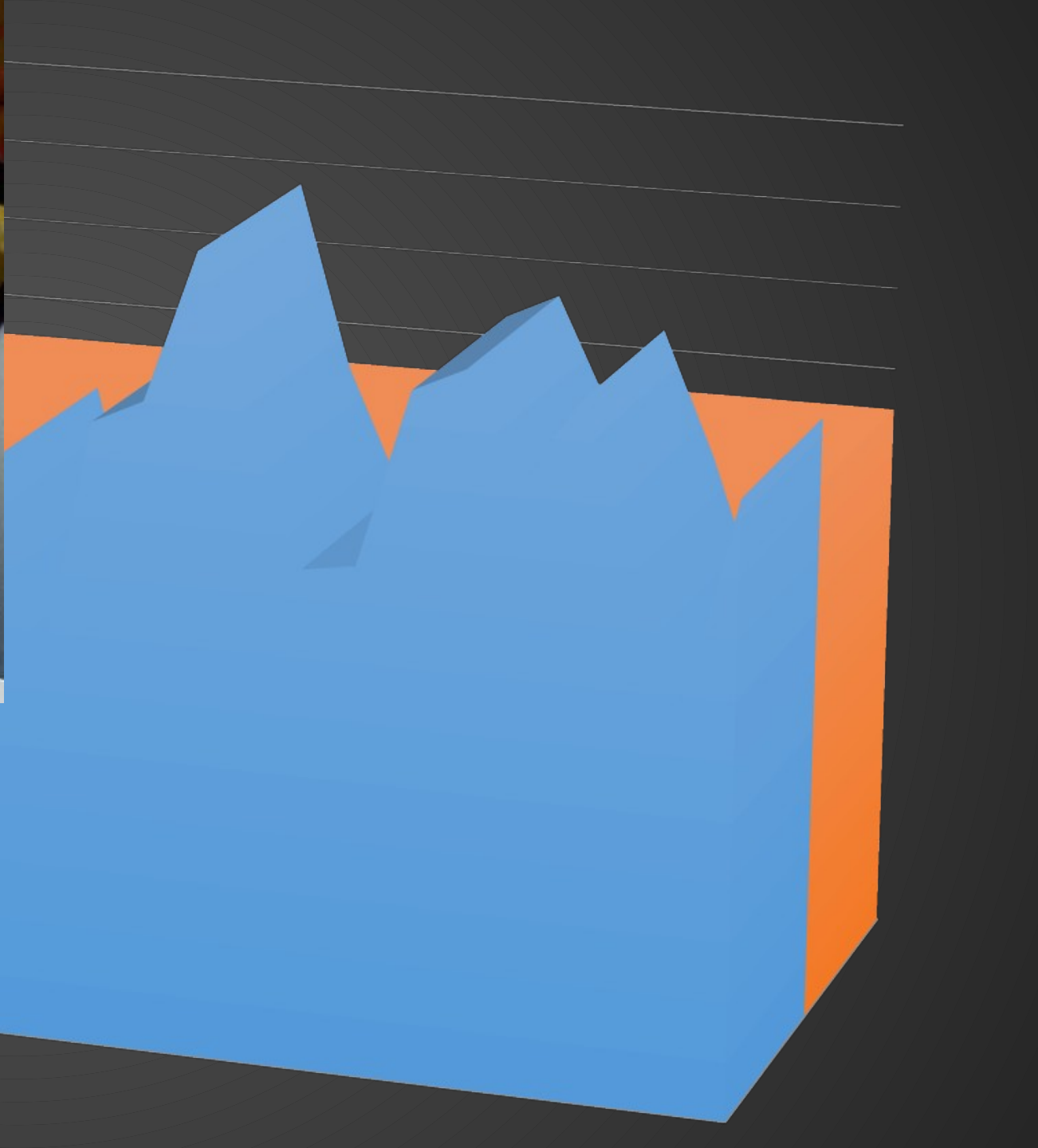


A scenic view of a mountain village. In the foreground, there are green fields and several buildings, including a prominent church with a tall, pointed steeple. The middle ground shows rolling green hills and dense evergreen forests. In the background, a massive, rugged mountain range with sharp peaks and rocky slopes dominates the landscape. The sky is filled with dramatic, dark clouds, with some light breaking through near the peaks.

www.alpine-anesthesia.com

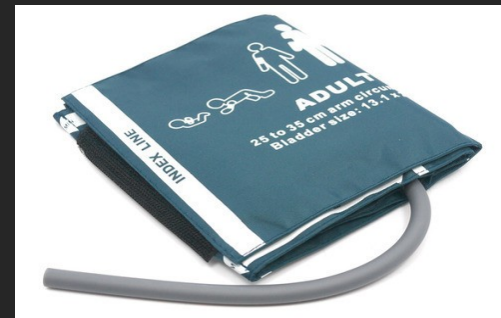


MAP
65 mmhg





**JE HYPO
MĚŘENÉ**



OPRAVDU HYPO

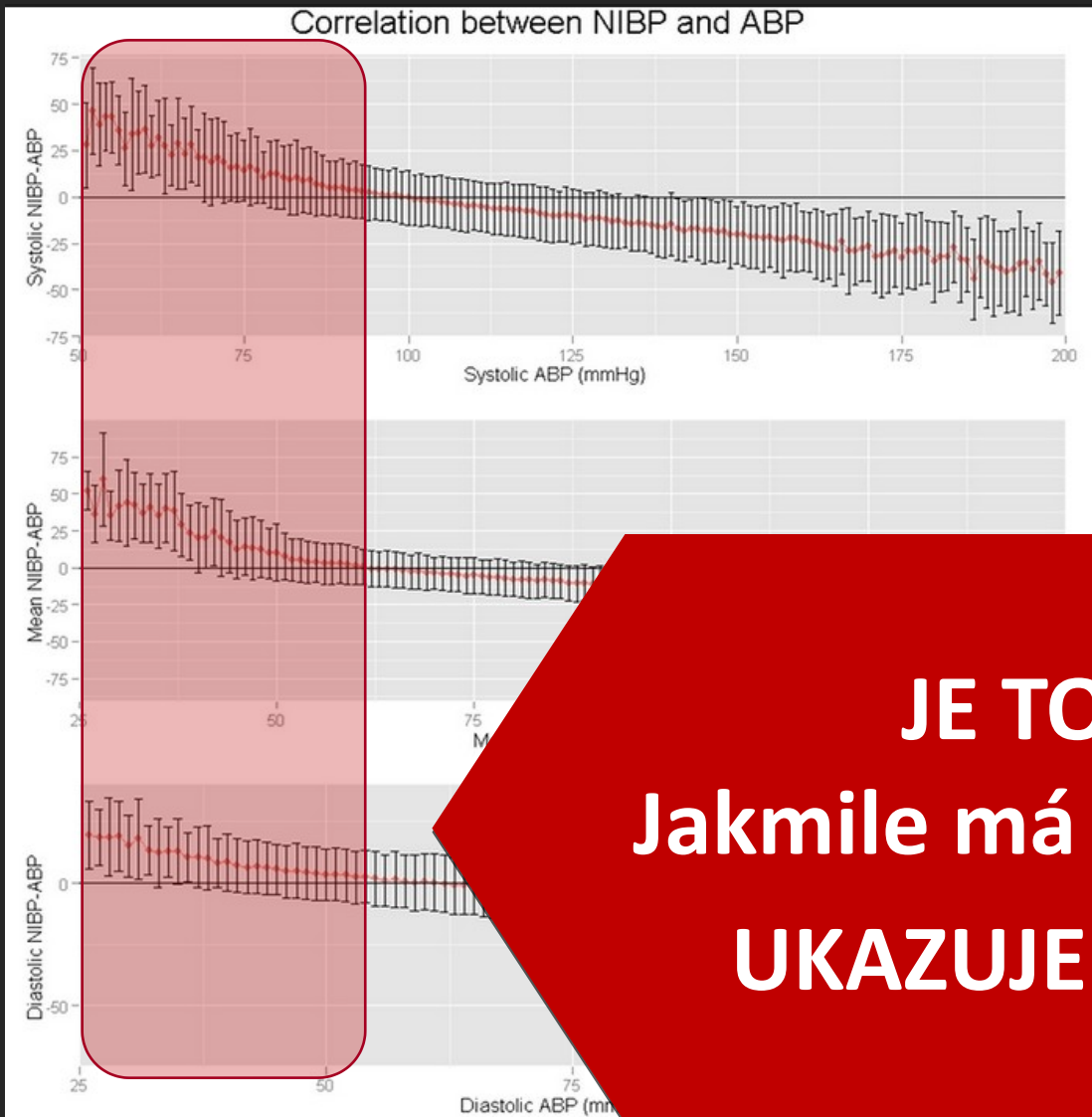


Figure 1

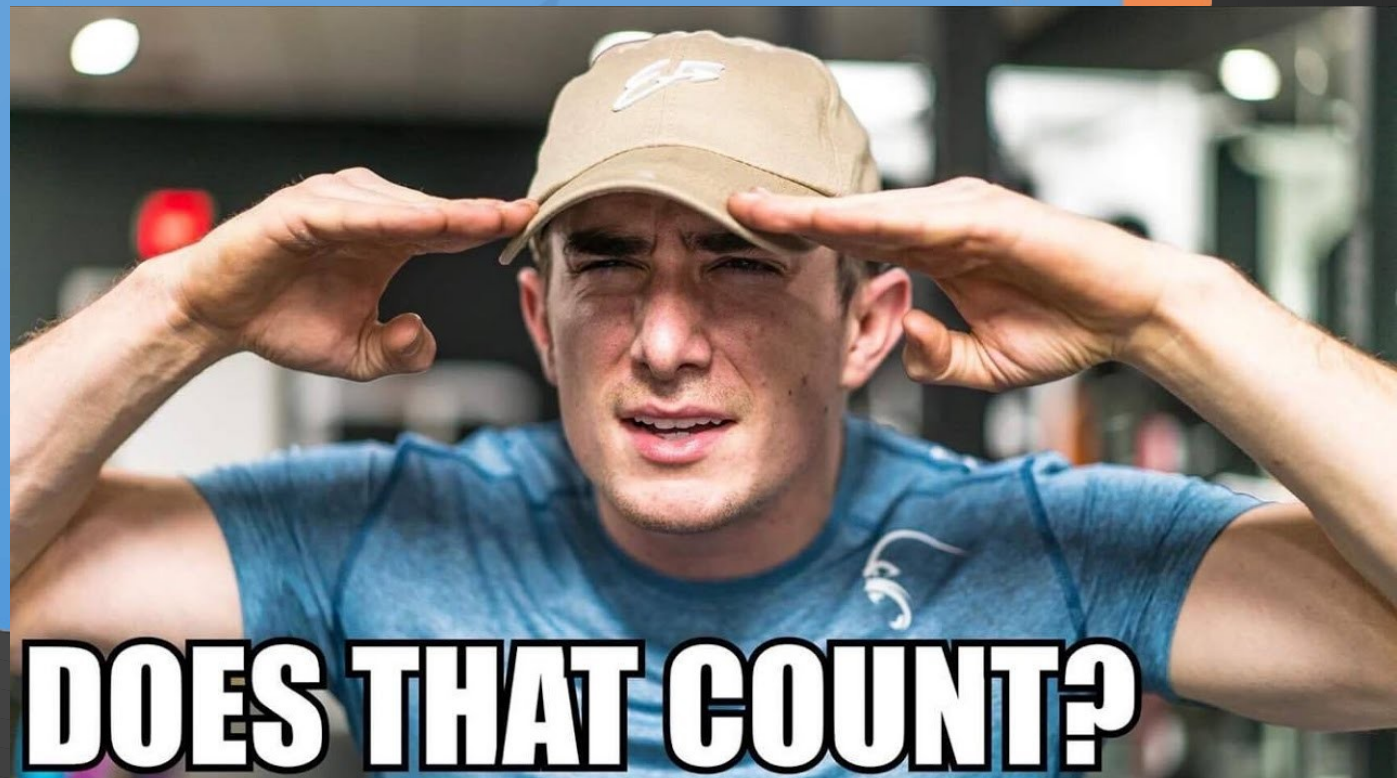
Graphical representation of the mean difference between NIBP and ABP across a physiologic range of systolic, mean, and diastolic blood pressures.

**JE HYPO
MĚŘENÉ**



**JE TO JEŠTĚ HORŠÍ !!!
Jakmile má pacient HYPO tak NIBP
UKAZUJE VYŠŠÍ HODNOTY**

HYPO

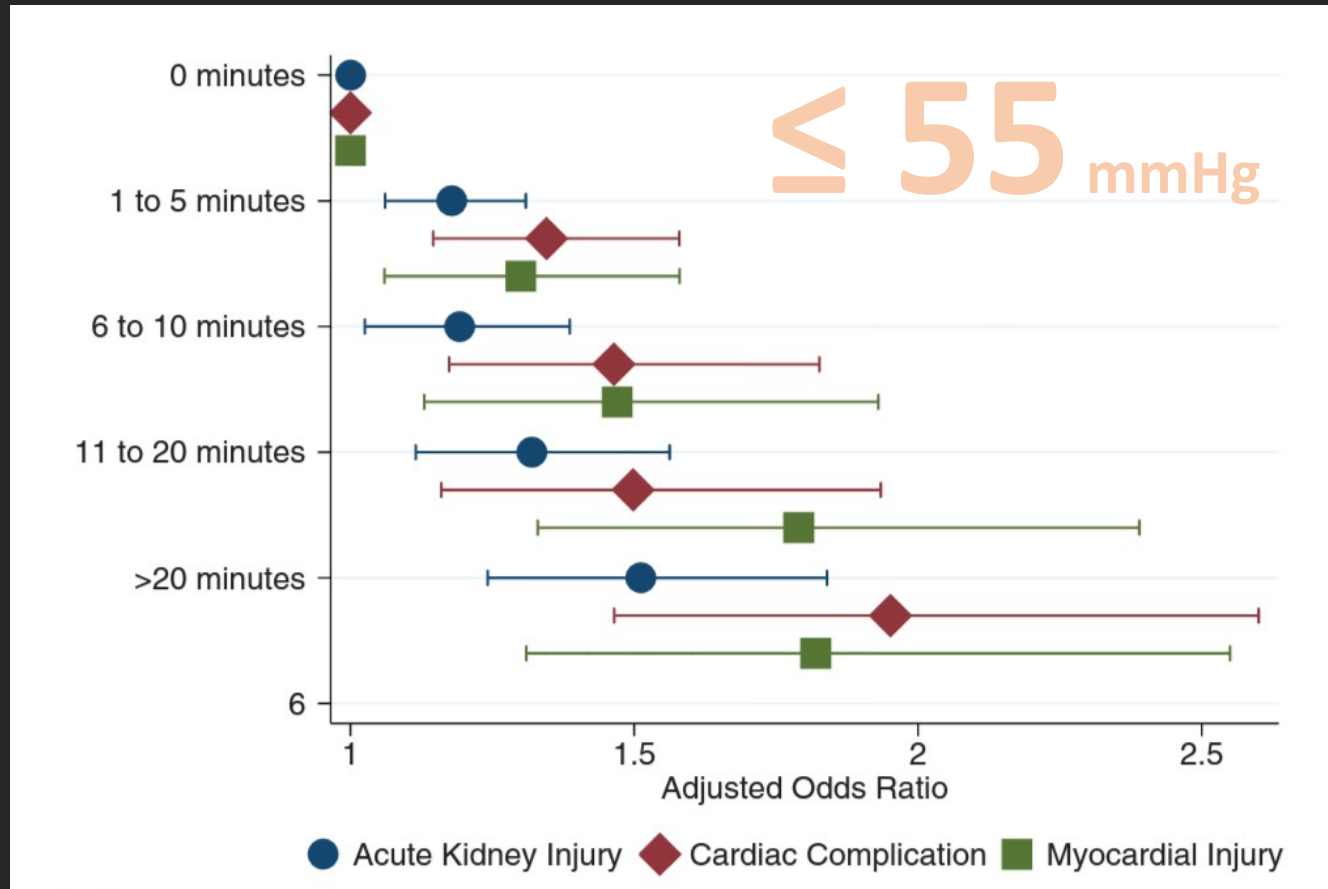


33 300 pts Nekardio operace

Relationship between Intraoperative Mean Arterial Pressure and Clinical Outcomes after Noncardiac Surgery

Toward an Empirical Definition of Hypotension

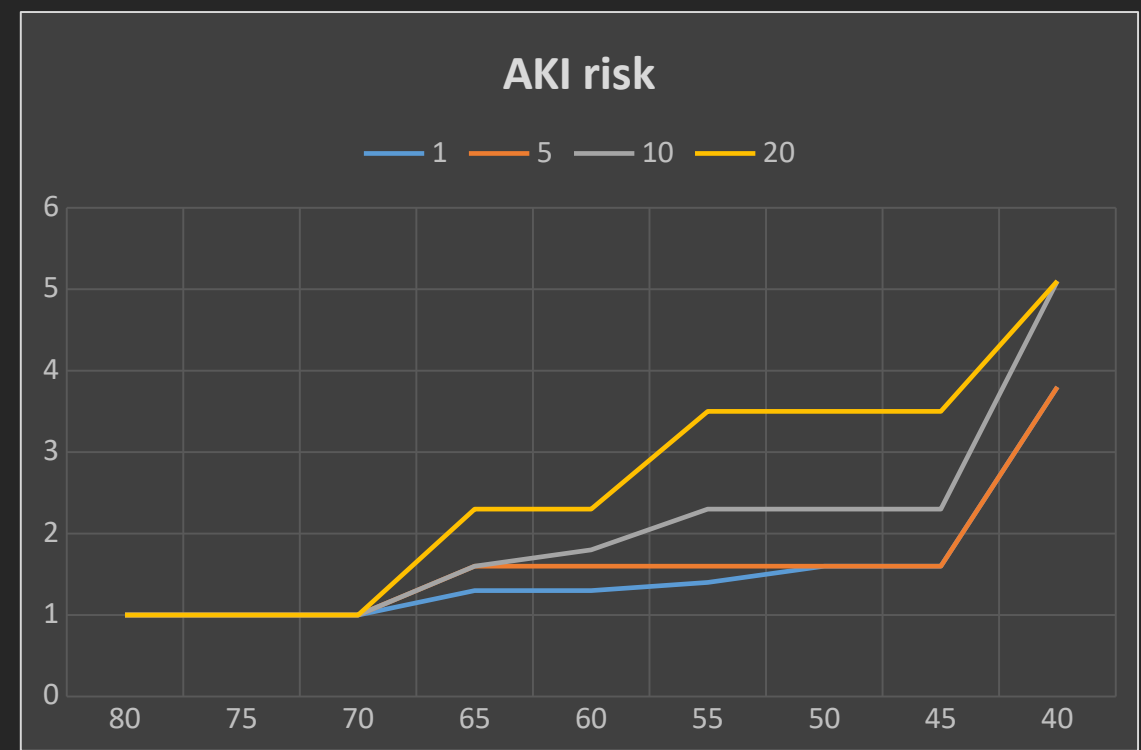
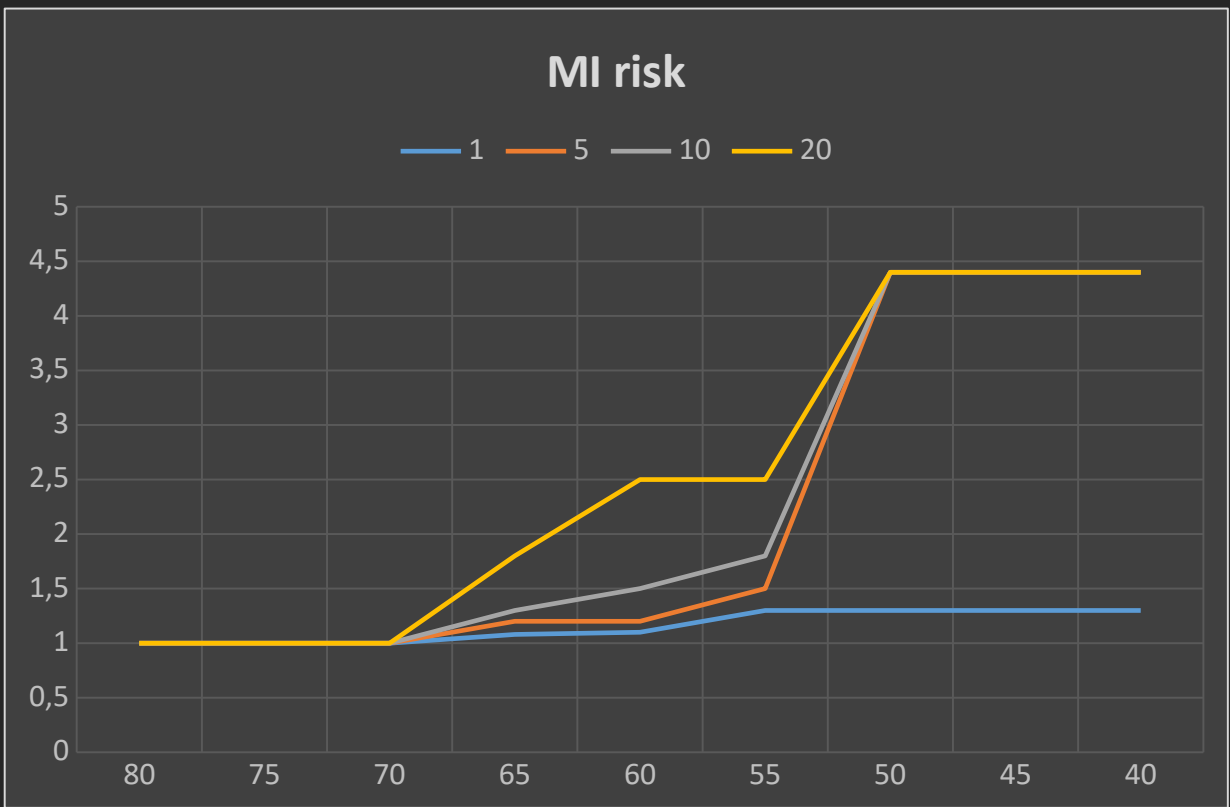
Michael Walsh, M.D.,* Philip J. Devereaux, M.D., Ph.D.,† Amit X. Garg, M.D., Ph.D.,‡
 Andrea Kurz, M.D.,§ Alparslan Turan, M.D.,|| Reitze N. Rodseth, M.D.,# Jacek Cywinski, M.D.,**
 Lehana Thabane, Ph.D.,†† Daniel I. Sessler, M.D.‡‡



Intraoperative hypotension and the risk of postoperative adverse outcomes: a systematic review

E. M. Wesselink^{1,*}, T. H. Kappen¹, H. M. Torn¹, A. J. C. Slooter² and W. A. van Klei¹

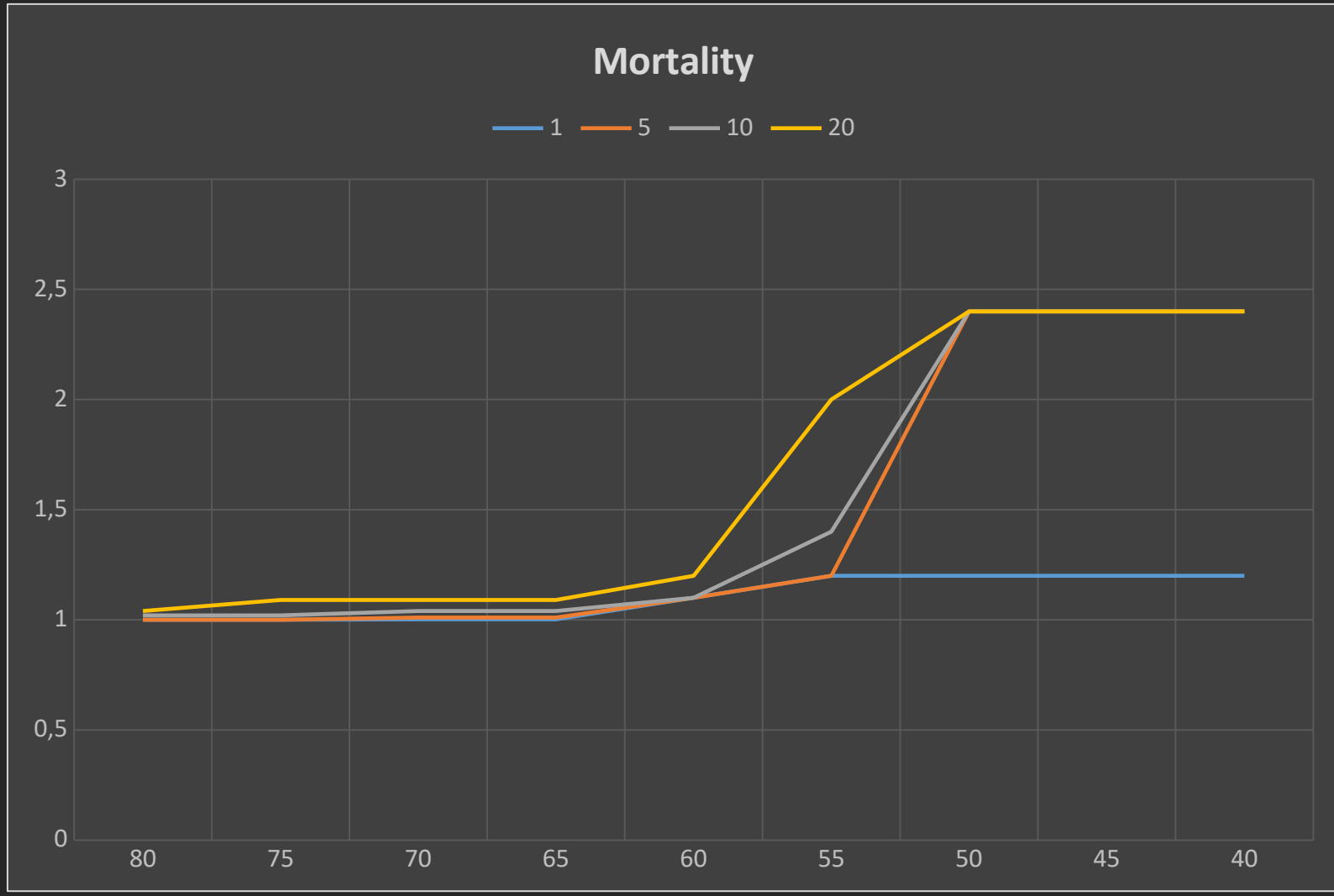
785 806 pts
42 std



Intraoperative hypotension and the risk of postoperative adverse outcomes: a systematic review

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785 806 pts
42 std

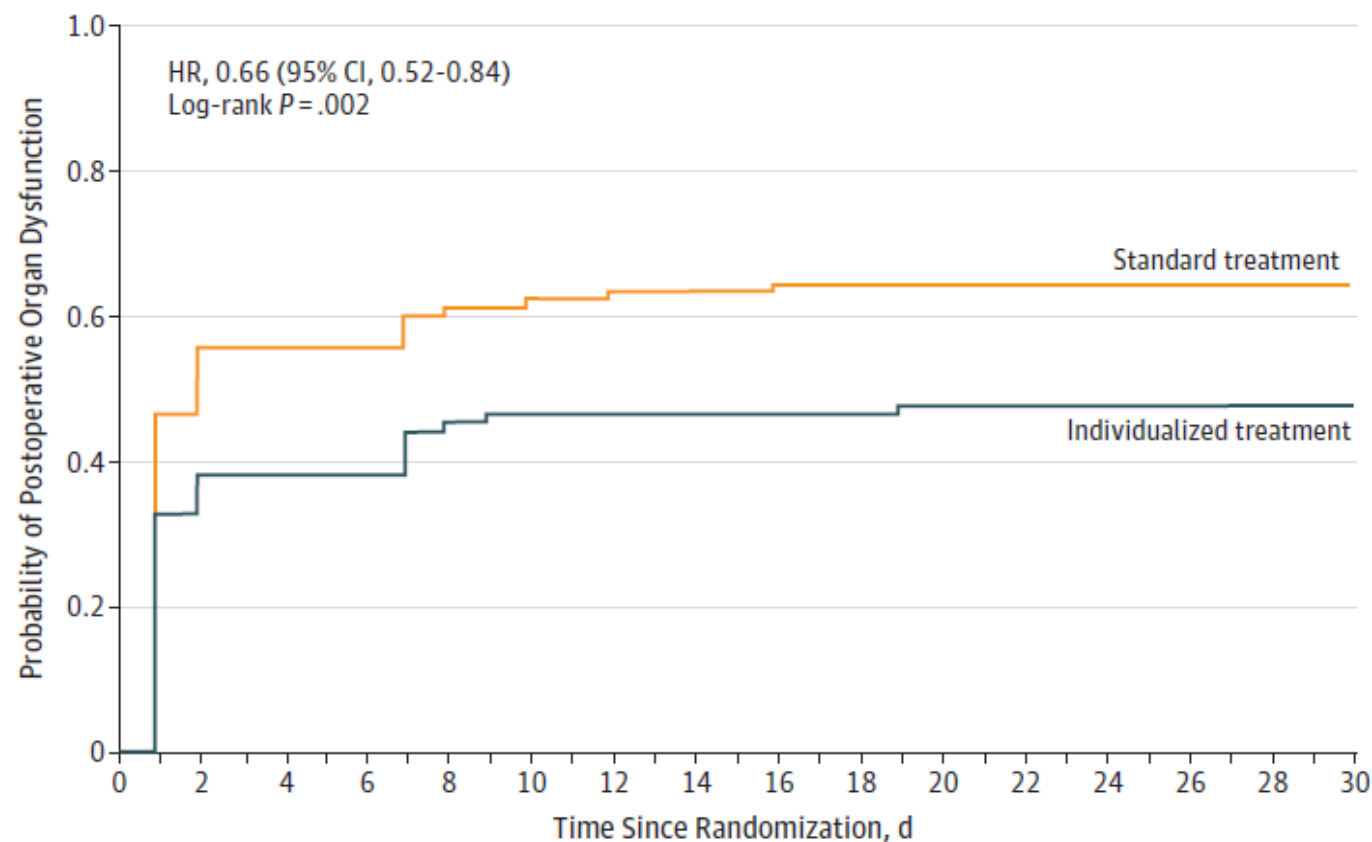


Effect of Individualized vs Standard Blood Pressure Management Strategies on Postoperative Organ Dysfunction Among High-Risk Patients Undergoing Major Surgery

A Randomized Clinical Trial

Emmanuel Futier, MD, PhD; Jean-Yves Lefrant, MD, PhD; Pierre-Gregoire Guinot, MD, PhD; Thomas Godet, MD, Philippe Cuvillon, MD, PhD; Sebastien Bertran, MD; Marc Leone, MD, PhD; Bruno Pastene, MD; Vincent Piriou, I Jacques Albanese, MD, PhD; Jean-Michel Julia, MD; Benoit Tavernier, MD, PhD; Etienne Imhoff, MD; Jean-Etien Jean-Michel Constantin, MD, PhD; Bruno Pereira, PhD; Samir Jaber, MD, PhD; for the INPRESS Study Group

Figure 3. Kaplan-Meier Estimates of the Probability of Postoperative Organ Dysfunction by Day 30 After Surgery



No. at risk	0	2	6	8	10	12	14	16	18	20	22	24	26	28	30
Standard treatment	145	78	65		58				54						53
Individualized treatment	147	99	91		82				80						79

Perioperative Quality Initiative consensus statement on intraoperative blood pressure, risk and outcomes for elective surgery

Daniel I. Sessler^{1,*†}, Joshua A. Bloomstone^{2,3,4,9,†}, Solomon Aronson⁵, Colin Berry⁶, Tong J. Gan⁷, John A. Kellum⁸, James Plumb^{11,12,13}, Monty G. Mythen^{9,10}, Michael P. W. Grocott^{9,11,12,13}, Mark R. Edwards^{11,12,13}, Timothy E. Miller^{5,9}, the Perioperative Quality Initiative-3 workgroup[‡]

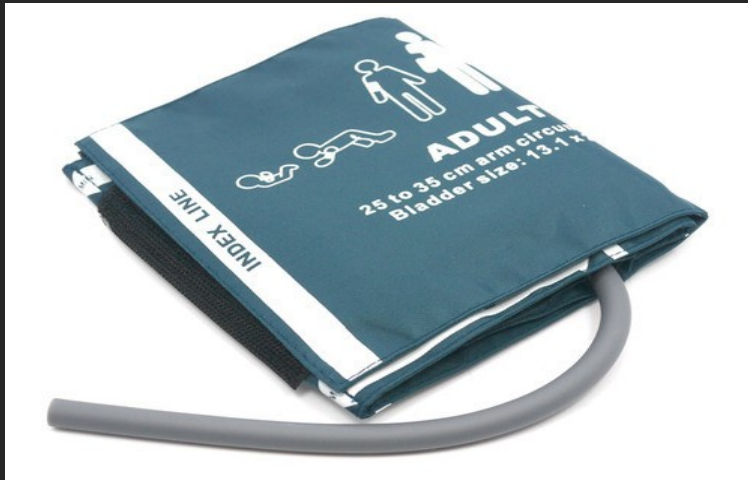
British Journal of Anaesthesia, 122 (5): 563–574 (2019)

doi: 10.1016/j.bja.2019.01.013

Advance Access Publication Date: 27 February 2019

Special Article

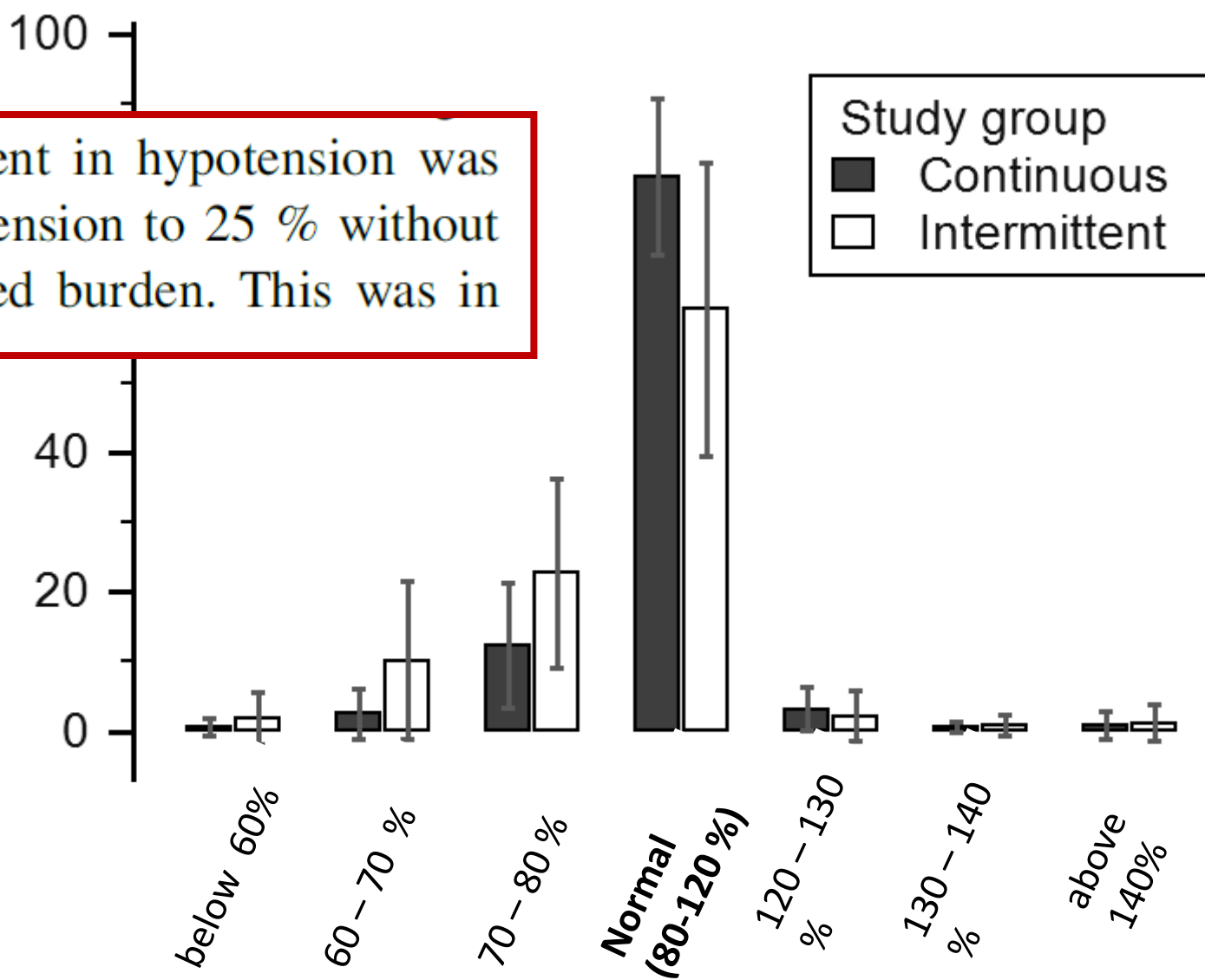
- There are strong associations between intraoperative hypotension and myocardial injury, kidney injury, and death.
- Maintaining systolic arterial pressure above 100 mm Hg and mean arterial pressure above 60–70 mm Hg may reduce risk.



Continuous non-invasive monitoring improves blood pressure stability in upright position: randomized controlled trial

Jan Benes · Alena Simanova · Tereza Tovarnicka ·
Silvie Sevcikova · Jakub Kletecka · Jan Zatloukal ·
Richard Pradl · Ivan Chytra · Eduard Kasal

The absolute and relative time spent in hypotension was reduced to 50 % and severe hypotension to 25 % without increasing the monitoring-associated burden. This was in



OPEN **A Randomized Trial of Continuous Noninvasive Blood Pressure Monitoring During Noncardiac Surgery**

Kamal Maheshwari, MD, MPH,*† Sandeep Khanna, MD,† Gausan Ratna Bajracharya, MD,* Natalya Makarova, MS,‡ Quinton Riter, BS,* Syed Raza, BS,* Jacek B. Cywinski, MD,† Maged Argaliou, MD, MBA, MEd, FASE,† Andrea Kurz, MD,*† and Daniel I. Sessler, MD*

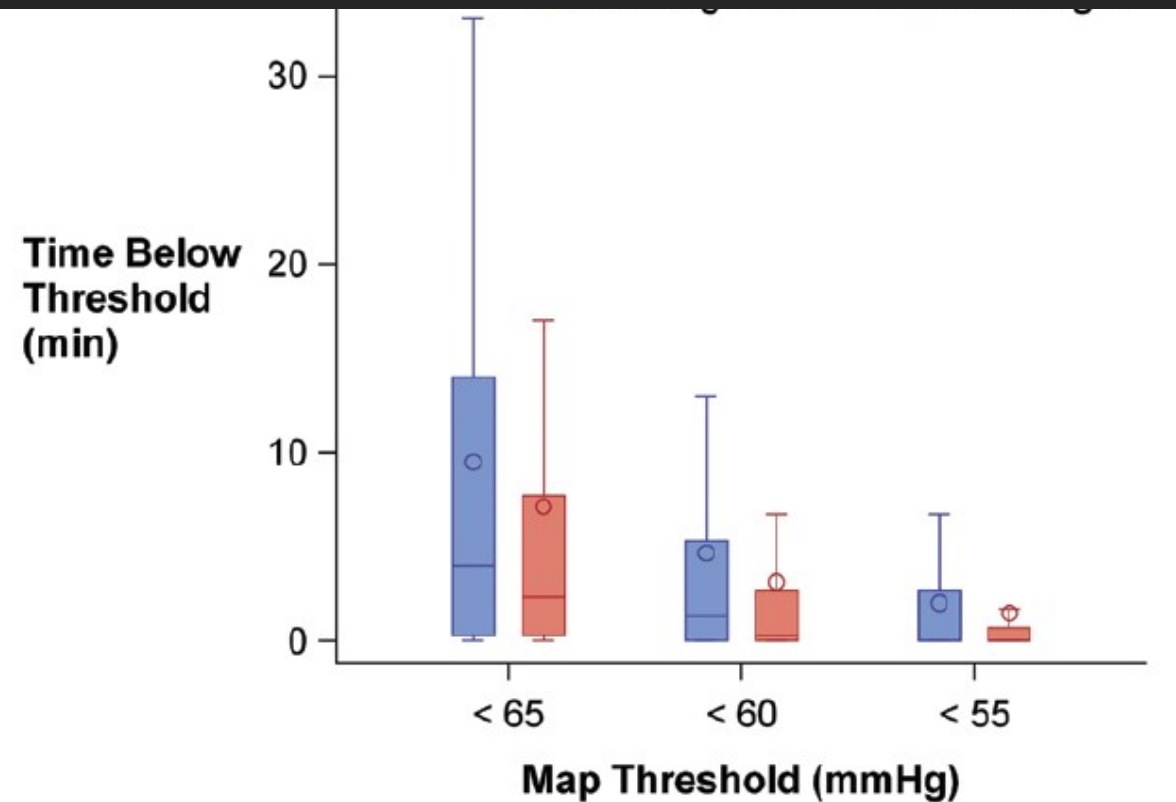


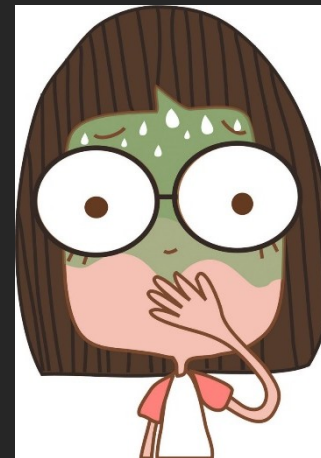
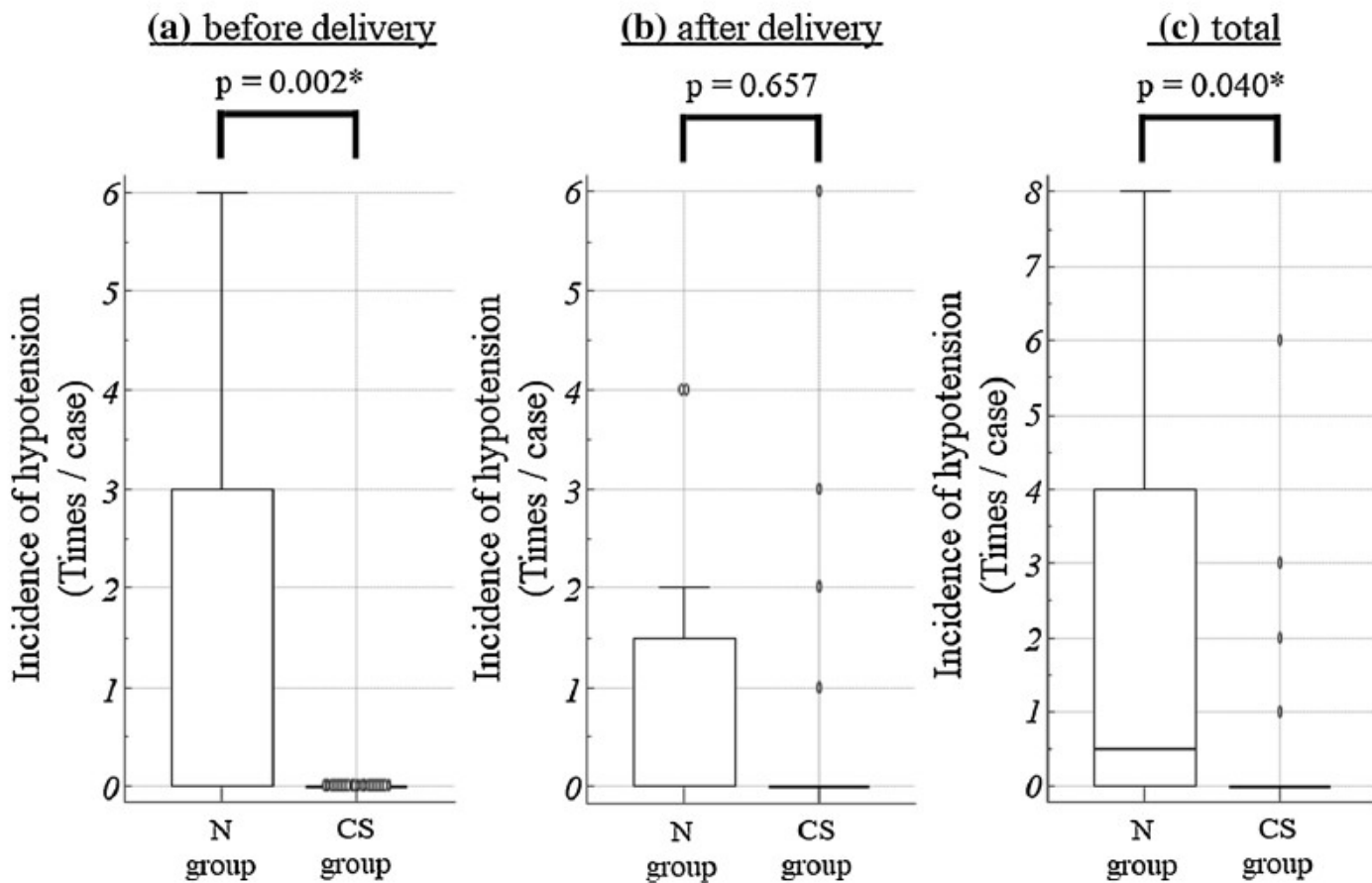
Figure 3. Intraoperative time patients spent below mean arterial pressure (MAP) thresholds of 65, 60, and 55 mm Hg.

CONCLUSIONS: Continuous noninvasive hemodynamic monitoring **nearly halved the** amount of intraoperative hypotension. Hypotension reduction with continuous monitoring, while statistically significant, is currently of uncertain clinical importance. (Anesth Analg 2018;127:424–31)

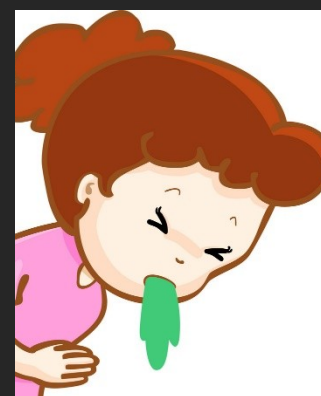


Impact of non-invasive continuous blood pressure monitoring on maternal hypotension during cesarean delivery: a randomized-controlled study

Takashi Juri¹ · Koichi Suehiro¹ · Aya Kimura¹ · Akira Mukai¹ · Katsuaki Tanaka¹ · Tokuhiko Yamada¹ · Takashi Mori¹ · Kiyonobu Nishikawa¹



9 : 2
 $(p=0.0012)$



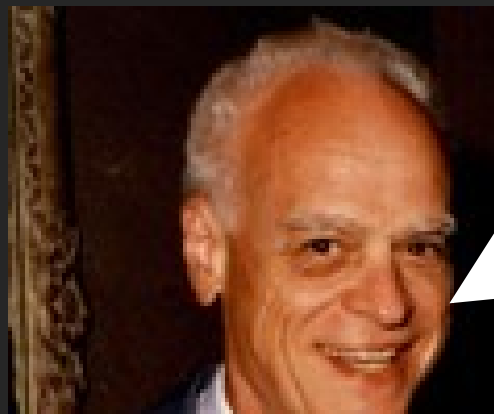
1 : 0
 $(p=ns)$

HYPO - TENZE

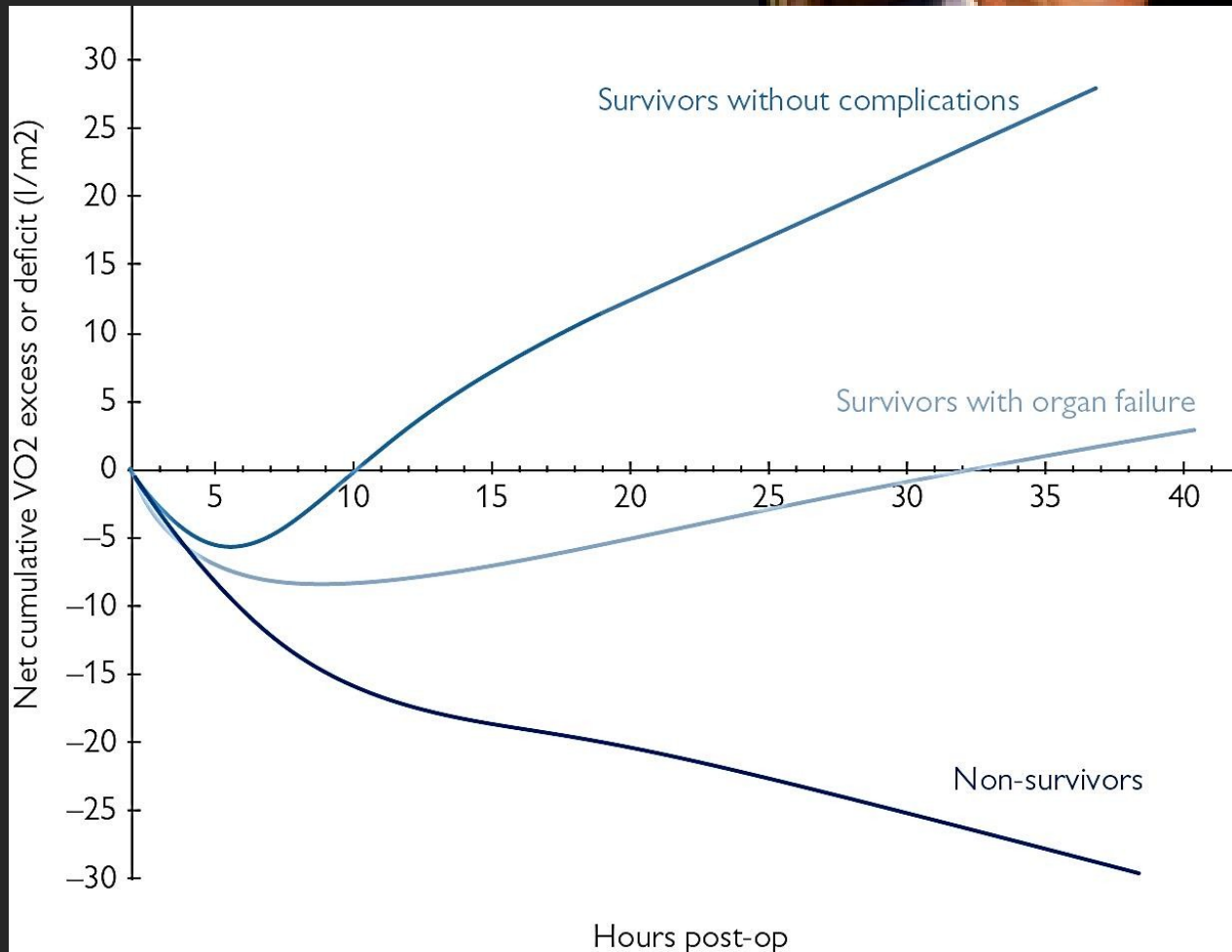


HYPO - PERFUZE

BACK TO THE 80's



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



Research

Open Access

Occult hypoperfusion is associated with increased mortality in hemodynamically stable, high-risk, surgical patients

André Meregalli¹, Roselaine P Oliveira¹ and Gilberto Friedman²

- Pooperační průběh 44 „stabilních“ (TK, SF, diuréza) vysoce rizikových pacientů
- Rozdíl v hladině laktátu (při příjmu a po 12 hod).

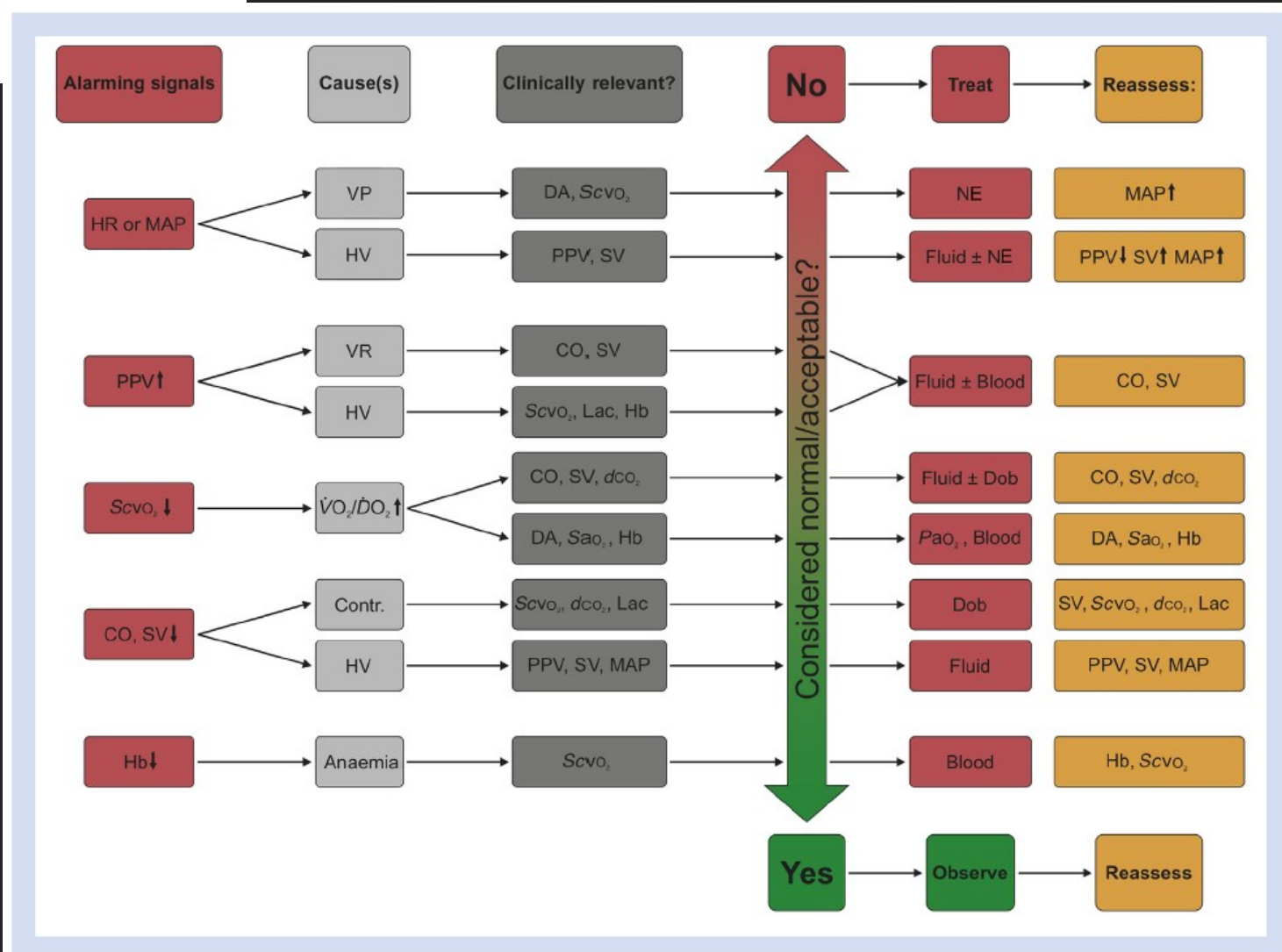
Key messages

- Survival rates in high-risk surgical patients are associated with an adequate resuscitation
- Adequate resuscitation cannot be based only on normalization of vital signs
- Elevated blood lactate levels despite normal vital signs (occult hypoperfusion) are good markers of mortality in surgical patients
- Resolution of persistent occult hypoperfusion may improve mortality rates in surgical patients

EDITORIALS

Intraoperative hypotension is just the tip of the iceberg: a call for multimodal, individualised, contextualised management of intraoperative cardiovascular dynamics

Zsolt Molnar^{1,2}, Jan Benes^{3,4,5} and Bernd Saugel^{6,7,*}



Perioperative goal directed therapy—current view

Jan Zatloukal^{1,2}, Jiri Pouska^{1,2}, Jan Beneš^{1,2,3}

ORIGINAL ARTICLE

Does goal-directed haemodynamic and fluid therapy improve peri-operative outcomes?

A systematic review and meta-analysis

Matthew A. Chong, Yongjun Wang, Nicolas M. Berbenetz and Ian McConachie

95 STUDIÍ

11 659 PTS

Table 1 Summary of the major positive outcomes of pGDT based on the meta-analysis by Chong *et al.* (7) and studies listed in *Table 2* (mortality only)

Parameter	Number of studies [subjects]	GRADE of evidence	Relative effect	Number needed to treat
Hospital LOS	62 [8,797]	Very low	-0.90 (0.48–1.32) days	N/A
Wound infection	32 [3,593]	Low	0.48 (0.37–0.63)	19
AKI	37 [4,310]	Low	0.73 (0.58–0.92)	29
Pneumonia	29 [2,776]	Low	0.69 (0.52–0.92)	38
Mortality [Chong <i>et al.</i> (7)]	52 [5,550]	Low	0.66 (0.50–0.87)	59
Mortality (<i>Table 2</i>)	94 [12,113]	N/A	0.80 (0.71–0.90)	56

pGDT, perioperative goal directed therapy; AKI, acute kidney injury; GRADE, Grades of Recommendation Assessment, Development and Evaluation; LOS, length of stay; N/A, not available.

Mortalita: OR 0,66, NNT - 59

Morbidity:

Pneumonie – OR 0.69 NNT – 38

AKI – 0.72 NNT – 29

Ranná infekce - 0.48 NNT – 19

Nemocniční LOS: -0,9 dne

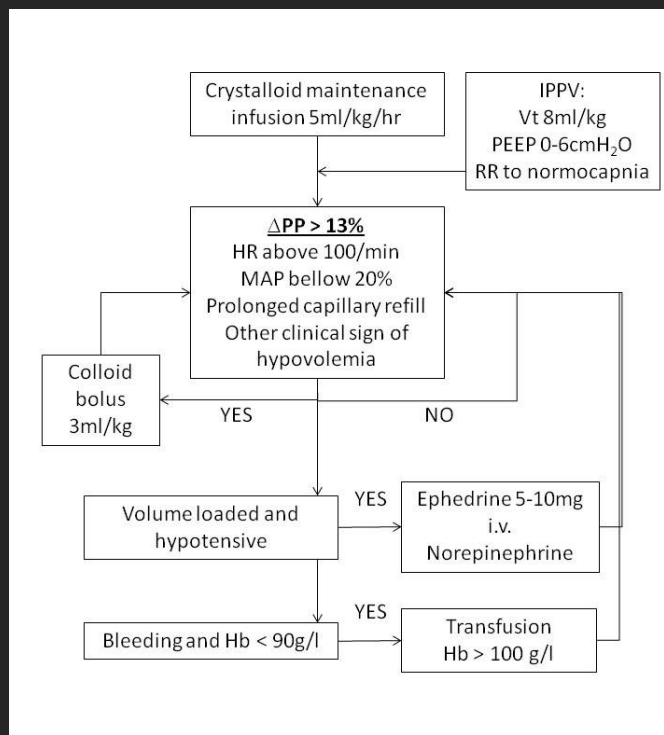


Fluid management guided by a continuous non-invasive arterial pressure device is associated with decreased postoperative morbidity after total knee and hip replacement

Jan Benes*, Lenka Haidingerova, Jiri Pouska, Jan Stepanik, Alena Stenglova, Jan Zatloukal, Richard Pradl, Ivan Chytra and Eduard Kasal

Cíl: Restrictivní tekutiny PPV < 13 %

Frekvence komplikací

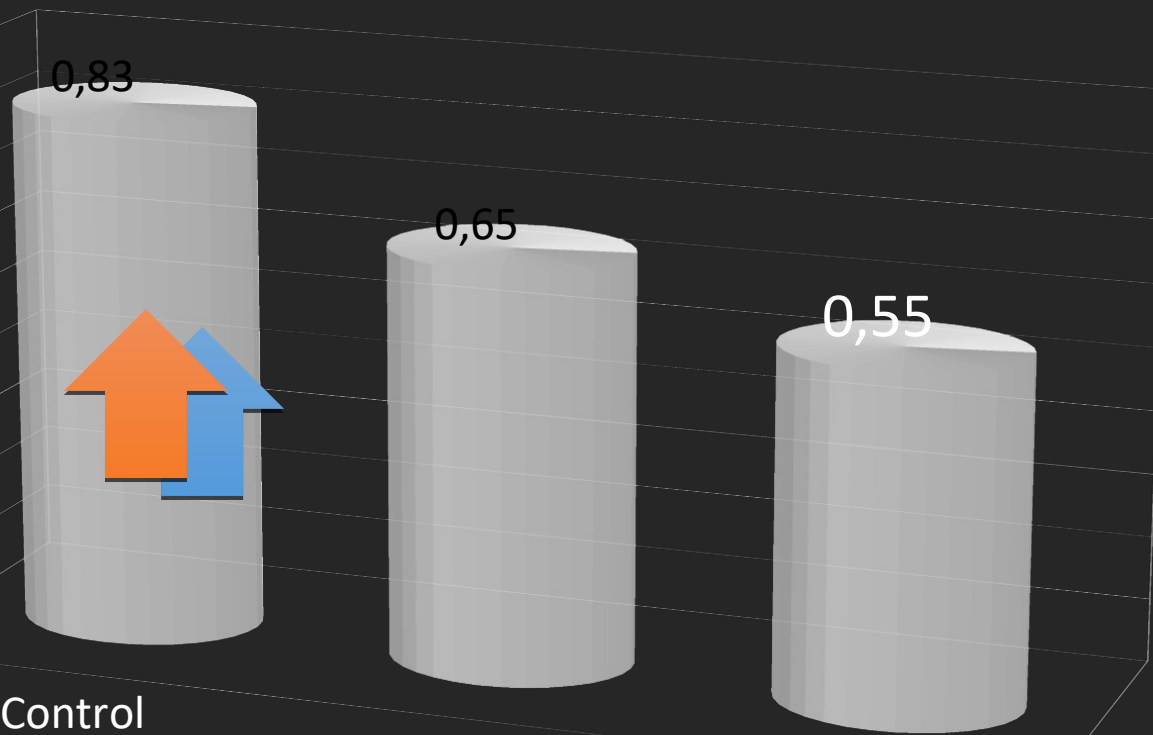


90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

Control

Continuous
BP

PPV





APPLANATION
TONOMETRY



VOLUME CLAMP



PULSE WAVE
TRANSIT TIME

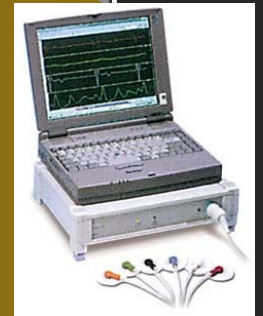


CO2
REBREATHING

PLETHYSMOGRAPHY



CURRENT
(BIOIMPEDANCE)
/BIOREACTANCE





VOLUME CLAMP

**PROTO
PRO
NAŠE
PACIENTY
MÁ
VÝZNAM**



**JESTLI SE
HYPu
DOKÁŽÍ
VYHNOUT
NEBO SE
POTOPÍ**

AKUTNÍ STŘEDY

webináře portálu **AKUTNĚ.CZ**



ČESKO-SLOVENSKÉ
FÓRUM PRO SEPSI



smai



Central and Eastern European
Sepsis Forum



Česká společnost anesteziologie,
resuscitace a intenzivní medicíny



ČESKÁ SPOLEČNOST
INTENZIVNÍ MEDICÍNY



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OF SEPSIS

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MUDr. **Roman Kulíšek**, Ph.D.
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Zakladatel a organizátor

.. a sledujte nás na ...