ANESTEZIE U CÍSAŘSKÉHO ŘEZU

JAN BLÁHA
KLINIKA ANESTEZIOLOGIE, RESUSCITACE A INTENZIVNÍ MEDICÍNY

1. LÉKAŘSKÁ FAKULTA
Univerzita Karlova

VŠEOBECNÁ FAKULTNÍ NEMOCNICE V PRAZE

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AKUTNÍ nebo AKUTNÍ! ?

- bradykardie plodu
- prolaps pupečníku
- masivní krvácení
- eklampsie
- …

THE ASPIRATION OF STOMACH CONTENTS INTO THE LUNGS DURING OBSTETRIC ANESTHESIA*

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Summary

Sixty-six cases of aspiration of stomach contents into the lungs during obstetric anesthesia are analyzed. The incidence of this complication is 0.15 per cent in 44,016 pregnancies at the New York Lying-In Hospital from 1932 to 1945.

Am J Obstet Gynecol 1945;49:554–66.

Table 7 Reported incidence of aspiration in obstetric and general surgical populations

Study	No. of cases	Patient group characteristics	Incidence of aspiration [no. of cases]
This study	1870	Obstetric; peripartum; nonintubated	0.053% [1]
Kranz & Edwards [3]	37 282	Obstetric; vaginal delivery; nonintubated	0.013% [5]
Kranz & Edwards [3]	3076	Obstetric; Caesarean section; intubated	0.228% [7]
Olsson *et al.* [2]	2643	Obstetric; Caesarean section; intubated	0.15% [4]
Olsson *et al.* [2]	111 215	General surgery; nonintubated	0.018% [20]
Olsson *et al.* [2]	74 143	General surgery; intubated	0.085% [63]
Cohen *et al.* [5]	112 000	General surgery; intubated and nonintubated	0.064% [72]
Kallar [6]	529 150	Outpatients; intubated and nonintubated	0.017% [90]
Warner *et al.* [4]	13 427	General surgery; emergency	0.112% [15]
Warner *et al.* [4]	202 061	General surgery; elective	0.0257% [52]

Ezri et al. Anaesthesia 2000; 55:421-426

Anaesthesia, 1993, Volume 48, pages 53–57

Forum

An evaluation of gastric emptying times in pregnancy and the puerperium

E. M. Whitehead,* BSc, FFARCS, Research Registrar, M. Smith,† MB, BS, FFARCS, Y. Dean, MB, BS, FRCA, Senior Registrars, G. O'Sullivan, MD, FFARCS, Consultant Anaesthetist, St Thomas' Hospital, Lambeth Palace Road, London SE1 7EH.

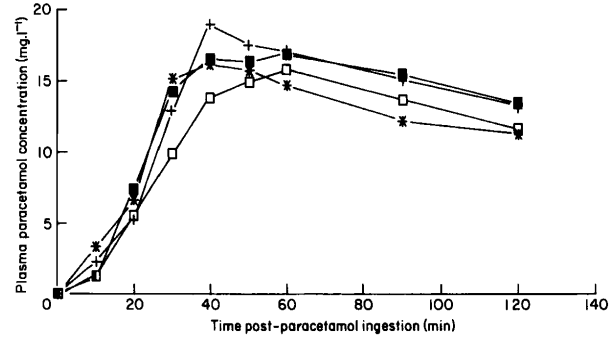


Fig. 1. Plasma paracetamol concentration vs time postparacetamol ingestion for the control (■), first (+), second (*) and third (□) trimester groups. Plasma paracetamol concentrations are expressed as median values.

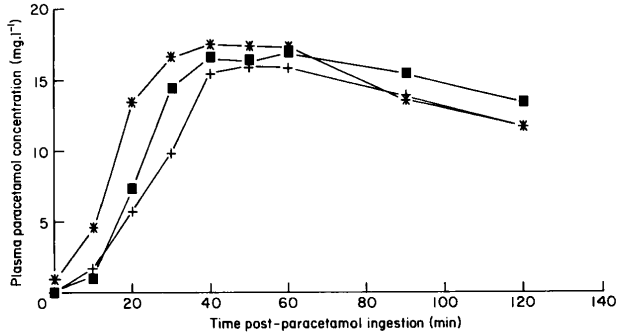


Fig. 2. Plasma paracetamol concentration vs time postparacetamol ingestion for the control group (■) and 30 females during the third trimester of pregnancy (+) and postdelivery between 18 and 48 h (*). Plasma paracetamol concentrations are expressed as median values.

POROD Z POHLEDU ANESTEZIOLOGA – INFORMACE PRO RODIČKY

PLÁNOVANÝ CÍSAŘSKÝ ŘEZ

V případech, kdy je jasné, že porod nebude veden spontánně, provádí se plánovaný císařský řez. Rodička je na něj předem připravena. Má kompletní předoperační vyšetření, je poučena o nutnosti lačnění, dostane léky snižující riziko komplikací během operace. Vyplní ***Anesteziologický dotazník*** *(F-KARIM-049)* a podepíše ***Informovaný souhlas s anestezií a následnou poanestetickou péčí*** *(IS-KARIM-001)*.

Jídlo a pití před operací:

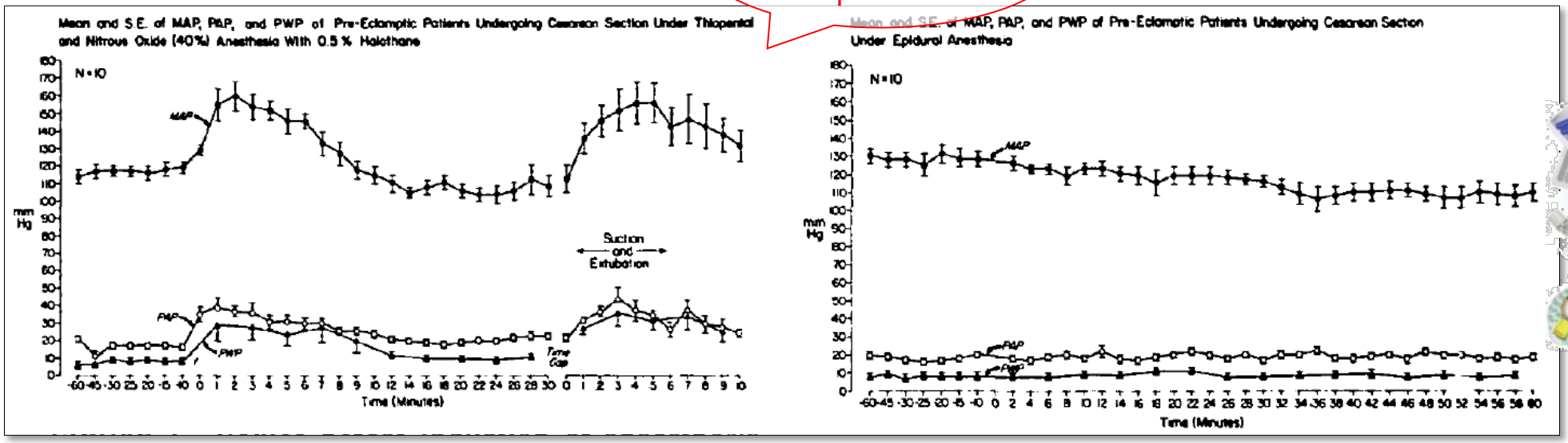
Den před výkonem rodička jí a pije normálně, a to až do půlnoci. Pokud se s anesteziologem nedohodne jinak, od 03:00 by již neměla jíst, především nesnídat. Pít může rodička volně do 6 hodin ráno, poté již jen po malých doušcích maximálně 200 ml v průběhu každé celé hodiny. Doporučuje se čistá voda, nesycená minerálka, slabý čaj. Tekutiny mohou být ochucené, sladké, je možno si ráno dát i kávu s mlékem. V žádném případě nepít sycené („bublinkové") vody, kyselé džusy, mléko.

Ostatní příprava:

Ráno před operací, po příjmu na porodní sál, je rodičce podána tableta ranitidinu a tableta metoklopramidu, oboje pro prevenci zvracení a snížení kyselosti žaludečního obsahu.

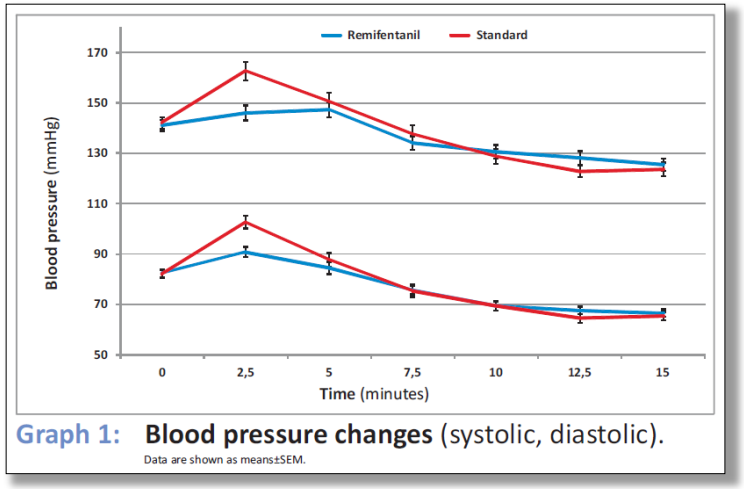
Jasný rozdíl je
v stresové hemodynamické
odpovědi !!!.

Hodgkinson et al. Can J Anesth 1980 27: 389-394.

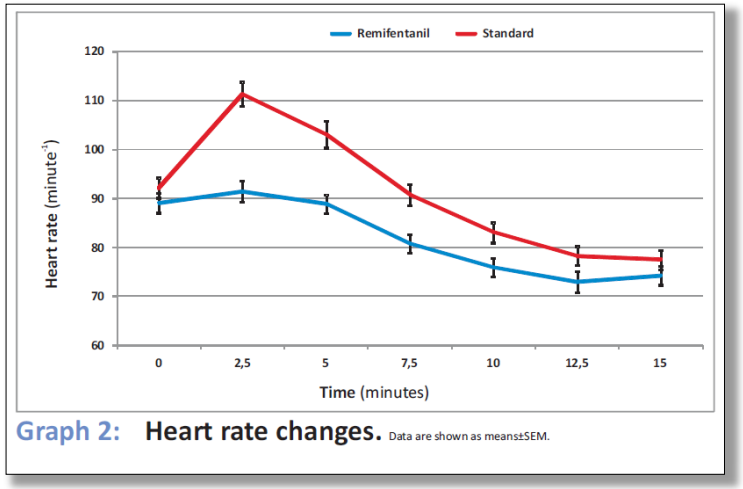


remifentanil

1 µg/kg před úvodem
do celkové anestezie

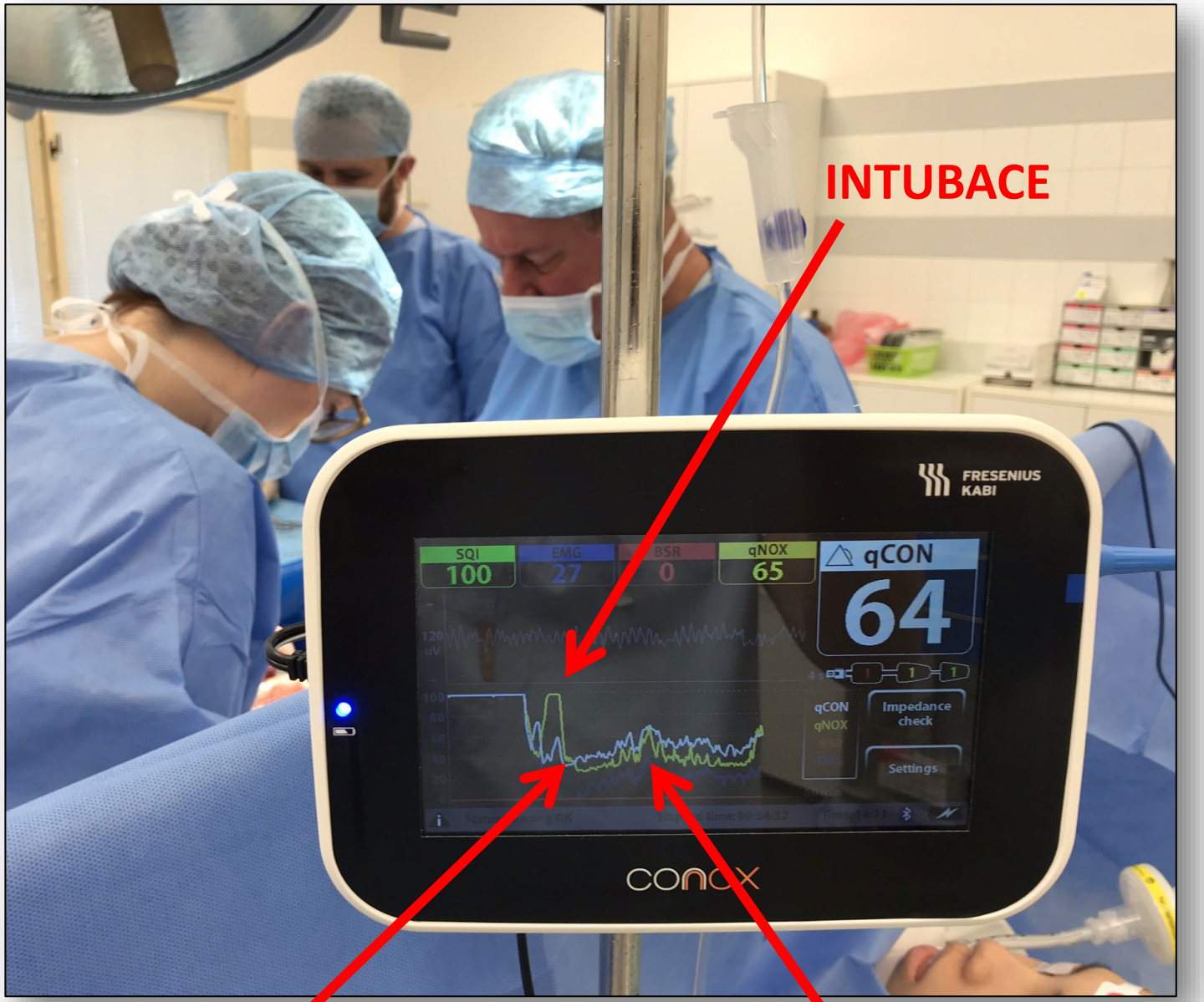


Graph 1: **Blood pressure changes** (systolic, diastolic).
Data are shown as means±SEM.



Graph 2: **Heart rate changes.** Data are shown as means±SEM.

Nosková, Bláha et al. BMC Anesthesiology 2015



INCIZE

„REVIZE“ BŘICHA

XXIX.
kongres České společnosti
anesteziologie, resuscitace
a intenzivní medicíny

Česká společnost anesteziologie, resuscitace a intenzivní medicíny

5.-7. října 2023
CLARION CONGRESS HOTEL PRAGUE
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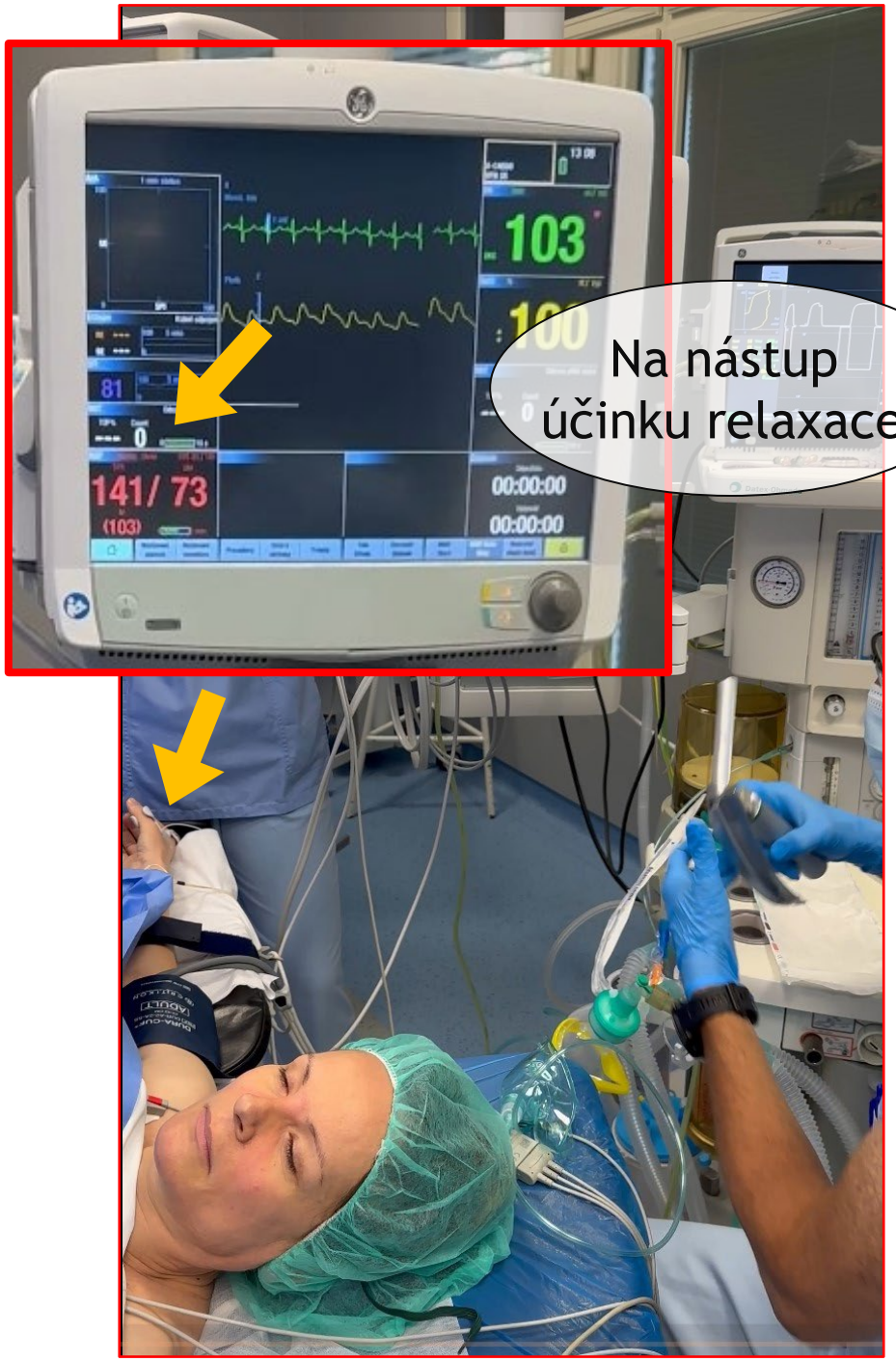
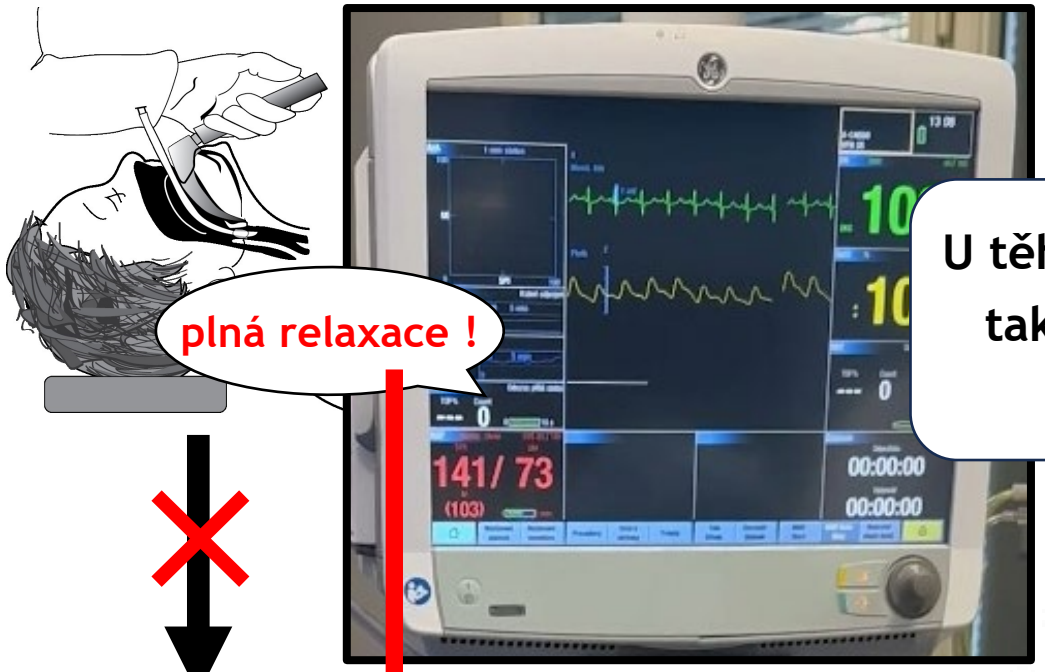
Kam se to
pořád dívá?


Čas podání relaxace!


Na nástup
účinku relaxace!

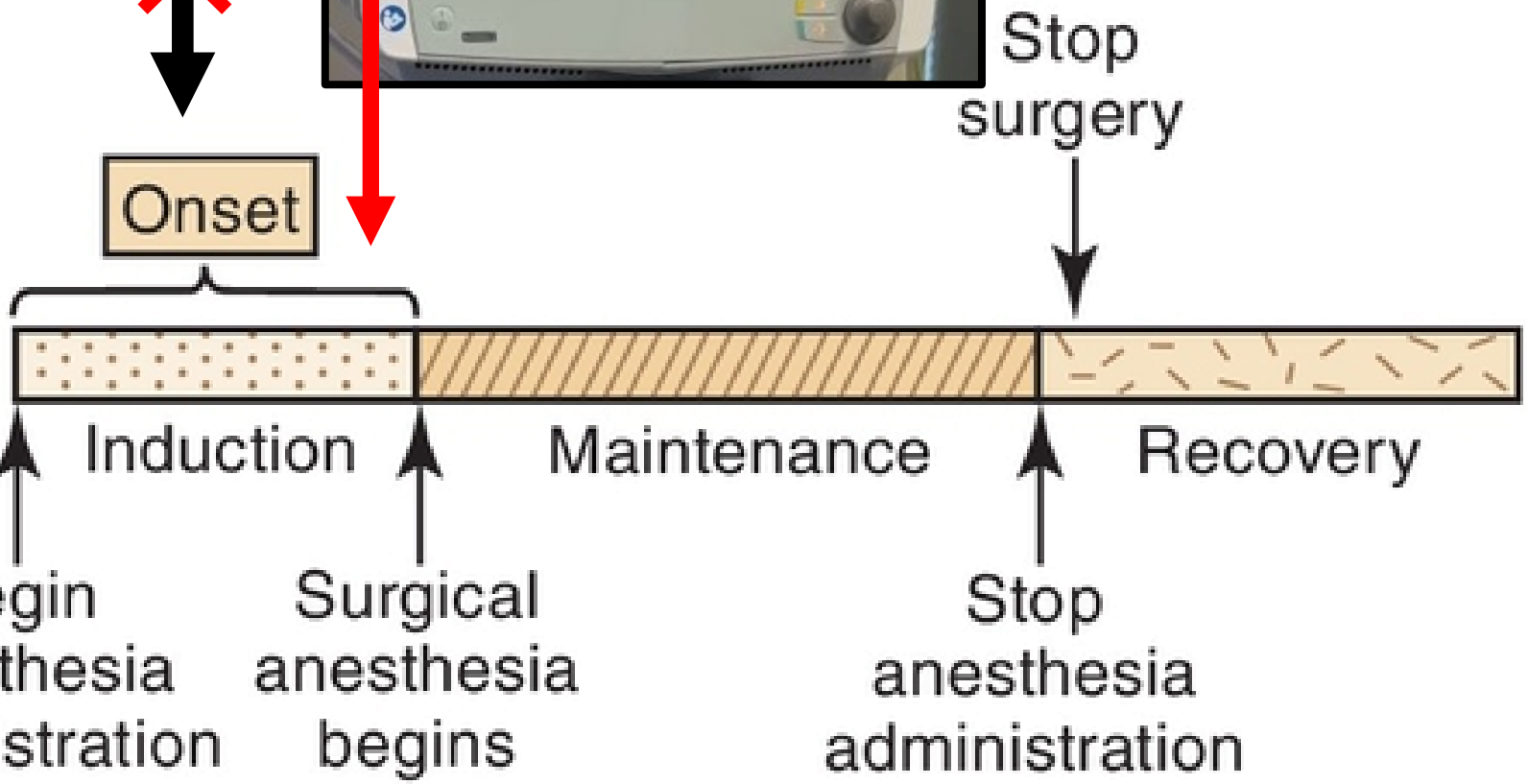


Na nástup
účinku relaxace!



plná relaxace !

U těhotné je 10x vyšší riziko obtížné intubace, tak si musíme vytvořit optimální podmínky, a ne nedostatečné!



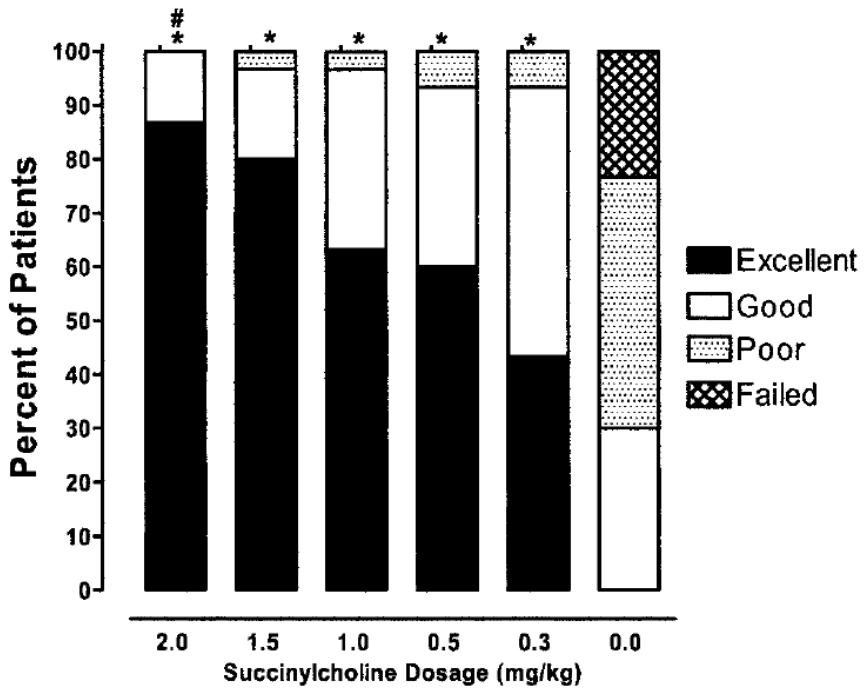


Figure 1. Intubating conditions with different doses of succinylcholine (n = 30 in. each group). The incidence of excellent intubating conditions was significantly more frequent ($^*P < 0.001$) in patients receiving succinylcholine than in those of the control group and in the 2.0 mg/kg succinylcholine group ($^{\#}P < 0.05$) than in the 0.3 mg/kg succinylcholine group (Kruskal-Wallis test for multiple comparisons).

Table 3. Onset Times and Durations of Neuromuscular Block

Succinylcholine dose (mg/kg)	Onset time(s)	Duration of block (min)	n
0.3	72 ± 30	4.4 ± 1.4	13
0.5	68 ± 44	5.2 ± 1.8	27
1.0	53 ± 23	5.9 ± 1.9†	30
1.5	56 ± 31	7.2 ± 2*	30
2.0	52 ± 21	7.5 ± 1.7*	30

Values are means ± SD.
*$P < 0.01$ *versus* succinylcholine 0.3, 0.5, and 1.0 mg/kg groups; †$P < 0.05$ *versus* succinylcholine 0.3 mg/kg group.

Doba nástupu účinku i čas do intubace jsou na dávce závislé !

Naguib M et al. Anesth Analg 2006;102:151–5

TABLE 24-1 COMMON WEIGHT SCALARS

Name	Equations
Ideal body weight	Male: 50 kg + 2.3 kg for each 2.54 cm (1 in) over 152 cm (5 ft) Female: 45.5 kg + 2.3 kg for each 2.54 cm (1 in) over 152 cm (5 ft)
Lean body mass	Male: $1.1 \times TBW - 128 \times (TBW \div Ht)^2$ Female: $1.07 \times TBW - 148 \times (TBW \div Ht)^2$
Fat free mass[35]	Male: $(9.27 \times 10^3 \times TBW) \div (6.68 \times 10^3 + 216 \times BMI)$ Female: $(9.27 \times 10^3 \times TBW) \div (8.78 \times 10^3 + 244 \times BMI)$
Pharmacokinetic mass[36,37]	$52 \div [1 + (196.4 \times e^{-0.025\ TBW} - 53.66) \div 100]$ (fentanyl only)
Corrected body weight[38,39]	IBW + 0.4* (IBW – FFM)

BMI, Body mass index; *FFM*, fat-free mass; *Ht*, height in centimeters; *IBW*, ideal body weight; *LBM*, lean body mass; *MFFM*, modified fat-free mass; *TBW*, total body weight in kg.
*The dose/kg using IBW, TBW, or FFM in an obese person are all less than the dose/kg using TBW in a nonobese patient.

TABLE 24-2 DOSING WEIGHTS BASED ON VARIOUS DOSING SCALARS

	176-cm (6-ft) Male	
	68 kg (BMI = 22)	185 kg (BMI = 66)
Dosing Scalar	Dosing Weight (kg)	Dosing Weight (kg)
Total body weight (TBW)	68	185
Ideal body weight (IBW)	71	71
Lean body mass (LBM)	55	62
Fat-free mass (FFM)	55	87
Corrrected body weight (CBW)	68	115

MI, Body mass index (kg/m2)

Table 2.1 Utilization of total body weight (TBW), lean body weight (LBW) or ideal body weight (IBW) to calculate dosing schemes in morbidly obese patients

Drug	Recommended dosing	References[a]
Propofol	Induction: IBW Induction: LBW assessed by BIA Maintenance: TBW or IBW + 0.4 excess weight	Kirby. *Anaesthesia* 1987; 42:1125–1126 Ingrande. *Anesth Analg* 2011; 113:57–62 Servin. *Anesthesiology* 1993; 78:657–665 Albertin. *Br J Anaesth* 2007; 98:66–75
Thiopental	7.5 mg/kg IBW TBW	Buckley. *Can J Anaesth* 1994; 41:R94–R100 Jung. *Anesthesiology* 1982; 56:269–274
Midazolam	TBW for initial dose IBW for continuous dose	Greenblatt. *Anesthesiology* 1984; 61:27–35 Reves. *Anesthesiology* 1985; 62:310–324
Vecoronium	IBW	Weinstein. *Anesth Analg* 1988; 67:1149–1153
Cisatracurium	TBW IBW	Kirkegaard-Nielsen. *Anesth Analg* 1996; 83:1076–1080 Leykin. *Anesth Analg* 2004; 99:1090–1094
Rocuronium	IBW	Leykin. *Anesth Analg* 2004; 99:1086–1089
Succinylcholine	TBW	Bentley. *Anesthesiology* 1982; 57:48–49
Neostigmine	TBW	Kirkegaard-Nielsen. *Can J Anaesth* 1998; 45:39–41
Suggamadex	IBW + 40% excess weight	Van Lancker. *Anaesthesia* 2011; 66:721–725
Alfentanil	IBW or corrected weight TBW	Bentley. *Anesth Analg* 1983; 62:245–262 Salihoglu. *EJA* 2002; 19:125–128 Maitre. *Anesthesiology* 1987; 66:3–12
Fentanyl	TBW Corrected weight = IBW + (0.4x excess weight) pharmacokinetic mass = $52/[1 + (196.4 \times e^{-0.025kg} - 53.66)/100]$	Bentley. *Anesth Analg* 1981; 60:548–551 Salihoglu. *EJA* 2002; 19:125–128 Shibutani. *Anesthesiology* 2004;101: 603–613
Sufentanil	TBW Corrected weight BMI >40	Schwartz. *Anesth Analg* 1991; 73:790–793 Slepchenko. *Anesthesiology* 2003; 98:65–73
Remifentanil	LBM (James equation) LBM (Janmahasatian equation)	Egan. *Anesthesiology* 1998; 89:562–573 La Colla. *Clin Pharmacokinet* 2010; 49:131–139
Morphine	IBW	Choi. *Obes Surg* 2000; 10:154–159
Paracetamol	IBW	Lee. *J Clin Pharmacol* 1981; 21: 284–287

[a] First author, journal abbreviation, year of publication, volume, pages

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https://doi.org/10.1016/j.ijoa.2019.08.005

ORIGINAL ARTICLE

ELSEVIER
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Surgical conditions with rocuronium versus suxamethonium in cesarean section: a randomized trial

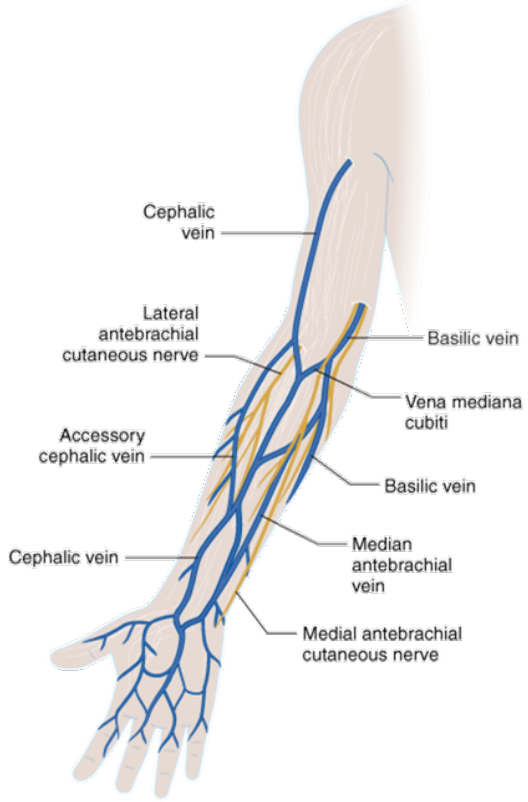
J. Bláha,[a,†] P. Nosková,[a,†] K. Hlinecká,[b] V. Krakovská,[c] V. Fundová,[a] T. Bartošová,[a] P. Michálek,[a] M. Stříteský[a]

Čas nástupu účinku sukcinylu je alespoň 50-60 sec!

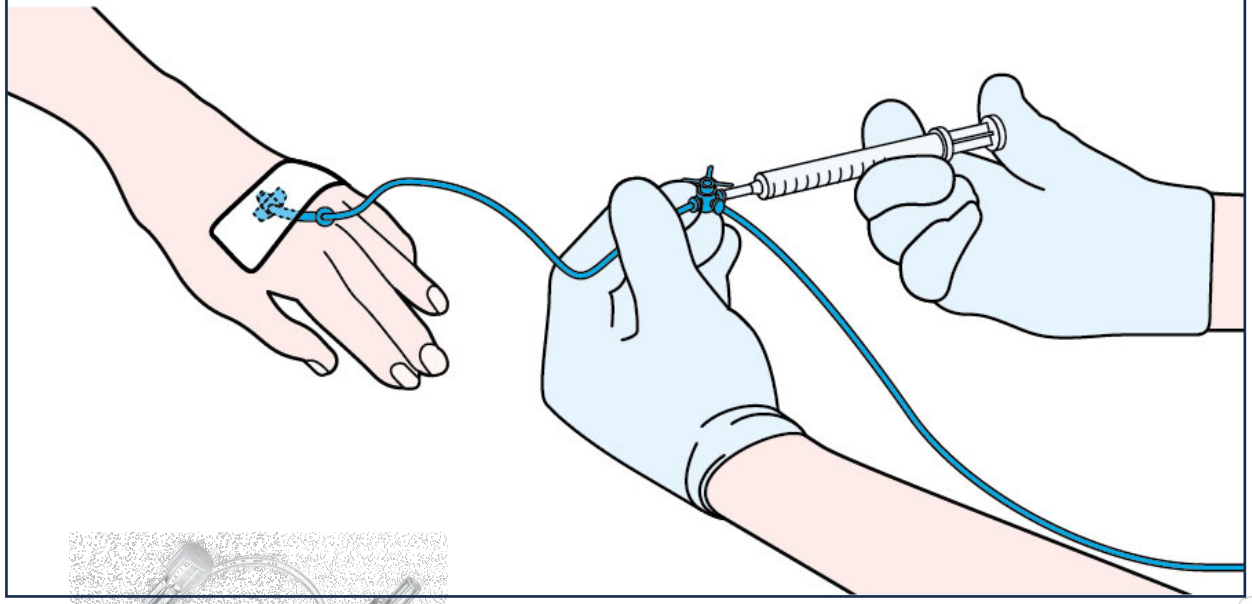
Table 2 Times from induction of anesthesia to end of surgery; and induction characteristics.

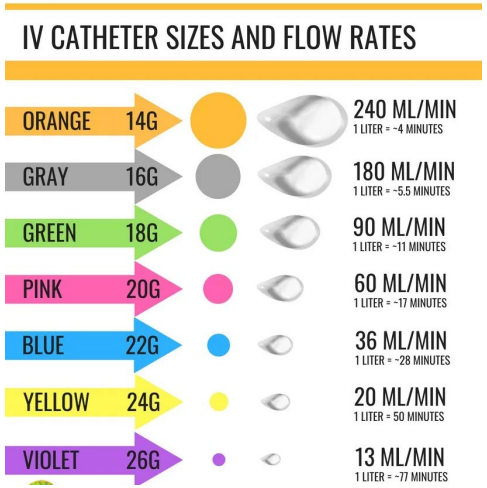
	Rocuronium group		Suxamethonium group		*Difference in means*	*P-value*
	Mean	*Median*	*mean*	*median*		
Induction – delivery interval (s)	268.4 (72.9)	265 (223–330)	275.6 (63.4)	267 (239–400)	−7.2 (−39.5 to 19.3)	0.62
Induction – intubation interval (s)	105.8 (33.7)	108 (77–134)	67.6 (32.1)	63 (50–123)	38.2 (24.4 to 52.0)	<0.001
Incision – delivery interval (s)	146.6 (68.3)	130 (99–179)	196.2 (50.7)	201 (167–277)	−49.7 (−74.8 to −24.4)	0.0002
Intubation – incision interval (min)	15.8 (6.9)	15 (4–43)	11.7 (6.4)	10 (3–29)	4.1 (0.4 to 7.8)	0.061
Length of surgery (min)	39.3 (8.9)	39 (27–53)	39.4 (9.6)	38 (26–54)	0.1 (−4.0 to 3.8)	0.976
End of surgery to extubation (min)	5.2 (4.6)	4 (0–13)	8.8 (5.8)	8 (2–19)	−3.5 (−5.8 to 1.4)	0.002
SRSD (points)	3.73 (0.53)	4 (3–5)	2.77 (0.55)	3 (2–4)	1.0 (−0.01 to 0.20)	<0.001
Blood loss (mL)	533 (76)	500 (500–600)	538 (98)	500 (500–650)	−5 (−38 to 28)	0.859
Thiopental (mg/kg)	4.7 (0.16)	4.7 (4.5–5.1)	4.7 (0.21)	4.7 (4.5–5.3)		0.471
Muscle relaxant dose (mL/kg)	0.092 (0.01)	0.093 (0.090–0.106)	0.095 (0.00)	0.094 (0.09–0.106)		0.072
Muscle relaxant dose (mg/kg)	0.55 (0.05)	0.56 (0.54–0.65)	0.95 (0.04)	0.94 (0.9–0.11)		0.177

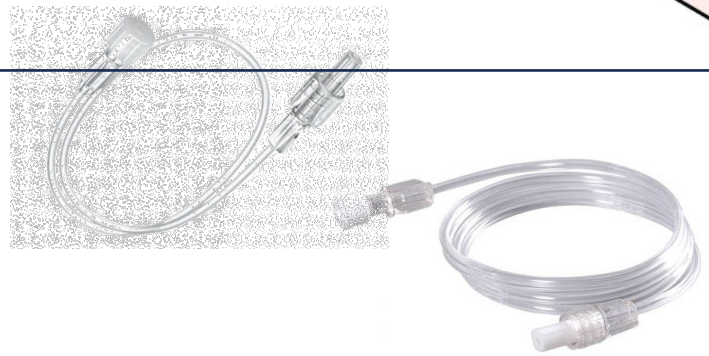
Data are presented as mean (SD) or median (range). Difference between the groups is expressed as median (95% confidence interval). SRSD: Surgical rating scale for delivery.



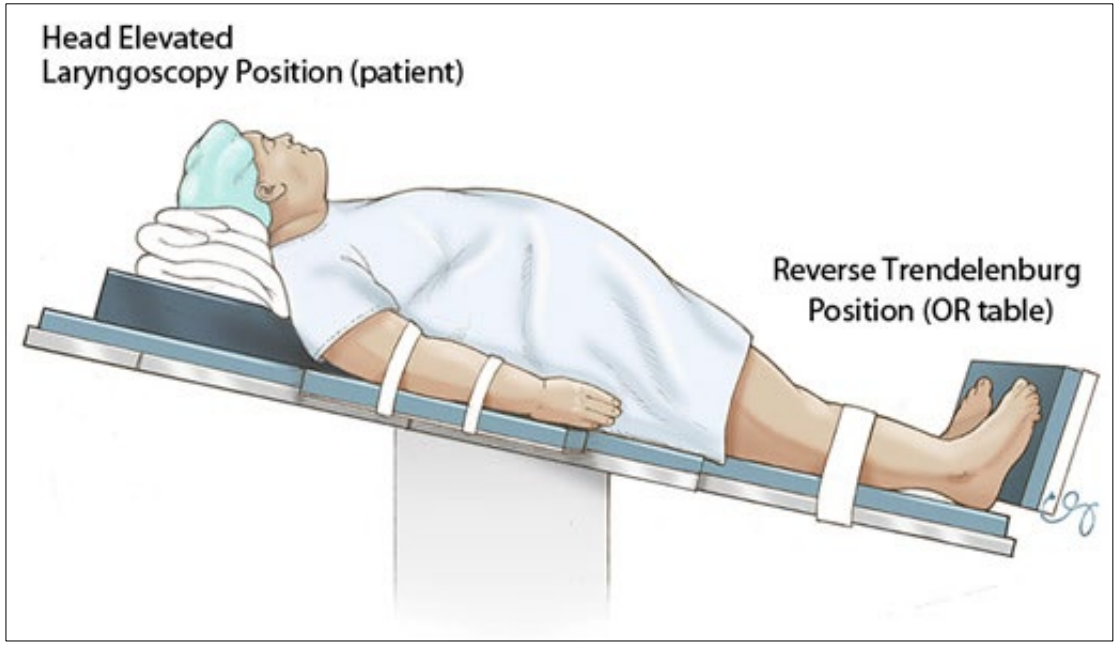
Doba nástupu účinku myorelaxancia záleží ale i na způsobu aplikace !!

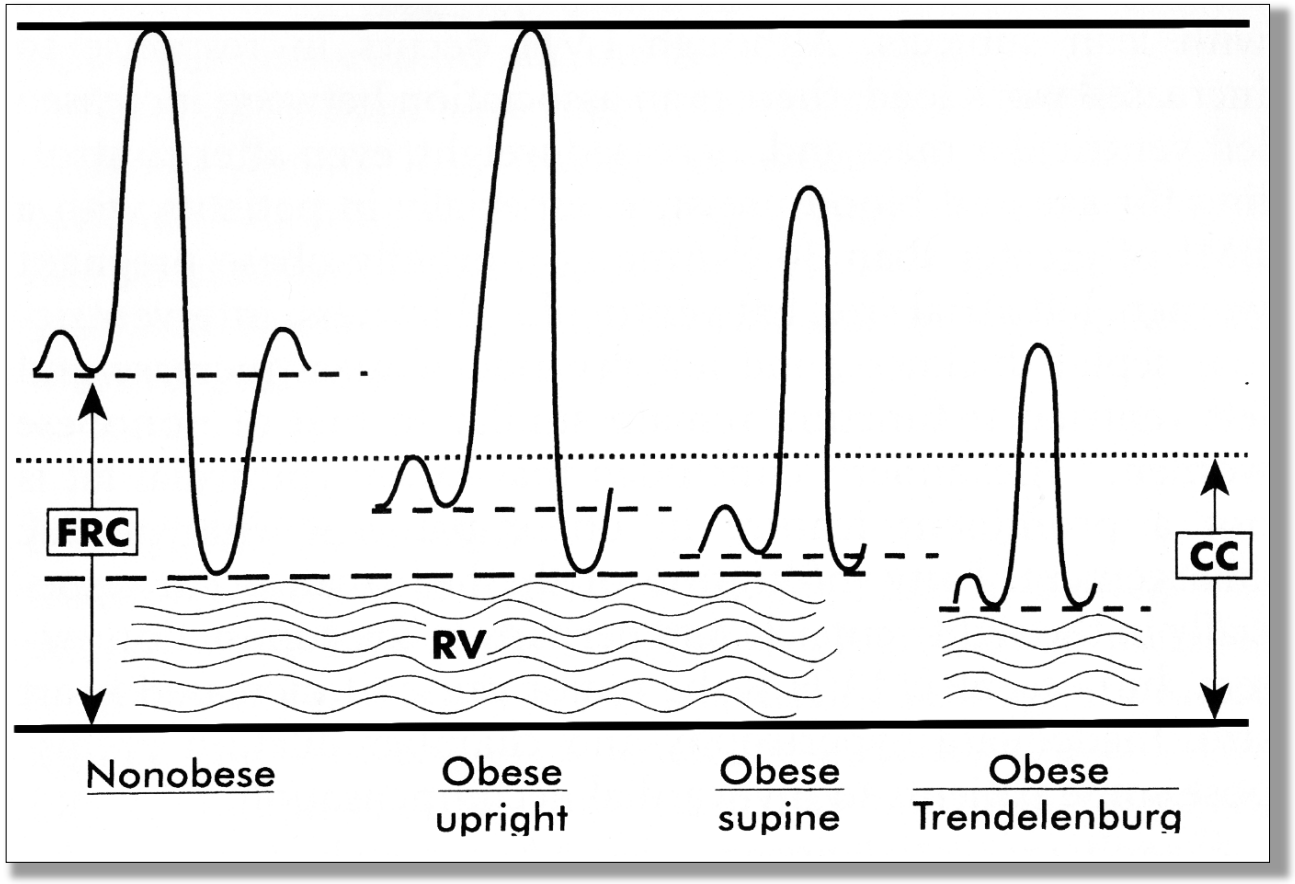




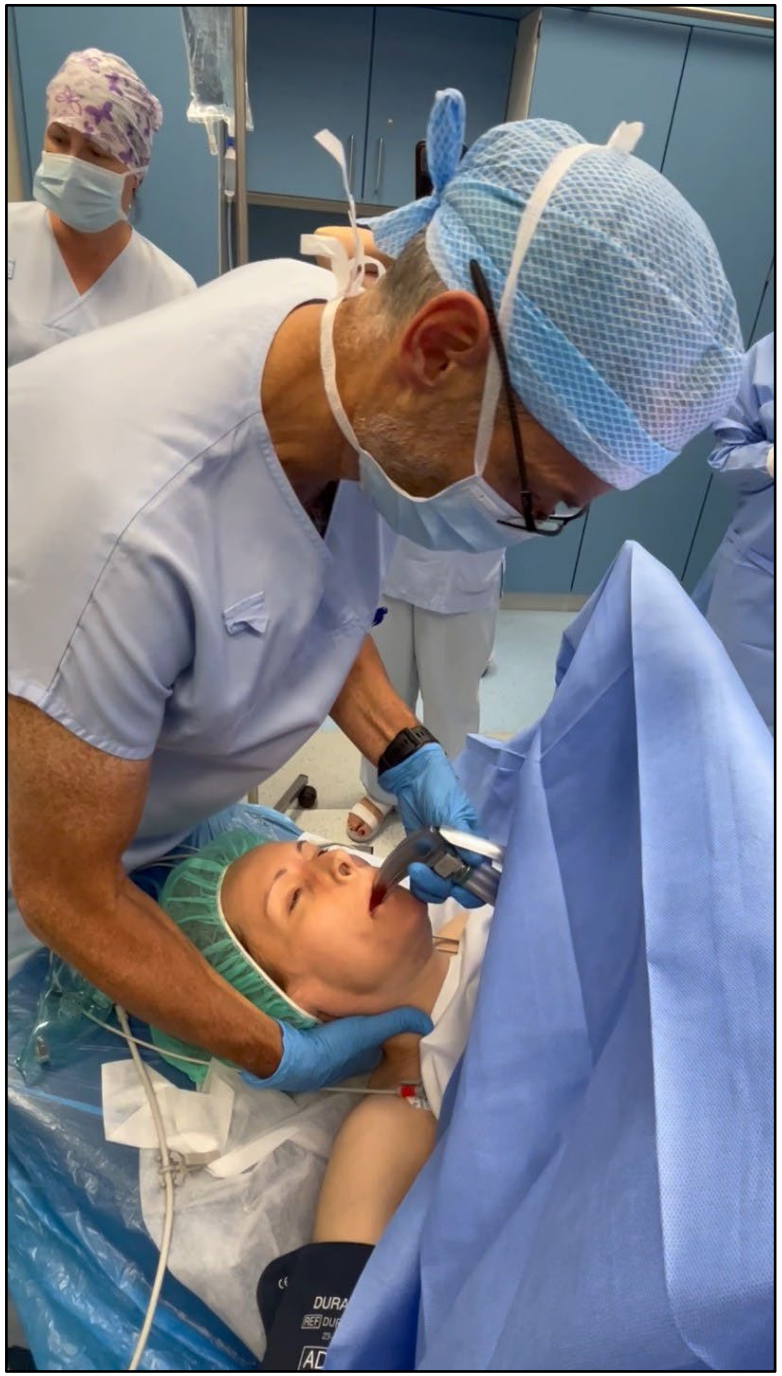


EFFECT OF POSITION ON LUNG VOLUMES





In Brown BR, editor. *Anesthesia and the Obese Patient.* Philadelphia, FA Davis 1082:26.



THE LANCET

Preliminary Communications

CRICOID PRESSURE TO CONTROL REGURGITATION OF STOMACH CONTENTS DURING INDUCTION OF ANÆSTHESIA

WHEN the contents of stomach or œsophagus gain access to the air-passages during anæsthesia the consequences are disastrous. In spite of modern anæsthetic techniques—or sometimes, regrettably, because of them—regurgitation is still a considerable hazard during the induction of anæsthesia, particularly for operative obstetrics and emergency general surgery.[1–8]

By a simple manœuvre during induction of anæsthesia, regurgitation of gastric or œsophageal contents can be controlled until intubation with a cuffed endotracheal tube is completed. The same manœuvre may also be used to prevent inflation of the stomach (a potent cause of regurgitation) resulting from positive-pressure ventilation

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2. Mendelson, C. L. *Amer. J. Obstet. Gynec.* 1946, **52**, 191.
3. Morton, H. J. V., Wylie, W. D. *Anæsthesia*, 1951, **6**, 190.
4. Coleman, D. J., Day, B. L. *Lancet*, 1956, i, 708.
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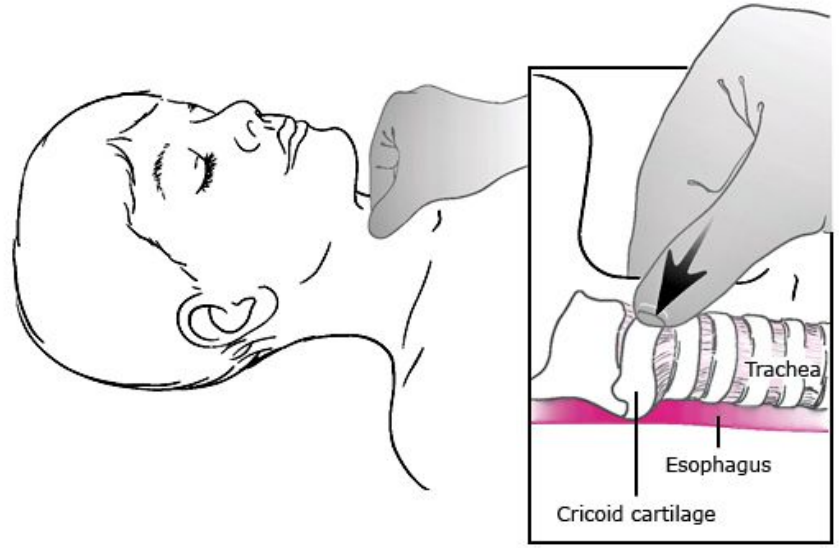
7. *Rep. Publ. Hlth med. Subj., Lond.* no. 97, 1957.
8. Reports on Confidential Enquiries into Maternal Deaths in England and Wales, 1952-54 and 1955-57. H.M. Stationery Office

Sellick B. The Lancet 1961;2:404

Teorie je jasná…



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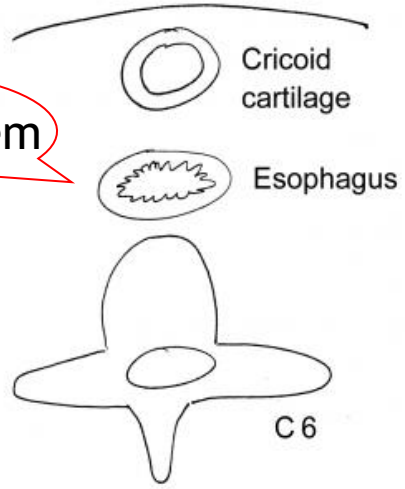

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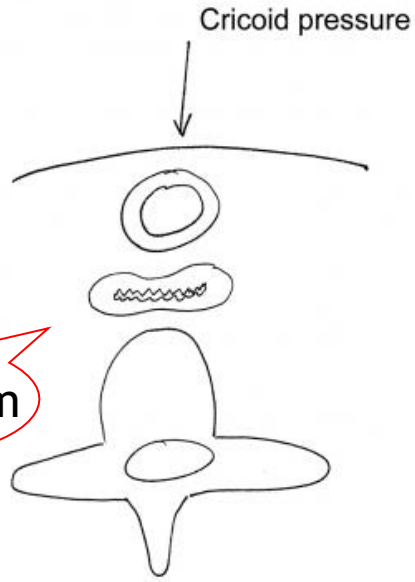


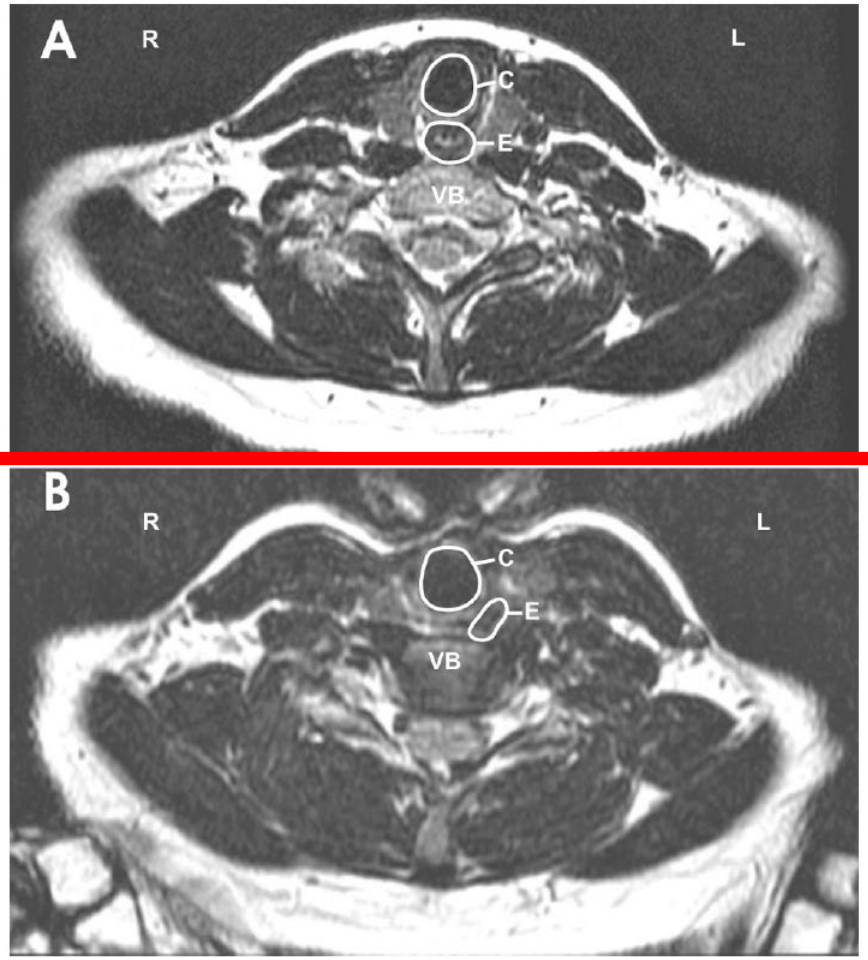
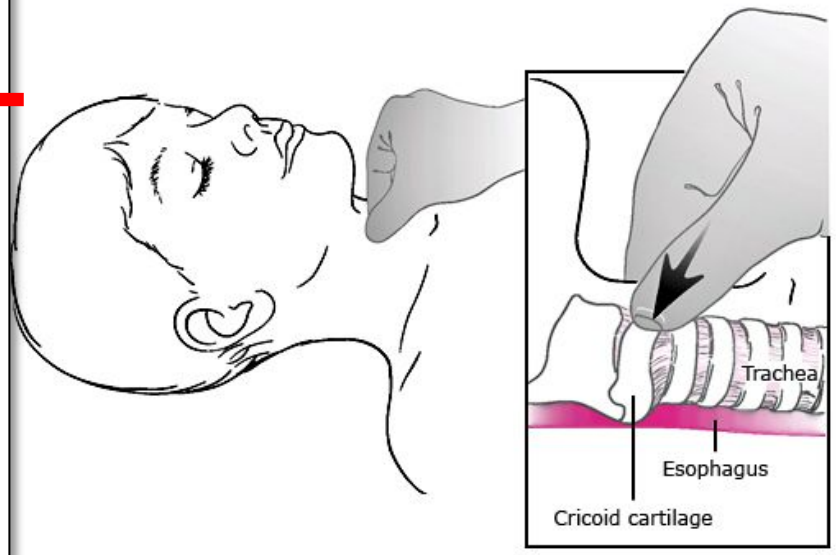


Fig. 3. (*A*) Magnetic resonance image of the neck without cricoid pressure. (*B*) Magnetic resonance image of the same subject demonstrating 12.1 mm of lateral esophageal displacement to the left with application of cricoid pressure. *C* = cricoid cartilage, *E* = esophagus, *VB* = vertebral body.



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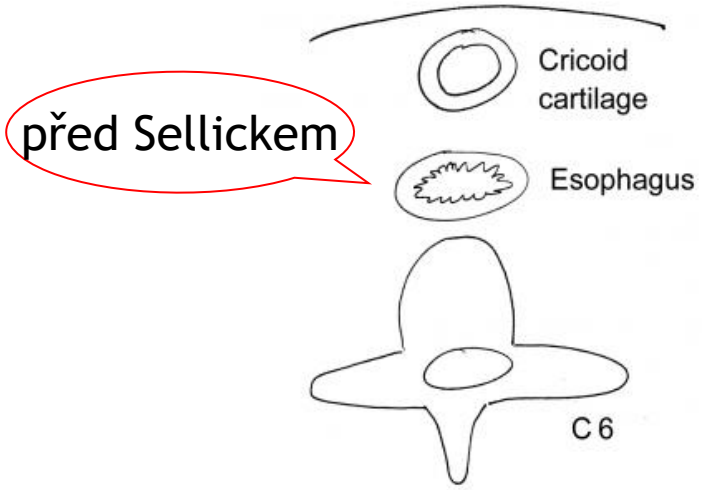
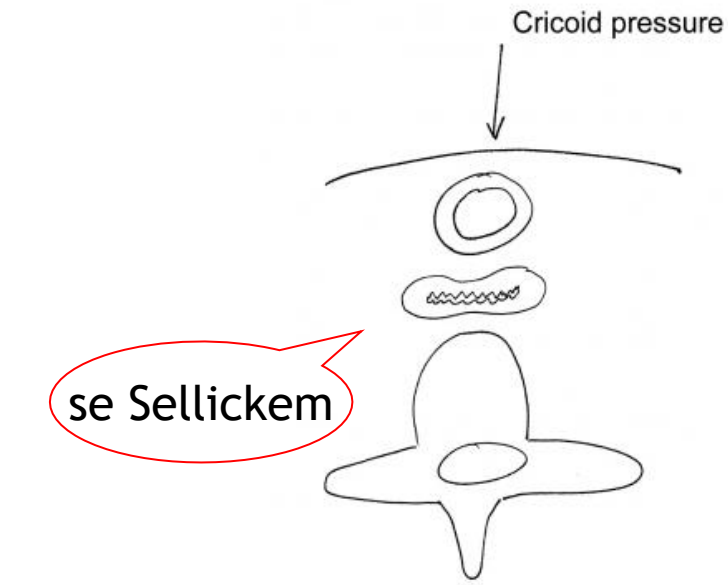




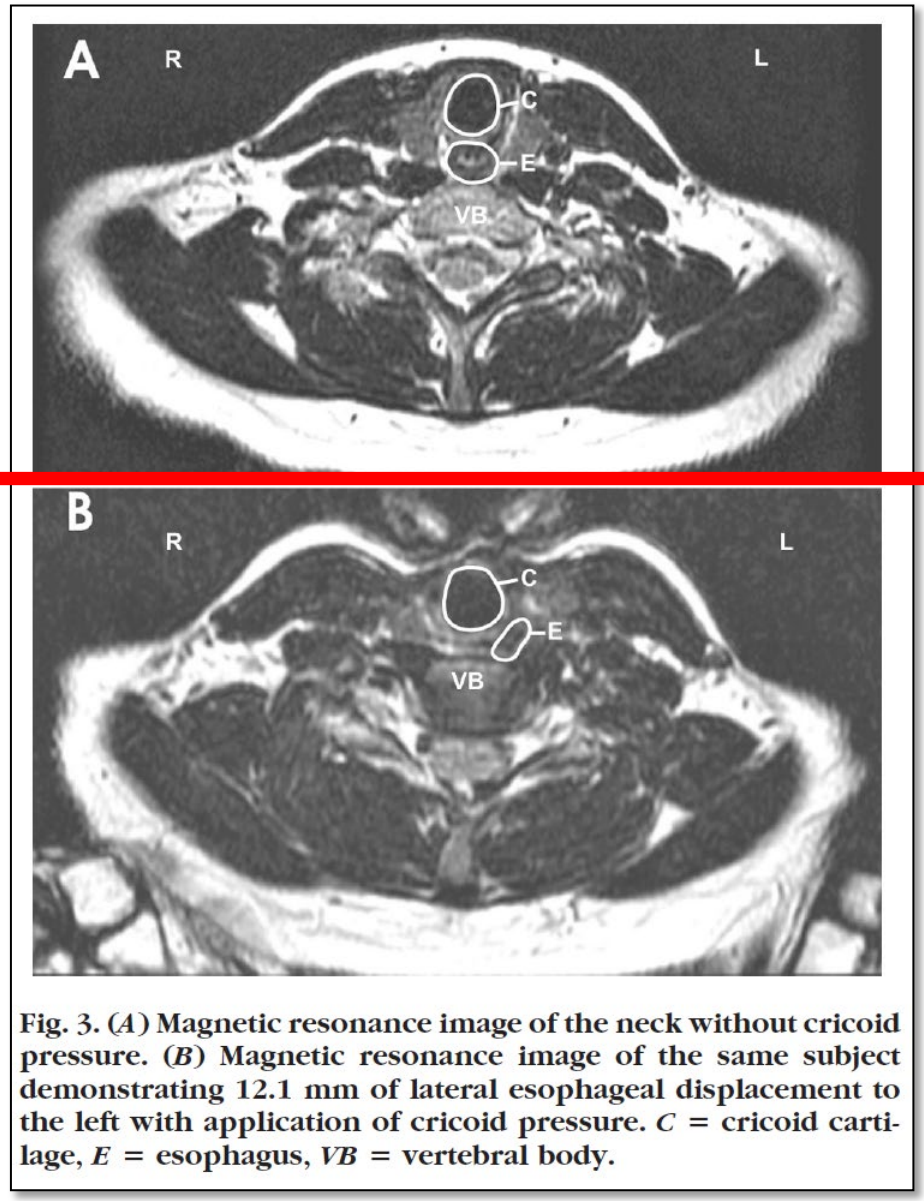
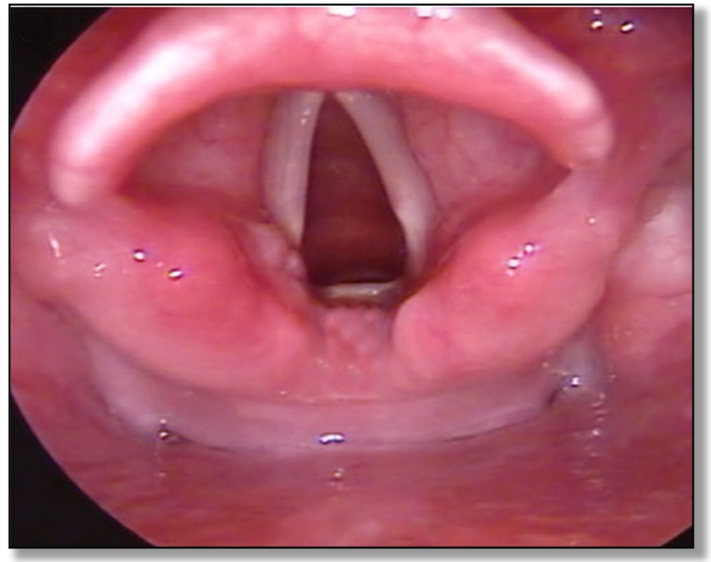


Fig. 3. (*A*) Magnetic resonance image of the neck without cricoid pressure. (*B*) Magnetic resonance image of the same subject demonstrating 12.1 mm of lateral esophageal displacement to the left with application of cricoid pressure. *C* = cricoid cartilage, *E* = esophagus, *VB* = vertebral body.



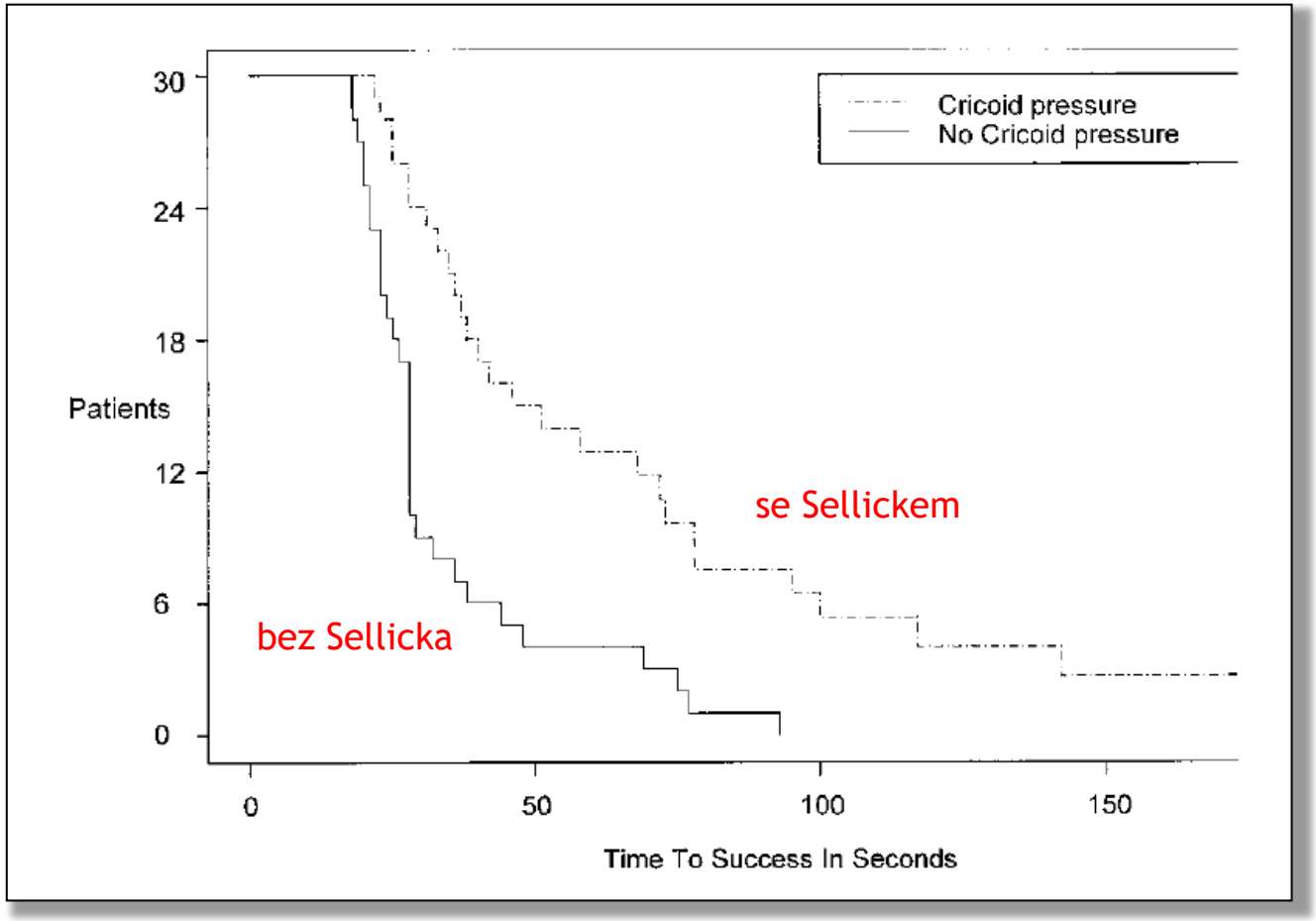
Smith KJ et al. Anesthesiology 2003; 99:60-4

Rice et al. Anesth Analg 2009;109:1546-52

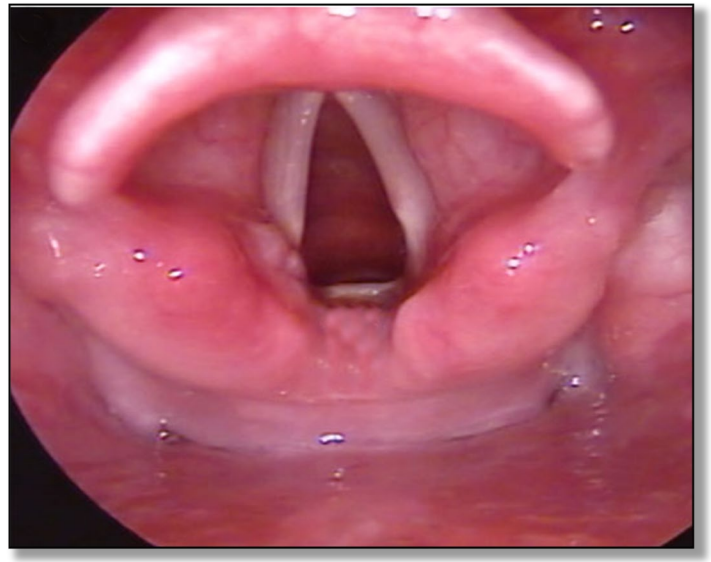
Haslam et al. Anaesthesia 2005; 60: 41-47

Effect of Cricoid Pressure on the Success of Endotracheal Intubation with a Lightwand

R. Eric Hodgson, M.B., Ch.B.(Hons.), F.C.A.(S.A.)(Crit. Care), P. Dean Gopalan, M.B., Ch.B., F.C.A.(S.A.),* Richard C. Burrows, M.B., Ch.B., F.C.A.(S.A.)(Crit. Care),† Khangelani Zuma, M.Sc.‡*



Hodgson. Anesthesiology 2001; 94:259–62

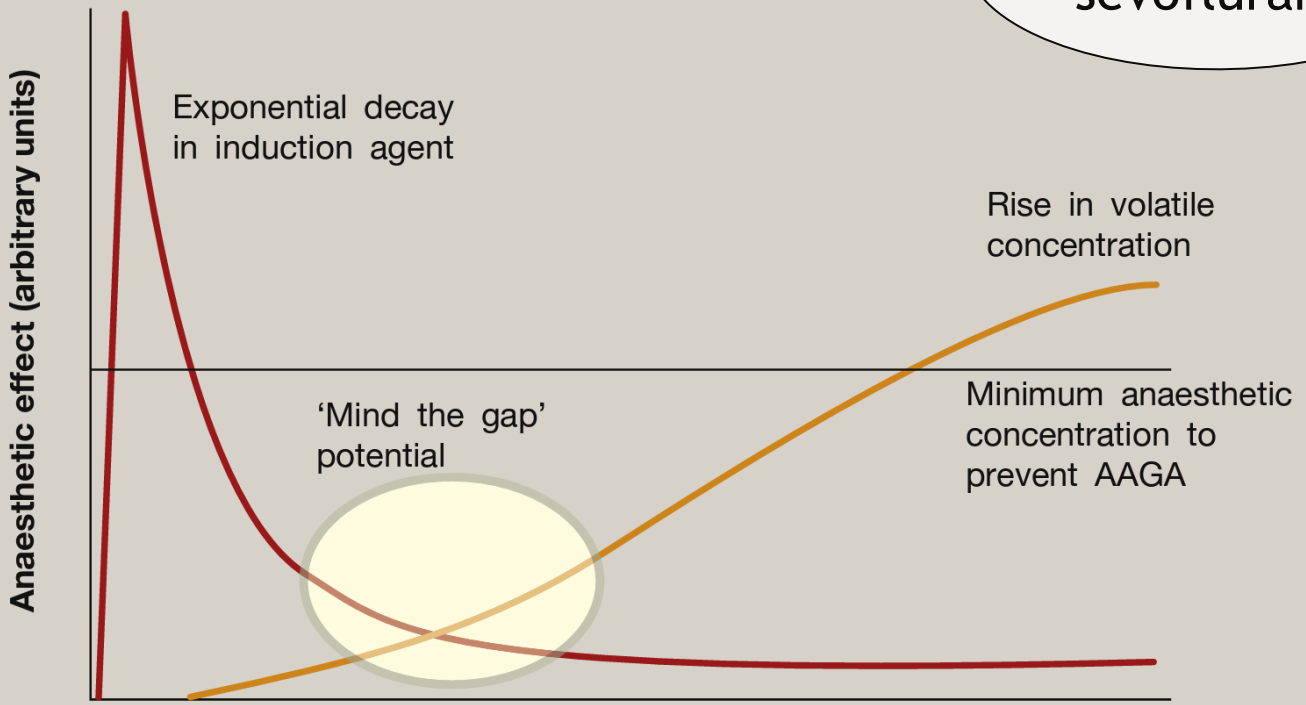


Smith KJ et al. Anesthesiology 2003; 99:60-4

Rice et al. Anesth Analg 2009;109:1546-52

Haslam et al. Anaesthesia 2005; 60: 41-47

Depth of anaesthesia ‘gap’

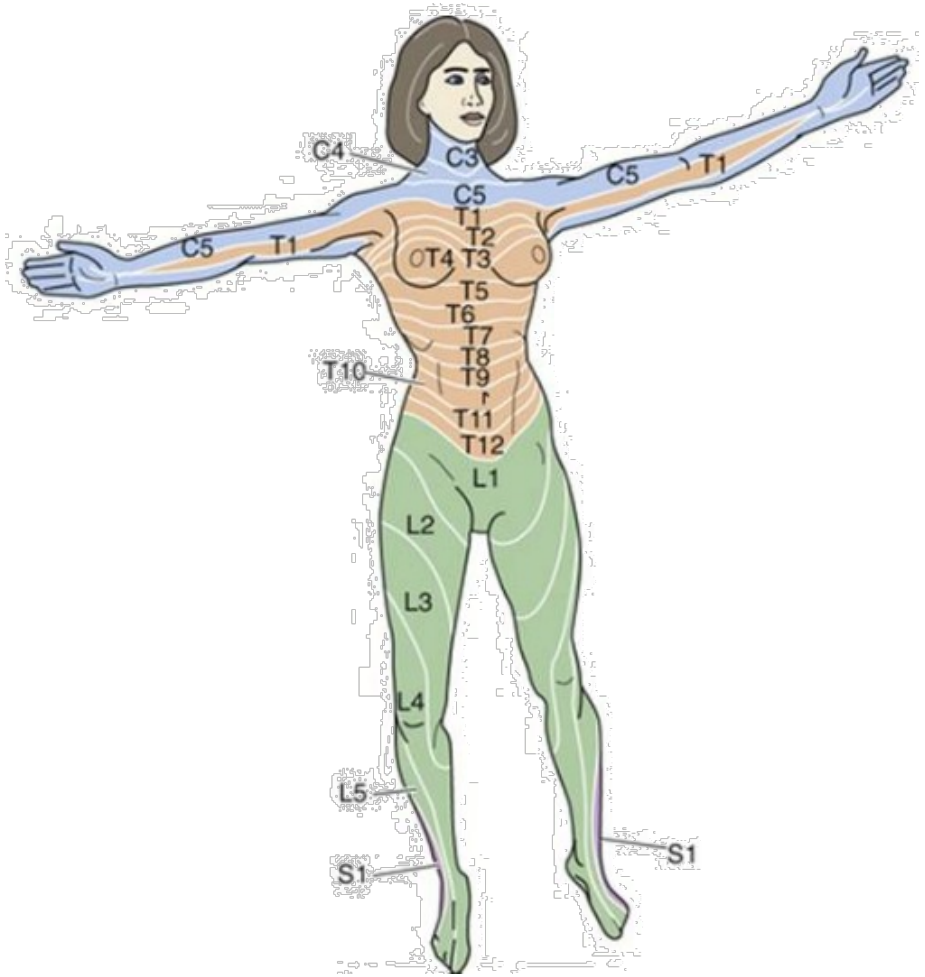


Dean Ch. RoyalCollegeofAnaesthetistsCPDMatrix:1A02,1E06,2A03

Prodýchávání maskou u sekce?

A PROČ NE?

jan.blaha@vfn.cz



Potřebný rozsah znecitlivění: až **Th_{5-6}**

midazolam

efedrin

27G
„normální hrot“

zavaděč

fenylefrin

stříkačka 2 ml

inzulinka

heavy bupivacain 0,5%

“Atraumatic” Sprotte needle reduces the incidence of post-lumbar puncture headaches

Article abstract—Post-lumbar puncture headache (PLPH) is best explained by spinal fluid leakage due to delayed closure of a dural defect. In a prospective, randomized, double-blind study, taking into consideration all known methodological problems, the authors compared the incidence of PLPH using the “atraumatic” Sprotte needle vs the “traumatic” Quincke needle. Of the 230 patients included in the final analysis, 24.4% of patients in the “traumatic” group developed PLPH, whereas only 12.2% of patients in the “atraumatic” group did ($p < 0.05$). Therefore, use of the “atraumatic” Sprotte needle for lumbar puncture is recommended.

NEUROLOGY 2001;57:2310–2312

M. Strupp, MD; O. Schueler, MD; A. Straube, MD; S. Von Stuckrad–Barre; and T. Brandt, MD, FRCP

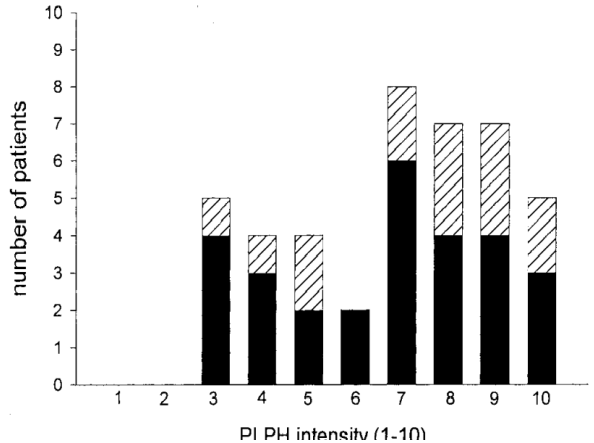


Figure 2. Intensity of the post-lumbar puncture headaches (PLPH). The complaints of the patients (mainly headache) were graded from 0 (no complaints) to 10 (major complaints). The mean value of the intensity of complaints (±SD) of the patients with the “traumatic needle” was 6.4 ± 2.3 (n = 28); it was 7.5 ± 2.2 for the patients with the “atraumatic needle” (n = 14), i.e., not significantly different. ■ = “traumatic needle”; ▨; = “atraumatic needle.”

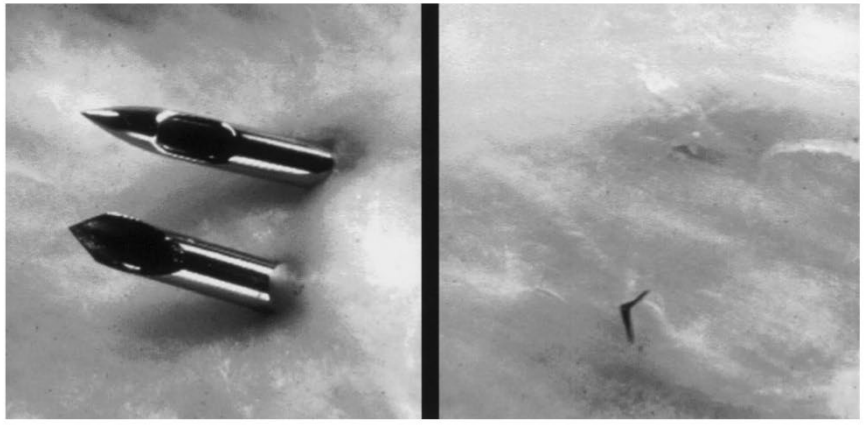
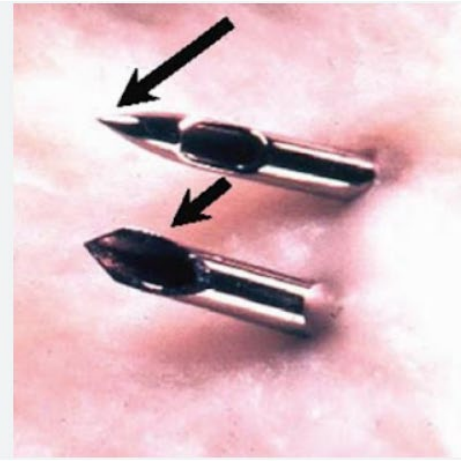


Figure 1. Two types of spinal needle tips: “Atraumatic Sprotte needle” (upper) and “traumatic Quincke needle” (lower) of the same diameter (left). As shown on the right, the atraumatic needle causes a smaller dural defect (upper) than the traumatic needle (lower). The smaller defect should theoretically result in a lower incidence of post-lumbar puncture headache.

Barts MS Blog



Multiple Sclerosis Research: It's OK to ask for an atraumatic needle

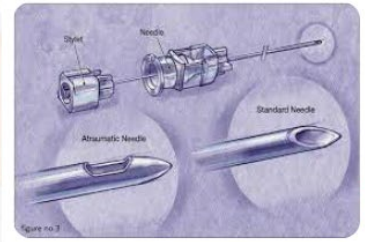
Navštívit

Autor: kschmierer

Zajímá vás, odkud tyto informace pocházejí? **Další informace**

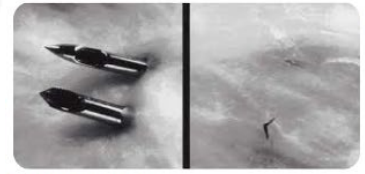
Na obrázky se mohou vztahovat autorská práva. **Další informace**

Související obsah



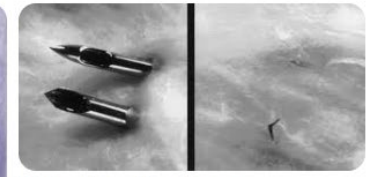
IJSIT

REVIEW: COMPARSION…



ResearchGate

Hole in dural sac caused by penci…



Neurology - Neurology.org

Atraumatic” Sprotte needle reduc…

Fujirebio

How to perform a lumbar puncture | Fujirebio

"Atraumatic" Sprotte needle reduces the incidence of post-lumbar puncture headaches

Article abstract—Post-lumbar puncture headache (PLPH) is best explained by spinal fluid leakage due to delayed closure of a dural defect. In a prospective, randomized, double-blind study, taking into consideration all known methodological problems, the authors compared the incidence of PLPH using the "atraumatic" Sprotte needle vs the "traumatic" Quincke needle. Of the 230 patients included in the final analysis, 24.4% of patients in the "traumatic" group developed PLPH, whereas only 12.2% of patients in the "atraumatic" group did ($p < 0.05$). Therefore, use of the "atraumatic" Sprotte needle for lumbar puncture is recommended.

NEUROLOGY 2001;57:2310–2312

M. Strupp, MD; O. Schueler, MD; A. Straube, MD; S. Von Stuckrad–Barre; and T. Brandt, MD, FRCP

LP was performed with either an "atraumatic" Sprotte needle[5] (22 Gauge, 0.80 mm, 90 mm; Pajunk, Geisingen, Germany) or a "traumatic" Quincke needle[4] (22 Gauge, 0.80 mm, 90 mm; Braun, Melsungen, Germany) (see figure 1) while the patient was in a sitting position. All LP were performed by experienced neurologists who were unaware of the type of needle.

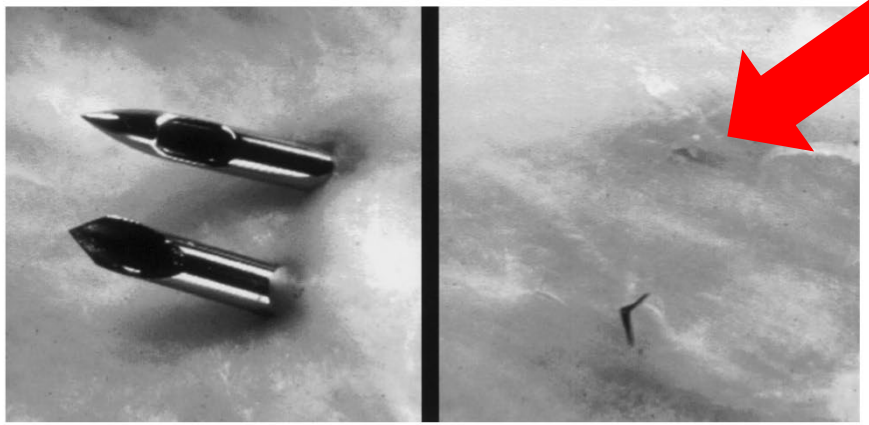


Figure 1. Two types of spinal needle tips: "Atraumatic Sprotte needle" (upper) and "traumatic Quincke needle" (lower) of the same diameter (left). As shown on the right, the atraumatic needle causes a smaller dural defect (upper) than the traumatic needle (lower). The smaller defect should theoretically result in a lower incidence of post-lumbar puncture headache.

Table *Baseline characteristics and symptoms of patients undergoing lumbar puncture with atraumatic or standard needles*

Characteristic	Needle type: "atraumatic," n = 115	Needle type: "traumatic," n = 115
Age, y	39.8 (12.8)	40.7 (11.5)
Females, %	64	63
Males, %	36	37
Body mass index, kg/m^2	23.3 (3.8)	23.3 (3.6)
Coffee consumption, cups/day		
Usually	1.6 (1.5)	1.8 (1.9)
Day of lumbar puncture	1.0 (1.2)	1.3 (1.8)
Days after lumbar puncture	1.4 (2.1)	1.6 (2.2)
Relative prevalence of migraine, %	21.3	24.6
Severity and prevalence of PLPH		
Mean	7.5 (2.2)	6.4 (2.3)
None, %	87.8	75.6
Mild, %	0.0	4.1
Moderate, %	4.9	12.2
Severe, %	7.3	8.1

Values are means (±SD) unless stated otherwise.

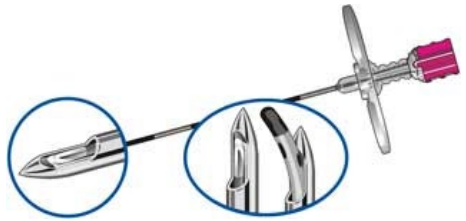
PLPH = Post-lumbar puncture headache.

U spinálu jehla „matters“,
ale ne hrot nýbrž velikost!

HUBER POINT

Edward B. Tuohy
(1908–1959: USA)

Robert F. Husted
(1928–2008: USA)



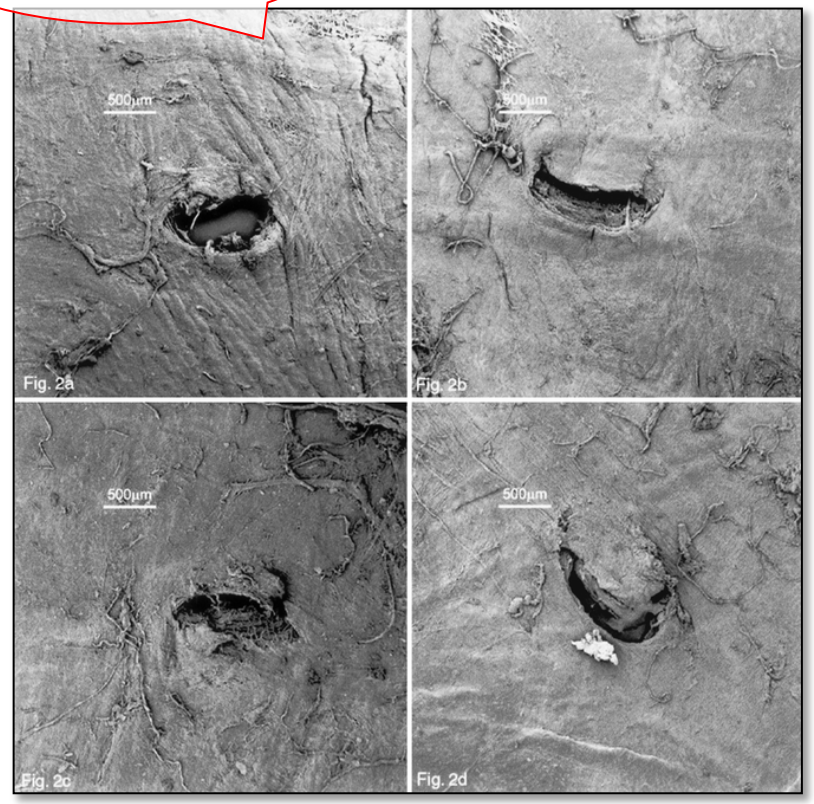


Fig. 2. Scanning electron microscopic images of (*a*) a 17-gauge Hustead epidural needle puncture (bevel parallel, 90° angle), (*b*) a 17-gauge Tuohy epidural needle puncture (bevel parallel, 90° angle), (*c*) an 18-gauge Special Sprotte® epidural needle puncture (90° angle), and (*d*) an 18-gauge Crawford epidural needle puncture (bevel parallel, 90° angle).

Pamela J. Angle et al. Anesthesiology. 2003;99(6):1376-1382

Anaesth Crit Care Pain Med 34 (2015) 277–280

Original Article

Influence of needle diameter on spinal anaesthesia puncture failures for caesarean section: A prospective, randomised, experimental study

Fausto Fama' [b,1,*], Cecile Linard [b,1], Damien Bierlaire [a], Maria Gioffre'-Florio [b], Jacques Fusciardi [a], Marc Laffon [a]

[a] University Hospital of Tours, Department of Anaesthesiology and Intensive Care, Hôpital Bretonneau, 2, boulevard Tonnellé, 37044 Tours cedex 9, France
[b] University Hospital of Messina, Department of Human Pathology, Via Consolare Valeria, 1, 98125 Messina, Italy

27 G více selhání,
26 G více PDPH

Table 2
Spinal puncture failures and incidence of postdural puncture headache. The number of puncture failures was statistically significant in the 27 G group ($P = 0.006$ versus the 25 G group, $P < 0.001$ versus the 26 G group). No statistically significant difference was found between the 25 G and 26 G groups ($P = 0.606$). Only 2 general anaesthesia procedures were carried out after 25 G attempt failures.

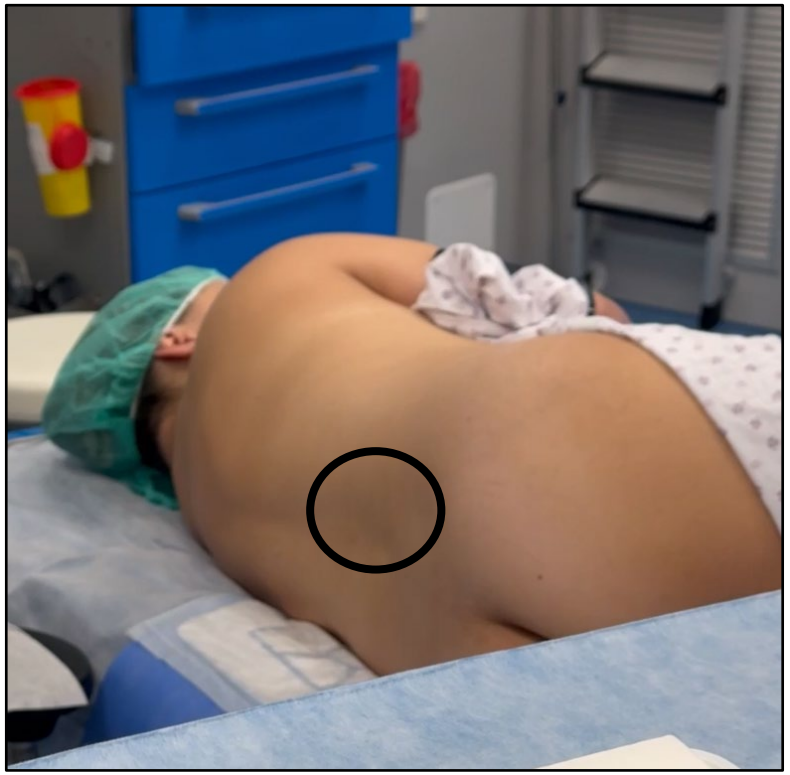
Group	25 G	26 G	27 G
Number of patients: *n*	109	121	98
Failure: *n* (%)	2 (1.8)[a]	1 (0.9)[a]	12 (10.9)
Headache: *n* (%)	5 (4.6)	3 (2.5)	2 (2.0)
Blood patch: *n*	1	1	0

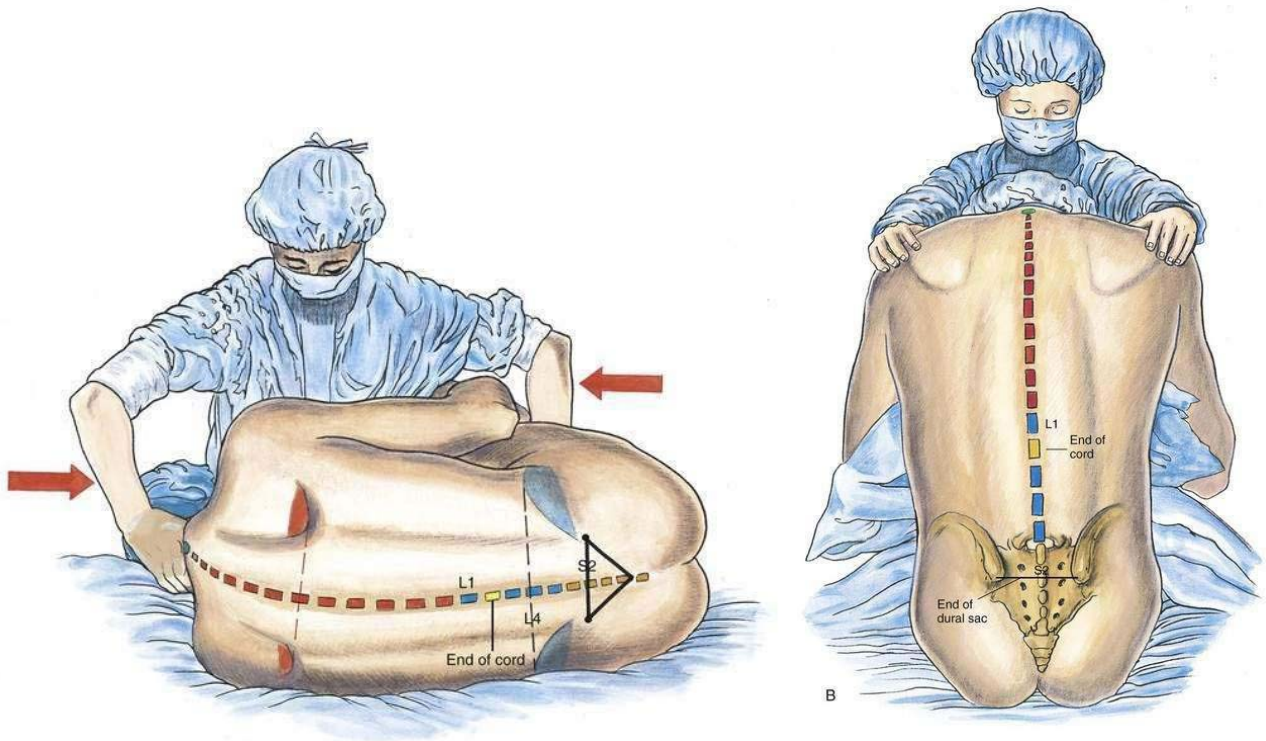
[a] $P < 0.05$, 27 G vs. 25G and 26 G.

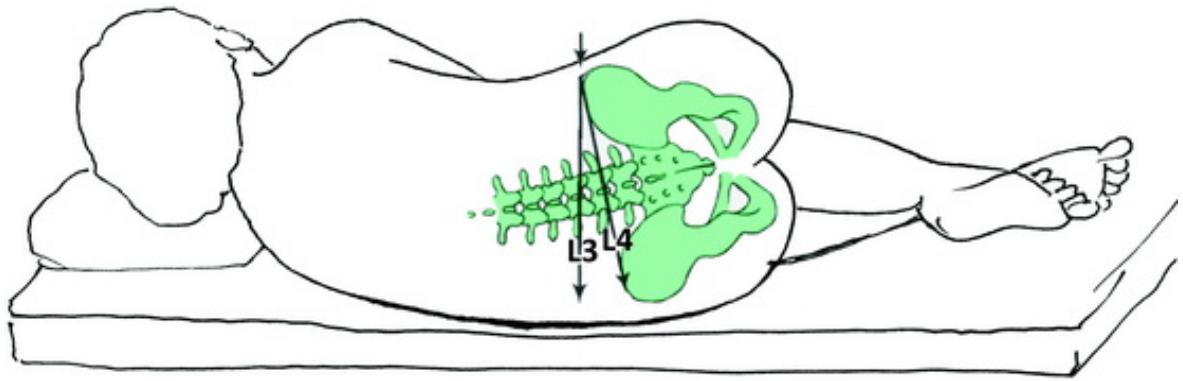

Arytmie potlačeny
Neinvazivní krevní tlak
Nastavení
Alarmy
Start cyklování
VYP
Hlasitost ukončení NIBP
Doba cyklu
2.5 min
Formát zobrazení
Sys/Dia (Mean)
Inflační limity
Auto
Start Stat
Start Venózní stase
Start manuální NIBP
Zavřít
Svody odpojeny
X-CAEDD
VFN OS
13:10
HR /min
EKG
SpO2 %
Pleth
NIBP mmHg Dosp.
SYS 80 180
136/89
(108)
Manuál 13:08
Časovače
Odpočítáv.
00:00:00
Uplynulý
00:00:00
Nastavení alarmů
Nastavení monitoru
Procedury
Data a stránky
Trendy
Tisk křivek
Zmrazit/ Snímek
NIBP Start
NIBP Auto Start
Nulování všech tlaků

ml
EPHEDRI
azolam Accord

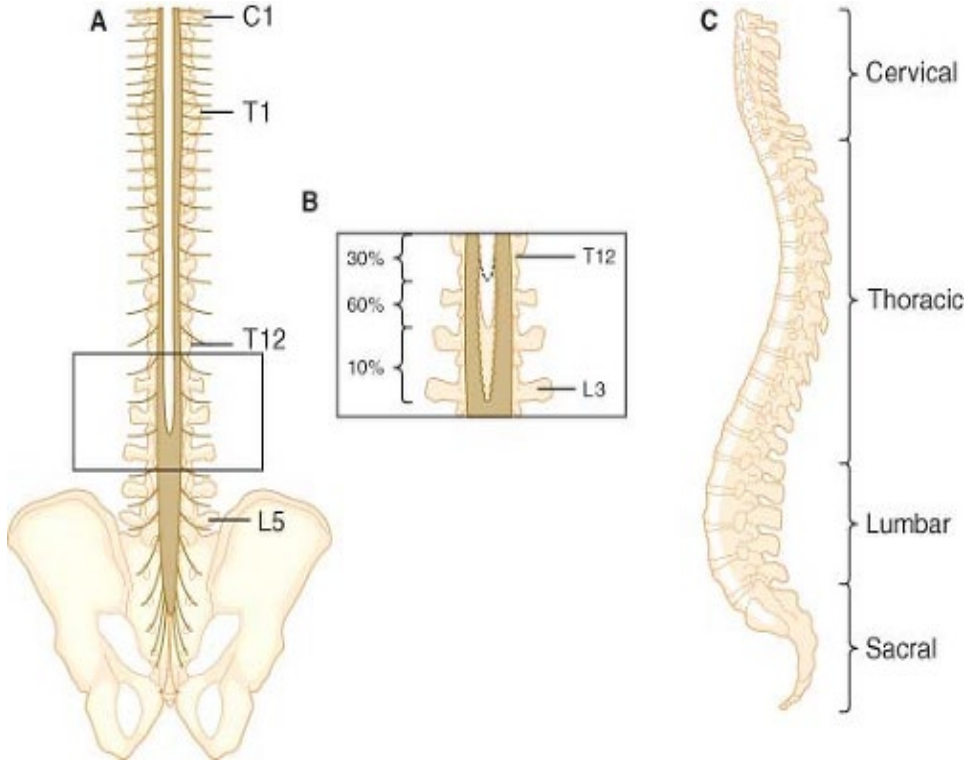
Arytmie potlačeny
X-CAEDD
VFN OS
13:21
1 min status
SPI
Entropie
Kabel odpojen
RE
SE
49
NMT
TOF%
Count
Monit. filtr
Svody odpojeny
Pleth
HR /min
140
SpO2 %
98
NIBP mmHg Dosp.
SYS 80 180
116/ 70
(86)
Časovače
Odpočítáv.
00:00:00
Uplynulý
00:00:00
Nastavení alarmů
Nastavení monitoru
Procedury
Data a stránky
Trendy
Tisk křivek
Zmrazit/ Snímek
NIBP Start
NIBP Auto Stop
Nulování všech tlaků







Obr 1. Projekce spojnice obou iliakálních krist u ležící těhotné ženy.



Posterior **(A)** and lateral **(C)** views of the human spinal column. Note the inset **(B)**, which depicts the variability in vertebral level at which the spinal cord terminates.

Bernards ChM. aneskey.com/epidural-and-spinal-anesthesia-2

Table 2. Mean Depth from the Skin to the Lumbar Epidural Space

Variable	Mean ± SD	Median	Range
BMI			
< 25	4.40 ± 0.81	4.5	3.0–7.0
25–29	4.80 ± 0.85	5.0	3.0–11.0
30–34	5.30 ± 0.93	5.0	3.0–10.0
35–39	6.2 ± 1.2	6.0	3.0–10.5
40–44	6.6 ± 1.3	7.0	3.0–11.0
45–49	7.2 ± 1.2	7.5	4.0–11.0
> 50	7.5 ± 1.2	7.5	5.0–11.0

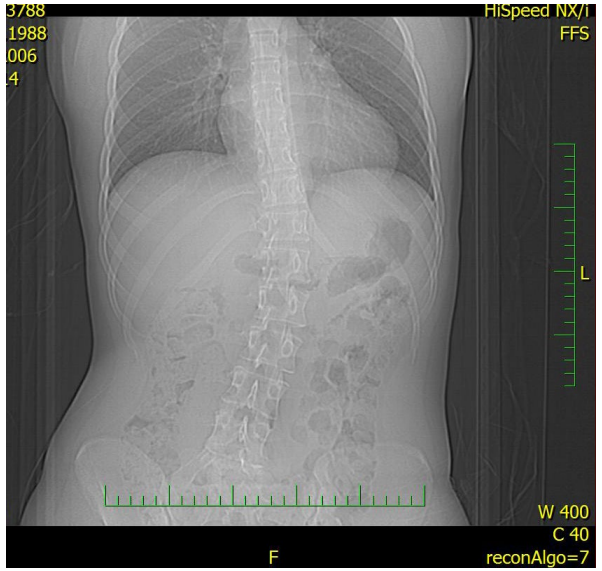
BMI: body mass index (kg/m^2). Modified from the article of Clinkscales et al. (Int J Obstet Anesth 2007; 16: 323-7)

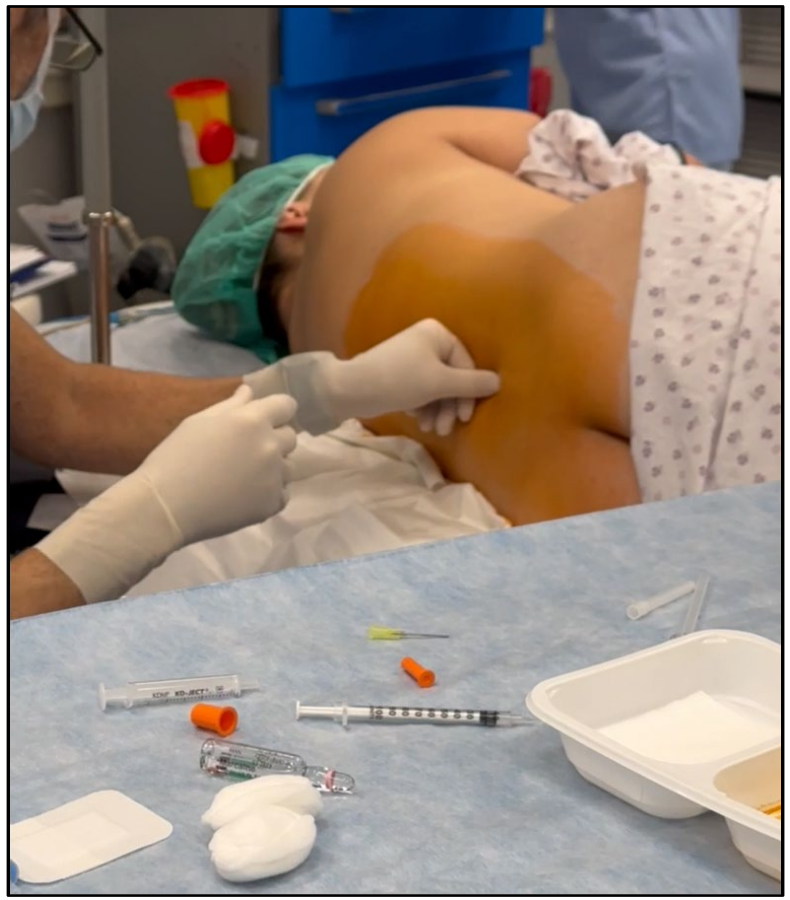
VYŠETŘENÍ ZAD

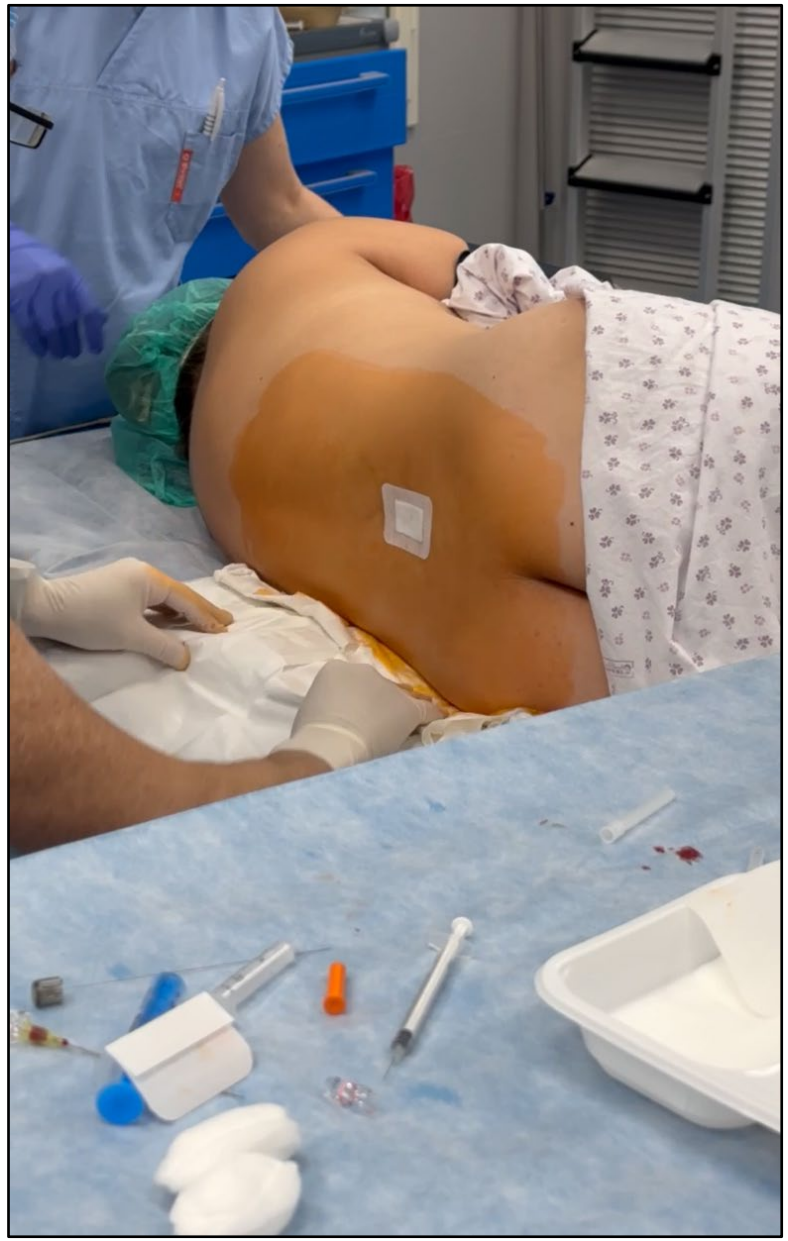
- stav kůže
- infekční komplikace
- tetování nevadí ! (chemicky indukovaná arachnoiditis neprokázána)

Frédéric J, Mercier.Tattooing and various piercing:anest. considerations . Curr Opin Anaesthesiol 22(3):436-41 (2009)

- **páteř** (průběh po celé délce)
- obezita, preeklampsie → **ultrazvuk**








133
97
116/ 70

Hasanin *et al. BMC Anesthesiology* (2017) 17:60
DOI 10.1186/s12871-017-0349-8

BMC Anesthesiology

RESEARCH ARTICLE Open Access

Leg elevation decreases the incidence of post-spinal hypotension in cesarean section: a randomized controlled trial

Ahmed Hasanin[1], Ahmed Aiyad[1], Ahmed Elsakka[1], Atef Kamel[1], Reham Fouad[2], Mohamed Osman[1], Ali Mokhtar[1], Sherin Refaat[1] and Yasmin Hassabelnaby[1*]

Abstract

Background: Maternal hypotension is a common complication after spinal anesthesia for cesarean section (CS). In this study we investigated the role of leg elevation (LE) as a method for prevention of post-spinal hypotension (PSH) for cesarean section.

Methods: One hundred and fifty full term parturients scheduled for CS were included in the study. Patients were randomized into two groups: Group LE (leg elevation group, $n = 75$) and group C (Control group, $n = 75$). Spinal block was performed in sitting position after administration of 10 mL/Kg Ringer's lactate as fluid preload. After successful intrathecal injection of local anesthetic, Patients were positioned in the supine position. Leg elevation was performed for LE group directly after spinal anesthesia and maintained till skin incision. Intraoperative hemodynamic parameters (Arterial blood pressure and heart rate), intra-operative ephedrine consumption, incidence of PSH, and incidence of nausea and vomiting were reported.

Results: LE group showed lower incidence of PSH (34.7% Vs 58.7%, $P = 0.005$) compared to the control group. Arterial blood pressure was higher in the LE group compared to the control group in the first two readings after spinal block. Other readings showed comparable arterial blood pressure and heart rate values between both study groups; however, LE showed less ephedrine consumption (4.9 ± 7.8 mg Vs 10 ± 11 mg, $P = 0.001$).

Conclusion: LE performed immediately after spinal block reduced the incidence of PSH in parturients undergoing CS.

Trial registration: The study was registered at Pan African Clinical Trials Registry system on 5/10/2015 with trial number PACTR201510001295348.

Keywords: Hypotension, Spinal anesthesia, Cesarean section, Leg elevation

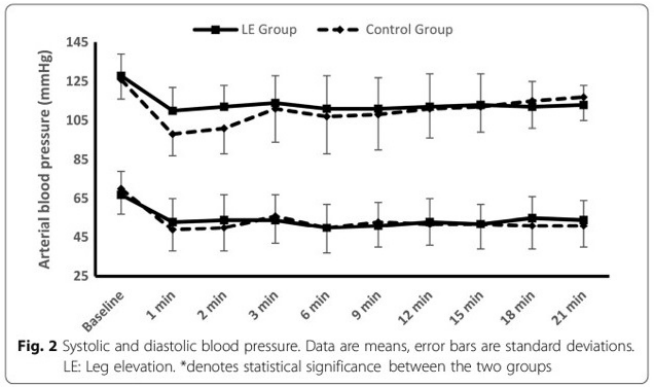
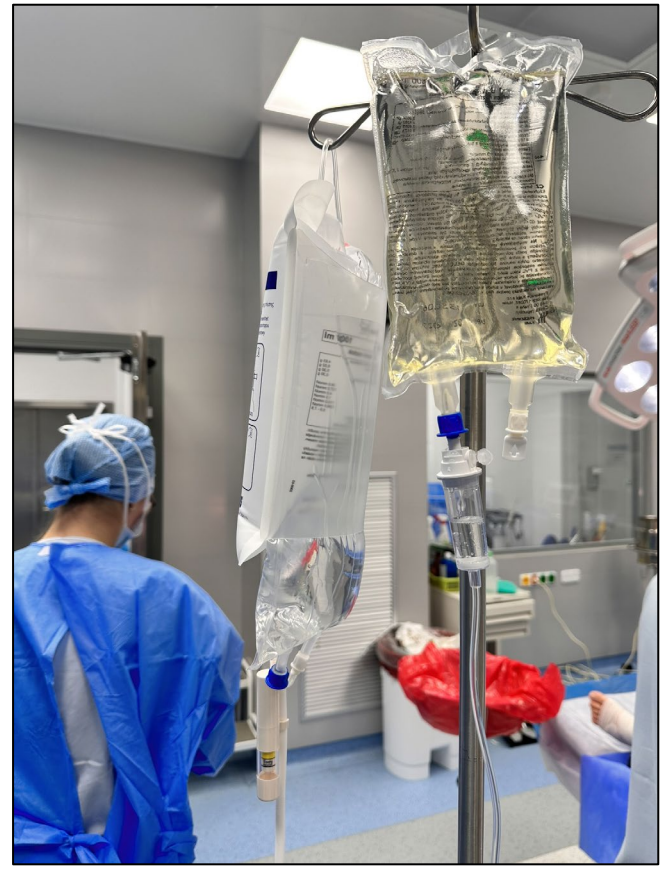


Fig. 2 Systolic and diastolic blood pressure. Data are means, error bars are standard deviations. LE: Leg elevation. *denotes statistical significance between the two groups

Table 1 Demographic data and patients' outcomes

	LE group ($n = 75$)	Control group ($n = 75$)	*P* value
Age (years)	29 ± 4	30 ± 4	0.13
Weight (Kg)	69 ± 7	72 ± 8	0.02*
Total infused volume (mL)	1790 ± 408	1865 ± 450	0.29
Urine output (mL)	570 ± 90	590 ± 69	0.12
Incidence of hypotension	26(34.7%)	44(58.7%)	0.005*
Ephedrine consumption (mg)	4.9 ± 7.8	10 ± 11	0.001*
Nausea & vomiting	8(10.7%)	14(18.7%)	0.24
Incidence of bradycardia	4(5.3%)	7(9.3%)	0.53

LE leg elevation, *SAB* subarachnoid block, *NS* not significant
*denotes statistical significance (*P* value < 0.05)
Data are presented as mean ± standard deviation and frequency (%)



Cochrane Library

Cochrane Database of Systematic Reviews

Techniques for preventing hypotension during spinal anaesthesia for caesarean section (Review)

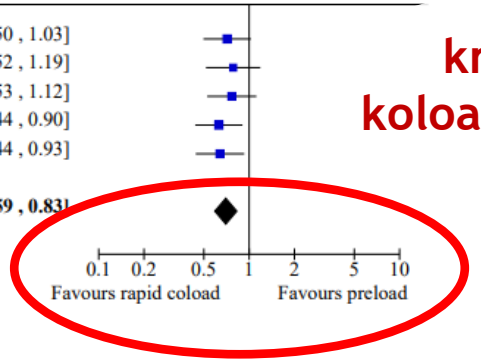
Chooi C, Cox JJ, Lumb RS, Middleton P, Chemali M, Emmett RS, Simmons SW, Cyna AM

Cochrane Database of Systematic Reviews 2020, Issue 7. Art. No.: CD002251.
DOI: 10.1002/14651858.CD002251.pub4.

Analysis 4.1. Comparison 4: Crystalloid: rapid coload vs preload, Outcome 1: Women with hypotension requiring intervention

Study or Subgroup	Rapid coload Events	Rapid coload Total	Preload Events	Preload Total	Weight	Risk Ratio M-H, Random, 95% CI
Dyer 2004	15	25	21	25	21.5%	0.71 [0.50 , 1.03]
Farid 2016	18	37	23	37	16.4%	0.78 [0.52 , 1.19]
Jacob 2012	23	50	30	50	20.0%	0.77 [0.53 , 1.12]
Khan 2013	22	50	35	50	21.6%	0.63 [0.44 , 0.90]
Oh 2014	16	30	25	30	20.5%	0.64 [0.44 , 0.93]
Total (95% CI)		**192**		**192**	**100.0%**	**0.70 [0.59 , 0.83]**
Total events:	94		134			

Heterogeneity: Tau² = 0.00; Chi² = 1.08, df = 4 (P = 0.90); I² = 0%
Test for overall effect: Z = 4.17 (P < 0.0001)
Test for subgroup differences: Not applicable

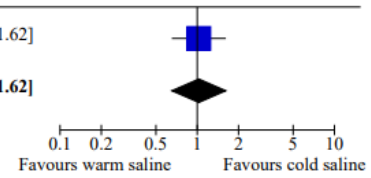


krystaloidy koload vs. preload

Analysis 5.1. Comparison 5: Crystalloid: warm vs cold, Outcome 1: Women with hypotension requiring intervention

Study or Subgroup	Warm saline Events	Warm saline Total	Cold saline Events	Cold saline Total	Weight	Risk Ratio M-H, Random, 95% CI
Jorgensen 2000	23	57	22	56	100.0%	1.03 [0.65 , 1.62]
Total (95% CI)		**57**		**56**	**100.0%**	**1.03 [0.65 , 1.62]**
Total events:	23		22			

Heterogeneity: Not applicable
Test for overall effect: Z = 0.12 (P = 0.91)
Test for subgroup differences: Not applicable



krystaloidy teplé vs. studené

Cochrane Library

Cochrane Database of Systematic Reviews

Techniques for preventing hypotension during spinal anaesthesia for caesarean section (Review)

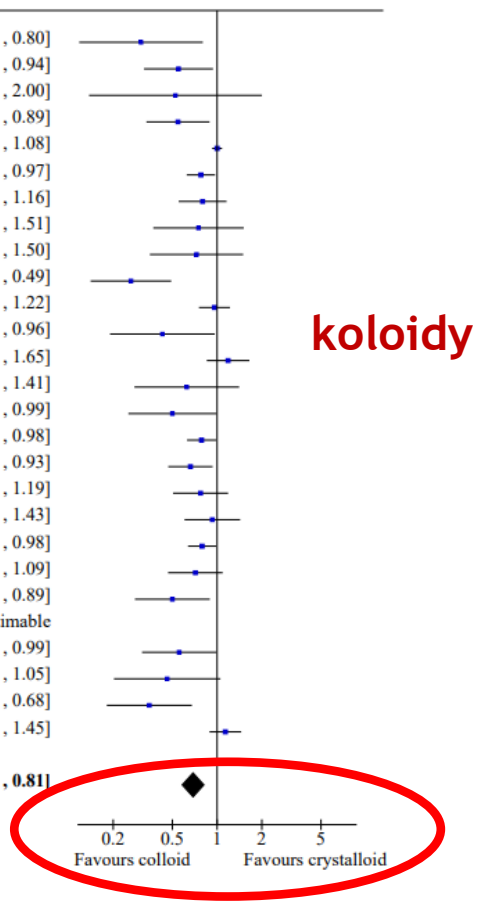
Chooi C, Cox JJ, Lumb RS, Middleton P, Chemali M, Emmett RS, Simmons SW, Cyna AM

Cochrane Database of Systematic Reviews 2020, Issue 7. Art. No.: CD002251.
DOI: 10.1002/14651858.CD002251.pub4.

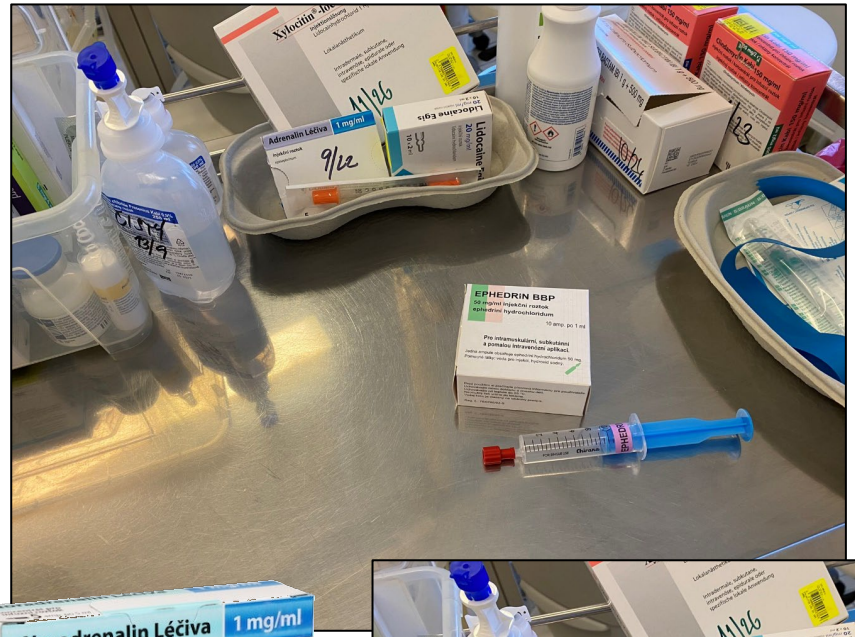
Analysis 7.1. Comparison 7: Colloid vs crystalloid, Outcome 1: Women with hypotension requiring intervention

Study or Subgroup	Colloid Events	Colloid Total	Crystalloid Events	Crystalloid Total	Weight	Risk Ratio M-H, Random, 95% CI
Alimian 2014	4	30	26	60	2.0%	0.31 [0.12 , 0.80]
Arora 2015 (1)	11	30	20	30	3.7%	0.55 [0.32 , 0.94]
Bottiger 2010	3	32	5	28	1.2%	0.53 [0.14 , 2.00]
Bouchnak 2012	12	30	22	30	3.9%	0.55 [0.33 , 0.89]
Cardoso 2004a	25	25	25	25	5.9%	1.00 [0.93 , 1.08]
Dahlgren 2005	37	56	45	53	5.4%	0.78 [0.62 , 0.97]
Dahlgren 2007	17	28	19	25	4.6%	0.80 [0.55 , 1.16]
El-Mekawy 2012	9	30	12	30	2.9%	0.75 [0.37 , 1.51]
Embu 2011	8	25	11	25	2.8%	0.73 [0.35 , 1.50]
French 1999	10	80	38	80	3.3%	0.26 [0.14 , 0.49]
Gunaydin 2009	24	30	25	30	5.3%	0.96 [0.76 , 1.22]
Hasan 2012	6	30	14	30	2.5%	0.43 [0.19 , 0.96]
Jabalameli 2011	32	50	27	50	4.8%	1.19 [0.85 , 1.65]
Karinen 1995	5	13	8	13	2.5%	0.63 [0.28 , 1.41]
Lin 1999	8	30	16	30	3.0%	0.50 [0.25 , 0.99]
Madi-Jebara 2008	39	61	48	59	5.4%	0.79 [0.63 , 0.98]
Mercier 2014	30	82	47	85	4.8%	0.66 [0.47 , 0.93]
Ozkan 2004	24	75	31	75	4.3%	0.77 [0.51 , 1.19]
Perumal 2004	13	20	14	20	4.3%	0.93 [0.60 , 1.43]
Romdhani 2014	33	48	46	53	5.4%	0.79 [0.64 , 0.98]
Selvan 2004	20	40	14	20	4.3%	0.71 [0.47 , 1.09]
Siddik 2000	8	20	16	20	3.5%	0.50 [0.28 , 0.89]
Singh 2009	0	30	0	30		Not estimable
Ueyama 1999	10	24	9	12	3.5%	0.56 [0.31 , 0.99]
Unlugenc 2015	6	30	13	30	2.4%	0.46 [0.20 , 1.05]
Upadya 2016	7	25	20	25	3.1%	0.35 [0.18 , 0.68]
Yorozu 2002	27	32	26	35	5.3%	1.14 [0.89 , 1.45]
Total (95% CI)		**1006**		**1003**	**100.0%**	**0.69 [0.58 , 0.81]**
Total events:	428		597			

Heterogeneity: Tau² = 0.12; Chi² = 140.36, df = 25 (P < 0.00001); I² = 82%
Test for overall effect: Z = 4.37 (P < 0.0001)
Test for subgroup differences: Not applicable

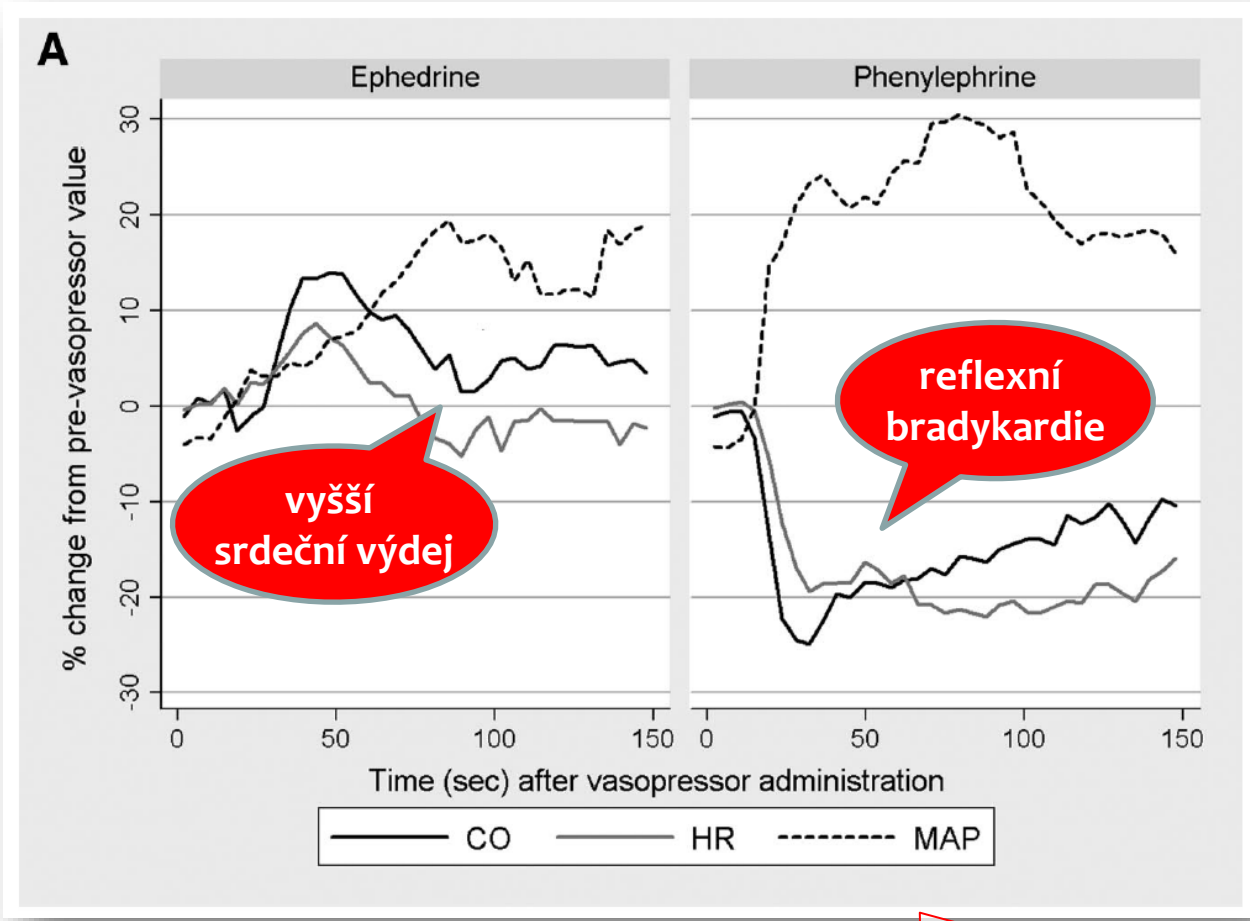


koloidy vs. krystaloidy



Kontinuálně !
(0,05-0,075 µg/kg/min)

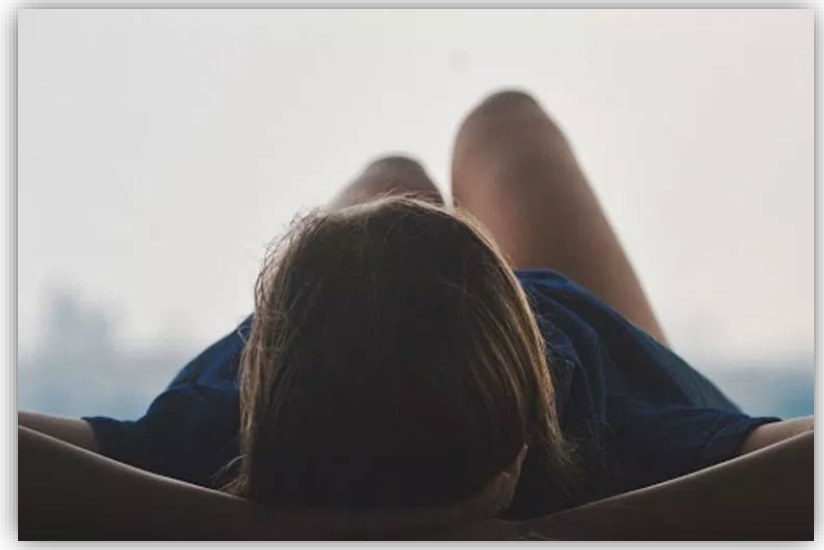
Phenylephrin je na porodnici absolutní POVINNOST !!!

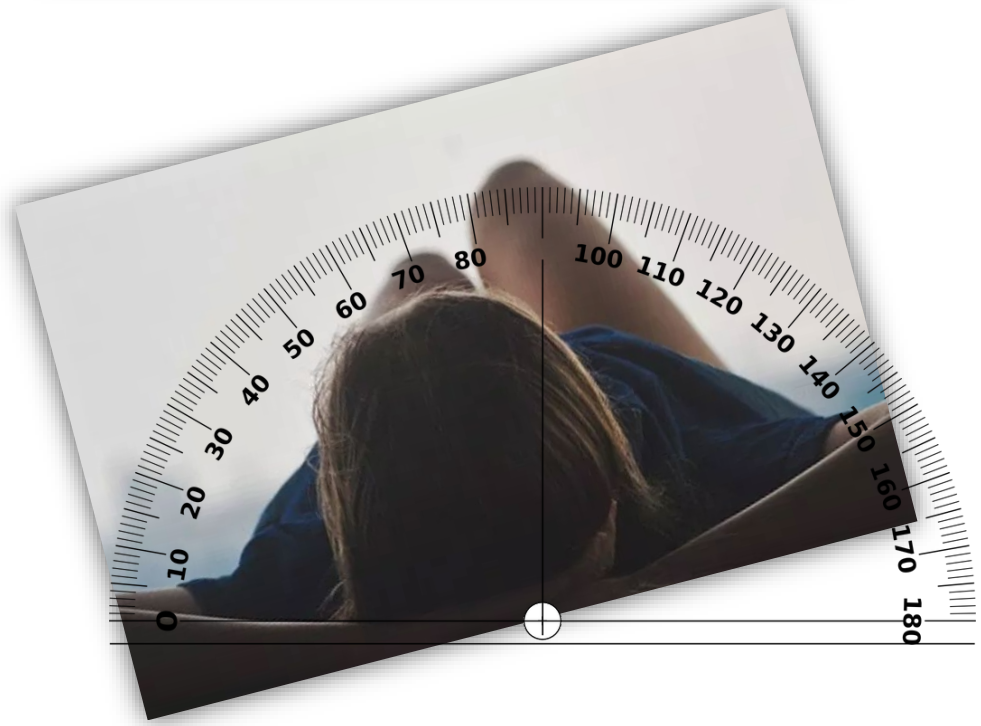


Phenylephrin je jasně lepší u tachykardie!

Dyer RA et al. Anesthesiology. 2009 Oct;111(4):753-65


13 29
X-CAEDD
VFN OS
HR /min
66
EKG
Sp02 %
98
Kabel odpojen
129/ 68
(88)
Odpočítáv.
00:00:00
Uplynulý
00:00:00
Nastavení alarmů
Nastavení monitoru
Procedury
Data a stránky
Trendy
Tisk křivek
Zmrazit/ Snímek
NIBP Start
NIBP Auto Stop
Nulování všech tlaků

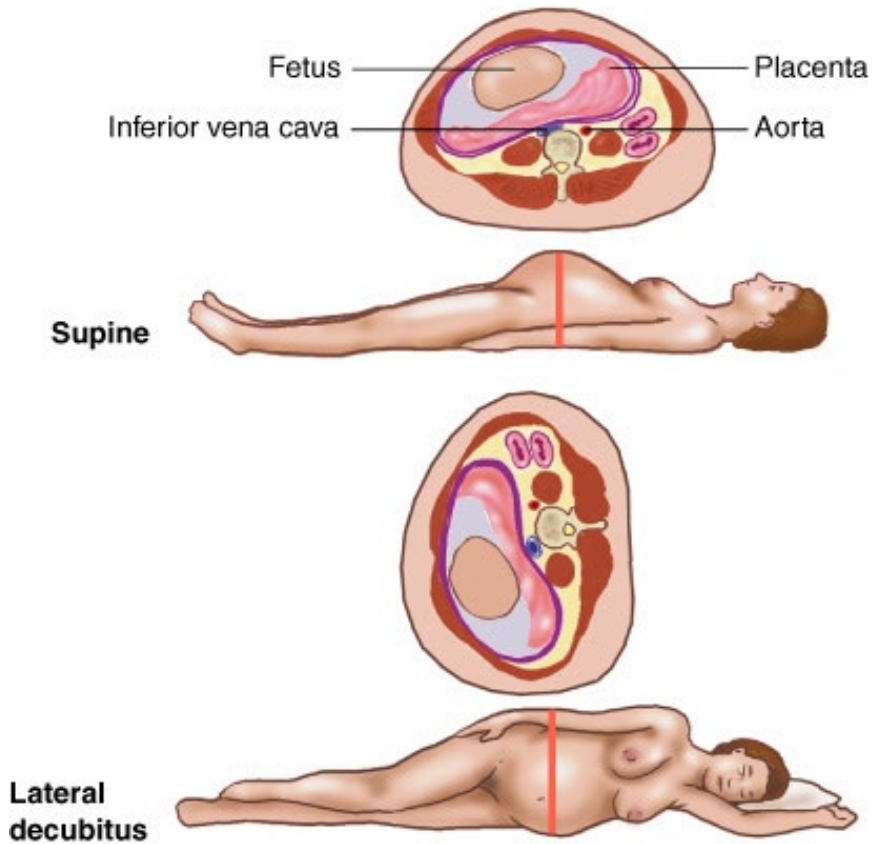


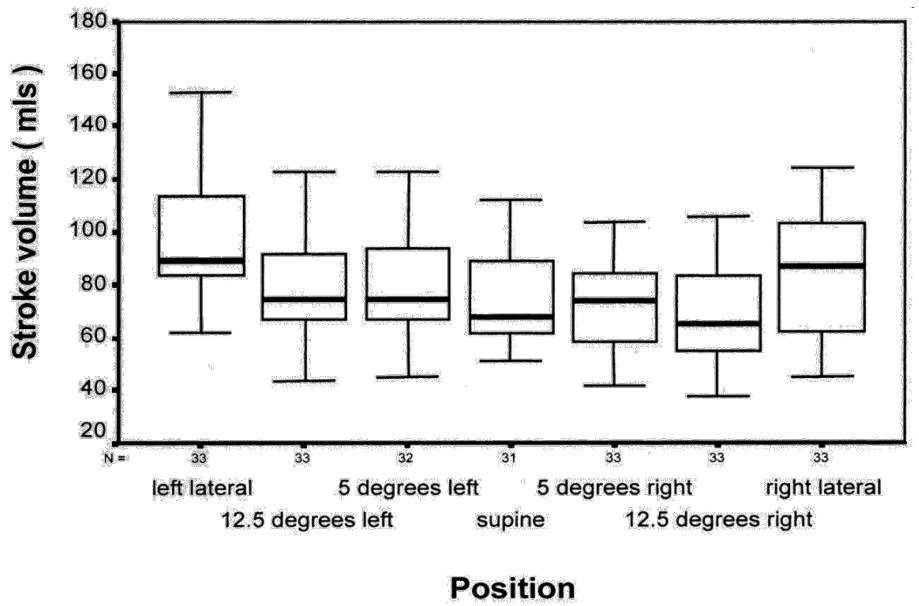

0
10
20
30
40
50
60
70
80
100
110
120
130
140
150
160
170
180

SEMILATERÁLNÍ POLOHA

naklonění trupu o 5-15 stupňů

= prevence aortokavální komprese





Bamber, J. H. et al. Anesth Analg 2003;97:256-258


Trendy
Zobrazit
Numerické
Časový interval
5 min
Tisk stránky
Zavřít
Vitální
IP
ST/QT
Tepl C.O.
Plyny BIS
Paw Průt
Výměna plynů
AoA
Nast. Vent
Vitální parametry
HR 83 104 109 77 59 93 127 123 /min
PVC /min
SpO2 99 99 99 99 98 98 98 98 %
NIBP 64/34 (44) 53/33 (43) 57/32 (45) 74/37 (53) 129/68 (88) 127/83 (101) 120/67 (89) 138/73 (100) mmHg
Art mmHg
CVP mmHg
RR /min
%
%
Značka
13:23 13:24 13:25 13:26 13:29 13:30 13:33 13:35 23 lis
13:37
X-CAEDD
VFN OS
HR /min
40 160
123
EKG
SpO2 %
Vyp
97
NIBP mmHg Dosp.
SYS 80 180
SYS DIA M
138/73 (100)
Mnž 118
Nastavení alarmů
Nastavení monitoru
Procedury
Data a stránky
Trendy
Tisk křivek
Zmrazit/ Snímek
Zrušit NIBP
NIBP Auto Stop
Nulování všech tlaků
Časovače
Odpočítáv. 00:00:00
Uplynulý 00:00:00

Epidurál: do jehly nebo do katetru…?

Všeobecná fakultní nemocnice v Praze
U Nemocnice 499/2, 128 08 Praha 2 IČ 00064165, tel. 22496 1111
Klinika anesteziologie, resuscitace a intenzivní medicíny
Přednosta: Doc. MUDr. Martin Stříteský, CSc. Primář: MUDr. Jan Krištof

F-KARIM-058 strana 1/1 verze 2015/1.0

ANESTEZIOLOGICKÝ ZÁZNAM

číslo /operační sál: 452/PS2

[redacted] 6P3
83[redacted] DG: Z35.8
VFN Praha 2 IČP: 02004377
NS: odb.6P3 POR-PJIP

výška (cm): 165 | váha (kg): 165/200 | ASA: III | Riziko obtížné intubace: MI nízké - střední - vysoké | datum: 10.8.17

diagnóza: Obesitas permagna, nemocenský dušení

operační výkon: S.C.

anesteziolog: BLAHA | anesteziologická sestra: Mgr. Daniela Šnajdrová | operatér: PAŘÍZEK

☒ Podepsaný Informovaný souhlas s anestezií.

Originál tohoto A…

ALERGIE: kys. acetylsalicylová, pyly, peří

PŘEDOPERAČNÍ ANESTEZIOLOGICKÉ VYŠETŘENÍ:

TK

Arter. hypertenze
Asthma bronchiale – nyní bez terapie; ale…
– zhoršení při stresu
Přijata k zahájení preeklampsie, TK …
ještě není k dispozici

Monstrózní obesita, BMI 73

Souhlas se všemi typy anestezie

PICC zaveden 7.8. na LHK

CHRONICKÁ MEDIKACE:

Dopegyt 2x 1tbl.

☐ **POZOR !** Pacient(ka) nerozumí česky. Hovoří těmito jazyky:

VOLBA ANESTEZIE: ☒ celková ☒ epidurální ☒ spinální ☐ kombinovan…

PŘEDOPERAČNÍ DOPORUČENÍ:

~~– 2x TU EBR do depa~~
– ráno v den S.C. pouze pokrm Degan 10 mg, Ranitinu 300 mg p.o.

Jitka Janoušková porodní asistentka

9.8.17 14⁰⁰

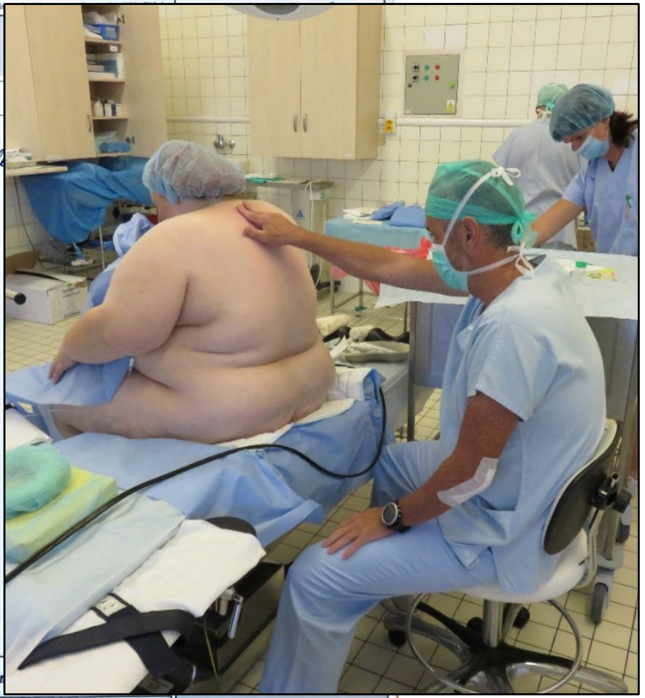
MUDr. Jana Kubátová 1639

ZÁVĚR: Schopen(a) anesteziologického výkonu. Datum, čas a podpis:

POLOHA PACIENTA

MONITORACE
☐ EKG ☐ NIBP ☐ SpO_2
☐ $ETCO_2$ ☐ $\%O_2$ ☐ %VA
☐ ST úsek ☐ ABP ☐ CVP
☐ BIS ☐ TOF ☐

☐ **Ostatní viz Předoperační protokol** ☐ **Akutní výkon bez Předoperačního protokolu**



Všeobecná fakultní nemocnice v Praze
U Nemocnice 499/2, 128 08 Praha 2 IČ 00064165, tel. 22496 1111
Klinika anestezie, resuscitace a intenzivní medicíny
Přednosta: Doc. MUDr. Martin Stříteský, CSc. Primář: MUDr. Jan Krištof

6P3
DG: Z35.8
VFN Praha 2 IČP: 02004377
NS: odb.6P3 POR-PJIP

BLAHA

Mgr. Daniela Šna

Podepsaný informovaný souhlas s anestezií.

ALERGIE:

PŘEDOPERAČNÍ ANESTEZIOLOGICKÉ VYŠETŘENÍ:

CHRONICKÁ MEDIKACE:

POZOR ! Pacient(ka) nerozumí česky. Hovoří těmito jazyky:

VOLBA ANESTEZIE: celková epidurální spinální kombinov

PŘEDOPERAČNÍ DOPORUČENÍ:

Jitka Papoušková
porodní asistentka

ZÁVĚR: Schopen(a) anestheziologického výkonu. Datum, čas a podpis:

Ostatní viz Předoperační protokol Akutní výkon bez

Stav pacienta se shoduje s anestheziologickým vyšetřením ANO NE (podrobnosti jsou uvedeny v dekurzu). VĚDOMÍ: normální GCS ..... OBĚHOVĚ: stabilní nestabilní DÝCHÁNÍ: eupnoe dyspnoe UPV

REGIONÁLNÍ ANESTEZIE katetr
oblast/typ: L3-4 (2) / EPID
Pokusy: 1x jehla:
krev:
mok:
hloubka:
Test katetru: bolus aspirace:
Aplikováno:
Efekt:
INFÚZE:

EPI

SAB

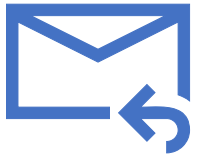
SAB / L3-4
1 pokus
Moč:
Krevní ztráty:
PŘÍJEM krystaloidů koloidů

TK P /min SpO2 % při FiO2

PODPIS ANESTEZIOLOGA:

PACIENTA(KU) PŘEVZAL(A):

Difficult Spinal in Obese Patient- Crash course with Dr. Hadzic



jan.blaha@vfn.cz