

Co může anesteziolog udělat pro minimalizaci pooperačních infekcí

David Astapenko



XXVIII. kongres ČSARIM
16. 9. 2022 Brno



Nemám konflikt zájmu

Osnova sdělení

Management pacienta (rezervoár je pacient)

– oxygenace, perfuze, glykémie, teplota, ATB, kurarizace

Management procedur (rezervoár je zdravotnický personál)

– asepse, hygiena rukou, pomůcky k zajištění vstupu a UPV

Antioxidační látky

Jak vypadá náš rutinní den na sále?

Jsme na sále včas?

Jsme obeznámeni s anamnézou, typem výkonu, zajištěním pacienta včetně ATB profylaxe?

Máme umyté ruce?

Používáme přísně aseptickou techniku?

Jsme dostatečně pozorní k výkyvům fyziologických funkcí pacienta?

Nozokomiální infekce

Ranná infekce (surgical site infection, SSI) → 2 – 5 %

Pneumonie (postoperative pulmonary complication, PCC)

Močová infekce (urinary tract infection, UTI)

Infekce krevního řečiště (blood stream infection, BSI)

Meningitida

7 %

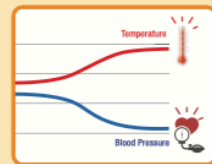


American Society of
Anesthesiologists

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asamonitor.org

ASA Monitor[®]

THE LEADING SOURCE FOR PERIOPERATIVE HEALTH CARE NEWS



Guest Editorial:

Perioperative Infection Control – We Have A Role!

Surgical Site Infections – Prevention Is Better Than Treatment!

Kumar G. Belani, MBBS, MS, FACA, FAAP, SAMBA-F

Partnerships Between Anesthesiology and Hospital Infection Prevention and Control Teams

Dustin R. Long, MD Vanessa Makarewicz, RN, MN, CIC Chloe Bryson-Cahn, MD Arman Dagal, MD, FRCA, MHA

Antimicrobial Prophylaxis for Surgical Site Infection (SSI) Prevention

Nil Ural, MD Shobana Rajan, MD, FASA Jonathan E. Metry, MD, FASA Muhammad B. Rafique, MBBS, FASA

Management pacienta

Oxygenace

Perfuze

Glykémie

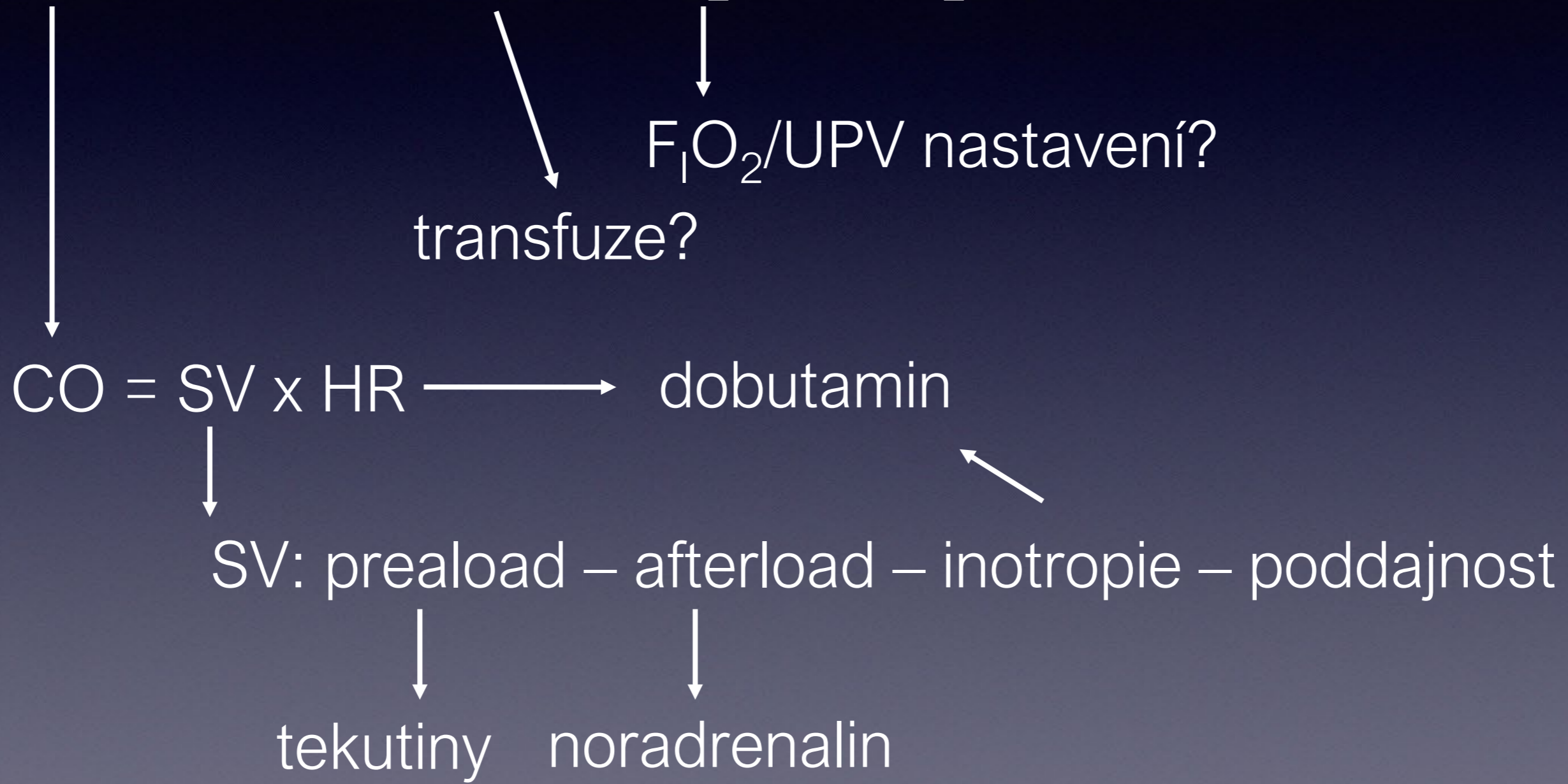
Teplota

Léky (ATB profylaxe, dekurarizace)



DO₂

$$DO_2 = CO \times 1,34 \times [Hb] \times SpO_2 + (paO_2 \times 0,003)$$



Hyperoxie

The Anesthesiologist's Role in the Prevention of Surgical Site Infections **FREE**

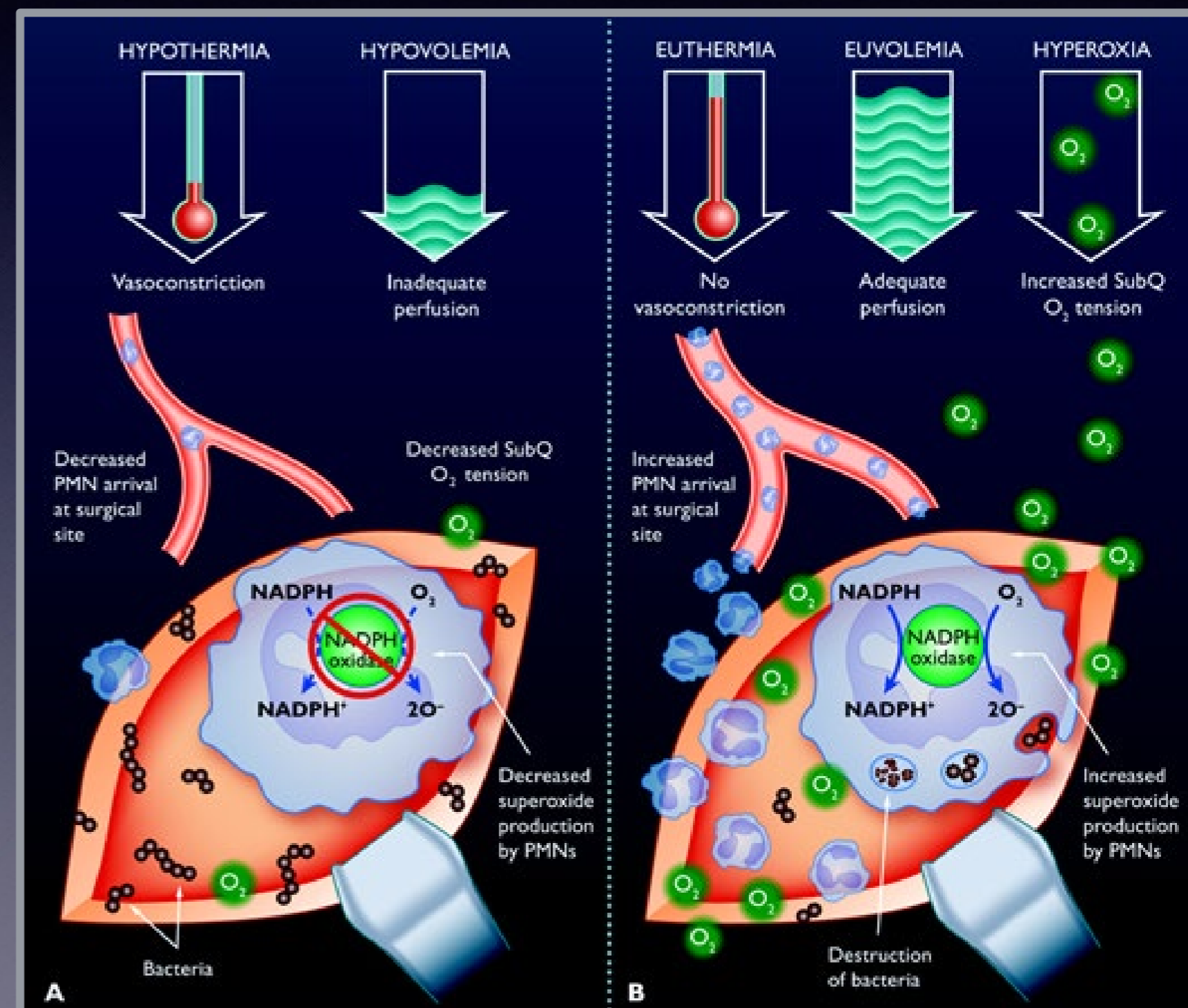
William J. Mauermann, M.D.; Edward C. Nemergut, M.D.; David C. Warltier, M.D., Ph.D.

Anesthesiology August 2006, Vol. 105, 413-421.

Prevence vzniku ranné infekce

2 pozitivní studie, 1 negativní

Biologické pozadí plauzibilní, ale?



Hyperoxie

Perioperative Hyperoxyphobia: Justified or Not? Benefits and Harms of Hyperoxia during Surgery

by  Robert P. Weenink ¹ ,  Stijn W. de Jonge ²,  Robert A. van Hulst ^{1,3},  Thijs T. Wingelaar ^{1,4} ,
 Pieter-Jan A. M. van Ooij ^{4,5},  Rogier V. Immink ¹,  Benedikt Preckel ^{1,*}   and
 Markus W. Hollmann ¹



[J Clin Med.](#) 2020 Mar; 9(3): 642.



Journal of
Clinical Medicine

setting. We ultimately conclude that current evidence is in favour of hyperoxia in noncritically ill intubated adult surgical patients.

Mortalita x extrapolace dat

Pooperační plicní komplikace (atelektázy)

Relativně vyšší KVS a CNS komplikace

Oxidační stres, vazokonstrikce, novorozenci/kojenci

CAVE

Glykémie

29 RCTs, 14 126 pacientů

primary outcome: SSIs

-> snížení výskytu (RR 0,63) ve skupině s úzce kontrolovanou glykemií (3,9 – 6,6 mmol/l)

-> pacienti s DM, břišní chirurgie, kardiochirurgie, intra- i pooperační fáze

x vyšší riziko hypoglykémie a vyšší mortalita

> [Front Surg.](#) 2022 Mar 25;9:855409. doi: 10.3389/fsurg.2022.855409. eCollection 2022.

Glycemic Control Regimens in the Prevention of Surgical Site Infections: A Meta-Analysis of Randomized Clinical Trials

[Jing Lai](#)¹, [Qihong Li](#)², [Ying He](#)¹, [Shiyue Zou](#)¹, [Xiaodong Bai](#)³, [Sanjay Rastogi](#)⁴

Affiliations + expand

PMID: 35402490 PMCID: [PMC8990940](#) DOI: [10.3389/fsurg.2022.855409](#)

Teplotní management



ELSEVIER

American Journal of Infection Control

Volume 48, Issue 10, October 2020, Pages 1248-1254



4.3 Nemocnice

Pokoje pro nemocné

22

20

Vyšetřovny, přípravný

24

20

Koupelny

24

20

Operační sály

25

20

Předsíně, chodby, WC, schodiště

20

18

V př
tepl

Publikov
Autor:

Minist

vytápe

předch

které u

potřebných uspor.

na nižší

,0 °C

dla pro

šení

ní podmínky,

áhnout tak

iated with

tive body

- The available scientific evidence is insufficient to clarify the benefits of warming methods in preventing surgical site infection.

ATB management

Indikace ze strany výkonu

-> místo incize, krevní ztráta, kontaminace

Indikace ze strany pacienta

-> stav imunity (splenektomie?)

Příprava kůže

24 hodin



ANESTHESIOLOGY

Gut Microbiome in Anesthesiology and Pain Medicine

Amir Minerbi, M.D., Ph.D., Shiqian Shen, M.D.

ANESTHESIOLOGY 2022; 137:93–108

Preoperative Anti

Marsha F. Crader; Matthew V

► [Author Information](#)

Last Update: June 1, 2022.

Reziduální kurarizace

> [Eur J Anaesthesiol.](#) 2014 Aug;31(8):423-9. doi: 10.1097/EJA.000000000000010.

Retrospective investigation of postoperative outcome after reversal of residual neuromuscular blockade: sugammadex, neostigmine or no reversal

Thomas Ledowski ¹, Laura Falke, Faye Johnston, Emily Gillies, Matt Greenaway, Ayala De Mel, Wuen S Tiong, Michael Phillips

CAVE

> [Trials.](#) 2022 May 7;23(1):376. doi: 10.1186/s13063-022-06328-3.

Comparison of the effects of neostigmine and sugammadex on postoperative residual curarization and postoperative pulmonary complications by means of diaphragm and lung ultrasonography: a study protocol for prospective double-blind randomized controlled trial

Yu-Guan Zhang ^{# 1}, Ying Chen ^{# 1}, Yue-Lun Zhang ¹, Jie Yi ²

Management procedur

Review > [Br J Anaesth.](#) 2019 Oct;123(4):e475-e479. doi: 10.1016/j.bja.2019.05.036.

Epub 2019 Jun 24.

Anaesthetists and syringe hygiene: getting to the pointy end – a summary of recommendations

[Lloyd E Kwanten](#)¹

Affiliations + expand

PMID: 31248642 DOI: [10.1016/j.bja.2019.05.036](#)

Zavádění intravaskulárních vstupů

Hygiena rukou, nakládání s léky, úklid na operačním sále

Nezapomeňme na propofol

Bak
Vyš

ČESKÁ LÉKAŘSKÁ SPOLEČNOST ČESKÁ SPOLEČNOST ANESTEZIOLOGIE, RESUSCITACE A INTENZIVNÍ MEDICÍNY

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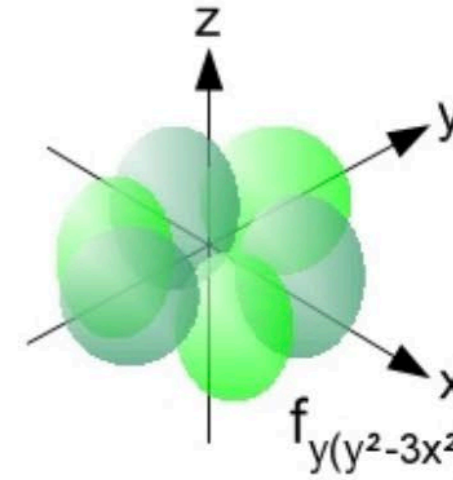
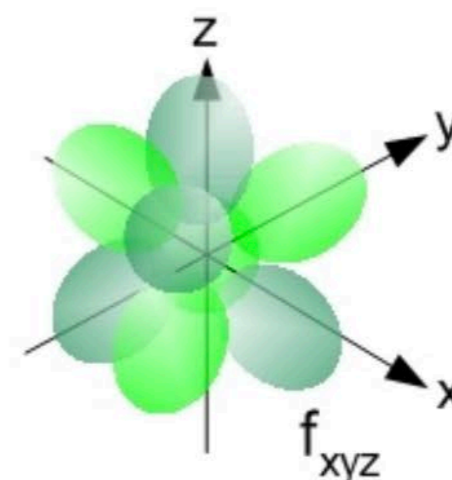
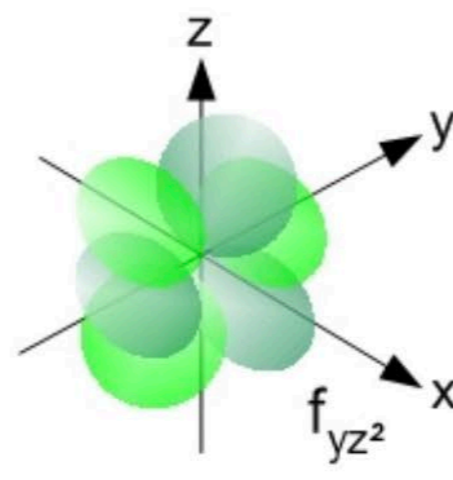
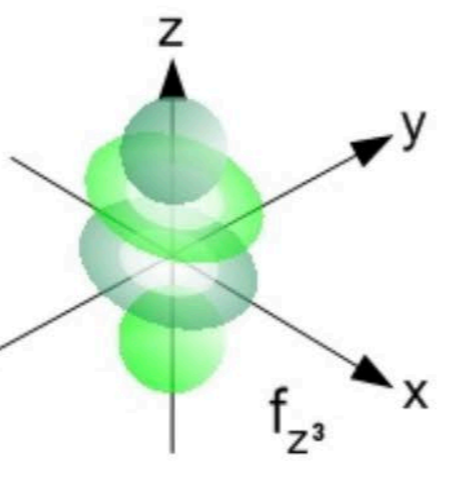
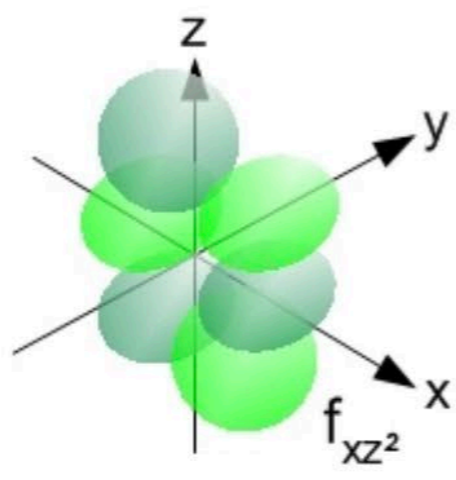
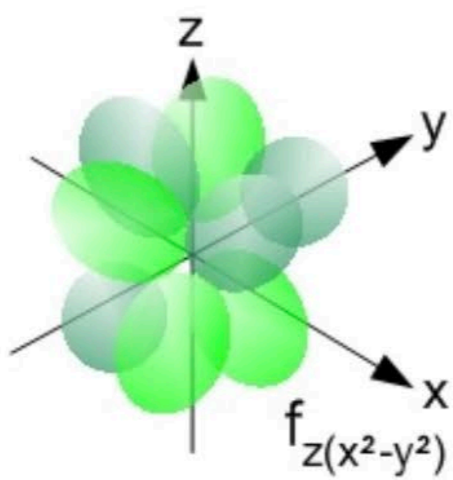
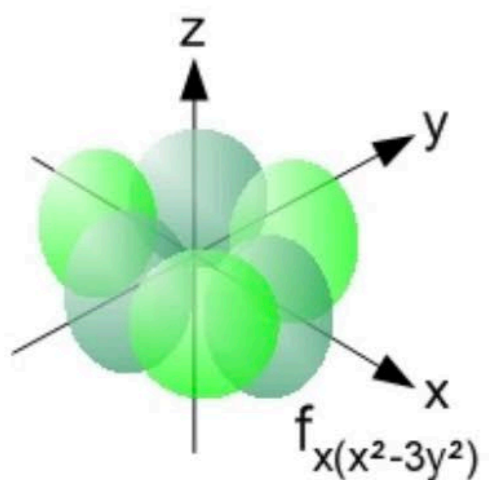
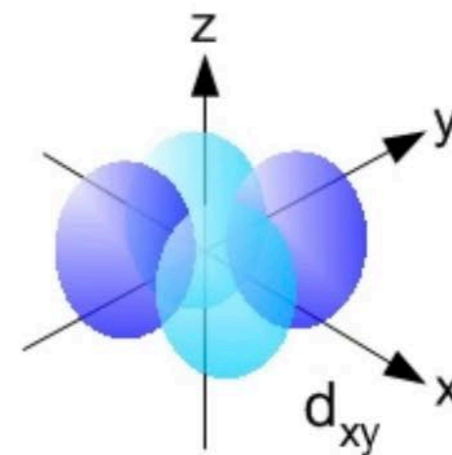
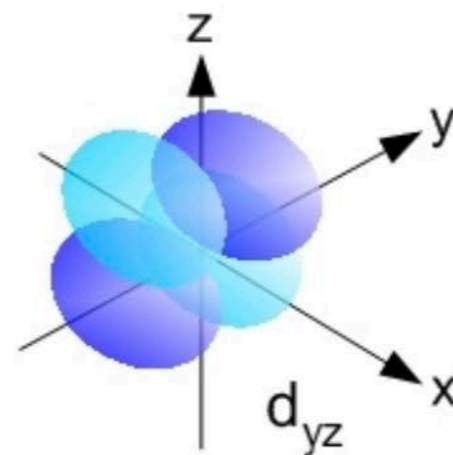
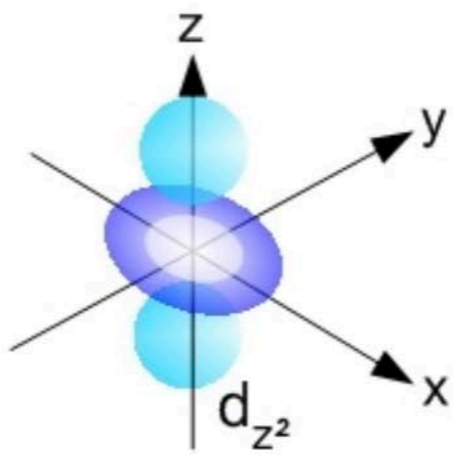
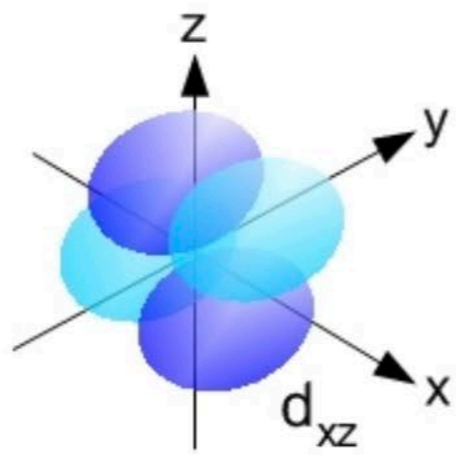
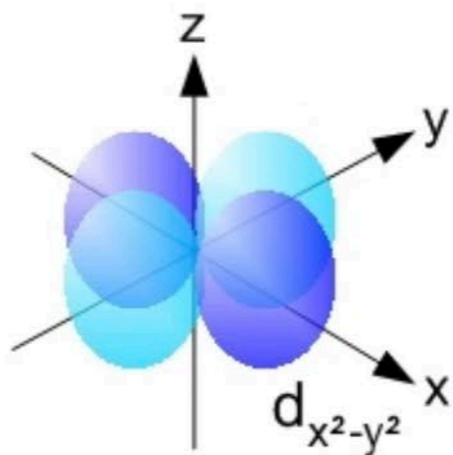
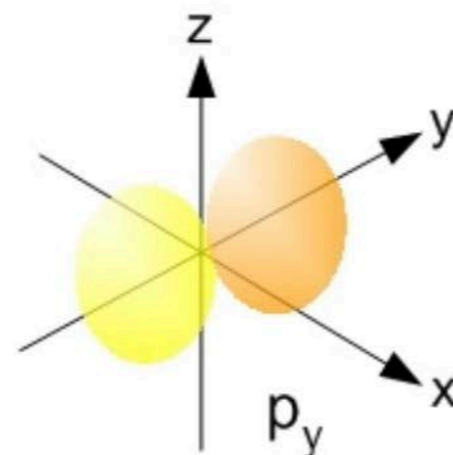
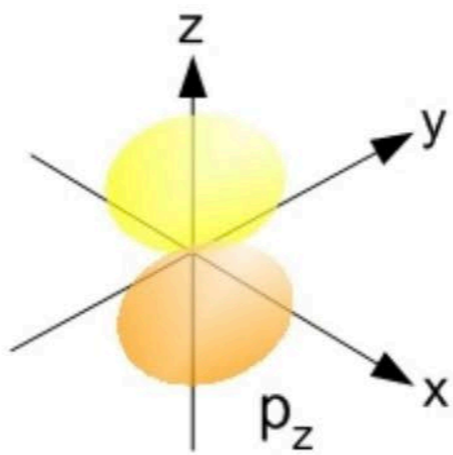
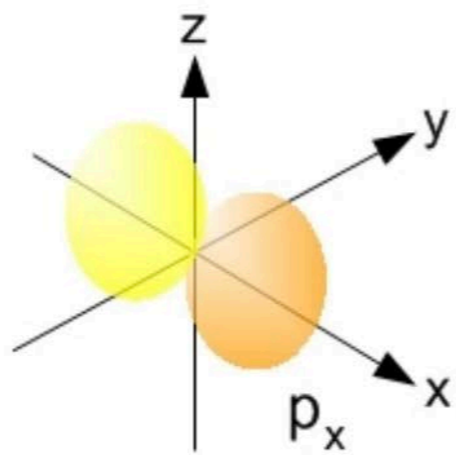
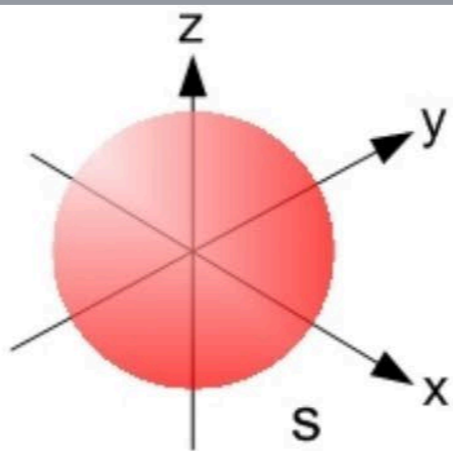
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STANOVISKO VÝBORU

K PODÁVÁNÍ LÉČIVÝCH PŘÍPRAVKŮ S OBSAHEM PROPOFOLU Z JEDNÉ
LAHVIČKY/AMPULKY PRO VÍCE PACIENTŮ

není známa

entů ve
nejm
dná
nemocnice
ní



Perioperative Infection Transmission: the Role of the Anesthesia Provider in Infection Control and Healthcare-Associated Infections

Archit Sharma,¹ Patrick G. Fernandez,² John P. Rowlands,³ Matthew D. Koff,⁴ and Randy W. Loftus¹

Anesteziolog



Chirurg



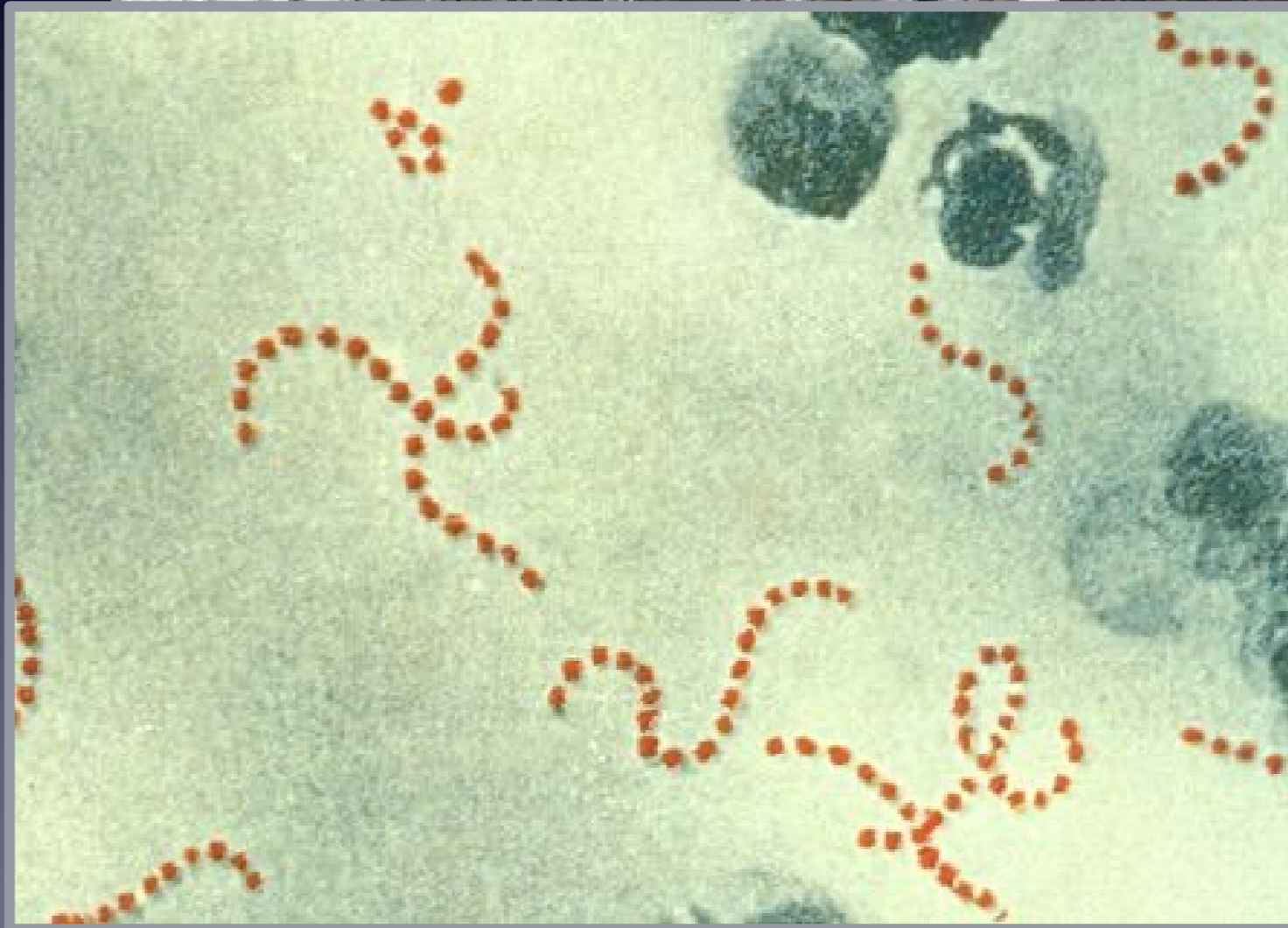
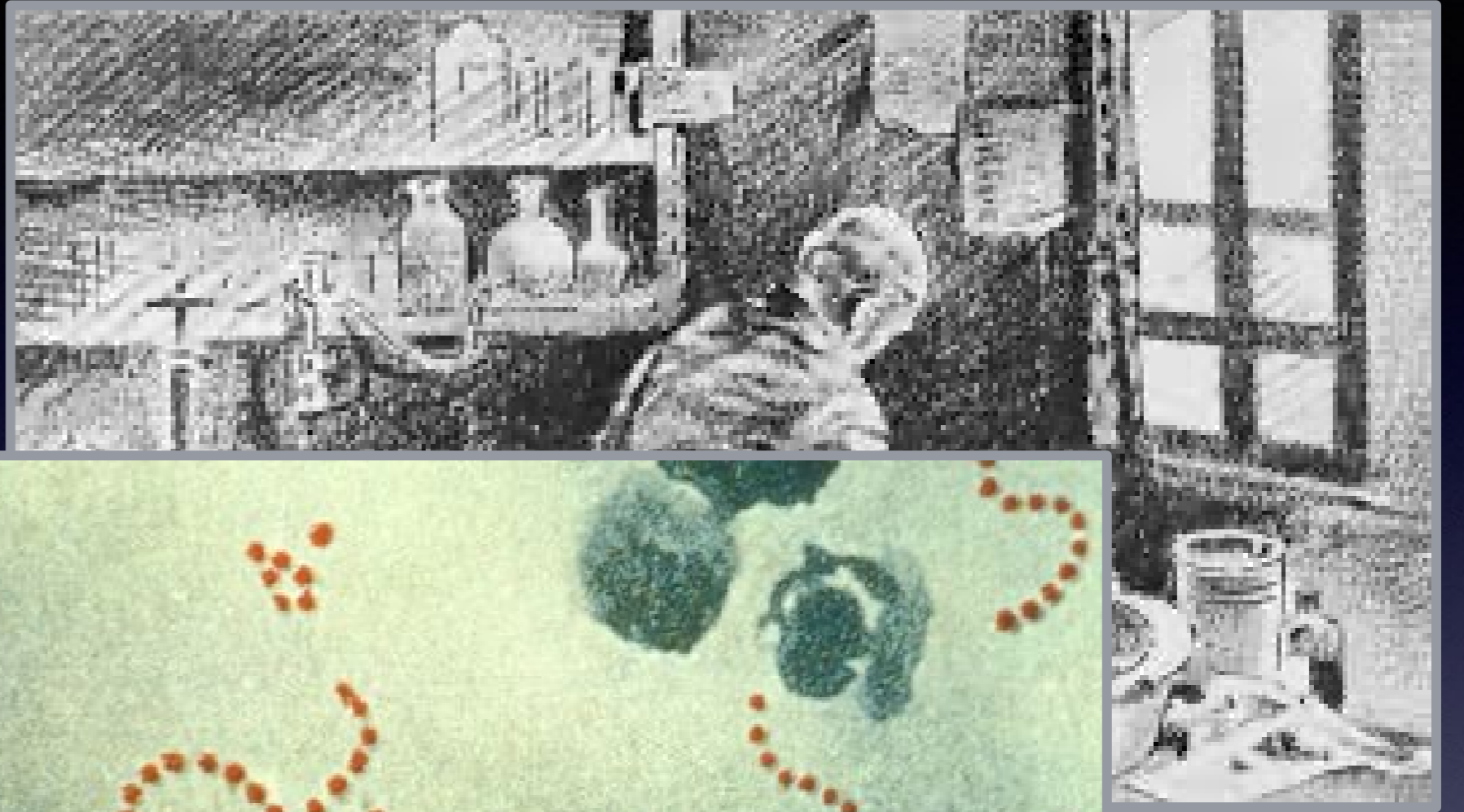
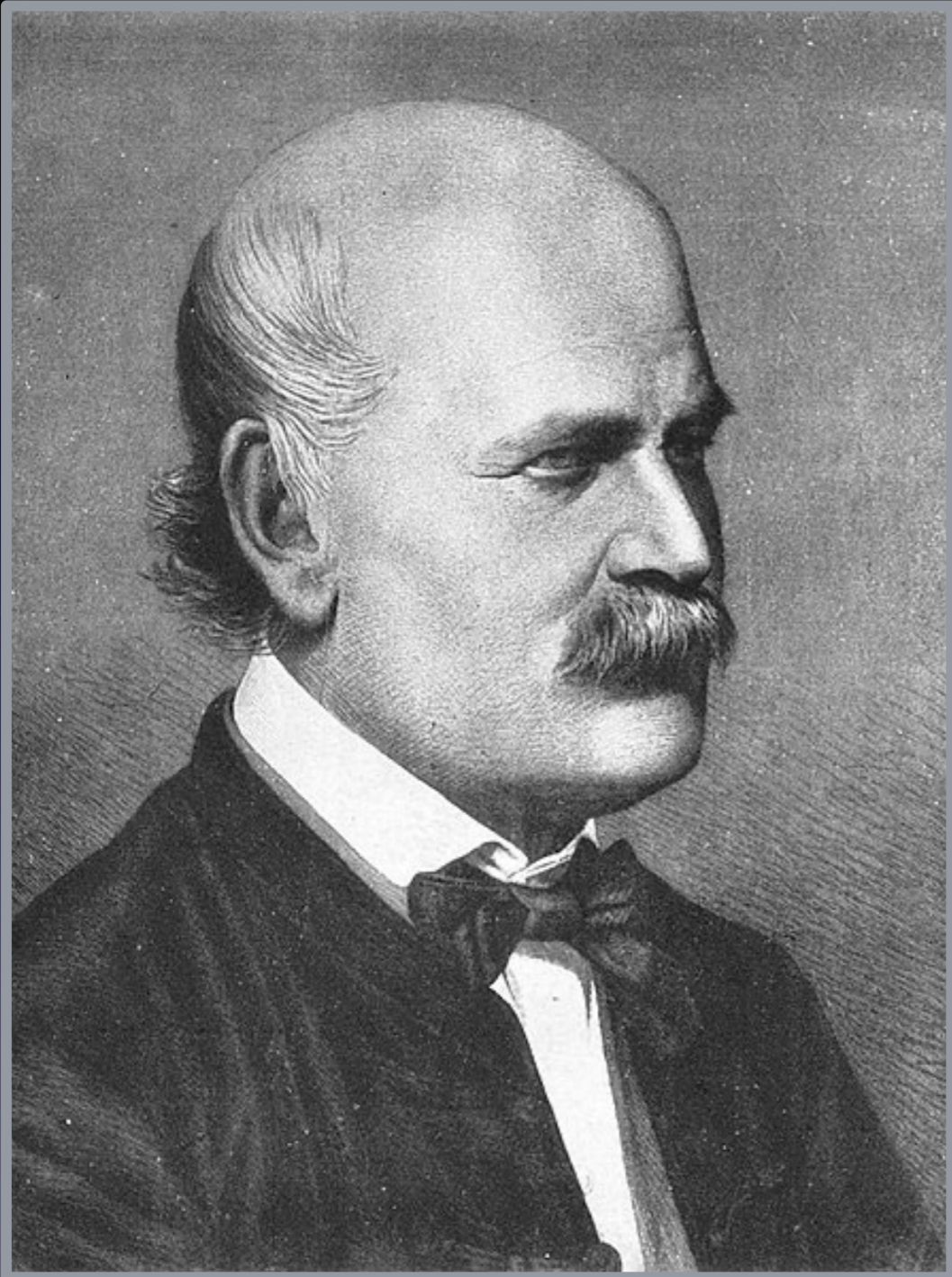
Obíhající sestra



Umývání rukou:

– jen 58 % anesteziologů
u méně rizikových výkonů







Operating Table
1889 - 1891

Early Surgery
Saint Marys First Operating Room
1889 - 1891
The St. Marys Hospital (now St. Marys)
was built in 1889. The first operating room
was in the basement. The St. Marys
Hospital is now a part of the
University of Maryland Medical System.

CARDIAC SURGERY PREOP BRIEFING

DEMOGRAPHICS		Age	Risk
Name			Fire Safety Rating
MR #			BSA
Allergies	Weight		PA/SA
Height	Resident		
Surgeon	CRNA		Perfusionist
Anesthesiologist	Circulator		
Scrub			

SURGICAL PROCEDURE	
Procedure	Sternotomy: <input type="checkbox"/> Full <input type="checkbox"/> Mini Thoracotomy: <input type="checkbox"/> Right <input type="checkbox"/> Left <input type="checkbox"/> Other _____
Approach	
Special Positioning	
Conduit	# of Grafts: _____ <input type="checkbox"/> LIMA <input type="checkbox"/> Bilateral IMAs <input type="checkbox"/> Radial Art <input type="checkbox"/> Right <input type="checkbox"/> Left <input type="checkbox"/> Vein <input type="checkbox"/> EVH <input type="checkbox"/> Open Length(s) _____
Implants	Valves: <input type="checkbox"/> Mechanical <input type="checkbox"/> Bioprosthetic Brand: _____ Annuloplasty Ring Type: Brand: _____ <input type="checkbox"/> Grafts <input type="checkbox"/> Pericardium
Additional Procedure Related Equipment	<input type="checkbox"/> MAZE: <input type="checkbox"/> Radio-Frequency <input type="checkbox"/> Cryo <input type="checkbox"/> Coronary Flow Probe <input type="checkbox"/> Defib Pads <input type="checkbox"/> C-Arm Other: _____

PERFUSION	
Cannulation	Arterial: <input type="checkbox"/> Aorta <input type="checkbox"/> Axillary <input type="checkbox"/> Femoral Size _____ Venous: <input type="checkbox"/> Bicaval <input type="checkbox"/> Dual-Stage <input type="checkbox"/> Triple-Stage <input type="checkbox"/> Femoral <input type="checkbox"/> IJ Size _____
Myocardial Protection	Vent: <input type="checkbox"/> Aortic Root <input type="checkbox"/> LV <input type="checkbox"/> PA Super Sucker <input type="checkbox"/> <input type="checkbox"/> Antegrade <input type="checkbox"/> Ostial <input type="checkbox"/> Retrograde <input type="checkbox"/> del Nido <input type="checkbox"/> Buckberg
CPB Management	Target MAP _____ mmHg
Circulatory Arrest	Target Flow Rate _____ L/min Target Temp _____ °C Cerebral Perfusion: <input type="checkbox"/> Antegrade <input type="checkbox"/> Retrograde <input type="checkbox"/> None

ANESTHESIA	
Airway Concerns	ET Tube Lumen: <input type="checkbox"/> Single <input type="checkbox"/> Double
Antibiotics	<input type="checkbox"/> Ancef <input type="checkbox"/> Vanco <input type="checkbox"/> Other _____
Antifibrinolytics	<input type="checkbox"/> Amicar <input type="checkbox"/> TXA <input type="checkbox"/> None
Monitoring	A-Line: _____ Radial: <input type="checkbox"/> Left <input type="checkbox"/> Right <input type="checkbox"/> MRSA Status _____ Access: <input type="checkbox"/> PA Cath <input type="checkbox"/> CVP <input type="checkbox"/> IJ Femoral: <input type="checkbox"/> Right <input type="checkbox"/> Left <input type="checkbox"/> Other: _____ Temp Probe: <input type="checkbox"/> Nasopharyngeal <input type="checkbox"/> Bladder Pacing Swan: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Cerebral Oximetry <input type="checkbox"/> EEG Monitoring

BLOOD MANAGEMENT	
Pre-CPB HCT	Estimated PD HCT
Blood Ordered # Units	PRBC _____ PLT _____ % ANH _____ mL
Antibodies: <input type="checkbox"/> Yes <input type="checkbox"/> No Description: _____	ATS: <input type="checkbox"/> Yes <input type="checkbox"/> No FFP _____ CRYO _____
	HMS: <input type="checkbox"/> Yes <input type="checkbox"/> No



Antioxidace

Vitamín C

Albumin

Glutathion

N-acetyl cystein

Vodík



Protekce glykokalyxu v iniciální fázi kritického stavu vodíkem

Model NZO na praseti domácím

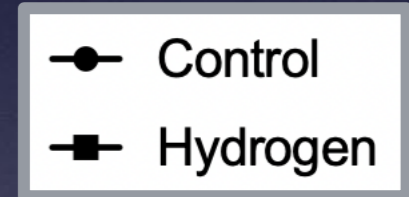
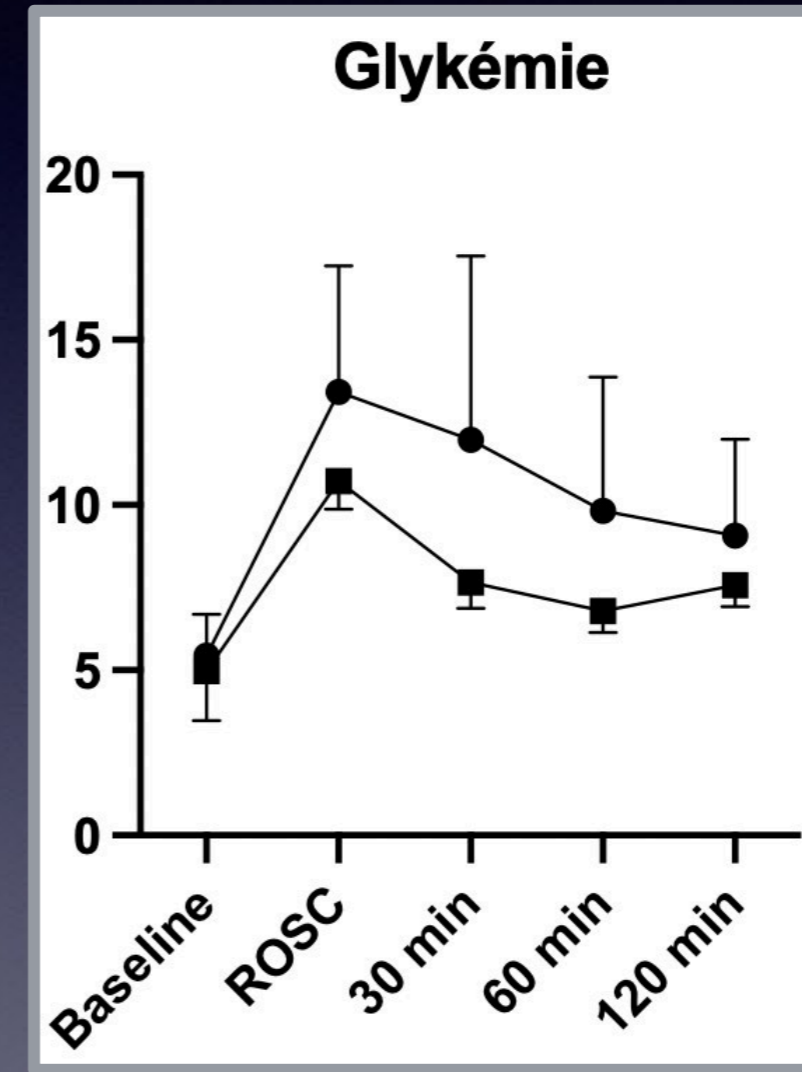
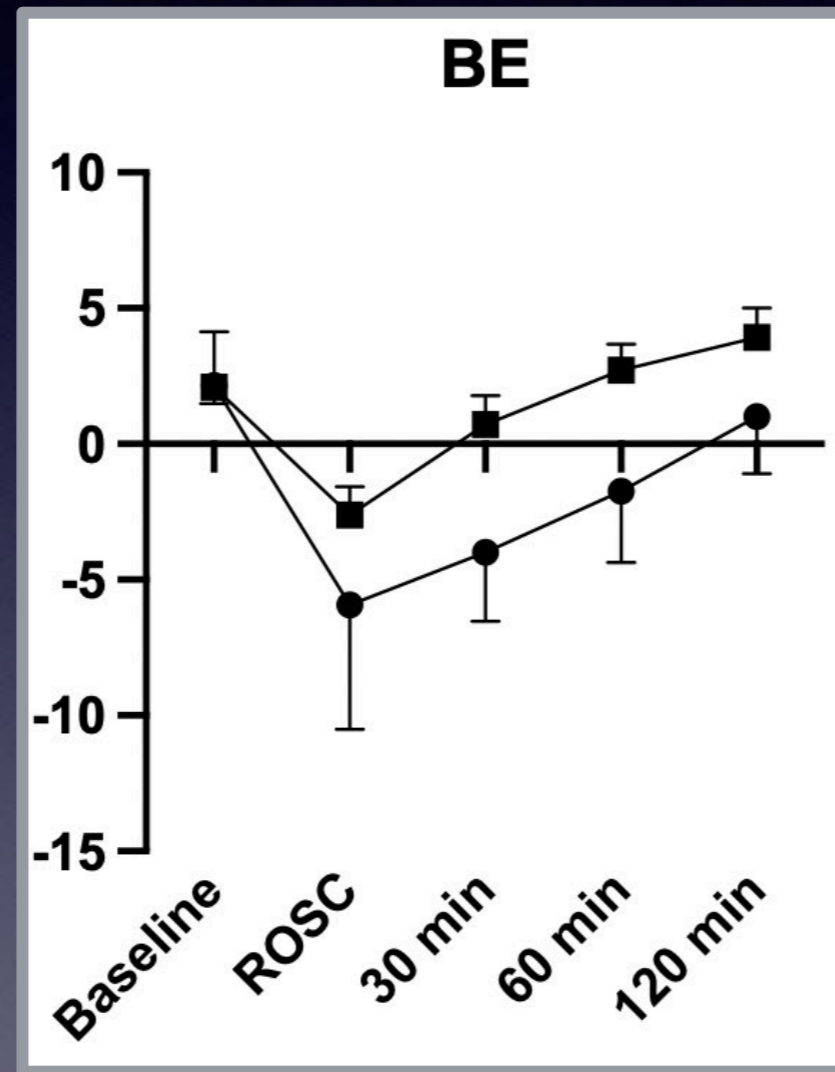
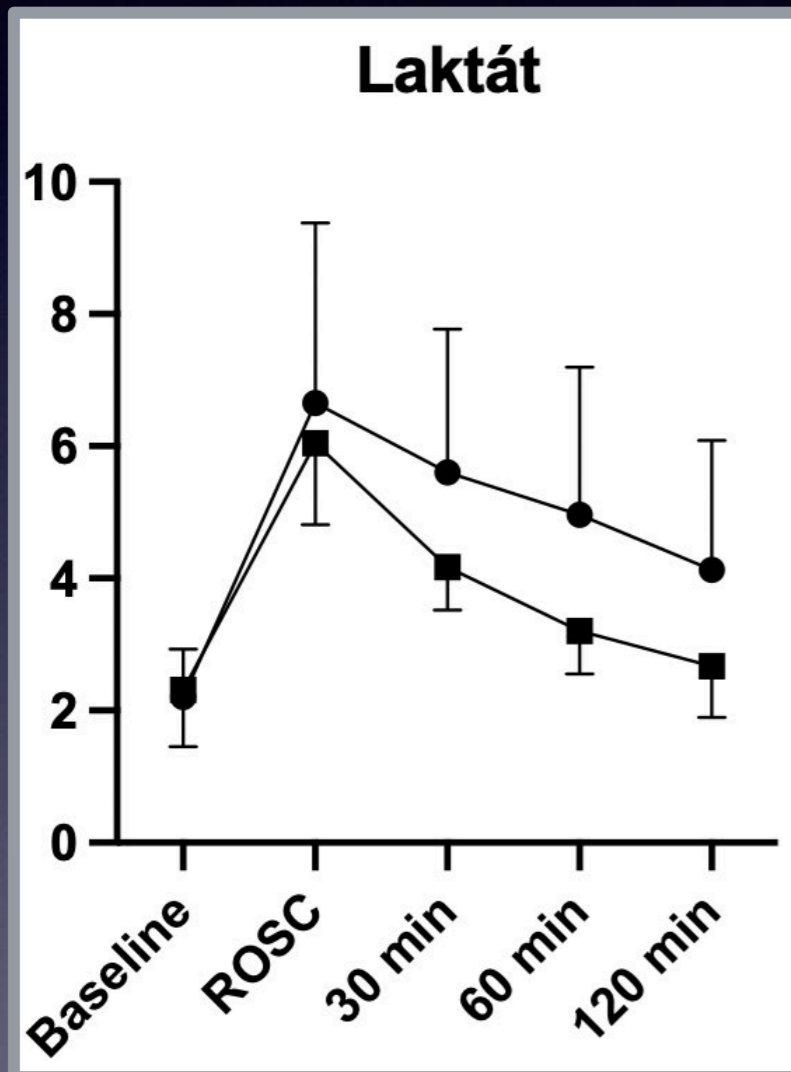
2 min no touch – 2 min LUCAS – 2 min 30:2

V intervenční skupině 2 % H₂ inhalačně
po dvě hodiny (7 zvířat ve skupině)

Protekce mikrocirkulace

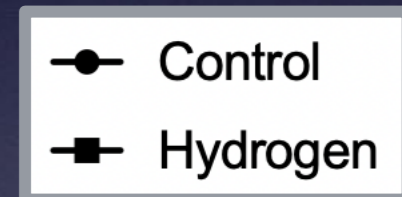
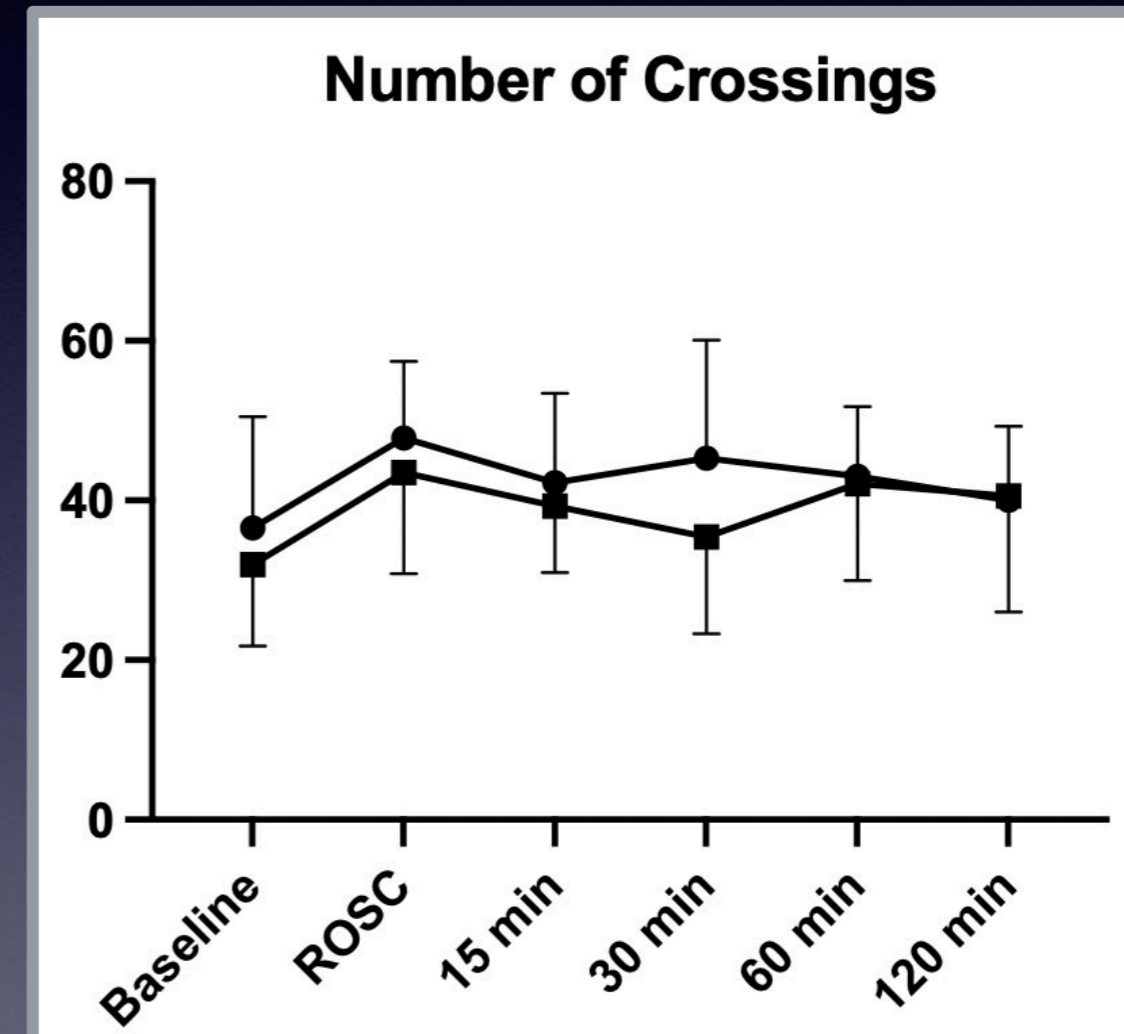
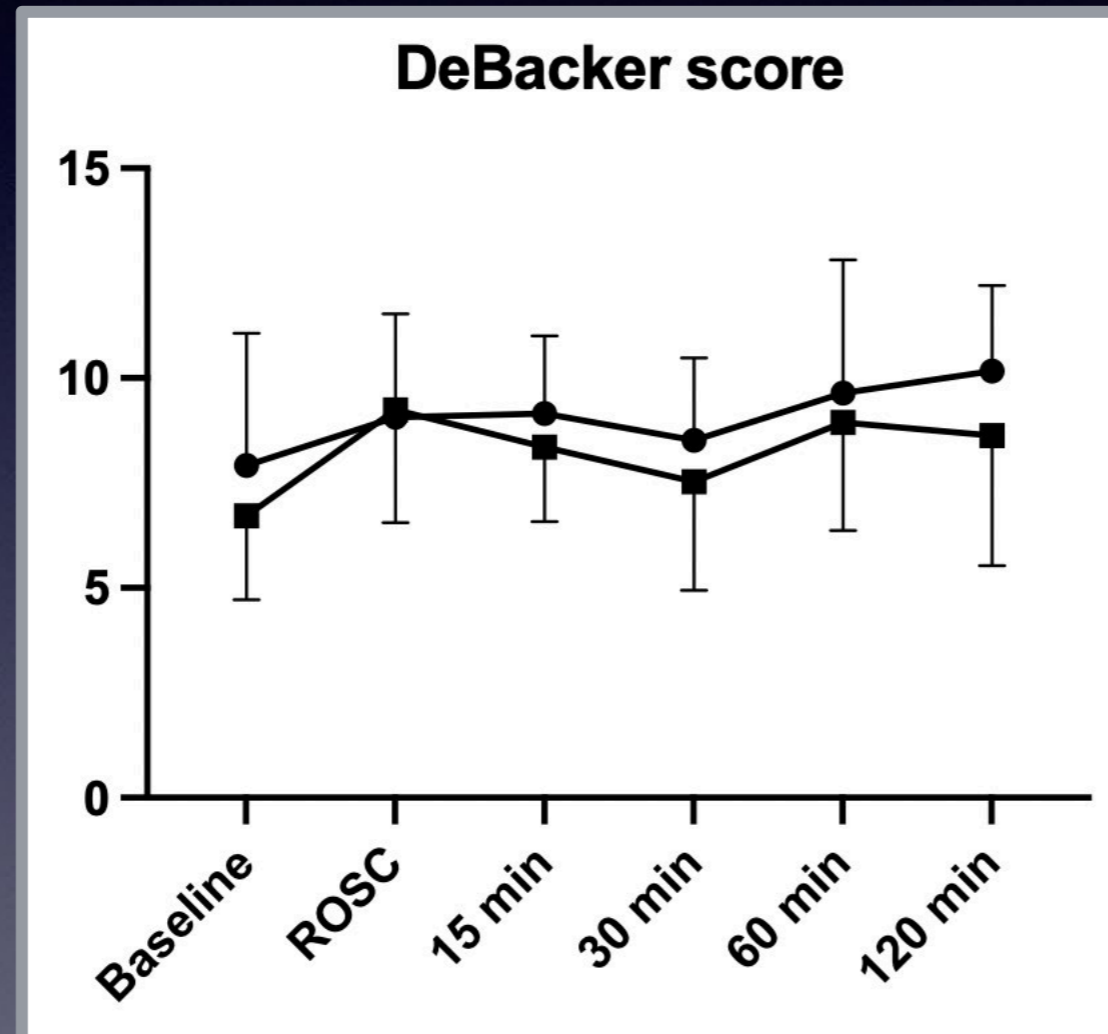
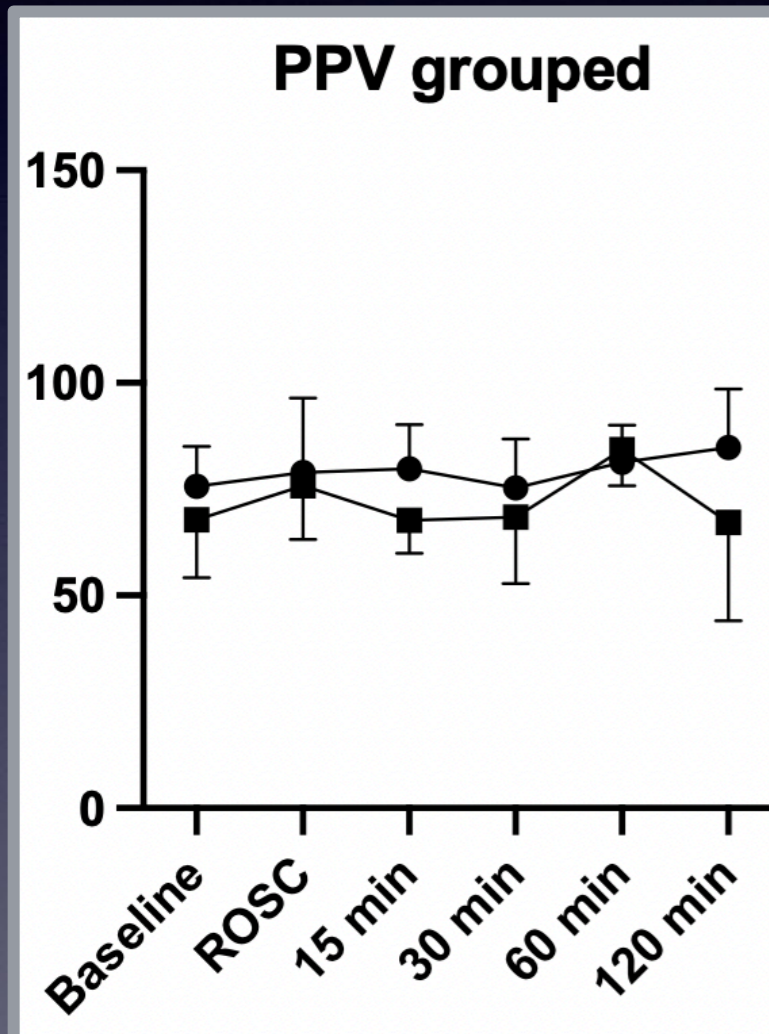


Vodík a ochrana tkání

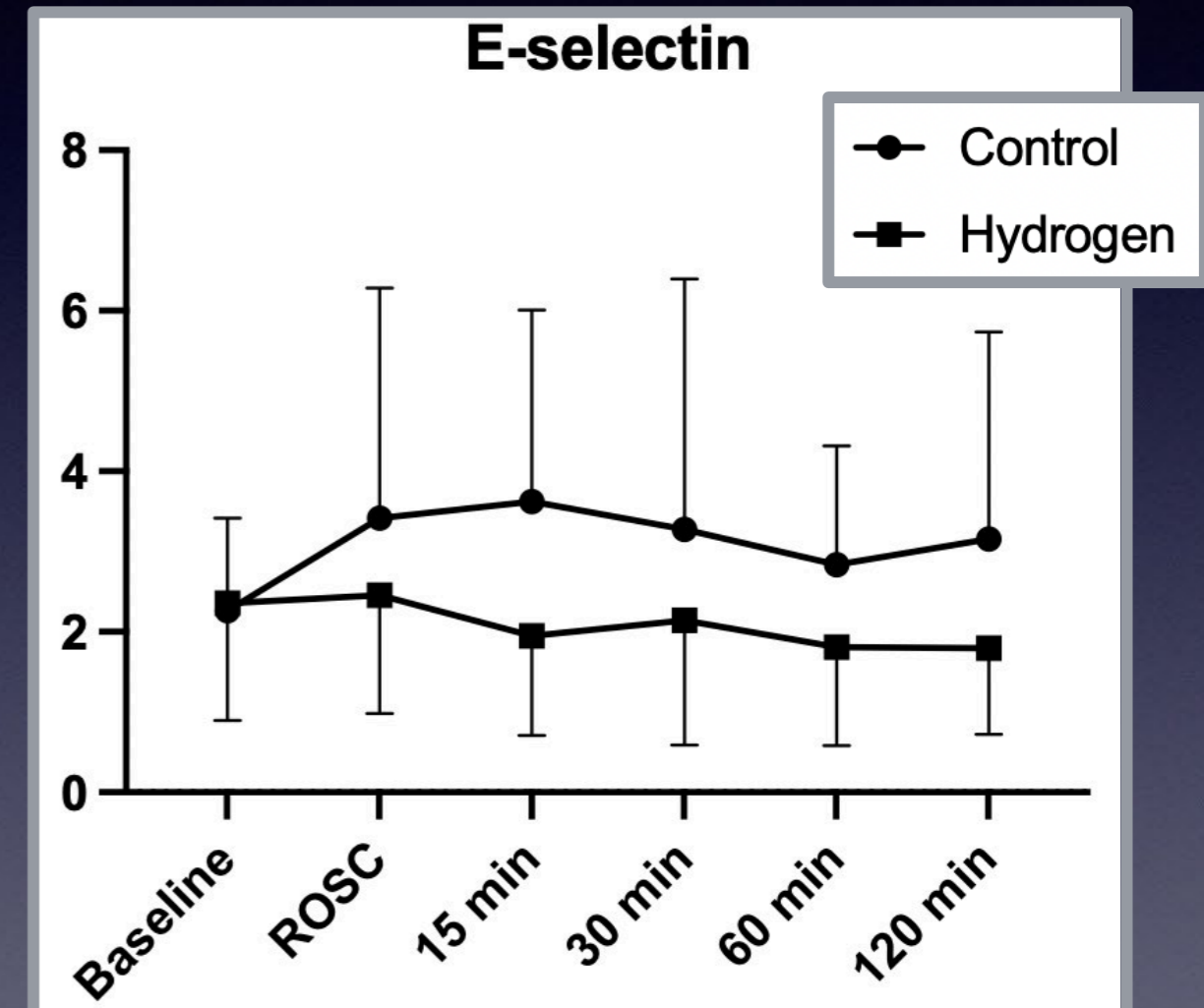
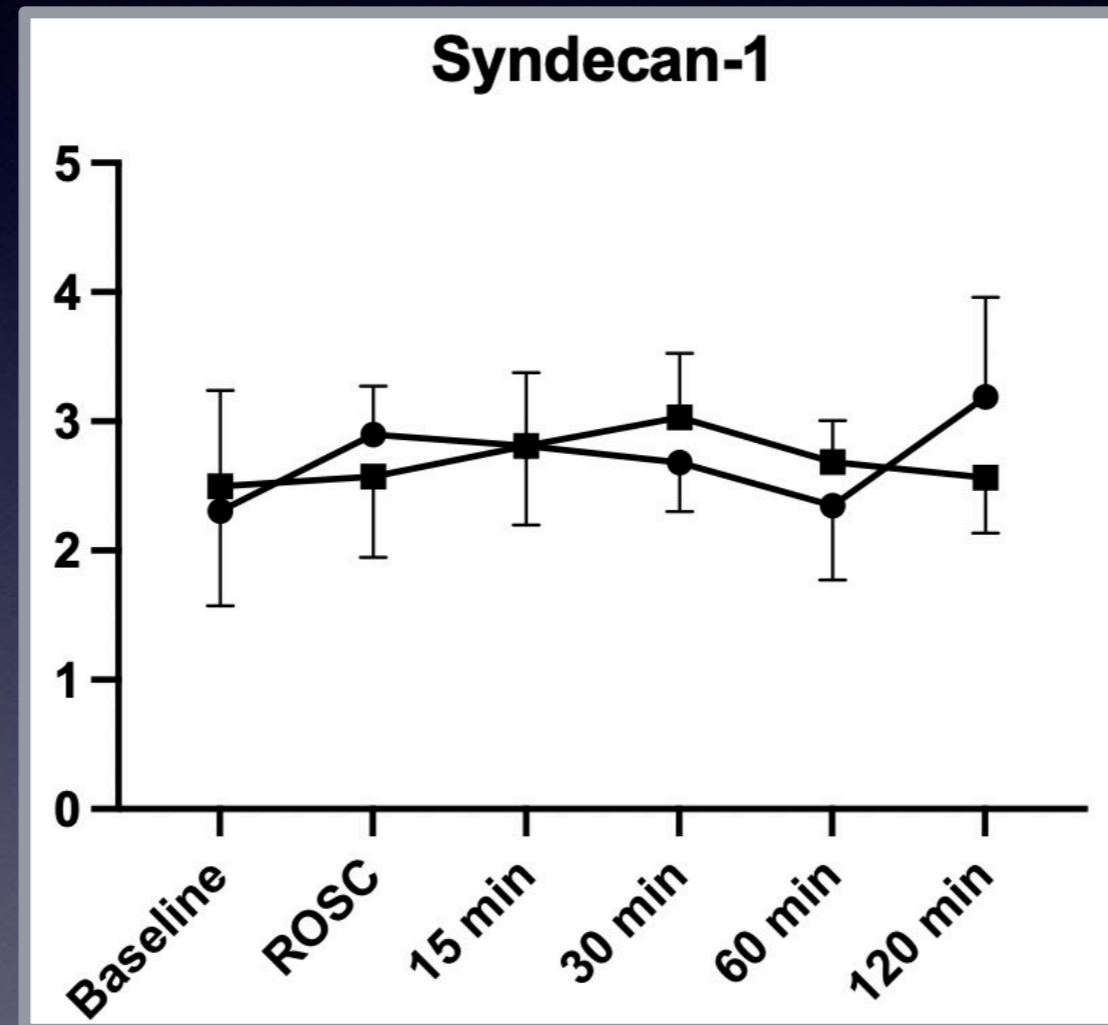
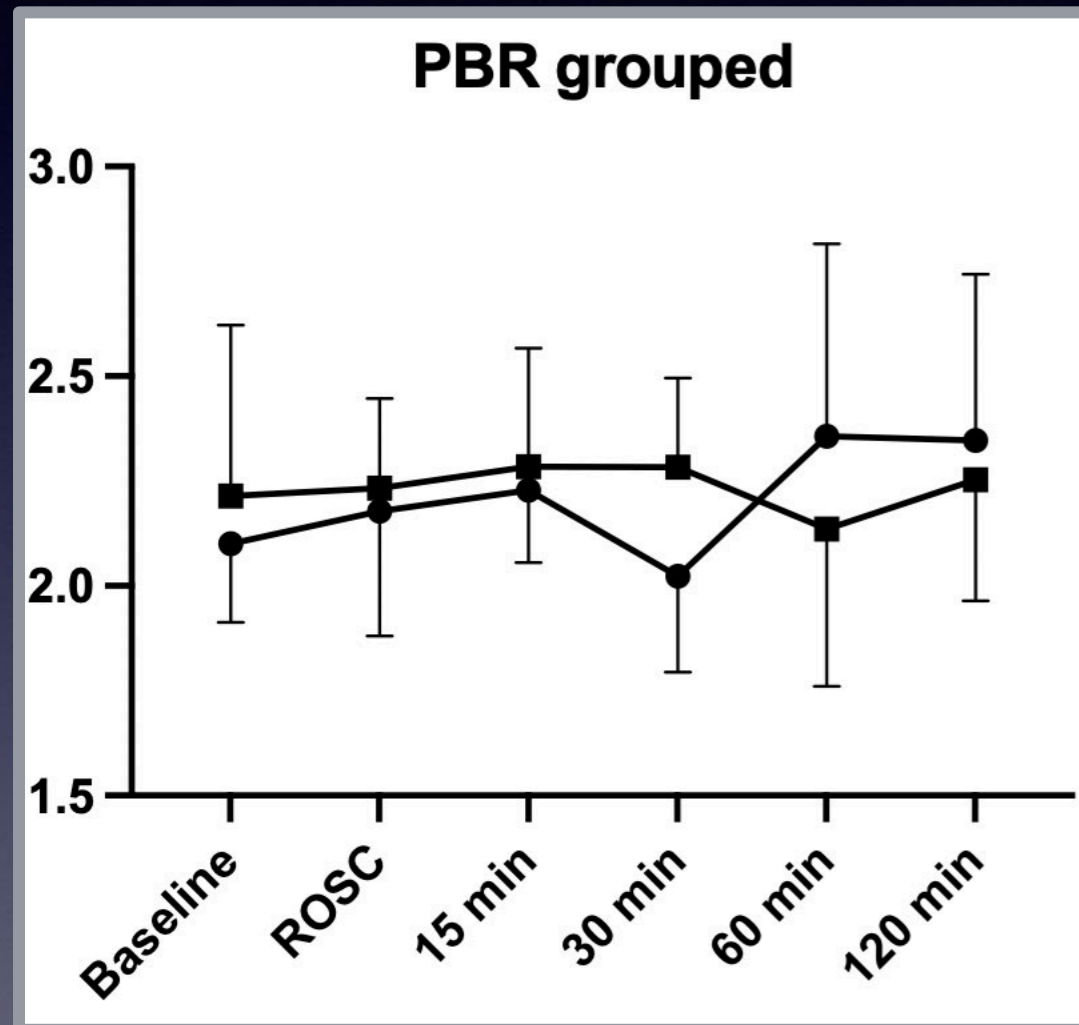


2way ANOVA $p < 0,0001$

Vodík a ochrana mikrocirkulace



Vodík a ochrana glykokalyxu



2way ANOVA $p < 0,0001$

Shrnutí

Oxygenace a perfuze

Glykémie

Teplota

Léky (ATB)

Asepsy

Antioxidace/imunomodulace



Děkuji za pozornost

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**“ The most important
person in the
operating room is
the patient ”**

DR. RUSSELL JOHN HOWARD
