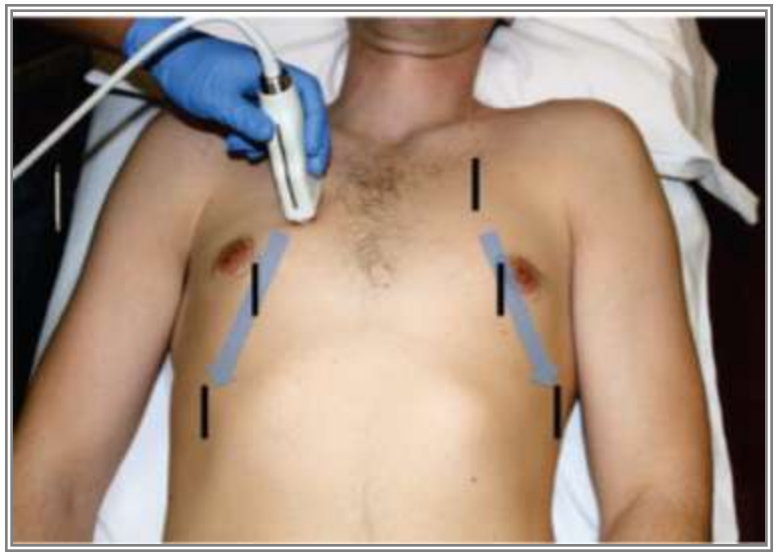


Toraks Anestezisinde Güncel Bilimsel Gelişmeler

Prof. Dr. F. Nur Kaya

Sunum akışı

Toraks anestezisinde;

- Ventilasyon yönetimi/destek sistemleri
- Sıvı yönetimi
- Non-invaziv ve minimal invaziv monitorizasyon
- Ultrasonografi, TEE
- Robotik-destekli torasik cerrahi
- Analjezi

Farklılıklar / Yenilikler

“Protective//ultraprotective” ventilasyon

“Protective” ventilasyon

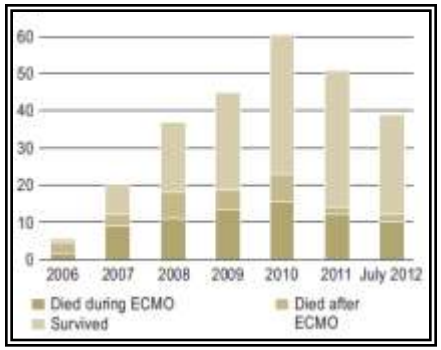
- Düşük tidal volüm
- PEEP
- Hiperkapnik asidoz
- “Recruitment” manevraları

“Ultraprotective” ventilasyon

“Protective” ventilasyon (akc.iş yükünde ↓)

+

ECMO, iLA (gaz değişimi)



Ekstrakorporeal pulmoner destek sistemleri

Extracorporeal pulmonary and circulatory support systems

Procedure	Principle	Indication
iLA (interventional lung assist)	Arteriovenous shunt with intercalated gas exchange membrane; pumpless, i.e. bloodflow is generated by the difference in pressure between arteries and veins	Extracorporeal carbon dioxide removal in patients without shock syndrome, in order to treat severe respiratory acidosis
VV ECMO (venovenous extracorporeal membrane oxygenation)	Pump-driven procedure: Venous blood from the inferior vena cava is enriched with oxygen using a membrane oxygenator; at the same time, carbon dioxide is removed. Return flow usually through a second cannula in the superior vena cava	Severe hypoxemic respiratory failure, to ensure vital gas exchange; also suitable for carbon dioxide removal alone at lower bloodflows (low-flow ECMO)
VA ECMO (venoarterial extracorporeal membrane oxygenation; also VA ECLS: venoarterial extracorporeal life support)	A pump-driven procedure in which venous blood, usually from the inferior vena cava, is pumped into the arterial circulation following oxygenation, especially to support systemic perfusion	Refractory cardiogenic shock, right heart failure, in-hospital resuscitation

	Renal haemodialysis	Extracorporeal removal of carbon dioxide	Extracorporeal oxygenation
Extracorporeal blood flow (ml min^{-1})	200–300	500–1000	2000–4000
Blood pumping	Optional	Optional	Required
Haemodynamic changes	Small	Small	Major
Vascular access	A-V shunt or A-V fistula	A-V shunt or A-V fistula or V-V pumping	V-V or V-A
Surgical complexity	Simple	Simple	Complex
Complexity of equipment	Moderate	Simple	Advanced
Requirement for heparin	Small	Small	Large

Akciğer transplantasyonu öncesi
ECMO desteği

Terminal dönem respiratuar veya kardiyopulmoner yetmezlikli akc. trans. adayı

ECMO	KMM
n=28	n=10
Trans.-sağkalım	
%80	%50

Am J Respir Crit Care Med 2012;185:763-68

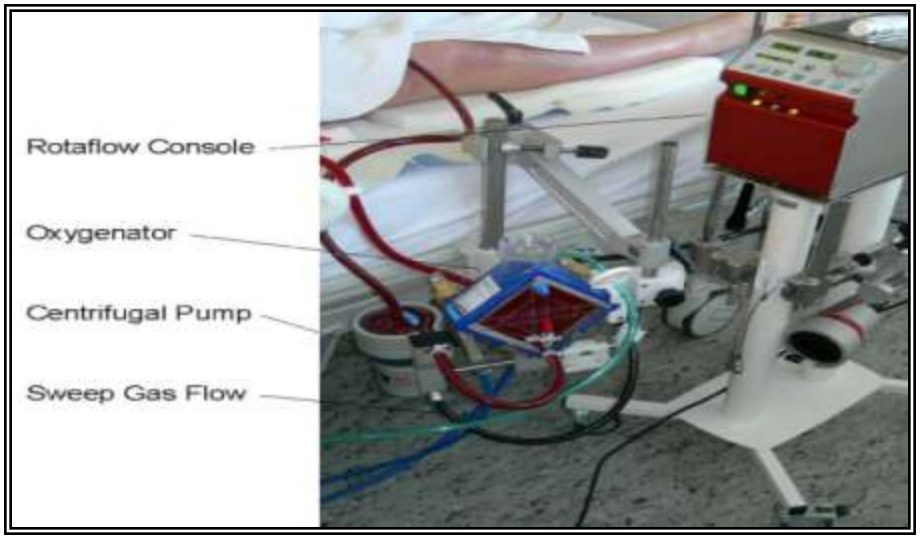
Authors	Number of transplants	Mortality
Fischer et al. 2006	10	%20
Hammainen et al. 2011	13	%8
Bermudez et al. 2011	17	%16

Resource	Unit	Cost	Comments
	ECMO		
Capital	per machine	$100,000	UHN has one machine; 18 years old; used 3-4 times a year; 35 procedures in the last 9 years
Disposables	per patient	$2,210	Cannulas, tubings, etc.
Maintenance cost		NR	Hospital incurs a cost for maintenance
	ILA		
Capital	per device/per patient	$7,100	ILA device plus disposables; 16 procedures in the last 2.5 years
Reusable pump	per lifetime	$65,000	Reusable; pump is 3 years old
Maintenance cost		Not Reported	Hospital incurs a cost for maintenance

Modern minyatür pulmoner destek sistemleri

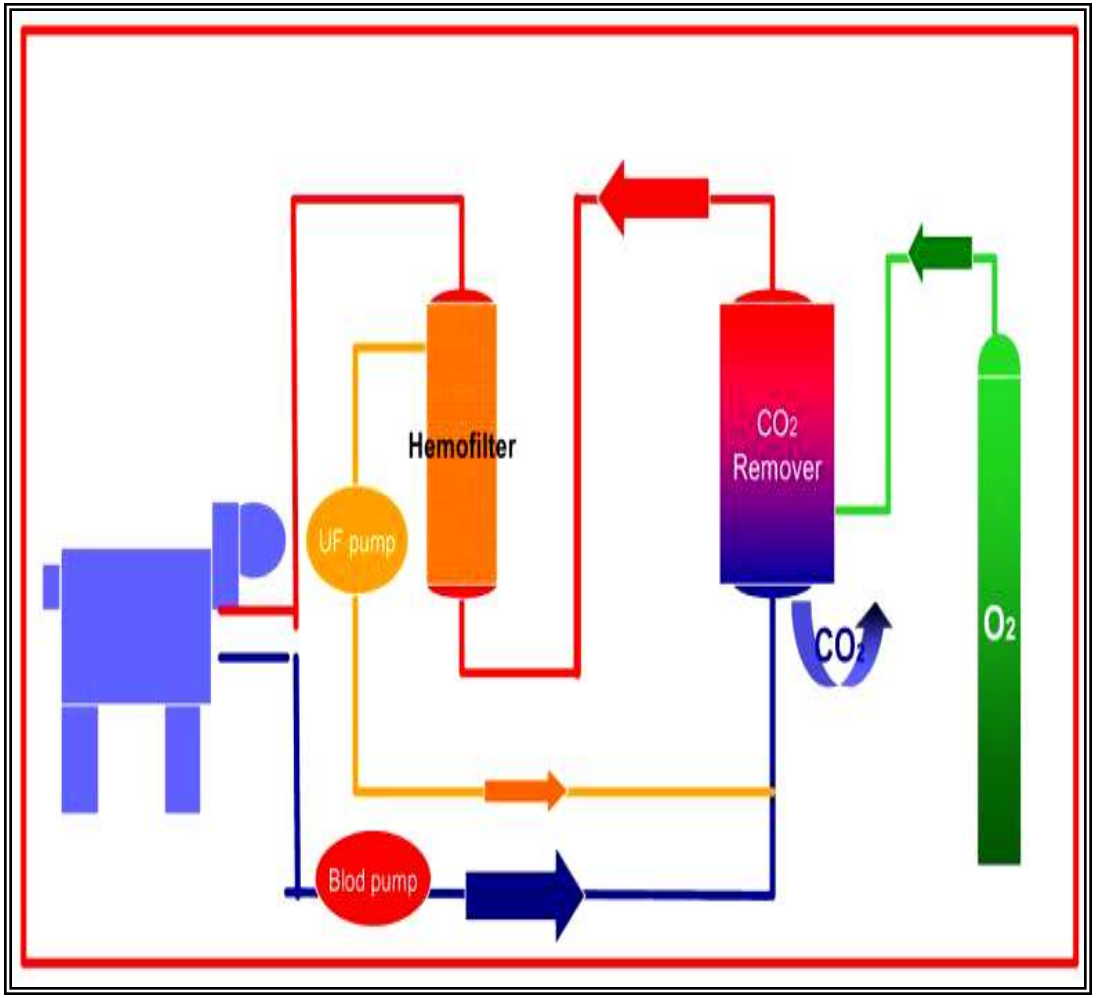
Figure 1: Examples of miniaturized modern extracorporeal membrane oxygenation units
a) the Cardiohelp system b) Deltastream DP3/Hilite 7000LT

iLA (Interventional lung assist)

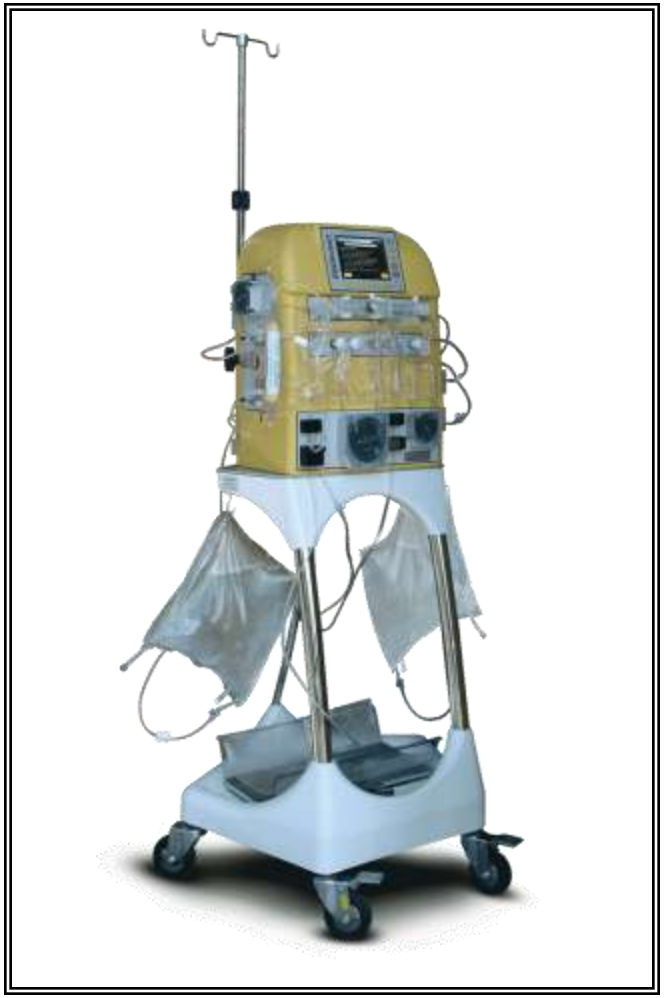


Minyatür ECMO

Sürekli renal replasman + extrakorporeal dekarboksilasyon

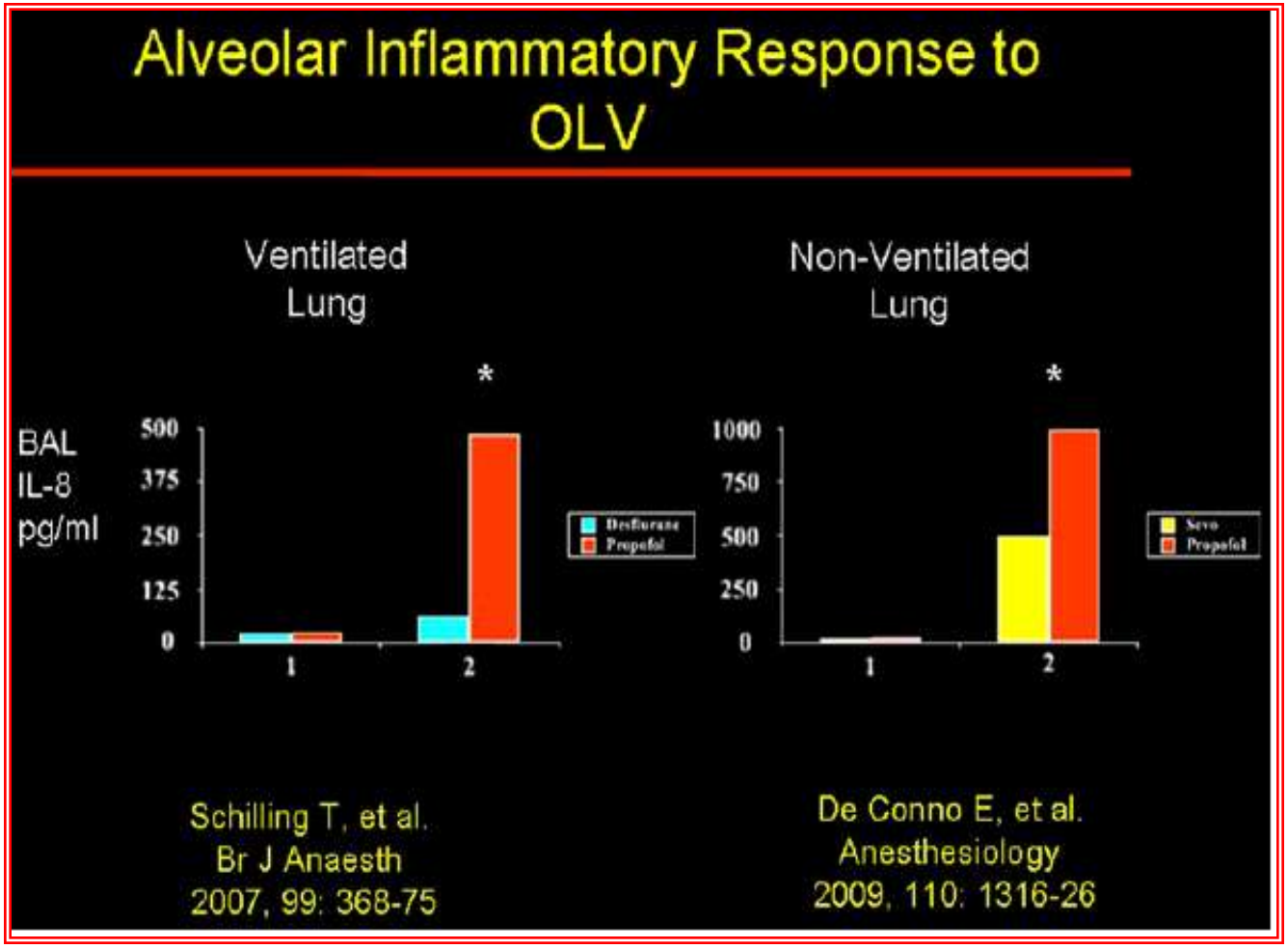


Livigni et al. Critical Care 2006 10:R151



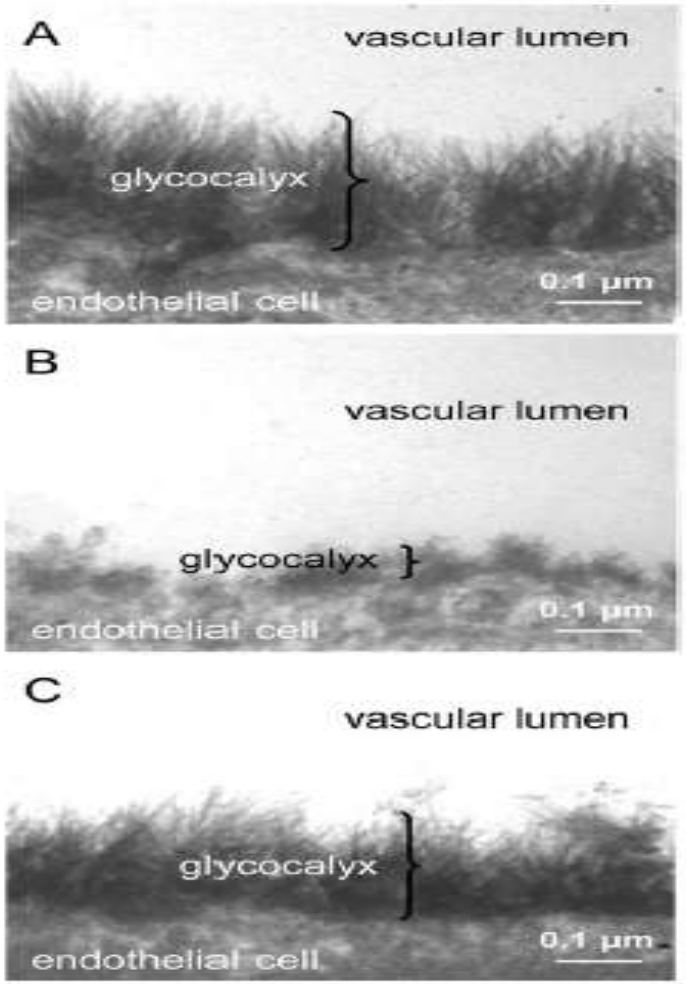
EQUAsmart

İnhalasyon anestezikleri inflamatuar yanıtı baskılar



Sevoflurane Reduces Leukocyte and Platelet Adhesion after Ischemia-Reperfusion by Protecting the Endothelial Glycocalyx

Daniel Chappell, M.D.,* Bernhard Heindl, M.D., Ph.D.,† Matthias Jacob, M.D.,* Thorsten Annecke, M.D.,‡ Congcong Chen, M.D.,§ Markus Rehm, M.D.,† Peter Conzen, M.D.,‖ Bernhard F. Becker, M.D., Ph.D.#



Sevofluran

- Lökosit ve platelet adezyonu ↓
- "Endotelial glycocalyx" stabilizasyonu

✓ Kapiller kaçak ↓
✓ Kardiyoprotektif etki !

Anesthesiology 2011; 115:483–91

β-Adrenergic agonists differentially regulate highly selective and nonselective epithelial sodium channels to promote alveolar fluid clearance in vivo

Charles A. Downs, Lisa H. Kriener, Ling Yu, Douglas C. Eaton, Lucky Jain and My N. Helms

Am J Physiol Lung Cell Mol Physiol 302:L1167-L1178, 2012. First published 13 April 2012; doi: 10.1152/ajplung.00038.2012

Downs CA, Kriener LH, Yu L, Eaton DC, Jain L, Helms MN. β-Adrenergic agonists differentially regulate highly selective and nonselective epithelial sodium channels to promote alveolar fluid clearance in vivo. *Am J Physiol Lung Cell Mol Physiol* 302: L1167–L1178, 2012. First published April 13, 2012; doi:10.1152/ajplung.00038.2012.—β-Adrenergic receptors (β-AR) increase epithelial sodium channel (ENaC) activity to promote lung fluid clearance. However, the effect of selective β-AR agonist on highly selective cation (HSC) channels or nonselective cation (NSC) channels in alveolar type 1 (T1) and type 2 (T2) cells is unknown. We hypothesized that stimulation with β_1-AR agonist (denopamine) or β_2-AR agonist (terbutaline) would increase HSC and/or NSC channel activity in alveolar epithelial cells. We performed single-channel measurements from T1 and T2 cells accessed from rat lung slices. Terbutaline (20 μM) increased HSC ENaC activity (open probability, NP_o) in T1 (from 0.96 ± 0.61 to 1.25 ± 0.71, $n = 5$, $P < 0.05$) and T2 cells (from 0.28 ± 0.14 to 1.0 ± 0.30, $n = 8$, $P = 0.02$). Denopamine (20 μM) increased NSC NP_o in T1 cells (from 0.34 ± 0.09 to 0.63 ± 0.14, $n = 7$, $P = 0.02$) and in T2 cells (from 0.47 ± 0.09 to 0.68 ± 0.10, $P = 0.004$). In vivo X-ray imaging of lung fluid clearance and ICI 118,551 selective inhibition of β_2-ARs confirmed patch-clamp findings. cAMP concentrations increased following treatment with denopamine or terbutaline ($n = 3$, $P < 0.002$). The effects of systemic (intraperitoneal, IP) and local (intratracheal, IT) modes of delivery on lung fluid clearance were assessed. IT delivery of denopamine promoted alveolar flooding, whereas IP delivery promoted delayed fluid clearance. In summary, β-AR agonists differentially regulate HSC and NSC in T1 and T2 cells to promote lung fluid clearance in vivo, and the mode of drug delivery is critical for maximizing β-AR agonist efficacy.

terbutaline; denopamine; β_1-adrenergic receptor; β_2-adrenergic receptor

RESEARCH Open Access

Low-molecular-weight heparin reduces hyperoxia-augmented ventilator-induced lung injury via serine/threonine kinase-protein kinase B

Inhaled Hydrogen Sulfide Protects against Ventilator-induced Lung Injury

Anesthesiology 2010; 113:104–15

Simone Faller, Ph.D.,* Stefan W. Ryter, Ph.D.,† Augustine M. K. Choi, M.D.,‡ Torsten Loop, M.D.,§ René Schmidt, M.D.,§ Alexander Hoetzel, M.D.§

Research

Critical Care 2009, 13:R51 Open Access

Inhaled aerosolised recombinant human activated protein C ameliorates endotoxin-induced lung injury in anaesthetised sheep

Kristine Waerhaug[1], Vsevolod V Kuzkov[1], Vladimir N Kuklin[1], Rica Mortensen[2], Kåre C Nordhus[2], Mikhail Y Kirov[1,3] and Lars J Bjertnaes[1]*

ACUTE LUNG INJURY

In vitro and in vivo effects of salbutamol on neutrophil function in acute lung injury

G D Perkins, N Nathani, D F McAuley, F Gao, D R Thickett

Thorax 2007;**62**:36–42. doi: 10.1136/thx.2006.059410

Akciğer monitorizasyonu

- VILI...PET
- Plato basıncı//metabolik aktivite

Hava yolu basıncı<26 cmH_2O//mekanik stres ↓

Minerva Anestesiol 2011;77:439-47

British Journal of Anaesthesia 106 (6): 761–3 (2011)
doi:10.1093/bja/aer113

EDITORIAL

Hypoxaemia associated with one-lung anaesthesia: new discoveries in ventilation and perfusion

A. Ng[1*] and J. Swanevelder[2]

- Volüm × basınç kontrollü ventilasyon

  Oksijenasyona etki Ø

- Epidural lokal anestezik

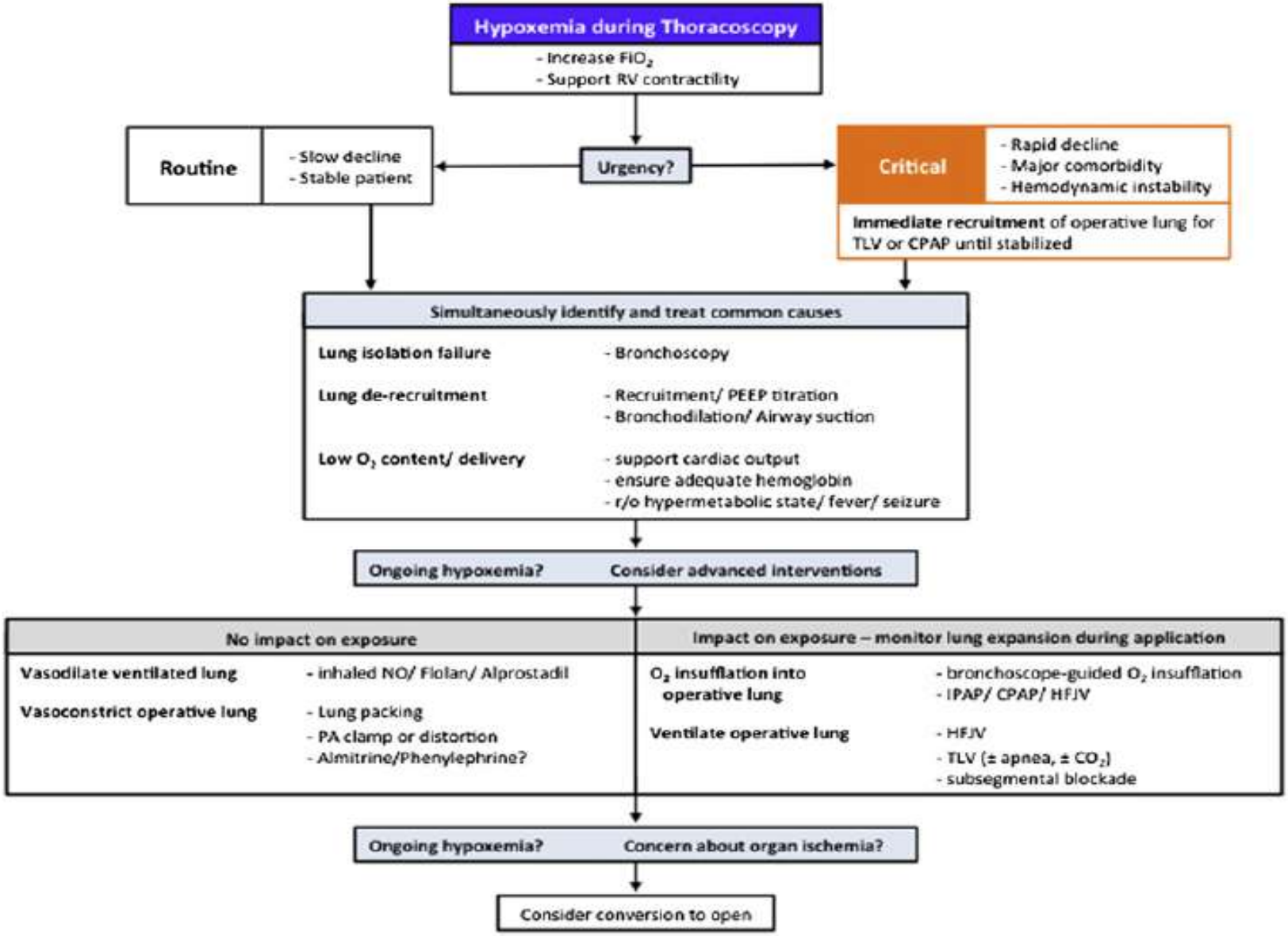
  <u>Yüksek</u> × düşük konsantrasyon

  Şantlaşma+hipoksemi

Managing Hypoxemia During Minimally Invasive Thoracic Surgery

Anesthesiology Clin 30; 683–697, 2012

Jens Lohser, MD, MSc, FRCPC



Torasik anestezide Non-invaziv ventilasyon

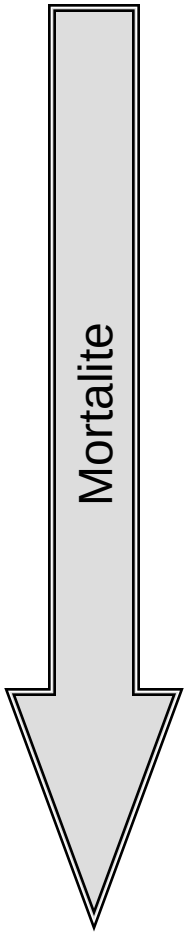
First Author	Design of the Study	Population	N	Main Results
NIV as a preventive tool				
Aguilò[24]	Randomized (1 hour nasal NPPV after extubation *v* no NPPV)	Elective lung resection	19	NIV improved arterial oxygenation and decreased the alveolar-arterial PO_2 difference, without complications
Perrin[25]	Randomized (intermittent NPPV 7 days before and 3 days after surgery *v* no NPPV)	Lobectomy and with preoperative FEV1 <70%	39	NPPV improved pulmonary function tests, reducing the incidence of atelectasis and the hospital stay
Liao[26]	Randomized (intermittent NPPV for 3 days after extubation *v* no NPPV)	Elective lung resection	50	NPPV improved lung re-expansion without benefits on pulmonary function tests or on the incidence of pulmonary complications
NIV as a therapeutic tool				
Auriant[28]	Randomized (intermittent nasal NPPV, mean duration = 2 days) *v* no NPPV)	Acute respiratory failure after lung resection	48	NPPV reduced the rate of endotracheal intubation and in-hospital and 120-day mortality, without complications
Rocco[30]	Prospective (intermittent NPPV through facemask, mean duration = 4 days)	Acute respiratory failure after bilateral lung transplantation	21	Endotracheal intubation was avoided in 18 patients (86%). Two of the 3 intubated patients died. Among the 3 patients with pneumonia, NIV was successful only in 1 case. The only complications were 4 cases of facial skin necrosis
Lefevbre[31]	Prospective (intermittent NPPV by nasal or facemask, mean duration = 3.4 days)	Acute respiratory failure after lung resection	89	NIV avoided endotracheal intubation in 81% of hypoxemic patients and in 93% of hypercapnic patients. Risk factors for NIV failure: cardiac comorbidities, no initial response; in the NIV failure group the mortality rate was 46%.
Riviere[32]	Retrospective	Acute respiratory failure and were treated by NIV after lung surgery	135	NIV failed in 30% of cases; mortality rate in the failure group was 20%. NIV failure was predicted by the high number of bronchoscopy, time on NIV, respiratory rate, and high SOFA score

J Cardiothorac Vasc Anesth 26:917-22, 2012

The Year in Cardiothoracic and Vascular Anesthesia: Selected Highlights from 2012

Harish Ramakrishna, MD, FASE,* Christopher Reidy, MD,† Hynek Riha, MD, DEAA, FCCP,‡ Aris Sophocles, MD,§ Bernard J. Lane, MD,§ Prakash A. Patel, MD,§ Michael Andritsos, MD,¶ Kamrouz Ghadimi, MD,§ and John G.T. Augoustides, MD, FASE, FAHA§

- Klorheksidin oral gargara
- Klonidin
- İnsulin
- İntraaortik balon pompası
- Leukodepletion
- Levosimendan
- Nöroaksiyal anestezi
- Non-invaziv solunum desteği
- Hemodinamik optimizasyon
- Oksijen
- Sindirim sisteminin selektif dekontaminasyonu
- Volatil anestezikler



J Cardiothorac Vasc Anesth 26:764 772, 2012

Anaesthesia 2013, 68, 179–189 doi:10.1111/anae.12067

Review Article

A review of enhanced recovery for thoracic anaesthesia and surgery

N. L. Jones,[1] L. Edmonds,[2] S. Ghosh[1] and A. A. Klein[1]

- “Pre-optimisation”
- Kısa açlık süresi
- Tromboemboli profilaksisi
- Uygun anestezi/analjezi/cerrahi teknik seçimi
- Postoperatif rehabilitasyon
- Göğüs direnajında yönetimi

REVIEW

Fluid management in thoracic surgery

Sherif Assaad[a], *Wanda Popescu*[b], *and Albert Perrino*[a]

- "Fluid restriction"
- **"Target an euvolemic state"**
  - "Standardized fluid theraphy"
  - "Goal-directed therapy"
  - "Individualized fluid theraphy"

“Standardized fluid theraphy”

- Koruyucu akc. ventilasyonu+normovolemi
  - ✓stabil Scr ve EVAS, Kİ ↑

Assaad S et al, 2013

“Goal-directed therapy”

- Sıvı tedavisi…Kİ, SVV, PPV izlemi
  - ✓stabil EVAS

Haas S et al, 2012

“Individualized fluid theraphy”

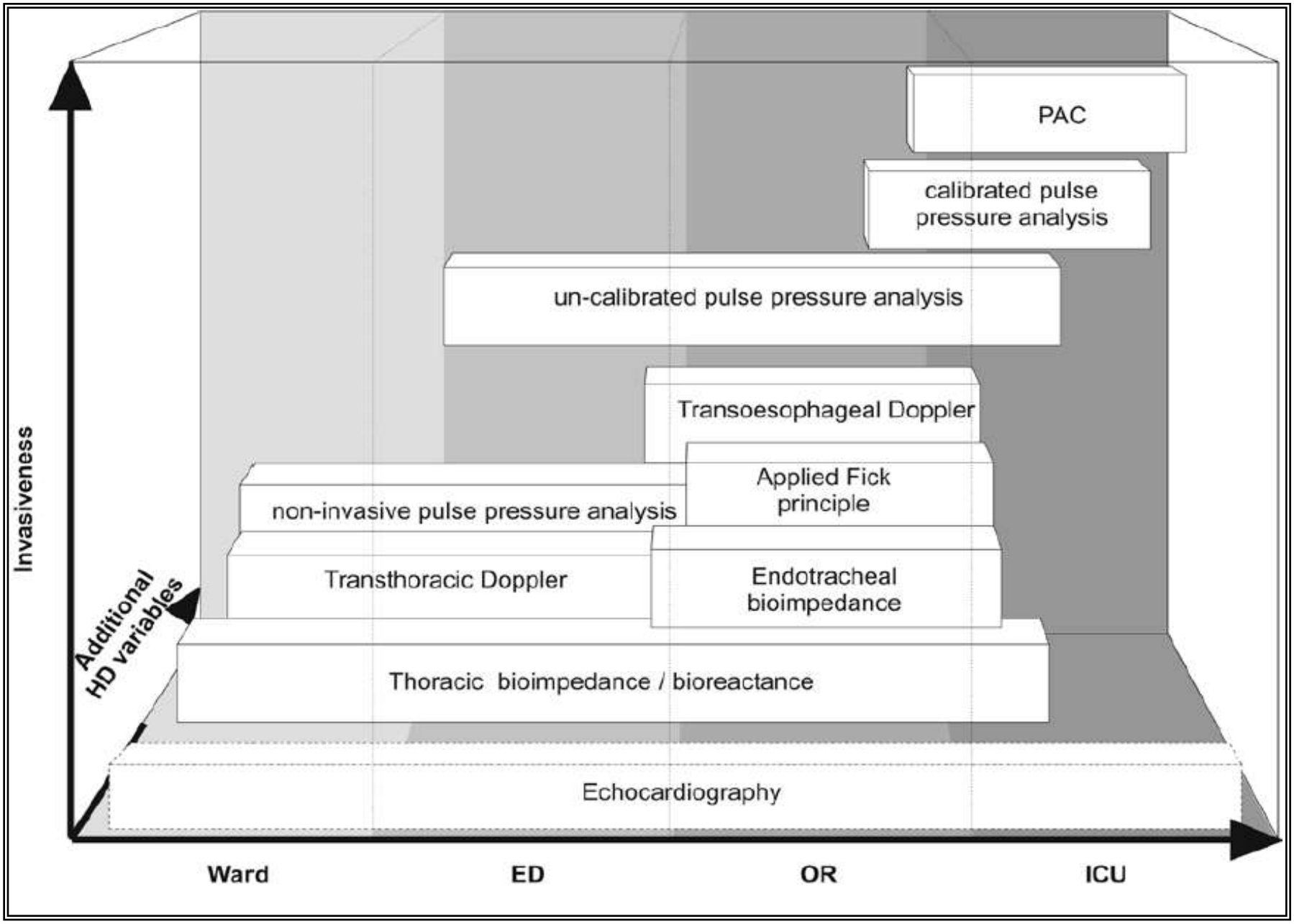
- Sıvı tedavisi…TDM (SV,Kİ), hasta verileri

Diaper J et al, 2008

Non-imvaziv ve minimal invaziv hemodinamik monitörler

					Additional variables		
Groups	**Examples**	**Features**	**Invasiveness**	**Continuous CO**	Static	Dynamic	SvO2 / ScvO2
Pulse wave analysis							
Calibrated	$PiCCO_2$	Thermistor-tipped arterial catheter Central venous line	☒☒	Beat-by-beat	CVP GEDV EVLW	SVV PPV	ScvO2 catheter for continuous measurement available
	LiDCOplus	Lithium dilution set	☒☒	Beat-by-beat	-	SVV PPV	-
	EV1000	Thermistor-tipped arterial catheter Central venous line	☒☒	NA	CVP GEDV EVLW	SVV	ScvO2 catheter for continuous measurement available
Un-calibrated	FloTrac/Vigileo	Specific arterial pressure sensor	☒	Update every 20"	-	SVV	ScvO2 catheter for continuous measurement available
	LiDCOrapid	Regular arterial line	☒	Beat-by-beat	-	SVV PPV	-
	PulsioFlex	Regular arterial line	☒	Beat-by-beat	-	SVV PPV	ScvO2 catheter for continuous measurement available
Non-invasive	^{CC}Nexfin	Specific pressure sensors	☐	Beat-by-beat	-	SVV PPV	-
Doppler							
TE	CardioQ	Flow probe	☒	Limited by probe positioning	-	-	-
TT	USCOM	Flow probe	☐	Intermittent	-	-	-
Bioimpedance/Bioreactance							
Endotracheal	ECOM	Specific endotracheal tube	☒	Continuous	-	-	-
Thoracal	BioZ	Specific electrodes	☐	Continuous	-	-	-
Thoracal bioimpedance	NICOM	Specific electrodes	☐	Continuous	-	SVV	-
Applied Fick principle							
Partial CO_2 rebreathing	NiCO system	Rebreating loop	☐	Up-date every 3'	-	-	-

Legend: CO = Cardiac Output, CVP = Central Venous Pressure, EVLW = Extravascular Lung Water, GEDV = Global End-Diastolic Volume, NA = Information not available, PPV = Pulse Pressure Variation, SCVO2 = Central Venous Oxygen Saturation, SVV = Stroke Volume Variation, TE = Trans-Esophageal, TT = Trans-Thoracic


PAC
calibrated pulse pressure analysis
un-calibrated pulse pressure analysis
Transoesophageal Doppler
Applied Fick principle
non-invasive pulse pressure analysis
Transthoracic Doppler
Endotracheal bioimpedance
Thoracic bioimpedance / bioreactance
Echocardiography
Invasiveness
Additional HD variables
Ward
ED
OR
ICU

British Journal of Anaesthesia 108 (4): 623–9 (2012)
Advance Access publication 5 February 2012 · doi:10.1093/bja/aer501

BJA

NEUROSCIENCES AND NEUROANAESTHESIA

Reduced cerebral oxygen saturation during thoracic surgery predicts early postoperative cognitive dysfunction

L. Tang[1], R. Kazan[1], R. Taddei[2], C. Zaouter[2], S. Cyr[1] and T. M. Hemmerling[1*]

Erken kognitif disfonksiyon//serebral oksijen sat.↓

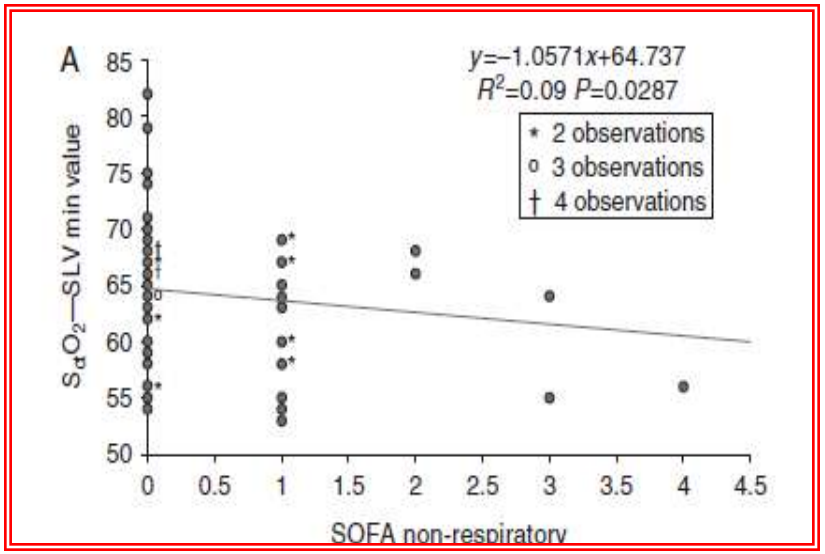
British Journal of Anaesthesia 103 (6): 811–16 (2009)
doi:10.1093/bja/aep309

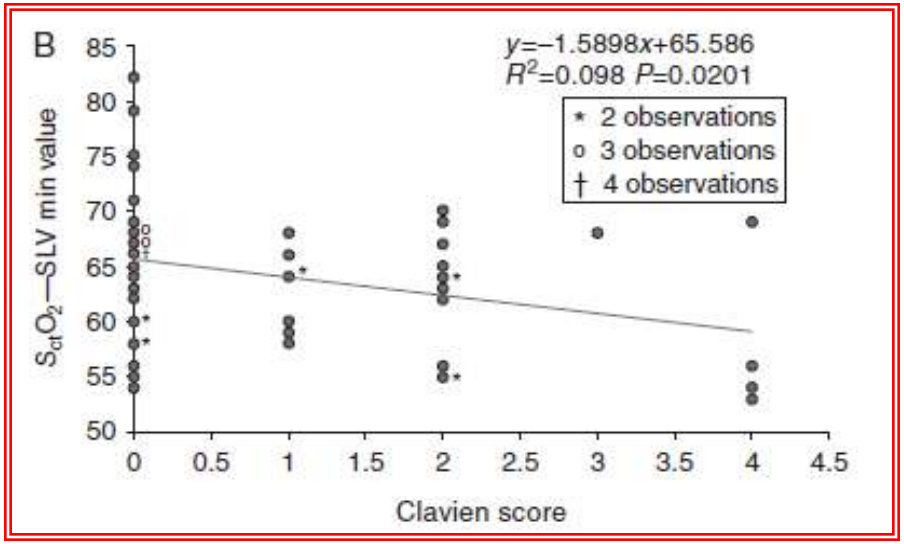
BJA

CLINICAL PRACTICE

Reduced cerebral oxygen saturation measured by absolute cerebral oximetry during thoracic surgery correlates with postoperative complications

R. Kazan, D. Bracco and T. M. Hemmerling*





British Journal of Anaesthesia 103 (6): 811–16 (2009)
doi:10.1093/bja/aep309

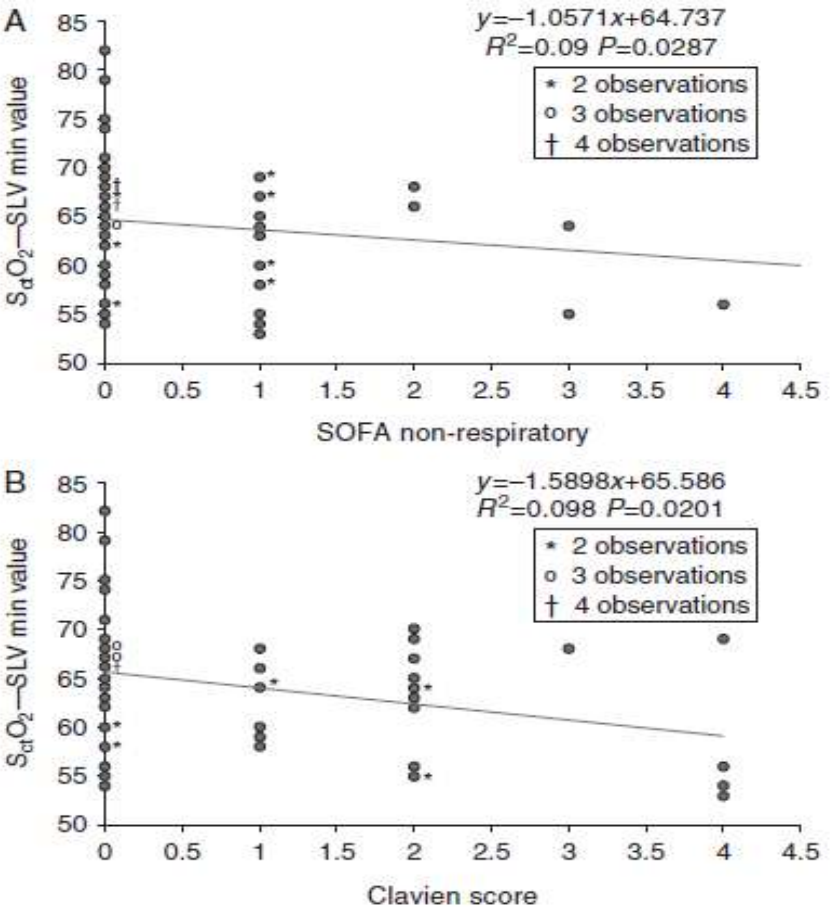
BJA

CLINICAL PRACTICE

Reduced cerebral oxygen saturation measured by absolute cerebral oximetry during thoracic surgery correlates with postoperative complications

R. Kazan, D. Bracco and T. M. Hemmerling*

Clavien score	Complication type	n
1	Postoperative cognitive dysfunction	2
	Respiratory atelectasis	4
	Pneumonia	1
2	Acute renal failure	2
	Pneumonia	6
	Clostridium difficile colitis	1
	Chronic obstructive pulmonary disease exacerbation	1
	Pulmonary hypertension	1
3	Respiratory failure	1
4	Atrial fibrillation+pneumonia	1
	Respiratory failure	3



Rejyonal serebral oksijen satürasyonu

eşik değer %65

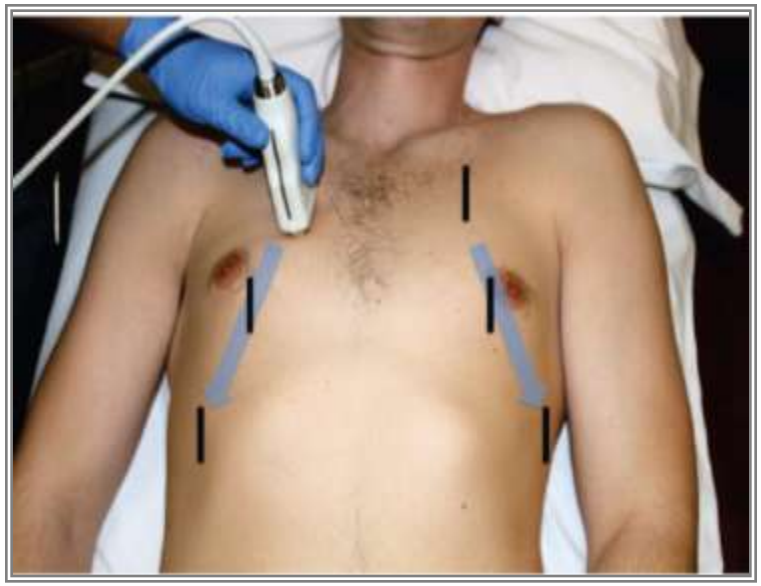
Perioperatif Hasta Başı Ultrason Kullanımı

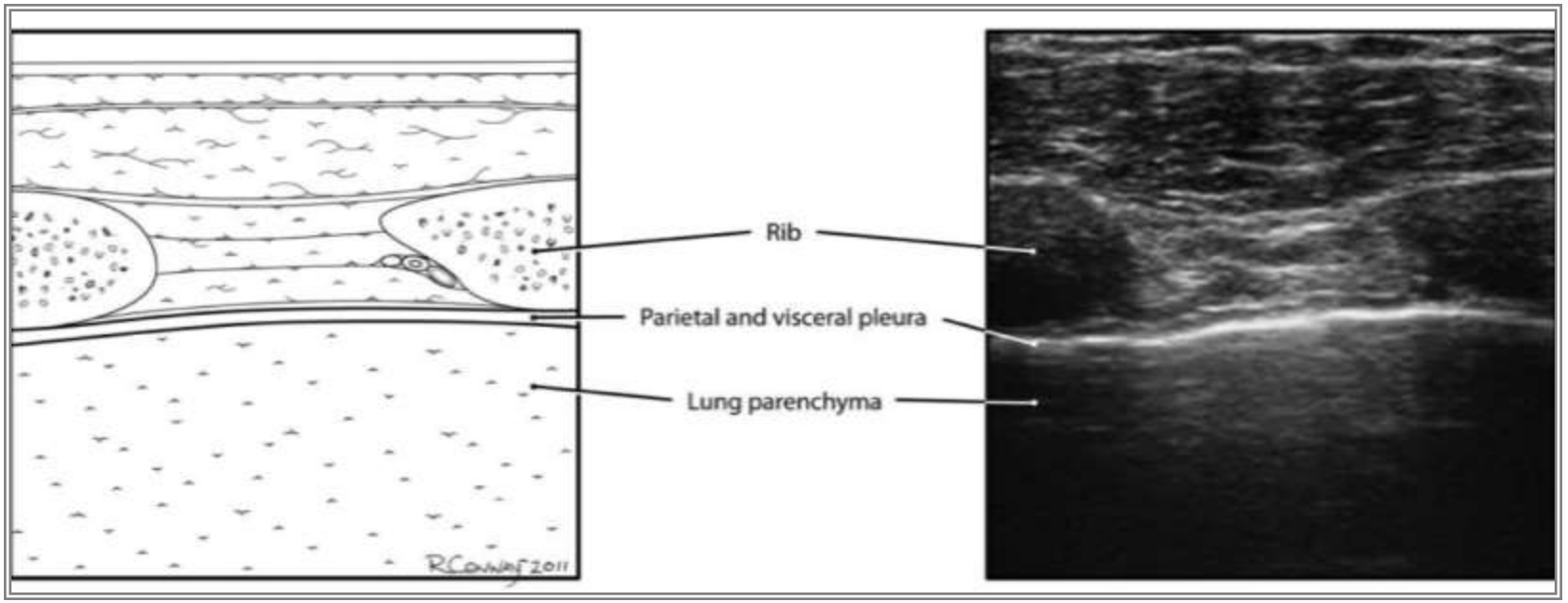
"Numerous studies have shown that ultrasound is more sensitive than chest x-ray for pneumothorax detection . . ."

Anesthesiology 2011; 115:460 –2

- ✓Vasküler ulaşım
- ✓Rejyonal anestezi
- ✓Gastrik içerik ve volüm
- ✓Serebral kan akımı-pozisyon
- ✓Üst hava yolu anatomisi
- ✓Pnömotoraks tanısı
- ✓Uygun ÇLET seçimi
- ✓ÇLET poz. doğrulama

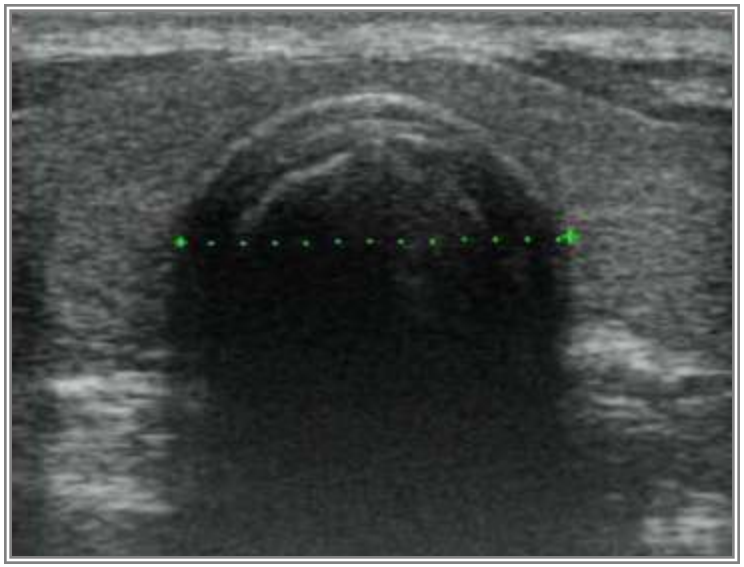
Transtorasik US ile pnömotoraks tanısı





Anesthesiology 2011; 115:653–5

Ultrason ile uygun ÇLET seçimi ve yerleşimi



Journal of Clinical Anesthesia (2008) 20, 247–252

LDLT size	LMB CT (mm)	TW CT (mm)	TW US (mm)
41F	≥12.5	≥18	≥21.2
39F	≥11.5	≥16	≥19.3
37F	≥10.5	≥15	≥18.3
35F	≥10	≥14	≥17.4
32F	<10	≥12.5	≥15.9

left main bronchus diameter (LMB), tracheal width (TW)

- ✓Transvers kesit
- ✓Sternoklaviküler bileşke üstü

- ✓“Lung sliding”
- ✓Diyafragma hareketi

	Clinical examination (Group A; 25 pts)	Clinical examination and US (Group B; 25 pts)
Sensitivity	100% (90-100%)	100% (90-100%)
Specificity	22% (17-29%)	50% (35-66%)
Accuracy	72% (66-79%)	88% (81-96%)
Positive predictive value	70% (64-76%)	86% (79-95%)
Negative predictive value	100% (90-100%)	100% (90-100%)

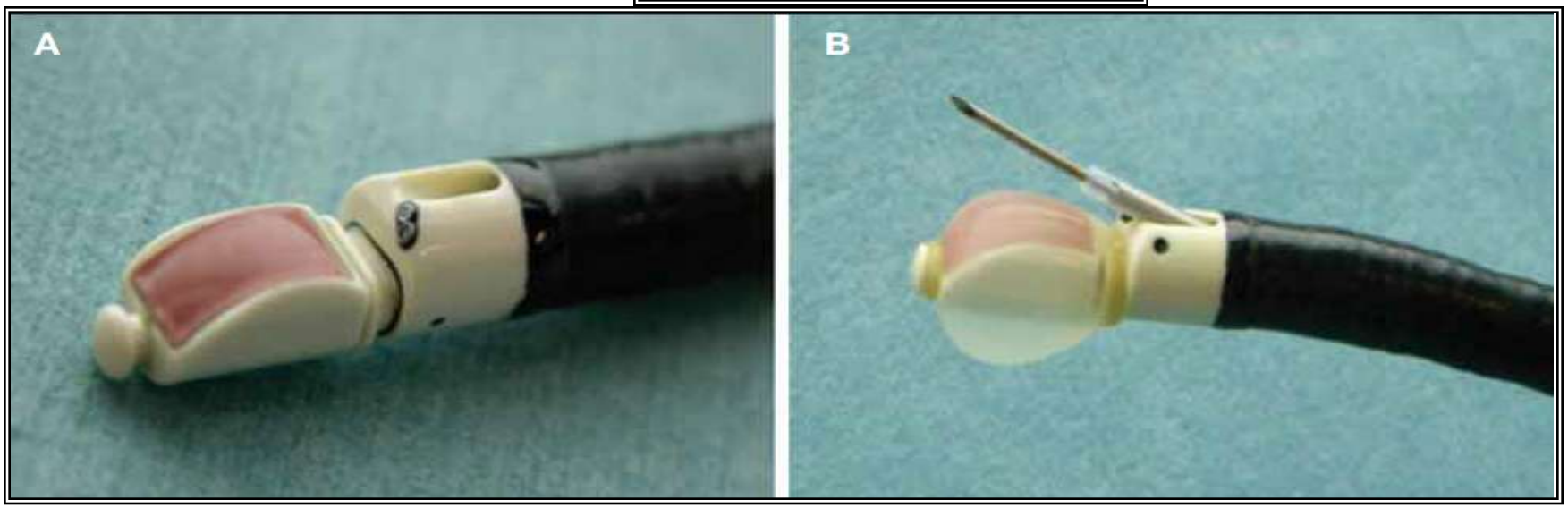
Data in parentheses are 95% confidence intervals.

Journal of Clinical Anesthesia (2010) 22, 246–249

Endobronşial ultrasonografi

EBUS endikasyonları

- Akc. ca.'da nodal evreleme
- Akc. ca.'da tedavi sonrası re-staging
- Mediastinal lenf nodu tanısı
- Mediastinal kitle lezyonlarında tanı
- Peribronşiyal hastalık



Transesophageal Echocardiography in Noncardiac Thoracic Surgery

Breandan Sullivan, MD*, Ferenc Puskas, MD, PhD,
Ana Fernandez-Bustamante, MD, PhD

KEYWORDS

- Noncardiac thoracic surgery • Transesophageal echocardiography
- Lung resection surgery • Thoracic aortic surgery

KEY POINTS

- Transesophageal echocardiography (TEE) is a minimally invasive monitor that has multiple applications in the operating room and in the intensive care unit.
- Although there is a lack of evidence in TEE improving outcomes outside of cardiac surgery, TEE is rapidly becoming a more common monitor in the operating room for critically ill patients undergoing high-risk surgery.
- For patients undergoing noncardiac thoracic surgery, TEE offers multiple additional benefits such as: rapid and reliable monitoring of right heart function; monitoring of lesions that can predict adverse outcomes (aortic atheromas); and assistance in placing extracorporeal membrane oxygenation cannulas.

Anesthesiology Clin 30 (2012) 657–669

-Non-kardiyak torasik cerrahide-TEE

- Sağ kalp fonk.
- Akut pulmoner HT
- Akc. rezeksiyonu/pnömonektomi
- Akc. transplantasyonu
- Torasik aort cerrahisi (plak vs)
- ECMO-kanül yerleşimi/doğrulama

TEE

- Minyatür, tek kullanımlık prob
- Sürekli hemodinamik değerlendirme

Robotik-Destekli Torasik Cerrahi (RATS)

Robotik lobectomi

	References	Cases	Arm	Conversion	Op time	LOS	Mortality	Morbidity
1.	Park et al. [15]	34	3	4 (11.8 %)	218	4.5	0 (0 %)	9 (26.5 %)
2.	Gharagozloo et al. [16, 17]	100	3	1 (1.0 %)	216	4	3 (3.0 %)	21 (21.0 %)
3.	Veronesi et al. [18]	54	4	7 (13.0 %)	236	5	0 (0 %)	11 (20.4 %)
4.	Giulianotti et al. [19]	38	3	6 (15.7 %)	209	10	1 (2.6 %)	4 (10.5 %)
5.	Ninan and Dylewski [20]	76	3	2 (2.6 %)	150	3	0 (0 %)	9 (11.8 %)
6.	Augustin et al. [21]	26	3	5 (19.2 %)	228	11	0 (0 %)	4 (15.4 %)
7.	Cerfolio et al. [22]	119	4	13 (10.9 %)	132	2	0 (0 %)	28 (23.5 %)
8.	Park et al. [23]	325	3/4	27 (8.3 %)	206	5	1 (0.3 %)	82 (25.2 %)
9.	Louie et al. [24]	46	3	1 (2.2 %)	213	4	0 (0 %)	20 (43.5 %)

LOS length of stay

Gen Thorac Cardiovasc Surg, 2012

- Kan kaybı
- Hastanede kalış
- Dren kalışı
- Komplikasyon
- Ağrı
- Yaşam kalitesi

- Maliyet
- Eğitim

doi:10.1510/icvts.2009.221127

INTERACTIVE CARDIOVASCULAR AND THORACIC SURGERY

Interactive CardioVascular and Thoracic Surgery 10 (2010) 92-96

www.icvts.org

Best evidence topic - Thoracic non-oncologic

In patients undergoing thoracic surgery is paravertebral block as effective as epidural analgesia for pain management?

Marco Scarci*, Abhishek Joshi, Rizwan Attia

Department of Thoracic Surgery, Guy's and St Thomas Hospital, Great Maze Pond, London, SE1 9RT, UK

Paravertebral blok

- Benzer analjezi
- Yan etki ↓
- Komplikasyon ↓
- Başarısız girişim ↓

Yükselen değer

- Paravertebral blok
- İnterkostal blok

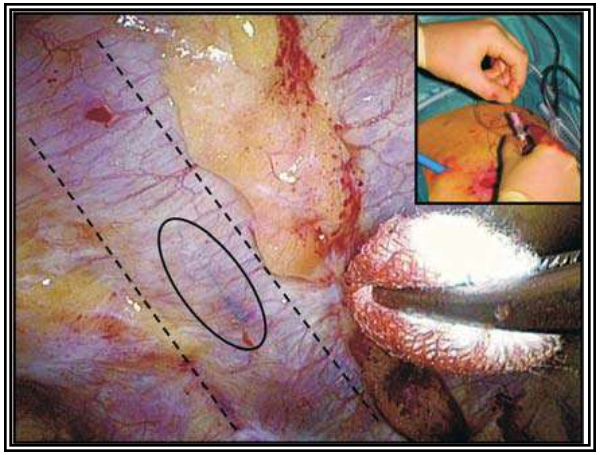
KOAH'da epidural analjezi daha yararlı !

European Journal of Cardio-Thoracic Surgery 41 (2012) 1072–1077
doi:10.1093/ejcts/ezr151 Advance Access publication 21 December 2011

ORIGINAL ARTICLE

Multimodal analgesic treatment in video-assisted thoracic surgery lobectomy using an intraoperative intercostal catheter†

Kim Wildgaard[a,*], Rene H. Petersen[b], Henrik J. Hansen[b], Hasse Møller-Sørensen[c], Thomas K. Ringsted[a] and Henrik Kehlet[a]



Comparison of the Analgesic Effects of Continuous Extrapleural Block and Continuous Epidural Block After Video-Assisted Thoracoscopic Surgery

Kunihisa Hotta, MD,* Tetsuya Endo, MD,† Koki Taira, MD,* Naho Sata, MD,* Soichiro Inoue, MD, PhD,* Mamoru Takeuchi, MD, PhD,* Norimasa Seo, MD, PhD,‡ and Shunsuke Endo, MD, PhD†

J cardiothorac vasc anesth 2011;25:1009-13

Ekstraplevral blok;

intraoperatif güvenli ve etkin alternatif

Semin Thoracic Surg 24:106-114, 2012

Awake Thoracic Surgery—Is it Worth the Trouble?

Eugenio Pompeo, MD

Potential Advantages of Awake Thoracic Surgery Over Conventional Surgery Under General Anesthesia and Relative Level of Scientific Evidence

Advantage	Level of Scientific Evidence*
Easier acceptance of surgery	0
Reduced need of high-dependency stay postoperatively	2
Better respiratory function in the early postoperative period	2
Reduced operative mortality	0
Reduced morbidity	2
Shorter hospital stay	2
Lower procedure-related costs	2
Attenuated stress hormone response	1
Attenuated impairment of immune response	2
Better survival in oncological surgery	0

*0 = no scientific data; 1 = data shown in more than 1 retrospective or observational study; 2 = data shown in randomized studies or in propensity score matching analyses; 3 = data shown in large, multi-institutional randomized studies.

Sonuçta...

Torasik anestezide;

- Preoperatif-intraopearatif-postoperatif yönetim bir bütün olarak düşünülmeli
- Anestezist ve cerrah güncel gelişmeleri paylaşmalı ve ortak hareket etmeli
- Minimal invaziv teknikler, multimodal yaklaşımlar tercih edilmeli