



GÖĞÜS KALP DAMAR ANESTEZİ
VE YOĞUN BAKIM DERNEĞİ

27. *Ulusal*
Kongresi

24 - 25 Eylül 2021 Wyndham Grand İzmir Özdilek



ERATS ve prehabilitasyon

Davud Yapıcı





GÖĞÜS KALP DAMAR ANESTEZİ
VE YOĞUN BAKIM DERNEĞİ

27. Ulusal
Kongresi

ERAS TORASİK (ERATS) ve PREHABİLİTASYON

Dr Davud YAPICI

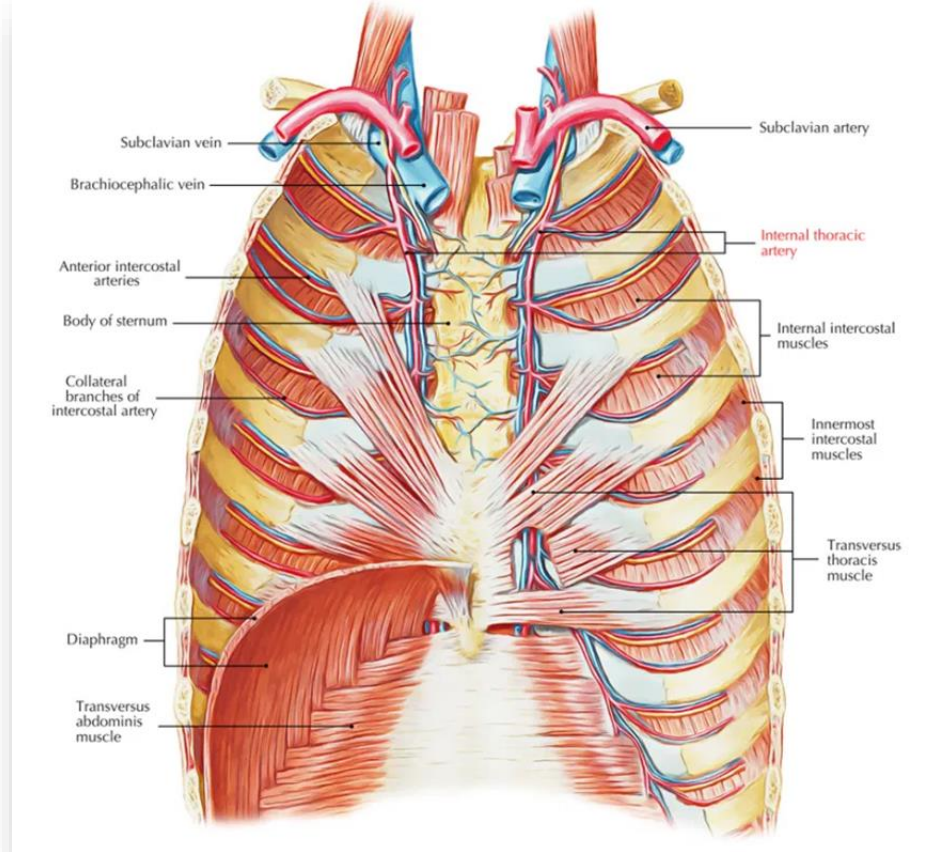
*Mersin Üniversitesi Tıp Fakültesi
Anesteziyoloji ve Reanimasyon AD.*



ERATS

- **Cerrahi;** VATS – RATS ile toraks travmasını azalttı...
- **Anestezi;** kendi pratiğindeki uygulamalara odaklanmalı...
 - Havayolu travması
 - Ventilasyon ilişkili akciğer hasarı
 - Sıvı yönetimi
 - Postoperatif analjezi

Toraks Cerrahisi..



Fiziksel bir kale..

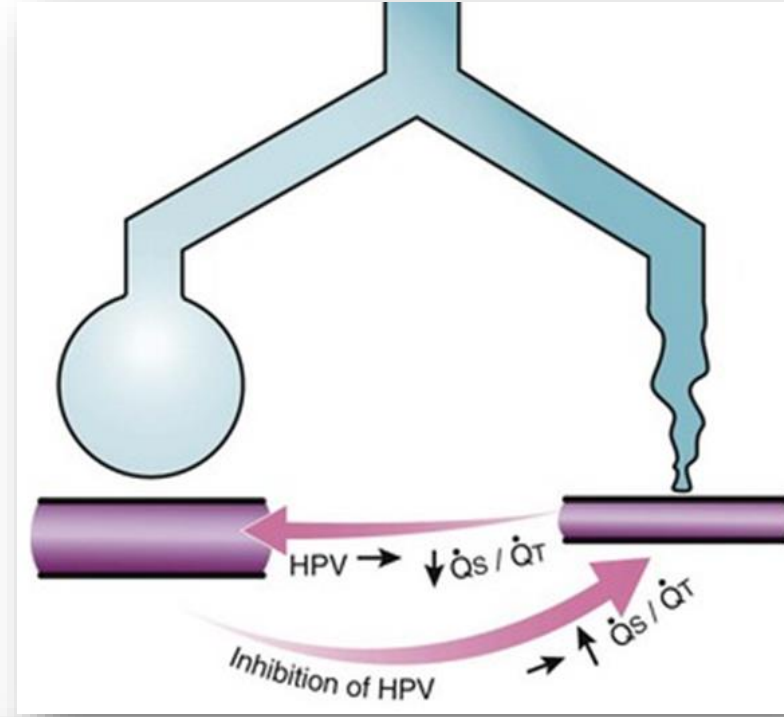
Cerrahisi zor,
Hasar verici
Genellikle kanlı...

Cerrahi travma, rezeksiyon ile birleşince;

- Karmaşık ve
- Uzun süreli bir iyileşme

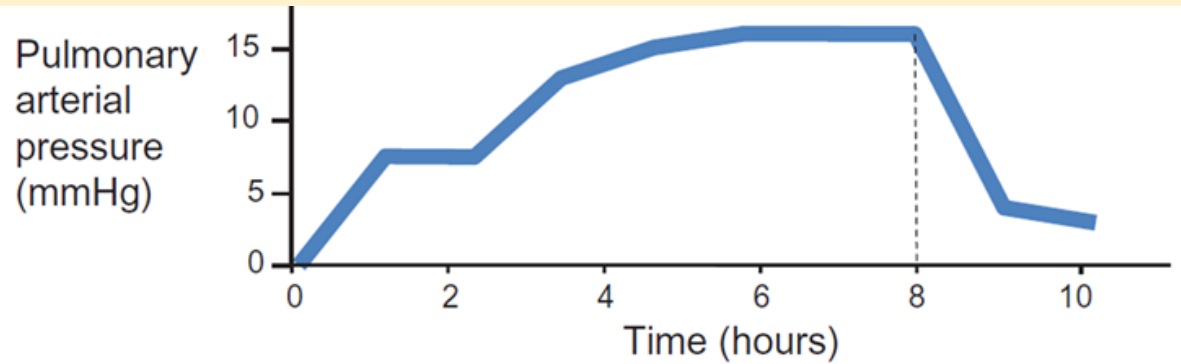
Tek Akciğer Ventilasyonu

Yüksek pulmoner akım
Glikokaliks hasarı



Hipoperfüzyon ve sonrası
I/R hasarı

Biz sebep olmuyoruz.. Ama uygulamalarımızla tabloyu ağırlaştırabiliyoruz.



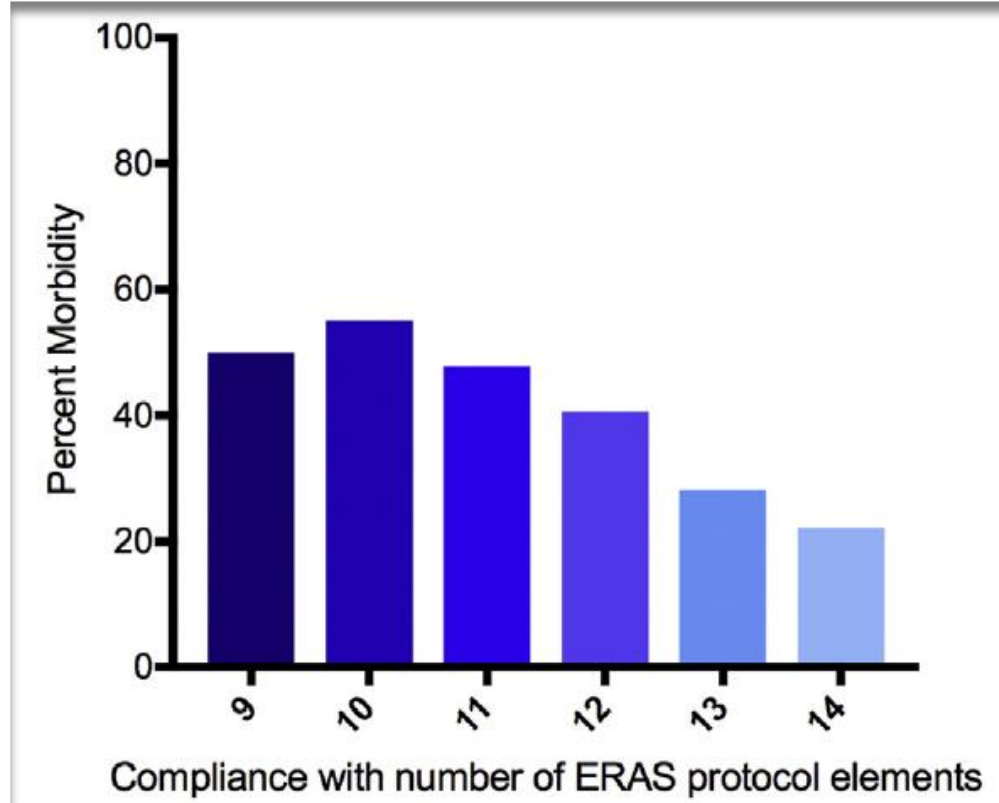


Minimizing postoperative pulmonary complications in thoracic surgery patients

Kai Kaufmann and Sebastian Heinrich

- PPC'lar, erken dönem mortalite ve uzun hastanede kalış nedeni...!.
 - Mümkünse VATS
 - Torasik Epidural Analjezi
 - Akciğer koruyucu ventilasyon
 - Hedefe yönelik sıvı tedavisi

ERATS



- ERATS protokollerinde, **bir bütün olarak** programa uyum çok önemlidir.

TABLE 2. Thoracic surgery Enhanced Recovery After Surgery pathway

Preoperative phase

1. Preoperative visit and assessment
2. Patient education and explanation of ERAS
3. Smoking cessation
4. Preoperative rehabilitation
5. Admission on day of surgery
6. Preoperative carbohydrate drink
7. Avoidance of sedative preanesthetic medication

Perioperative phase

1. Prophylactic antibiotics
2. Regional anesthesia with paravertebral catheters
3. Avoidance of crystalloid overload
4. Intraoperative warming
5. Venous thromboembolism prophylaxis
6. Avoidance of urinary catheter
7. Minimally invasive surgery (VATS) where possible
8. Single chest drain

Postoperative phase

1. Avoidance of postoperative intravenous fluids
2. Avoidance of opiate analgesia
3. Early feeding
4. Targeted PONV therapy
5. Mobilization within 24 h
6. Early chest drain and catheter removal

Enhanced Recovery After Surgery (ERAS) in Thoracic Surgery

*Tara R. Semenkovich, MD, MPHS, Jessica L. Hudson, MD, MPHS,
Melanie Subramanian, MD, and Benjamin D. Kozower, MD, MPH*

ERATS uygulamaya başlayan çeşitli merkezler;

- Protokollerini ve
- ERATS öncesi ve sonrası sonuçlarını paylaştılar.

Table 1. Key Changes Made With Institution of ERAS Protocols in the Reviewed Studies and Associated Outcomes

	Madani et al	Brunelli et al	Van Haren et al	Rogers et al	Martin et al
Components	Components that differed from baseline practice are detailed below.				
Patient education	Preoperative education according to a standardized protocol with ERAS-focused materials provided	Intensive patient education program (2 h, with materials focused on ERAS elements and patient role in perioperative care) Daily motivational talks performed by a dedicated nurse Preoperative instruction on incentive spirometry use and	ERAS-focused materials given to patients preoperatively	Preoperative assessment and multidisciplinary visit with ERAS-focused education and materials Smoking cessation and prehabilitation counseling if indicated	Nurse-led preoperative education, ERAS-focused materials provided
Nutrition	DOS: clear liquids POD1: advance diet	Preoperative consumption of 1200 cc of Nutricia for carbohydrate loading Supplements 3× per day Scheduled antiemetic medications	Preoperative clear liquids until 2 hours before surgery DOS: clear liquids, then diet advanced as tolerated	Preoperative carbohydrate loading 2 h before surgery, oral intake as soon as possible postoperatively Advance diet as tolerated, usually by POD1	20 oz Gatorade 2 h before surgery DOS: clear fluids given in recovery Diet advanced as tolerated
IV fluids and Foley management	Foley removed POD1 with a retention protocol in place	Decrease IV fluids POD1	Intraoperative pulse wave monitoring used to direct fluid replacement	Scheduled ondansetron Avoidance of fluid restriction or overload	Restrictive intraoperative fluid administration IV fluids at 75 cc/h postoperatively, stopped POD1 Foley catheter until POD1 Tamsulosin if male and >50 years old
Mobilization	DOS: up in chair POD1: up in chair 3× for >30 minutes, ambulate 2× POD2: out of bed for >8 hours, ambulate > 17.5 m 3× POD3: ambulate 75 m 3–5×	Utilization of a mobile suction unit to allow ambulation		Early mobilization, by POD1 Visits with physical therapy	DOS: up in chair Out of bed >3× daily

Table 1. Key Changes Made With Institution of ERAS Protocols in the Reviewed Studies and Associated Outcomes

	Madani et al	Brunelli et al	Van Haren et al	Rogers et al	Martin et al
Pain control		<p>Protocolized tapering of pain medications: POD1: PCA stopped and transitioned to OxyContin POD2: paravertebral catheter removed POD3: transitioned to dihydrocodeine</p>	<p><i>Preoperative:</i> Tramadol ER 300 mg PO and gabapentin 300 mg PO <i>Intraoperative:</i> <u>Liposomal bupivacaine</u> used for posterior intercostal nerve block and local administration to incision, acetaminophen 1000 mg IV, and ketorolac 30 mg IV Rare use of thoracic epidurals <i>Postoperative:</i> Acetaminophen 1000 mg IV × 2 d, followed by oral Ketorolac 15 mg IV × 2 days followed by oral NSAIDS Gabapentin 300 mg PO PRN tramadol 50 mg PO then additional opiates</p>	<p>Regional anesthesia with a paravertebral catheter, continued through POD2, Intercostal blocks IV ketamine Scheduled acetaminophen and NSAIDS Opiates PRN</p>	<p><i>Preoperative:</i> Gabapentin 600 mg PO Celecoxib 300 mg PO Acetaminophen 975 mg PO <i>Intraoperative:</i> <u>Thoracic epidural during early ERAS, transitioned to 250 mcg subarachnoid morphine for thoracotomy or lobectomy patients and posterior intercostal nerve block with 266 mg liposomal bupivacaine</u> <i>Postoperative:</i> Acetaminophen 975 mg PO q6 Celecoxib 100 mg PO BID Gabapentin 300 mg PO TID Ketamine 0.1–0.5 mg/kg/h × 24 h for thoracotomy patients Oxycodone 5 mg PO q4 PRN, PCA if >3 doses needed</p>

Table 1. Key Changes Made With Institution of ERAS Protocols in the Reviewed Studies and Associated Outcomes

	Madani et al	Brunelli et al	Van Haren et al	Rogers et al	Martin et al
Results All results listed as post-ERAS vs pre-ERAS, except for Rogers et al where there was no pre-ERAS comparator group; * indicates statistical significance					
Length of stay	6 days vs 7 days* (overall) 5 days vs 6 days* (uncomplicated)	5 days vs 4 days	4 days vs 5 days*	5 days	2 days vs 3 days (VATS) 4 days vs 6 days* (thoracotomy)
Chest tube duration	4 days vs 5 days*		2 days vs 3 days*		
Total complication rate	37% vs 50%*			25% minor 13% major	
Pulmonary complication rate	25% vs 31%	18% vs 17%	20% vs 29%*		
Readmission rate	6% vs 5%	7% vs 7%	4% vs 3%	6%	2% vs 7% (VATS) 17% vs 10% (thoracotomy)
Mortality rate		3.8% vs 2.3% (30-day) 4.7% vs 3.0% (90-day)	0.6% vs 1.0% (30-day)	1.4% (30-day) 1.7% (60-day) 2.1% (90-day)	1% vs 1% (VATS) 0% vs 2% (thoracotomy)

Hastanede yatış kısalıyor
Pulmoner komplik aynı
Güvenle uygulanabilir.

Torakotomi

Hastaların bakım kalitesi artıyor.

Thoracic Enhanced Recovery After Surgery: Single Academic Center Observations After Implementation

ERATS öncesi VATS,
sonrası VATS + RATS

Table 1. University of North Carolina Thoracic ERAS Protocol

Preoperative	Intraoperative	Postoperative
<p>Tobacco cessation Incentive spirometry education</p> <p>Preoperative nutritional screening and oral carbohydrate loading</p> <p>Day of surgery:</p> <p>Preoperative medications: Tylenol 1000 mg PO, Celebrex 200 mg PO, Pregabalin 100 mg PO</p> <p>Consumption of clear fluids up until 2 h before surgery.</p>	<p>Analgesia (VATS/RATS):</p> <ol style="list-style-type: none"> 1. Intercostal blocks (T2-T10 levels) with 1:1 mix of 0.25% plain bupivacaine + liposomal bupivacaine. 2. Ketamine infusion: 0.25 mg•kg•h <p>Analgesia (thoracotomy):</p> <p>Thoracic epidural: 0.25% plain bupivacaine infusion, 3-6 mL/h</p> <p>Fluids:</p> <p>Establish and maintain euvoemia; frequent arterial blood gas interpretation.</p> <p>Blood pressure:</p> <p>Maintain systolic blood pressure >20% baseline.</p> <p>Vasopressin 0.02-0.04 units•kg•h first line; norepinephrine 0.02-0.04 µg•kg•min second line.</p> <p>Mechanical ventilation:</p> <ul style="list-style-type: none"> • Pressure control ventilation • Recruitment breaths q30min • 2 lung: tidal volume 5-8 mL/kg (3-5 for ESLD) IBW, FiO₂ <0.5 if possible, PEEP 5 • 1 lung: tidal volume 4-7 mL/kg IBW, FiO₂ 1.0 and wean by 0.1 q5min, PEEP 5-8 (3-5 for ESLD) • Respiratory rate: Keep PaCO₂ within 10 mm Hg of baseline <p>Antibiotic prophylaxis</p> <p>Prevention of Postoperative Nausea with Dexamethasone</p> <p>Venous thromboembolism prophylaxis</p> <p>Prevention of intraoperative hypothermia</p> <p>Minimally invasive surgical technique (VATS, RATS) or muscle-sparing and nerve-sparing techniques for thoracotomy</p>	<p>Analgesia (VATS/RATS):</p> <ul style="list-style-type: none"> • NSAIDs-scheduled • Ketorolac 15 mg IV q8h or ibuprofen 800 mg PO q8h × 24 h on POD 0. • Transition to Ibuprofen 600 mg PO q6hr PRN on POD 1 and until discharge. • Gabapentin 300 mg PO TID until discharge. • Tylenol 650 mg PO QID until discharge. <p>Early mobilization</p> <p>Early chest tube removal (24-h output <250 mL and no air leak)</p> <p>Early urinary catheter removal</p>

Table 3. Intraoperative Characteristics, Stratified by Pre-ERAS and Post-ERAS Implementation

Variable	Pre-ERAS 133 (50%)	Post-ERAS 131 (50%)	P Value
Patients	133 (50)	131 (50)	
Preoperative medications			
Acetaminophen	7 (5)	102 (78)	<.0001
Pregabalin	5 (4)	85 (65)	<.0001
Celecoxib	1 (1)	73 (56)	<.0001
Intraoperative medications			
Ketorolac	3 (2)	26 (20)	<.0001
Dexamethasone	44 (33)	69 (53)	.002
Vasopressin	9 (7)	51 (39)	<.0001
Norepinephrine	1 (1)	18 (14)	<.0001
Regional block type			
Intercostal nerve block	90 (68)	102 (78)	.07
Epidural	0 (0)	0 (0)	...
Intercostal nerve block and epidural	43 (32)	29 (22)	.07
Intercostal nerve block type			
Bupivacaine alone	133 (100)	37 (28)	<.0001
Liposomal bupivacaine alone	0 (0)	61 (47)	<.0001
Bupivacaine and liposomal bupivacaine	0 (0)	33 (25)	<.0001
Transfusion	0 (0)	0 (0)	...
Total crystalloids, mL	2000 (900-1600)	800 (496-1100)	<.0001
Total colloids, mL	0 (0-0)	250 (0-500)	<.0001
Morphine equivalents, mg	25 (22-32)	20 (15-25)	<.0001

Thoracic Enhanced Recovery After Surgery: Single Academic Center Observations After Implementation

- PPC's.. Geç taburculuk nedeni
- PPC'un yarısı **uzamış hava kaçağı** (Sigara kullanımıyla ilişkili)
- Hava kaçağını önleme protokolü..!

Table 4. Adjusted Effect of ERAS Implementation, Compared With Pre-ERAS Implementation, on Inpatient Complications and 30-Day Outcomes

Variable	Pre-ERAS	Post-ERAS	HR (95% CI) ^a
Inpatient complications			
Pulmonary	20 (15)	20 (15)	0.79 (0.27-2.34)
Cardiovascular	12 (9)	9 (7)	1.07 (0.27-4.20)
Urinary	10 (8)	17 (13)	0.84 (0.25-2.88)
Infection	2 (2)	1 (1)	NA
Hemolytic	2 (2)	2 (2)	NA
Gastrointestinal	2 (2)	0 (0)	NA
Neurological	5 (4)	1 (1)	NA
Other	4 (3)	6 (5)	0.93 (0.12-7.50)
Any complication	36 (27)	44 (34)	1.25 (0.62-2.51)
30-d mortality	0 (0)	2 (2)	NA
30-d readmission	11 (8)	13 (10)	1.85 (0.52-6.66)
			OR (95% CI) ^a
Prolonged LOS ^b	65 (49)	54 (49)	1.55 (0.69-3.47)

VATS için ERATS'a gerek yok gibi duruyor..!

Günlük aktivitelere dönüş zamanı da değerlendirilmelidir.!

Systematic review of the influence of enhanced recovery pathways in elective lung resection

Julio F. Fiore.

Study	Preoperative			Intraoperative			Postoperative								
	Patient education and/or counseling	Shorter preoperative fasting	Prophylactic antibiotics	Epidural anesthesia/analgesia	Use of single chest tube	Fissureless right upper lobectomy	Muscle sparing surgery/VATS	Intraoperative Prevention of hypothermia	Standardized chest tube management	Early removal of epidural catheter	Early removal of urinary catheter	Postoperative fluid restriction/early discontinuation of IV fluids	Early removal of oxygen support	Early feeding	Early mobilization
Salati, 2012	✓				✓	✓			✓						
Numan, 2012	✓		✓	✓			✓		✓						✓
Muehling, 2008	✓*	✓		✓				✓	✓			✓*		✓	✓
Maruyama, 2006	✓		✓	✓				✓	✓	✓			✓	✓	✓
Zehr, 1998			✓	✓					✓				✓	✓	✓
Wright, 1997	✓		✓	✓					✓				✓	✓	✓

✓ Güvenle uygulanabilir.

✓ Hastanede yatış süresi ve maliyeti **azaltma potansiyeli** var.

Enhanced recovery programs in lung cancer surgery: systematic review and meta-analysis of randomized controlled trials

Shuangjiang Li¹

- Postop. Pulmoner komplikasyonlar,
- Hastane ve yoğun bakım süresi ve
- Mortalite **..azalıyor.**
- Postoperatif hayat kalitesi ve
- Hastaneye geri başvuru.. **homojen veriler yok..**

Kısa sürede Uluslararası konsensus oluşturulması gerekiyor...!.

Table 1 Baseline characteristics

Reference	Language	Country	RCT design	Study period
Dong et al ¹⁸	English	China	Single center	2012–2014
Huang et al ¹⁹	English	China	Single center	2015–2016
Lai et al ²⁰	Chinese	China	Single center	2015
Licker et al ²¹	English	Switzerland	Multicenter	2011–2014
Muehling et al ²²	English	Germany	Single center	NI
Sokouti et al ²³	English	Iran	Single center	2010
Zhao et al ²⁴	Chinese	China	Single center	2008–2009

**Guidelines for enhanced recovery after lung surgery:
recommendations of the Enhanced Recovery After Surgery (ERAS®)
Society and the European Society of Thoracic Surgeons (ESTS)**

Timothy J.P. Batchelor^{a,*}, Neil J. Rasburn^b, Etienne Abdelnour-Berchtold^c, Alessandro Brunelli^d,
Robert J. Cerfolio^e, Michel Gonzalez^c, Olle Ljungqvist^f, René H. Petersen^g, Wanda M. Popescu^h,
Peter D. Slingerⁱ and Babu Naidu^j

Akciğer rezeksiyonu uygulanan hastaların (VATS veya torakotomi)

“optimal perioperatif yönetimi için fikir birliğine ulaşılan öneriler” sıralandı..

Bir çok konuda **zayıf kanıtlarla, güçlü öneriler** yapılmıştır.

Recommendations	Evidence level	Recommendation grade
Preoperative phase		
Preadmission information, education and counselling Patients should routinely receive dedicated preoperative counselling	Low	Strong
Perioperative nutrition		
Patients should be screened preoperatively for nutritional status and weight loss	High	Strong
Oral nutritional supplements should be given to malnourished patients	Moderate	Strong
Immune-enhancing nutrition may have a role in the malnourished patient postoperatively	Low	Weak
Smoking cessation		
Smoking should be stopped at least 4 weeks before surgery	High	Strong
Alcohol dependency management		
Alcohol consumption (in alcohol abusers) should be avoided for at least 4 weeks before surgery	Moderate	Strong
Anaemia management		
Anaemia should be identified, investigated and corrected preoperatively	High	Strong
Pulmonary rehabilitation and prehabilitation		
Prehabilitation should be considered for patients with borderline lung function or exercise capacity	Low	Strong
Admission		
Preoperative fasting and carbohydrate treatment		
Clear fluids should be allowed up until 2 h before the induction of anaesthesia and solids until 6 h before induction of anaesthesia	High	Strong
Oral carbohydrate loading reduces postoperative insulin resistance and should be used routinely	Low	Strong
Preanaesthetic medication		
Routine administration of sedatives to reduce anxiety preoperatively should be avoided	Moderate	Strong

PREHABILITASYON

Recommendations	Evidence level	Recommendation grade
Perioperative phase		
Venous thromboembolism prophylaxis		
Patients undergoing major lung resection should be treated with pharmacological and mechanical VTE prophylaxis	Moderate	Strong
Patients at high risk of VTE may be considered for extended prophylaxis with LMWH for up to 4 weeks	Low	Weak
Antibiotic prophylaxis and skin preparation		
Routine intravenous antibiotics should be administered within 60 min of, but prior to, the skin incision	High	Strong
Hair clipping is recommended if hair removal is required	High	Strong
Chlorhexidine-alcohol is preferred to povidone-iodine solution for skin preparation	High	Strong
Preventing intraoperative hypothermia		
Maintenance of normothermia with convective active warming devices should be used perioperatively	High	Strong
Continuous measurement of core temperature for efficacy and compliance is recommended	High	Strong
Standard anaesthetic protocol		
Lung-protective strategies should be used during one-lung ventilation	Moderate	Strong
A combination of regional and general anaesthetic techniques should be used	Low	Strong
Short-acting volatile or intravenous anaesthetics, or their combination, are equivalent choices	Low	Strong
PONV control		
Non-pharmacological measures to decrease the baseline risk of PONV should be used in all patients	High	Strong
A multimodal pharmacological approach for PONV prophylaxis is indicated in patients at moderate risk or high risk	Moderate	Strong

Recommendations	Evidence level	Recommendation grade
Regional anaesthesia and pain relief		
Regional anaesthesia is recommended with the aim of reducing postoperative opioid use.	High	Strong
Paravertebral blockade provides equivalent analgesia to epidural anaesthesia		
A combination of acetaminophen and NSAIDs should be administered regularly to all patients unless contraindications exist	High	Strong
Ketamine should be considered for patients with pre-existing chronic pain	Moderate	Strong
Dexamethasone may be administered to prevent PONV and reduce pain	Low	Strong
Perioperative fluid management		
Very restrictive or liberal fluid regimes should be avoided in favour of euvolemia	Moderate	Strong
Balanced crystalloids are the intravenous fluid of choice and are preferred to 0.9% saline	High	Strong
Intravenous fluids should be discontinued as soon as possible and replaced with oral fluids and diet	Moderate	Strong
Atrial fibrillation prevention		
Patients taking β -blockers preoperatively should continue to take them in the postoperative period	High	Strong
Magnesium supplementation may be considered in magnesium deplete patients	Low	Weak
It is reasonable to administer diltiazem preoperatively or amiodarone postoperatively for patients at risk	Moderate	Weak
Surgical technique: thoracotomy		
If a thoracotomy is required, a muscle-sparing technique should be performed	Moderate	Strong
Surgical technique: minimally invasive surgery		
Intercostal muscle- and nerve-sparing techniques are recommended	Moderate	Strong
Reapproximation of the ribs during thoracotomy closure should spare the inferior intercostal nerve	Moderate	Strong
A VATS approach for lung resection is recommended for early-stage lung cancer	High	Strong

Recommendations	Evidence level	Recommendation grade
Postoperative phase		
Chest drain management		
The routine application of external suction should be avoided	Low	Strong
Digital drainage systems reduce variability in decision-making and should be used	Low	Strong
Chest tubes should be removed even if the daily serous effusion is of high volume (up to 450 ml/24 h)	Moderate	Strong
A single tube should be used instead of 2 after anatomical lung resection	Moderate	Strong
Urinary drainage		
In patients with normal preoperative renal function, a transurethral catheter should not be routinely placed for the sole purpose of monitoring urine output	Moderate	Strong
It is reasonable to place a transurethral catheter in patients with thoracic epidural anaesthesia	Low	Strong
Early mobilization and adjuncts to physiotherapy		
Patients should be mobilized within 24 h of surgery	Low	Strong
Prophylactic minitracheostomy use may be considered in certain high-risk patients	Low	Weak

Genel Anestezi

Hava yolu travması:

- Çift Lümenli Tüpler
- Bronşiyal Blokerler
- FOB

Genel Anestezi:

- İnhalasyon – İV Anestezikler
- Masada ekstübasyon
- Erken derlenme

ERATS

- **Cerrahi**; VATS – RATS ile toraks travmasını azalttı...
- **Anestezi**; kendi pratiğindeki uygulamalara odaklanmalı...
 - Havayolu travması...?
 - Ventilasyon ilişkili akciğer hasarı..?
 - Sıvı yönetimi
 - Postoperatif analjezi (TEA'ye alternatif..?)

Curr Opin Anesthesiol 2019, 32:1–2

Genel Anestezi

TAV'a baėlı Akciėer Hasarı;

Oksijenasyon ve/veya inflamatuvar yanıtta etkisini biliyoruz..!

ERATS'ta hangi strateji; postop. outcome ve derlenmede daha iyi?

Öneriler:

- Düşük TV (4-6 ml/kg TV, IBW)
- Optimum PEEP (DP'a göre ideal PEEP - PEEP 5-8 cmH₂O)
- Düşük Driving pressure (DP)
- RM (hangi hastada ve ne zaman?)

Saudi J Anaesth 2021;15:348-55.

Precise anesthesia in thoracoscopic operations

Ming-Hui Hung^a, Jin-Shing Chen^b, and Ya-Jung Cheng^a

Hassas (Precise) anestezi..

- Entübe etmeden..
- Lokal ve rejyonel teknik
- **Genel anestezi ve M. Ventilasyon'un etkileri azaltılabilir mi?**
- Hasta seçimi ve hazırlığı konusunda kanıtlar yetersiz..!

High-flow nasal cannula oxygen therapy in patients undergoing thoracic surgery: current evidence and practice

Jakob Wittenstein^a, Lorenzo Ball^{b,c}, Paolo Pelosi^{b,c},

High flow ventilasyon..!

- Non-invaziv ventilasyona alternatif
- Isıtılmış ve nemlendirilmiş hava
- Operasyon ve Ekstübasyon sonrası solunum desteği.
- **Kanıt gerekiyor..!**

Ađrı Yönetimi

İnterkostal blok + Postop 3. gün opioid kesilmesi; **ERATS'a uyumu zorlaştırıyor.**

Postoperatif **opioid tüketimini azaltmak** için;

- **TEA** (torakotomi)..... **PVB** (VATS)
- Multimodal analjezi (Non-opioidler-tüm hastalarda)
- Lipozomal Bupivacaine: IC, ESPB veya SAPB uygulanabilir..?

Rutin İV-PCA uygulamasından kaçınılmalıdır...!

Güçlü kanıt ve Öneri

Perioperatif sıvı yönetimi

Preoperatif: 2 saate kadar berrak sıvı

İntraoperatif:

- Dengeli kristalloid sıvı (**izotonik değil**)
- Perioperatif <1500 ml (veya 20 ml/kg/24 h).
- İdrar çıkışı > **0.2 ml/kg/h**
- Rejyonel analjezi ve kan kayıplarında; **ilave sıvı ve vazopressor.**

Postoperatif:

- En kısa zamanda; **İV sıvı kesilmeli** ve **oral alıma** izin verilmelidir.

Güçlü kanıt ve öneri

Perioperatif sıvı yönetimi:

Hedef, Euvolemi;

Diğer organ disfonksiyonuna neden olmadan, fazla sıvıdan kaçınmak ..!

6 ml/kg/h - **CI>2,5l/dk** - MAP>70mmHg - **SVV<%10**

Monitorizasyon:

- Pulse contour analysis
- **Doppler ultrasound**
- **Transpulmonary Thermodilution**
- Central venous oximetry

Yüksek riskli ve kompleks olgularda ?

Postoperatif Erken Mobilizasyon ve Fizyoterapi

Hastalar postoperatif 24 saat içinde mobilize edilmelidir.

(zayıf kanıt, güçlü öneri)

- Göğüs tüpü,
- İdrar sondası,
- İV sıvının devamı,
- Yetersiz ağrı kontrolü



Enhanced recovery after thoracic anesthesia

ERATS; Uygulanması kolay ve pragmatik bir yaklaşım fakat hedefe ulaşılması o kadar kolay değil gibi duruyor.

Klinikte ERATS'ın düşünülmesi bile (farkındalık), genel olarak hasta sonuçlarına olumlu yansıyacak ve protokollerini değiştirmeleri için motivasyon yaratacaktır..

Finally, the authors want to underline an important note that “enhanced” does not mean necessarily “fast” discharge.

PREHABİLİTASYON

- Multidisipliner yaklaşım
 - Eğitim ve danışmanlık
 - **Nutrisyon**
 - **Sigara ve Alkol**
 - Oral hijyen
 - Psikolojik destek
 - **Fiziksel Ekzersiz**

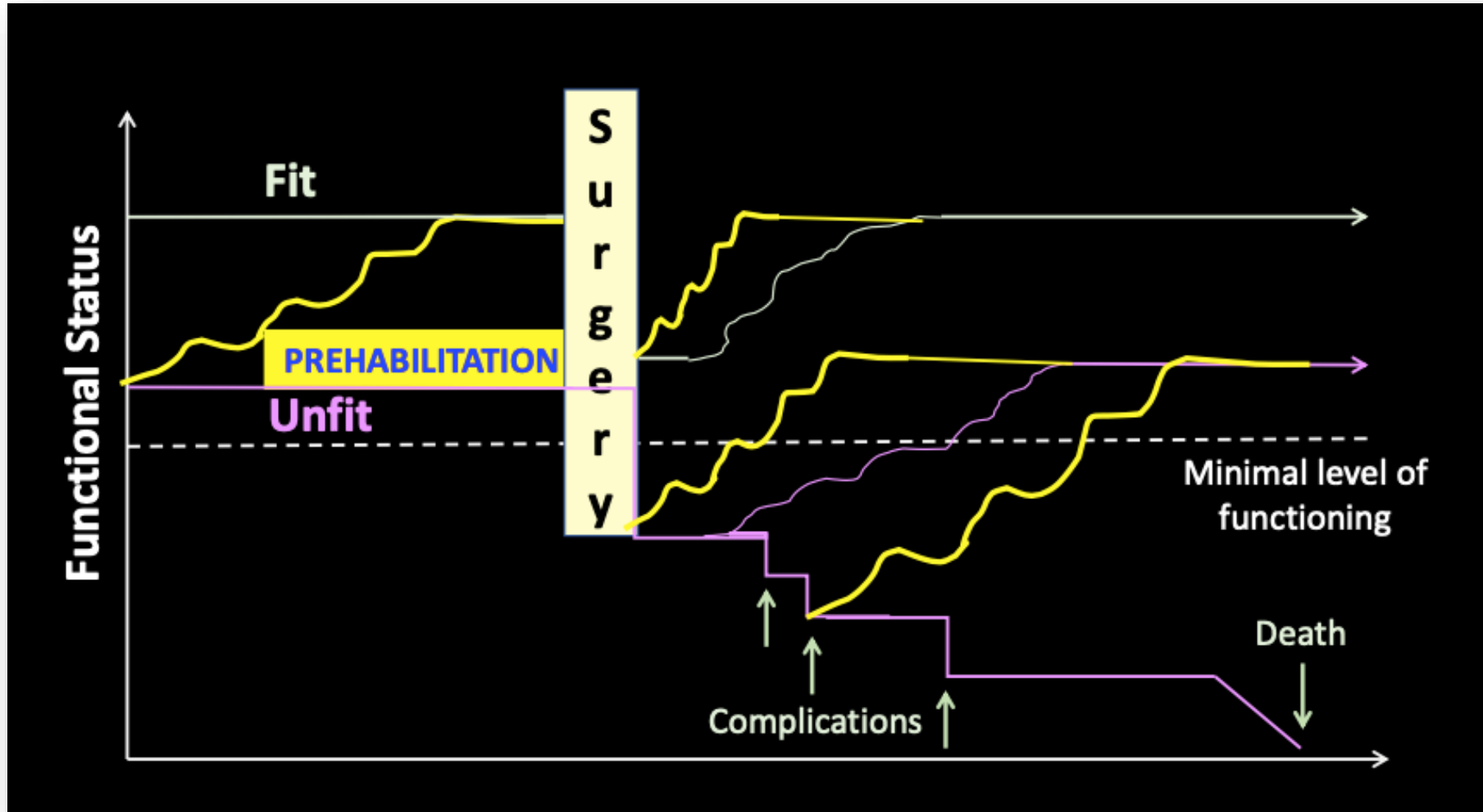
Pulmoner Rehabilitasyon Prehabilitasyon

Preoperatif egzersiz kapasitesi kötü olan akciğer kanseri hastalarında;
“kanser tanısının konması ve cerrahiye alınması arasında geçen sürede”
egzersiz kapasitesinin arttırılması için uygulanacak girişimler faydalıdır.

Güçlü öneri

Postoperatif yapılan egzersizlerin faydası sınırlı kalmaktadır.

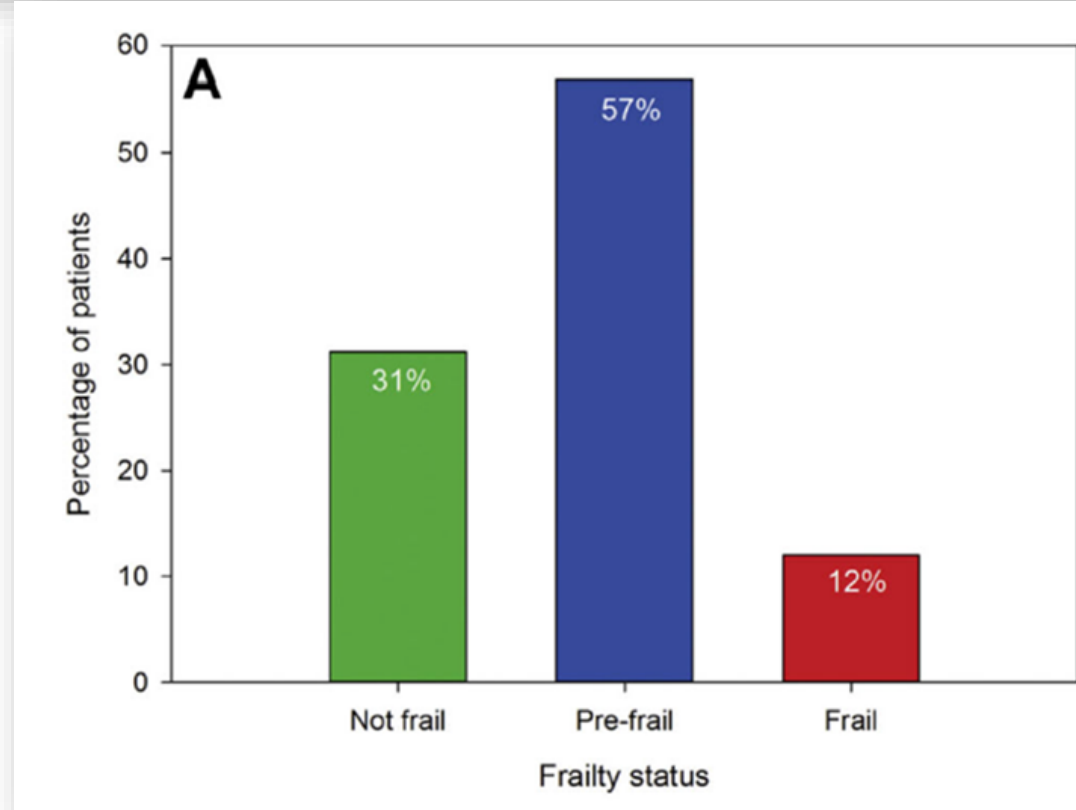
PREHABILITASYON



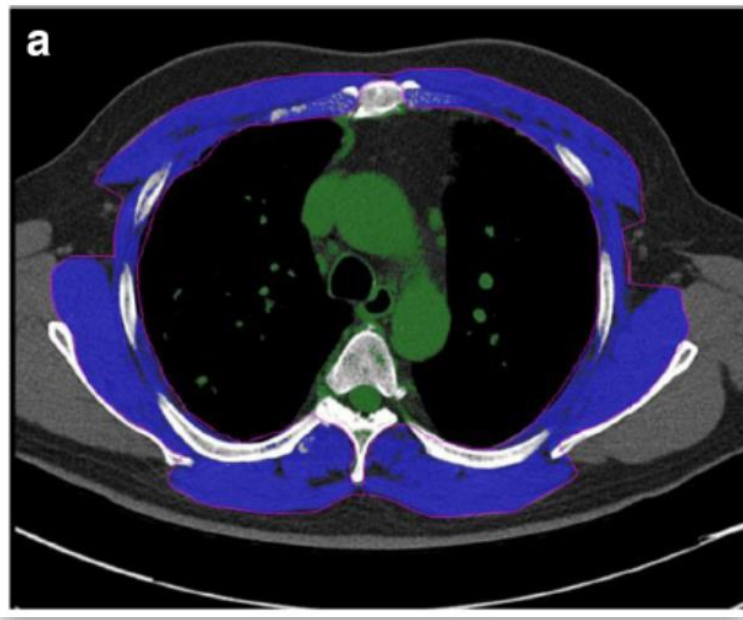
Screening for Frailty in Thoracic Surgical Patients



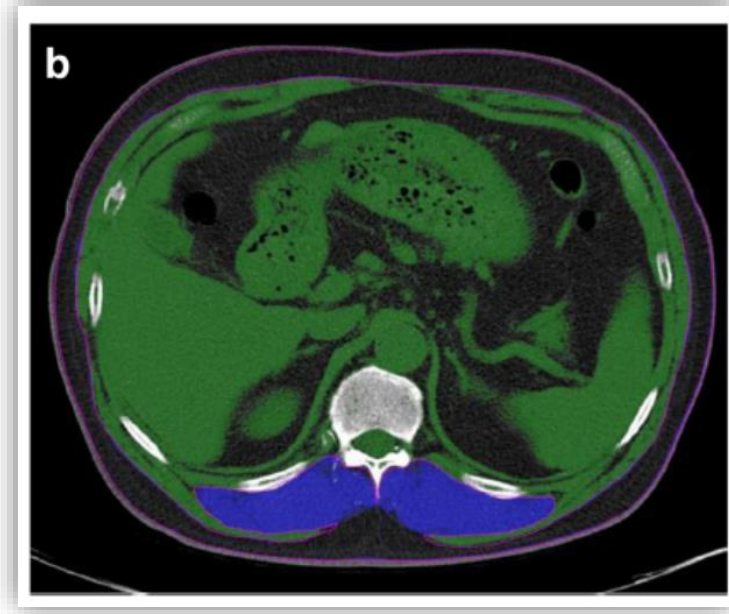
Angela K. Beckert, MD, Megan Huisingh-Scheetz, MD, Katherine Thompson, MD,



Toraks cerrahisi hastaları, Frailty'e daha yatkın..!



4. Torasik vertebra-carena hizası-kas kesit alanı
(pectoral, interkostal, paraspinal, serratus ve latissimus dorsi)



12. Torasik vertebra hizası Erector spinae kası kesit alanı

CT ile torasik bölgeden belirlenen **sarkopeni %40.....**
Preoperatif değerlendirilmelidir.!

Fiziksel Ekzersiz

Aerobik kapasiteyi artırmak

Endurans egzersizleri

- Koşu, Yüzme, Kürek, Merdiven
- **VO_{2max} 'in %40-60'ı**

Hiperintens-intervalli (HIIT)

- Daha kısa süreli
- Aralıklı dinlenme
- **VO_{2max} 'in %80'i**

Solunum kaslarını güçlendirmek

İnspiratuar kas eg (IMT)

- Ayarlanabilir iş yükü



Ekspiratuar kas eg (EMT)

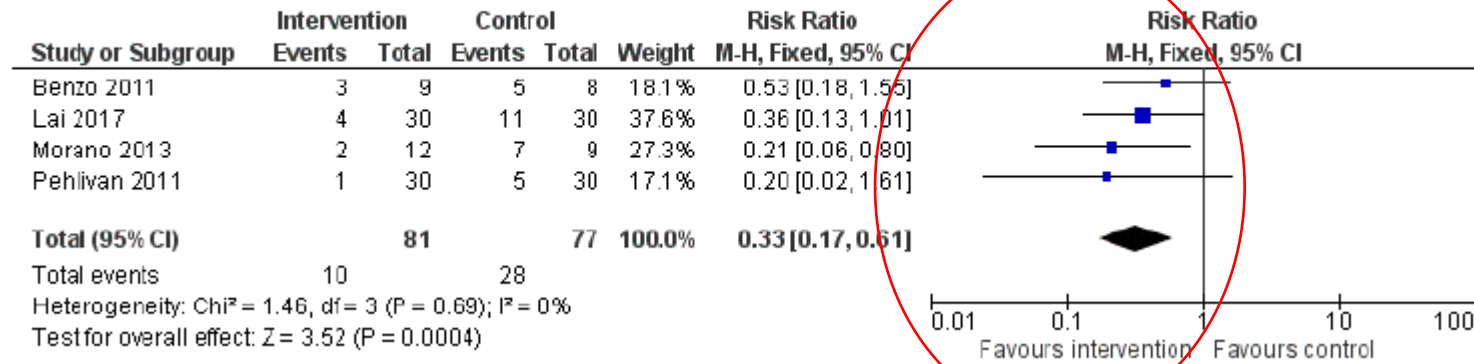


Preoperative exercise training for patients with non-small cell lung cancer (Review)

Cavalheri V, Granger C

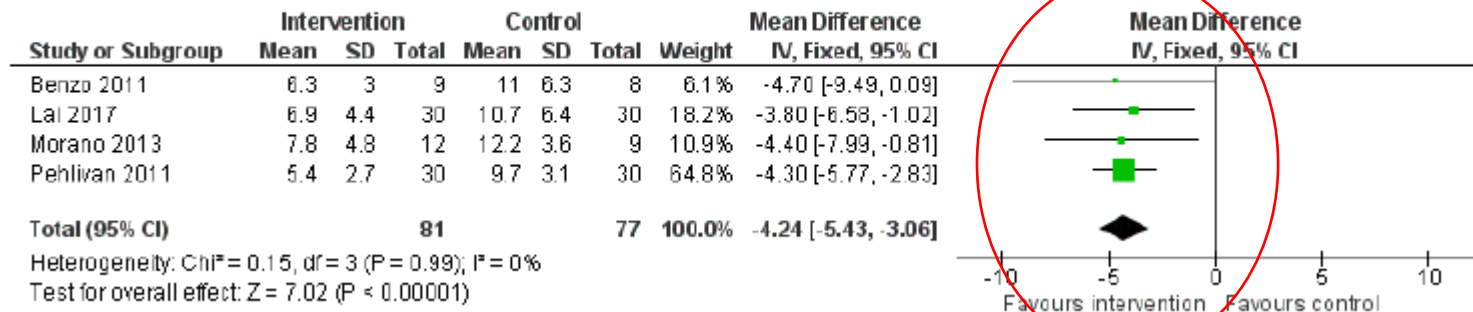
Cochrane Database of Systematic Reviews 2017,

Figure 4. Forest plot of comparison: 1 Intervention group versus control group, outcome: 1.1 Risk of developing a postoperative pulmonary complication.



- Süre ?
- Yoğunluk ?
- Yöntem ?
- Hangi hasta ?

Figure 6. Forest plot of comparison: 1 Intervention group versus control group, outcome: 1.3 Postoperative length of hospital stay.





European Association
of Cardiothoracic
Anaesthesiology

Dr Emre Bingul

has been awarded the EACTA Research Grant of 10.000€ for the project

**Preoperative inspiratory muscle training coupled to aerobic
exercises to prevent postoperative pulmonary complications in
patients undergoing thoracic surgery (INSPIRE study): a
multicentre randomized controlled trial**

Steffen Rex

Subspecialty Committee Coordinator

Fabio Guarracino

President of EACTA

Ghent, 06/09/2019

Öneriler

- Preoperatif eğitim, **hasta ve yakınlarının desteğini almak için önemli..**
- Başlamadan önceki protokolleriniz, **ERATS'tan ne kadar farklı?**
- Protokolü tam olarak uygulayabilmek, 6 ay-1 yıl sürüyor.. Geri bildirimler alıp, protokolde revizyon yapmak gerekebiliyor.
- Sosyoekonomik durum ve hasta bakımı açısından **doğu-batı arasında fark?**
- Hastaların **taburculuk sonrası yaşam kalitesi** de sorgulanmalıdır...

Özelleştirilmiş bir “**göğüs cerrahisi modeli**” gereklidir.

Prof Dr Agah ertuđ



Saygıyla...