



VATS (Video Assisted Thoracic Surgery)

Uygulamalarında Anestezi



Dr. F. Nur Kaya

# VATS/Özellikler

Mükemmel akciğer separasyonu

Optimal görüş için iyi kollabe olmuş akciğer

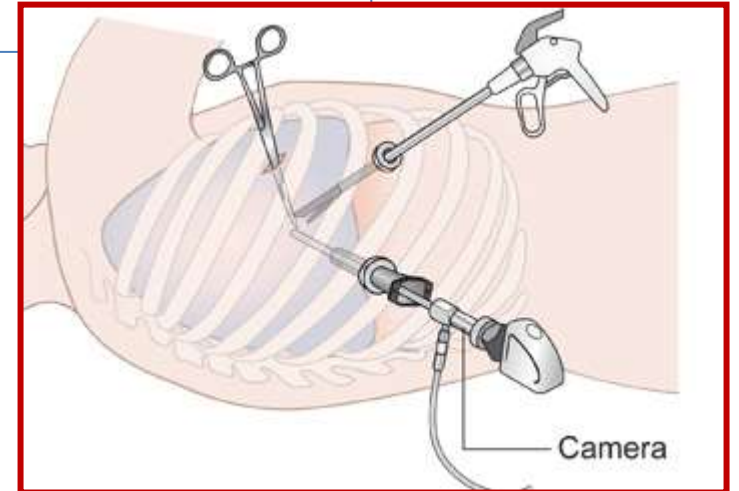
CO<sub>2</sub> insuflasyonu → 2 L/min (10–12 cm H<sub>2</sub>O)

KVS instabilite

Hiperkarbi/gaz embolisi/aritmi

Cerrahi alan/patolojinin sınırlı değerlendirilmesi  
(sınırlı evreleme)

Sınırlı kanama kontrolü, plevral yayılım



# VATS/Endikasyonlar

Tanıya yönelik

Tedaviye yönelik

**Plevral hastalık**  
Efüzyon

**Plevral hastalık**  
Plörodezis  
Dekortikasyon  
Ampiyem boşaltılması

**Tüberküloz**  
Mezotelyoma

**Parankim hastalığı**  
Pnöminektomi, lobektomi  
«Wedge» rezeksiyon  
Akc. volüm küçültme

**Evreleme**  
Akc./ özafagus kanseri

**Perikardiyal hastalık**  
Pencere

**Parankim hastalığı**  
intertisyel fibrozis, soliter nodül

**Mediastinal hastalık**  
Timektomi, şilotoraks

**Mediastinal tümör**  
Metastaz, lenfoma

**Özafagus cerrahisi**  
Vagotomi  
Antireflü cer.

**Perikardiyal hastalık**  
Biyopsi, efüzyon

**Sempatektomi**  
Hiperhidrozis, RSD

# UÜTF Göğüs Cerrahisi AD

## 1994-2013 VATS Girişimleri

Girişim	1994-2002	2003-2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Toplam
<b>Plevral biyopsi</b>	72	19	40	16	18	14	37	27	20	8	27	298
<b>Spontan pnömotoraks</b>	30	5	10	13	2	9	24	17	16	13	20	159
<b>«Wedge» rezeksiyon</b>	37	18	20	23	30	34	71	60	59	67	131	550
Hematom boşaltılması	3	1	1		1		2		1	2	4	15
Yabancı cisim çıkarılması	2		1									3
PPP	3	3	1	1	3						2	13
LN örnekleme	1				1							2
Mediastinal kitle eksizyonu	1		1		1	1	1	3	4	5	11	28
Debridman		2	5	1	1	2		3	4	7	14	39
<b>Sempatektomi</b>			1	2	4	10	13	19	28	29	32	138
Timektomi						1	2	2	3	1	9	18
Lobektomi							1			4	18	23
VKA								1		1	4	6
Dekortikasyon									4			4
Sinir ablasyonu									1			1
Özafagus eksplorasyonu									1			1
GD kitle eksizyonu									1			1
NUSS									5	2		7
Klips çıkarılması									1	1	2	4
Segmentektomi									2	5	3	10
Diyafragma onarımı											1	1
Toplam	149	48	80	56	61	71	151	132	150	145	278	<b>1321</b>

# VATS lobektomi önerilebilecek hasta grupları

Ann Thorac Surg 2008;85:S719-28

Hasta özellikleri	Örneklem
Pulmoner sorunlar	↓FEV1/DLCO, ciddi sigara içiciliği, uyku apnesi, son dönemde pnömoni hikayesi
Kardiyak sorunlar	Konjestif KY, ciddi KAH, son dönemde Mİ, kapak hastalığı
Ekstratorasik maligniteler	Soliter beyin met. (akc.'den), lobektomi gerektiren pulmoner met.
Düşük fiziksel performans	Performans durumu 2-3, morbid obez
Romatolojik/ortopedik sorunlar	Spinal hastalık, ciddi romatoid artrit, ciddi kifoz, lupus, osteomyelit
İleri yaş	>70 y
Vasküler sorunlar	Anevrizma, ciddi periferik vasküler hastalık
Yakında geçirilmiş veya geçirilecek majör cerrahi	Acil abdominal cerrahi, koltuk değneği gerektiren eklem replasmanı, kontralateral torakotomi gereksinimi
İmmünodepressif/yara iyileşmesinde bozulma	Geçirilmiş transplant öyküsü, diabet

# VATS/Avantajlar

Daha az invaziv/küçük insizyon

Daha az ağrı

Hızlı derlenme ve taburculuk

Kot hasarı Ø

Daha az pulmoner komplikasyon

Yüksek riskli hastalarda daha tolere edilebilir

Daha az masraf

Hasta için cazip

Cerrah için atraktif

*V/P uyumsuzluğu, hipoksi*

*Minimal ulaşımli cerrahi*

*Minimal invazif cerrahi*

# Lobektomi sonrası komplikasyonlar

J Thorac Cardiovasc Surg 2007;3:775-9

Özellik/komplikasyon	Torakotomi (n=122)	VATS (n=122)	P değeri
Hastanede kalma süresi (g)(ort±SD)	7.2±3.8	4.9±2.4	0.001
Atriyal fibrillasyon (n, %)	20 (16)	15 (12)	0.36
Atalektazi (n, %)	5 (4.1)	2 (1.6)	0.28
Uzamış hava kaçağı (n, %)	7 (5.7)	4 (3.8)	0.54
Pnömotoraks (n, %)	3 (2.5)	1 (0.8)	0.62
Pnömoni (n, %)	5 (4.1)	2 (1.6)	0.28
<b>Toplam (n, %)</b>	<b>34 (27.9)</b>	<b>21 (17.2)</b>	<b>0.046</b>
Ölüm (n, %)	3 (2.5)	0 (0)	0.25

# Açık Torakotomiye Geçme Oranları

	Olgu sayısı (n=743)	Torakotomiye geçme		Yüzde (%)
		Genel nedenler	Spesifik nedenler	
Biopsi	98	0	0	0
«Wedge» rezeksiyon	412	18	33	12.4
Segmentektomi	15	0	2	13.3
Lobektomi, bilobektomi	217	6	21	12.6
Pnöminektomi	1	0	0	0

*Surg Endosc 2008; 22:298–310*

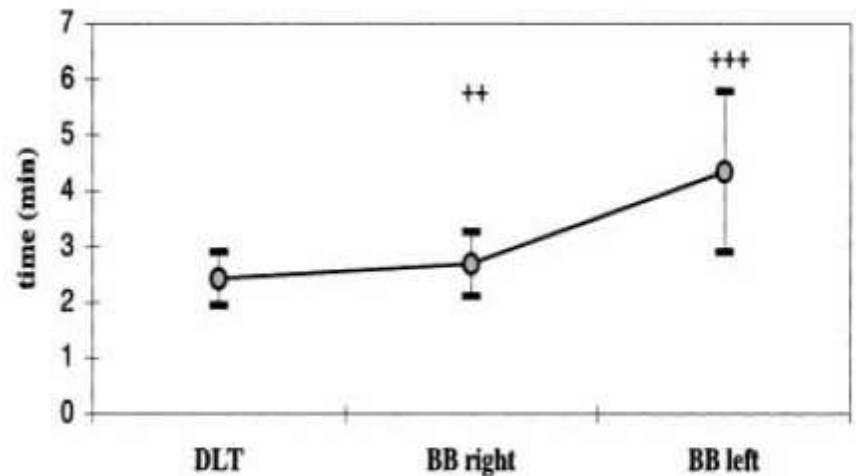


# Bronchial blocker compared to double-lumen tube for one-lung ventilation during thoracoscopy

*Acta Anaesthesiol Scand 2001; 45: 250–254*

Number of initial malpositionings.

	DLT	BB right	BB left
Malpositionings	2/15 <sup>a</sup>	2/9	7/7



++  $P < 0,008$  BB r versus BB l  
+++  $P < 0,0006$  DLT versus BB l

Quality of lung deflation.

	DLT	BB right	BB left
Excellent	13	2	7
Fair	2	3	0
Poor	0	4	0
Total	15	9	7

## Sol-yan VATS

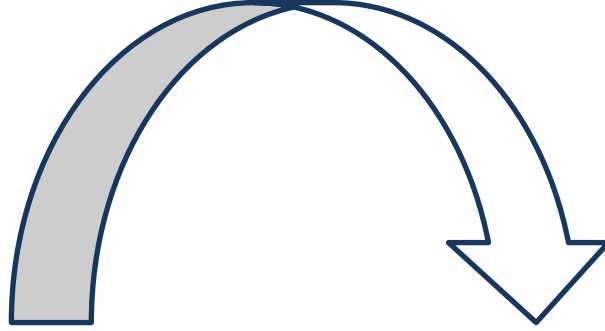
DLT>>>>BB (yerleştirme)

## Sağ-yan VATS

DLT=BB (yerleştirme)

DLT>>>>BB (sönme)

# Tek Akciğer Ventilasyonu (TAV)



## Geleneksel TAV Yönetimi

Hedef → Oksijenasyon

FiO<sub>2</sub> 1.0

TV 10 ml/kg

Normokapni

ZEEP

Volüm kontrollü ventilasyon

## Koruyucu TAV Yönetimi

Hedef → Açık akc. + ALI'dan kaçınmak

FiO<sub>2</sub> 0.5-0.8

TV 4-6 ml/kg

pCO<sub>2</sub> 40-60 mmHg

PEEP 5-10 cmH<sub>2</sub>O

Basınç kontrollü ventilasyon ?

*Jens Lohser, Peter Slinger*

*Thoracic Anesthesia Symposium*

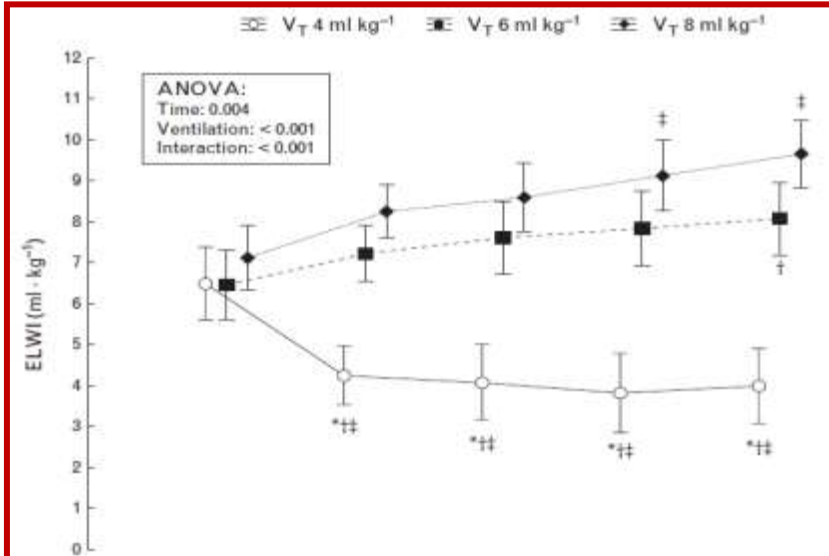
*2013 SCA Annual Meeting*

*April 5th, 2013*

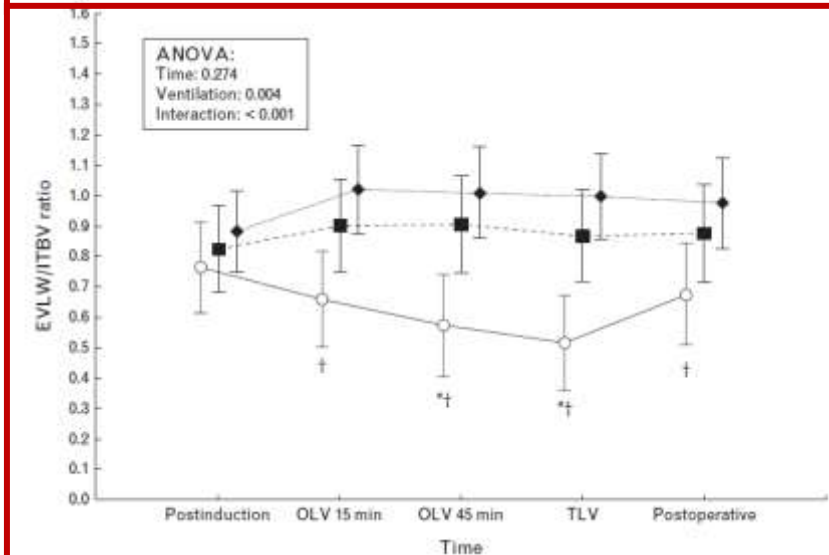
# Effect of tidal volume on extravascular lung water content during one-lung ventilation for video-assisted thoracoscopic surgery

A randomised, controlled trial

Eur J Anaesthesiol 2014; 31:1 – 8

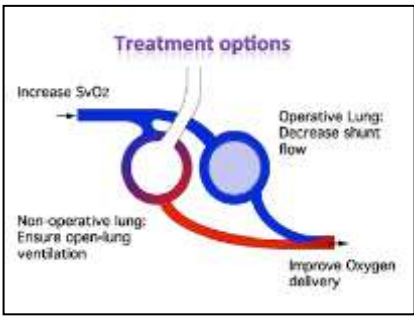


↑EVLWI/ITBVI... Artmış permeabilite/ALI  
↓EVLWI/ITBVI...Hidrostatik pulmoner ödem



## 4-6-8 ml/kg tidal volüm

- 4 ml/kg...EVLWI ↓
- Postop. komplikasyon →
- 30 g sağkalım →



# Torakoskopi sırasında hipoksemi

FiO2'yi artır

RV kontraktilitesini destekle

**Rutin**  
-Yavaş azalma  
-Stabil hasta

**Aciliyet ?**

**Kritik**  
-Hızlı azalma  
-Major komorbidite  
-Hemodinamik instabilite

Stabilize oluncaya kadar bağımsız akciğere hemen «recruitment» veya CPAP

**Sorunu sapt ve tedavi et**

İzolasyonda sorun -Bronkoskopi

Akciğerde «de-recruitment» -«Recruitment»/PEEP  
-Bronkodilatasyon/aspirasyon

Düşük O2 içeriği/sunumu -KD'yi destekle  
-Yeterli Hb sağla  
-Hipermetabolik durum/ateş/nöbet

**Hipoksemi devam ediyor mu? İleri girişimleri düşün**

## Hipoksemi devam ediyor mu? İleri girişimleri düşün



Cerrahi görüşe etki (-)		Cerrahi görüşe etki (+)	
Vazodilate bağımlı akciğer	-İnhale NO/flolan/alprostadil	Bağımsız akciğere O2 insuflasyonu	-Bronkoskop-guided O2 insuflasyonu -IPAP/CPAP/HFJV
Vazokonstrikte bağımsız akciğer	-«Packing» -PA'e klemp veya distorsiyon -Almitrin/fenilefrin	Bağımsız akciğer ventilasyonu	-HFJV -ÇAV -Subsegmental blokaj



## Hipoksemi devam ediyor mu? Organ iskemisi ?



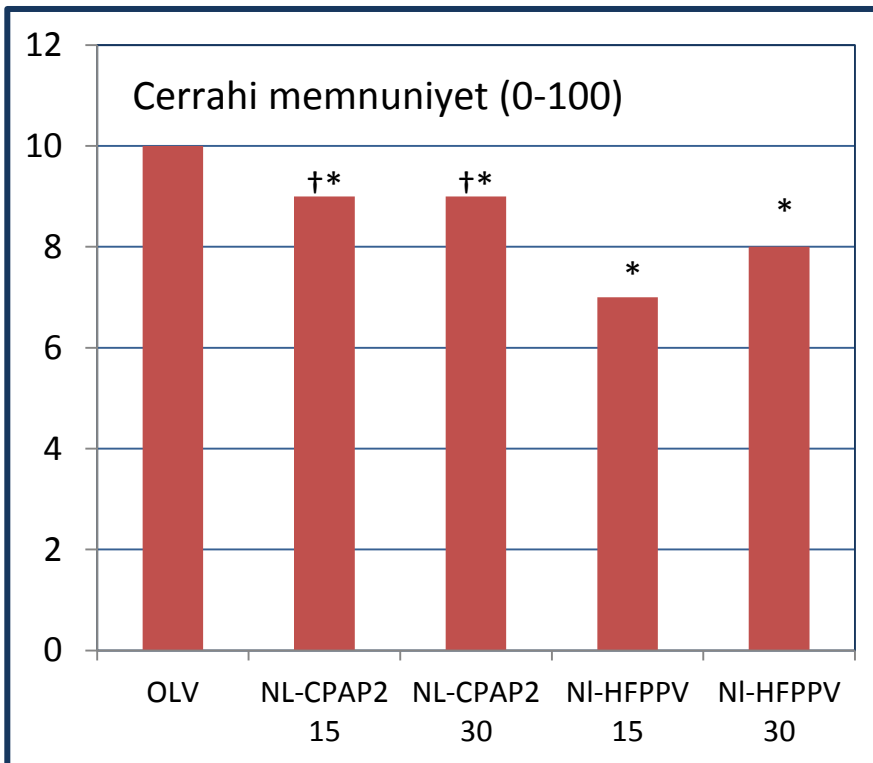
Açık torakotomiye geçmeyi düşün

# Comparative study of the non-dependent continuous positive pressure ventilation and high-frequency positive-pressure ventilation during one-lung ventilation for video-assisted thoracoscopic surgery<sup>☆</sup>

*Interactive CardioVascular and Thoracic Surgery 12 (2011) 899-902*

**CPAP** → 2 cm H<sub>2</sub>O

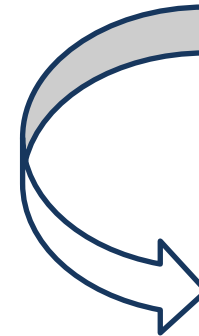
**HFPPV** → tidal volüm 2 ml/kg, i/E 0.3, SS 60/dk



KAH ve OAB benzer

CPAP ve HFPPV (>OLV) → PaO<sub>2</sub> ↑

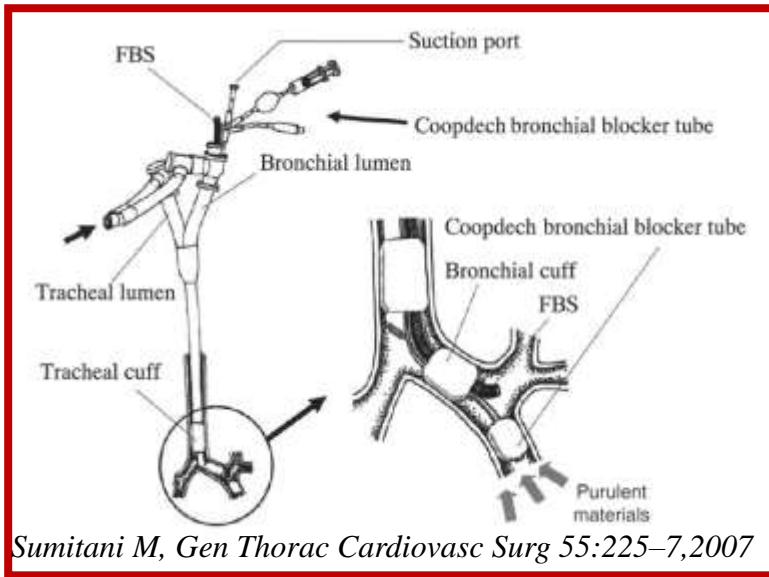
**HFPPV (>CPAP ve OLV)**



**PaO<sub>2</sub> ↑, PaCO<sub>2</sub> ↓**

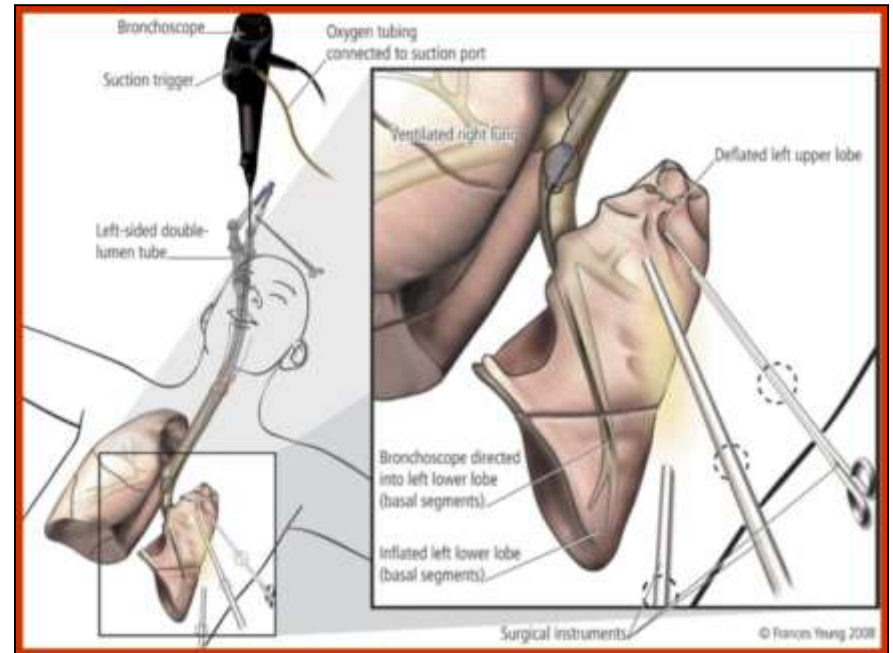
*P* < 0.002 significant compared with \*OLV and †NL-HFPPV periods

## Selektif lobar bronşial blokaj

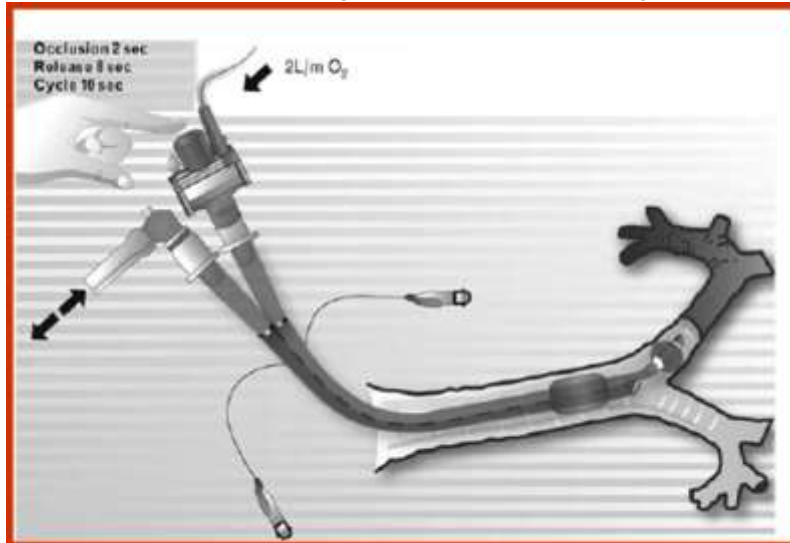


# Bağımsız Akciğerin Kısmi Ventilasyonu

Fiberoptik bronkoskopik segmental oksijen insuflasyonu



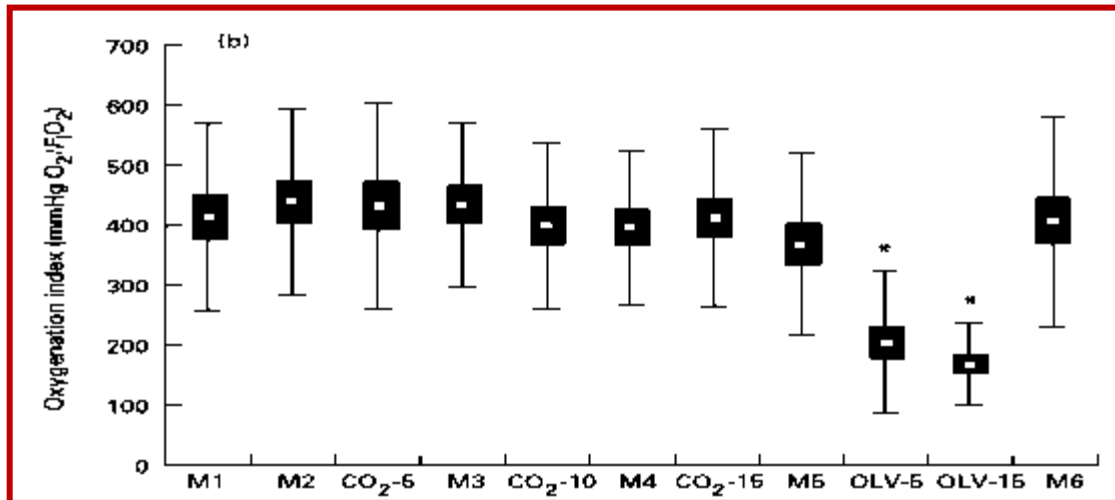
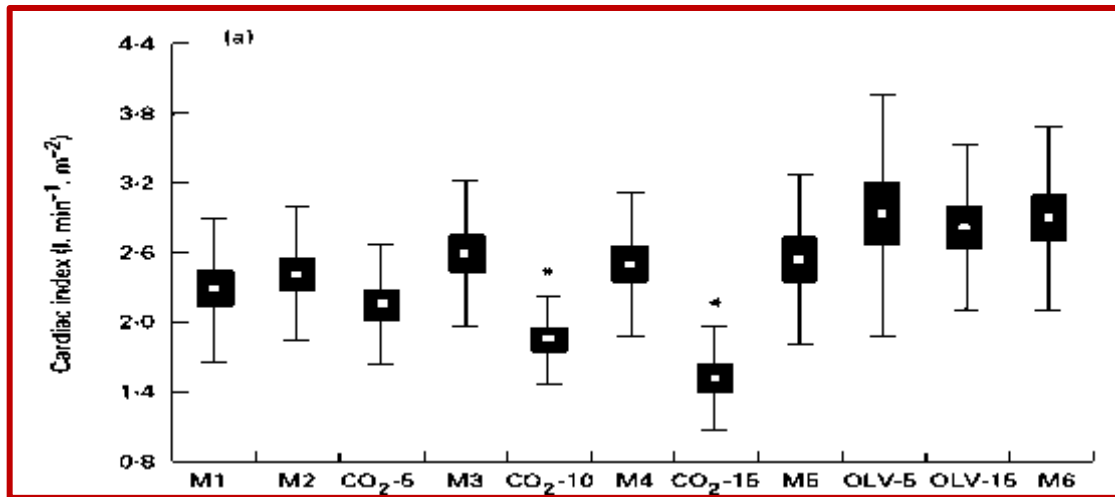
## Aralıklı oksijen insuflasyonu



# Haemodynamic changes during thoracoscopic surgery

The effects of one-lung ventilation compared with carbon dioxide insufflation

Anaesthesia, 2000, 55, pages 10–16



Hemodinamik instabiliteyi  
önlemek için

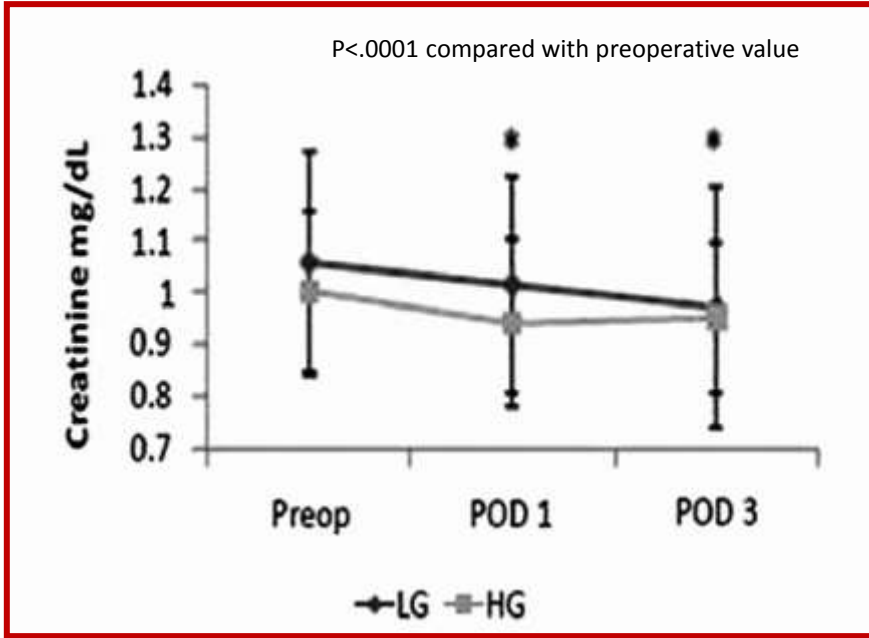
CO<sub>2</sub> insuflasyon  
basıncı düşük tutulmalı  
(<10 mmHg)

After induction of anaesthesia (M1), after turning into a lateral decubitus position (M2), during CO<sub>2</sub> insufflation at pressures of 5mmHg (CO<sub>2</sub>-5), 10mmHg (CO<sub>2</sub>-10) and 15mmHg (CO<sub>2</sub>-15), after subsequent release of CO<sub>2</sub> at each pressure level (M3, M4 and M5, respectively), 5 and 15 min after onset of one lung ventilation (OLV-5 and OLV-15, respectively), and finally with two-lung ventilation after completion of surgery (M6).



# Fluid management during video-assisted thoracoscopic surgery for lung resection: A randomized, controlled trial of effects on urinary output and postoperative renal function

*J Thorac Cardiovasc Surg* 2013;146:461-6



## Takip parametreleri

Primer: intraoperatif idrar çıkışı

Sekonder: perioperatif kreatinin düzeyi  
postoperatif komplikasyon

Sıvı uygulamasından bağımsız !!

Düşük volüm (LG, n=51) → 2 ml/kg/sa RL

Yüksek volüm (HG, n=51) → 8 ml/kg/sa RL

**Diürezi artırmak için; fazla sıvı uygulamasından kaçınılmalı!**

# İnhalasyon vs İntravenöz Anestezikler

«Effects of volatile and intravenous anesthesia on the alveolar and systemic inflammatory response in thoracic surgical patients» *Anesthesiology* 2011;115:65-74

**Desfluran ve sevofluran (propofol Ø) lokal inflamatuvar yanıtı (sistemik Ø) baskılar**

«Anesthetic-induced improvement of the inflammatory response to one-lung ventilation»

*Anesthesiology* 2009;110:1316-26

**Sevofluran (propofol Ø) immünomodülatör etkiye sahip**

«Effects of propofol vs sevoflurane on arterial oxygenation during one-lung ventilation»

*Br J Anaesth* 2007;98:539-44

**Arterial oksijenasyona benzer etki**

«Effects of sevoflurane and propofol on pulmonary shunt fraction during one-lung ventilation for thoracic surgery» *Br J Anaesth* 2001;86:38-43

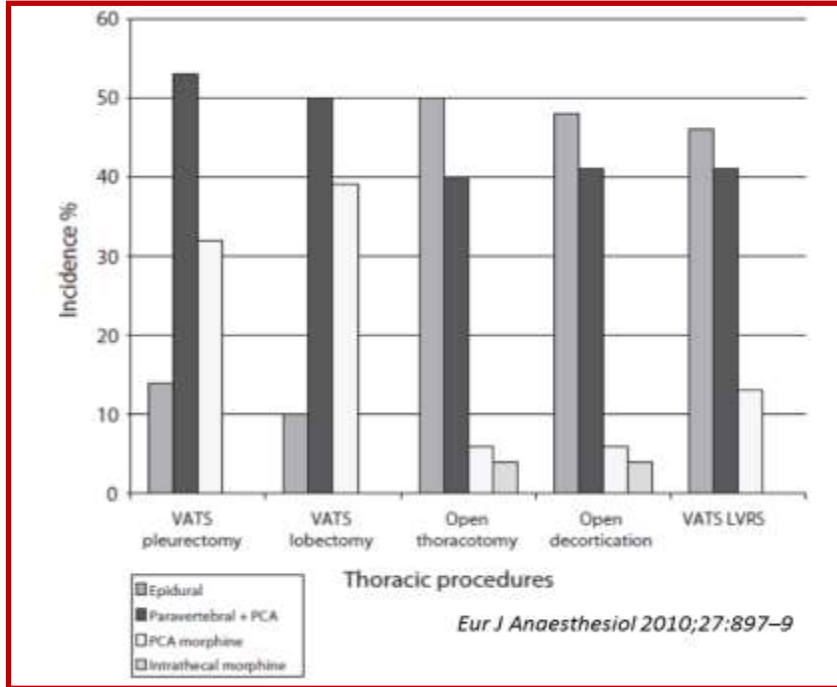
**HPV'yi inhibe edici etkisine bağlı sevofluran ile minimal şantlaşmada artma**

«Intravenous versus inhalation anaesthesia for one-lung ventilation» *Cochrane Database Syst Rev* 2013

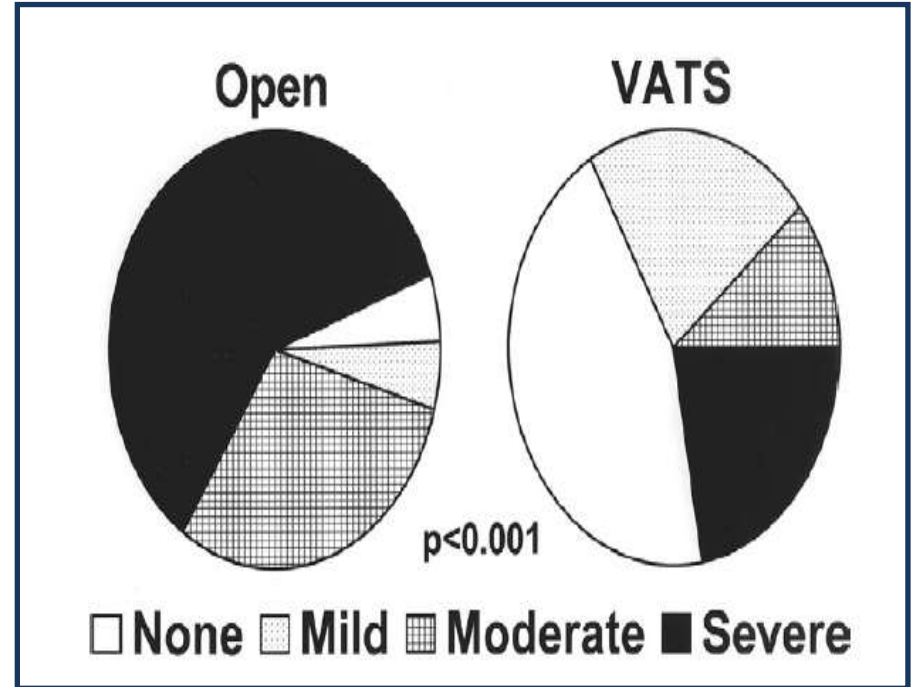
**29 derleme → farklılığı destekleyecek veri yok**

# Postoperatif Ağrı/Analjezi

## Analjezik teknikler



## Girişim sonrası 3 haftalık ağrı kontrolü



## Kronik ağrı insidansı

VATS → %20-47 (interkostal sinir hasarı)

Torakotomi → %20-80

# Acute Pain Management for Video-Assisted Thoracoscopic Surgery: An Update

*J Cardiothorac Vasc Anesth 26:312-21, 2012*

Teknik	Analjezik yayılım	Avantaj	Yan etki
<i>Torasik epidural analjezi</i>	-Çift taraflı -Çoklu dermatomal yayılım	-Mükemmel analjezi -Torakotomide «altın standart»	-Hematom -Abse -Dural «puncture» -Hipotansiyon, B/K, üriner retansiyon
<i>Paravertebral analjezi</i>	-Tek taraflı -Çoklu enj. gereksinimi -Karşı dermatomlara yayılım	-Hipotansiyon, B/K, üriner retansiyon <TEA -Pulmoner fonksiyona etki <TEA -İntraoperatif uygulanabilme	-Pnömotoraks -Nöraksial yayılım -İntraplevral inj.
<i>İnterkostal analjezi</i>	-Tek taraflı -Çoklu enj. gereksinimi -Karşı dermatomlara yayılım	-Hipotansiyon minimal, B/K, üriner retansiyon ⚡ -Pulmoner fonksiyona etki minimal -İntraoperatif uygulanabilme	-Pnömotoraks -Hemotoraks -İV inj. -LA toksisitesi
<i>İntraplevral analjezi</i>	-Tek taraflı -Karşı dermatomlara yayılım (>İKA)	-Hipotansiyon minimal, B/K, üriner retansiyon ⚡ -Pulmoner fonksiyona etki minimal -İntraoperatif uygulanabilme	-Kateterin doğru yerleşmemesi -Pnömotoraks -LA toksisitesi

# Preoperative Multiple-Injection Thoracic Paravertebral Blocks Reduce Postoperative Pain and Analgesic Requirements After Video-Assisted Thoracic Surgery

Fatma Nur Kaya, MD,\* Gurkan Turker, MD,\* Elif Basagan-Mogol, MD,\* Suna Goren, MD,\* Sami Bayram, MD,† and Cengiz Gebitekin, MD†

**Objective:** The hypothesis was tested that preoperative multiple-injection thoracic paravertebral blocks reduce opioid requirements and promote early ambulation after video-assisted thoracic surgery procedures.

**Design:** Prospective, randomized, controlled, blinded study.

**Setting:** Single-university hospital.

**Participants:** Fifty consenting patients undergoing video-assisted thoracic surgery.

**Interventions:** Patients were randomly assigned to receive preoperative multiple-injection thoracic paravertebral blocks (PVB group, n = 25) or preoperative multiple subcutaneous saline injections at the same site as in the PVB group (control group, n = 25).

**Measurements and Main Results:** Intraoperative fentanyl consumption was lower in the PVB group ( $p < 0.01$ ). The time to first analgesic requirement was longer, and pain score at this time was lower in the PVB group ( $p < 0.05$  and  $p < 0.01$ , respectively). Postoperative pain scores both at rest and coughing were lower during the first 4 hours in the

PVB group than those in the control group ( $p < 0.01$  for 0 hours and  $p < 0.05$  for 1, 2, and 4 hours). Cumulative morphine consumption was significantly less in the PVB group at all time points ( $p < 0.05$  for 12 hours and  $p < 0.01$  for all other time points), but there were no significant differences in sedation scores between the 2 groups. There were no complications because of the blocks. Patient satisfaction with the analgesia was significantly greater ( $p < 0.05$ ), and first mobilization and hospital discharge were quicker ( $p < 0.01$  and  $p < 0.05$ , respectively) in the PVB group.

**Conclusion:** Perioperative multiple-injection thoracic paravertebral blocks with bupivacaine containing epinephrine provided effective pain relief and a significant reduction in opioid requirements. This approach may also contribute to earlier postoperative ambulation after video-assisted thoracic surgery.

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**KEY WORDS:** thoracic paravertebral blocks, postoperative analgesia, thoracoscopic surgery

Table 3. Postoperative Data

	PVB Group (n = 25)	Control Group (n = 22)	<i>p</i>
Time to first analgesic requirement (h)	2 (2-2)	0 (0-1)	<0.05
VAS pain scores at first analgesic requirement	3 (2-3)	6 (5-7.5)	<0.01
Maximum VAS pain scores during 48-hour study period	4 (3-4.5)	7 (5-8)	<0.01
Patient satisfaction with analgesia*	3 (3-3)	2 (2-3)	<0.05
Time to first mobilization (h)	4 (4-5)	7 (6-7.8)	<0.01
Time to hospital discharge (d)	2 (2-3)	3 (2-4.5)	<0.05

Table 4. Postoperative Pain Scores at Rest and With Coughing

Time After Surgery	PVB Group (n = 25)		Control Group (n = 22)	
	VAS <sub>R</sub>	VAS <sub>C</sub>	VAS <sub>R</sub>	VAS <sub>C</sub>
0 h	2 (1-2)*	3 (3-4)*	5 (4-6)	6 (5-7)
1 h	2 (1-2)†	3 (3-4)†	3 (2.8-4)	6 (4-6.5)
2 h	2 (1-3)†	3 (2-3)†	3 (2-3.5)	4 (2.8-4)
4 h	1 (1-2)†	3 (2-4)†	3 (2-4)	5 (4-6)
8 h	2 (1-2)	3 (3-4)	2 (1-3)	3 (3-4.5)
16 h	2 (1-2)	3 (2-3)	2 (1-2.5)	3 (2-4)
24 h	2 (1-2)	2 (2-3)	2 (1-3.5)	3 (2-3.5)
36 h	2 (1-2)	2 (2-3)	2 (1-3)	3 (2-3.5)
48 h	1 (1-2)	2 (2-3)	2 (1-2.5)	3 (2-3)



# Thoracic Paravertebral Block for Video-Assisted Thoracoscopic Surgery: Single Injection Versus Multiple Injections

Fatma Nur Kaya, MD, Gurkan Turker, MD, Elif Basagan Mogol, MD, and Selcan Bayraktar, MD

**Objective:** Thoracic paravertebral blocks (PVBs) have been shown to be effective for analgesia after video-assisted thoracoscopic surgery (VATS) with single- and multiple-injection techniques. The efficacy of single-injection PVB was compared with multiple-injection PVB on postoperative analgesia in VATS was studied.

**Design:** Prospective, randomized study.

**Setting:** Single university hospital.

**Participants:** Fifty patients undergoing VATS.

**Interventions:** A nerve stimulator-guided PVB was performed in the sitting position before surgery using a solution of 20 mL 0.5% bupivacaine with 1:200,000 epinephrine by a single injection at T6 (group S, n = 25) or by 5 injections of 4 mL each at T4 to T8 (group M, n = 25).

**Measurements and Main Results:** A successful PVB was achieved in all patients. The times to perform the blocks were  $6.8 \pm 1.9$  minutes in the S group and  $17.9 \pm 3.0$  minutes in the M group ( $p < 0.001$ ). The times to block onset were  $8.3 \pm 1.8$  minutes in the S group and  $7.2 \pm 0.9$  minutes

in the M group ( $p = 0.014$ ). The numbers of anesthetized dermatomes were  $5.8 \pm 0.8$  for the S group and  $6.6 \pm 1.1$  for the M group ( $p = 0.009$ ). The postoperative pain scores and morphine consumption with patient-controlled analgesia were comparable in the two groups. There were no significant differences in times to the first mobilization and hospital discharge for two groups. Patient satisfaction with the analgesic procedure was greater in the S group ( $p < 0.05$ ). No complications were attributed to the blocks.

**Conclusions:** The two techniques provided comparable postoperative analgesia. However, single-injection PVB may represent an advantage over multiple-injection PVB in patients undergoing VATS, with greater patient satisfaction associated with a shorter procedure and the likelihood of decreased complications.

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**KEY WORDS:** paravertebral block, postoperative pain, analgesia, video-assisted thoracoscopic surgery

## Intraoperative Data

	Group S (n = 25)	Group M (n = 25)	p Value
Paravertebral block characteristics			
Time to perform block (min)	$6.8 \pm 1.9$	$17.9 \pm 3.0$	<0.001
Time to block onset (min)	$8.3 \pm 1.8$	$7.2 \pm 0.9$	0.014
Anesthetized dermatomes (n)	$5.8 \pm 0.8$	$6.6 \pm 1.1$	0.009

## Postoperative Pain Scores at Rest and With Coughing

Time after surgery (h)	Group S (n = 25)		Group M (n = 25)	
	VAS <sub>R</sub>	VAS <sub>C</sub>	VAS <sub>R</sub>	VAS <sub>C</sub>
0	2 (0-5)	3 (2-5)	2 (0-4)	3 (2-6)
1	2 (0-5)	4 (2-5)	2 (0-4)	3 (3-5)
2	3 (0-5)	3 (2-4)	2 (0-4)	3 (2-4)
4	2 (0-4)	4 (3-5)	2 (0-4)	4 (3-5)
8	2 (0-4)	3 (2-5)	2 (0-4)	3 (2-5)
12	2 (0-4)	3 (2-4)	2 (0-4)	3 (2-4)
24	2 (0-4)	3 (2-3)	2 (0-3)	3 (2-4)

# Uyanık «Non-intubated» VATS

Rejyonel blok (modifiye interkostal blok+stellat blođu, epidural blok)

Sedasyon (remifentanil/propofol)

Kısa süreli cerrahi (<1 sa)

Acil durumda hava yolu sağlayabilme

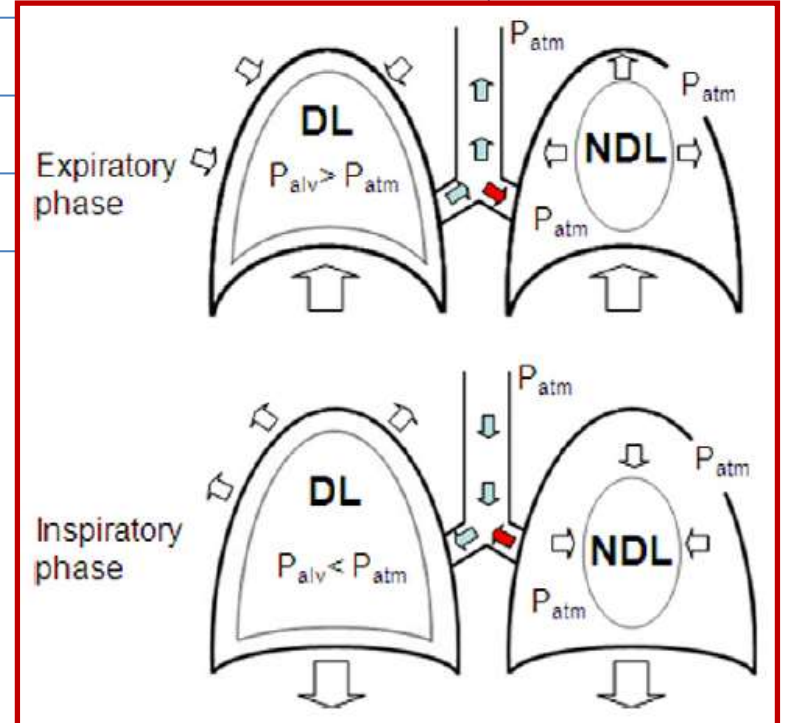
Cerrahi pnömotoraks sırasında spontan solunum

Paradoksal solunuma bađlı hipoksi ve hiperkarbi

Mediastinal şifte bađlı hipotansiyon

Pozitif basınç desteđi

CO<sub>2</sub> insuflasyonu ∅



# «Non-intubated» VATS

## Endikasyonlar

*J Thorac Dis 2014;6(1):2-9*

Riskli olgular

Basit ve kolay girişimler

## Kontrendikasyonlar

Hemodinamik açıdan stabil olmayan hastalar

Beklenen zor hava yolu yönetimi

Obezite (BMI>30)

Beklenen yoğun/geniş plevral adezyonlar

Deneyimsiz cerrahi ekip

Geniş /santral pulmoner lezyonlar (>6 cm)

Torasik epidural anestezi uygulamasına engel durumlar



# «Non-intubated» VATS

## Gerçekten Avantajlı mı?

Olası avantajlar	Bilimsel kanıt düzeyi (0-3)*
Cerrahinin kolay kabul edilebilirliği	0
Postop. bağımlılıkta azalma	2
Erken postop. daha iyi solunum fonksiyonu	2
Operatif mortalitede azalma	0
Morbidite azalma	2
Hastanede kalma süresinde azalma	2
Masraflarda azalma	2
Stres hormon salınımında azalma	1
Bozulmuş immün yanıtta azalma	2
Onkolojik cerrahide daha olumlu sonuçlar	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.

*Semin Thoracic Surg 24:106-114, 2012*

# Sonuçta VATS....

Anesteziist açısından stres kaynağı ?

- Rezervi kötü hasta
- Mükemmel akc. separasyonu

Torakotomiye nazaran olumlu sonuçlar alınmakta ise de, daha az invaziv (BASİT ?) olduğu cazibesine kapılmamalı !!!