



# REJYONEL ANESTEZİ ve KAROTİS CERRAHİSİ

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İTF Anesteziyoloji A. D.*



- **Hemodinamik kontrol**
- **Monitorizasyon**
- **Sedasyon**
- **Prognoz**

# Karotis endarterektomisi

- Endikasyonları belirlenmiş koruyucu bir cerrahi
- Karotis darlığına yaklaşımda "altın standart"
- ✓ Ölüm ve inme stent ile benzer
- ✓ Girişim başarısı ↑ ve restenoz ↓
- ✓ Sinir hasarı ↓

Luebke T, Eur J Vasc Endovasc Surg 2007

# Karotis endarterektomi komplikasyonlar

hipertansiyon	%20
"unstable" TA	%73.5
MI	%1
disritmi	%1
stroke	%2-7
kafa çifti hasarı	%4-7
hematom	%5.5
acil cerrahi	%1.4
mortalite	%1

✓ arteriyel baroreseptörler: akut TA düzenlenmesi

✓ işlev bozukluğu:

kronik HT, karotis hastalığı, cerrahi, karotid baroresptör denervasyon

# hemodinamik kontrol

## Risk faktörleri:

- Nörolojik olay ile kısa ara
- Bilateral karotis darlığı
- Geçirilmiş karotis veya boyun cerrahisi
- Kontrolsüz hipertansiyon
- Karotid sinüse blok veya rezeksiyon

# LA/RA ile klempaj sirasinda TA daha ↑

Forsell C, Eur J Vasc Surg 1989

Prough DS, J Neurosurg Anesthesiol 1989

Pluskwa F, Ann Fr Anesth 1989

Gimenez A, Cardiovasc Surg 2003

- **Derlenmede HT GA grubunda RA grubundan daha fazla**

Scruder PE, J Neurosurg Anesthesiol 1989

- **RA grubunda vpresör gereksinimi daha fazla**

Prough DS, J Neurosurg Anesthesiol 1989



- Postoperatif TA dalgalanması GA sonrası (%30) SBa (derin+yüzeysel) (%15) göre daha sık

Hartsell PA, Ann Vasc Surg 1999

- İlk 8 saat SNP gereksinimi GA sonrası daha yüksek
- YB ve hospitalizasyon GA grubunda daha uzun

Eibes TA, Am Surg 2000



## General anaesthesia versus local anaesthesia for carotid surgery (GALA): a multicentre, randomised controlled trial

GALA Trial Collaborative Group\*

### Summary

Lancet 2008; 372: 2132-42

Published Online  
November 27, 2008  
DOI:10.1016/S0140-  
6736(08)61699-2

**Background** The effect of carotid endarterectomy in lowering the risk of stroke ipsilateral to severe atherosclerotic carotid-artery stenosis is offset by complications during or soon after surgery. We compared surgery under general anaesthesia with that under local anaesthesia because prediction and avoidance of perioperative strokes might be easier under local anaesthesia than under general anaesthesia.

## Hemodinamik girişim

GA  $\Rightarrow$  TA  $\uparrow$  (%43 vs %17)

RA  $\Rightarrow$  TA  $\downarrow$  (%74) ; girişim  $\emptyset$   
(%41)

$P < 0.001$

- ✓ sonuçları yorumlamak güç
  - ✓ LA'de postop. hipotansiyon!
- Hemodinamik müdahale fazla**

Rerkasem R, Cochrane Stroke Group 2009

- 
- Hemodinamik kontrol
  - **Monitorizasyon**
  - Sedasyon
  - Prognoz

# A Review of Recent Developments in the Management of Carotid Artery Stenosis

Ritesh Maharaj, MD

*Journal of Cardiothoracic and Vascular Anesthesia, 2008:*

Modality	False-Positive	False-Negative
Awake	Gold standard	Gold standard
Stump pressure	20%-40%	0%-23%
Stump pressure index	40%	0%
Transcranial Doppler	4%-45%	Up to 17%
EEG	5%-13%	5%-25%
NIRS	Unknown	Unknown
SSEP	Unknown	Unknown

- ✓ **Klempaj esnasında BIS azalması  
GA altında serebral hipoperfüzyon  
ile ilişkili**

El Dawlatly AA, Middle East J Anesth 2003

- ✓ **Uyanık karotis cerrahisinde test  
klempajı ve şant yerleştirilmesi  
esnasında anlamlı BIS azalması**

Estruch-Perez, EJA 2010

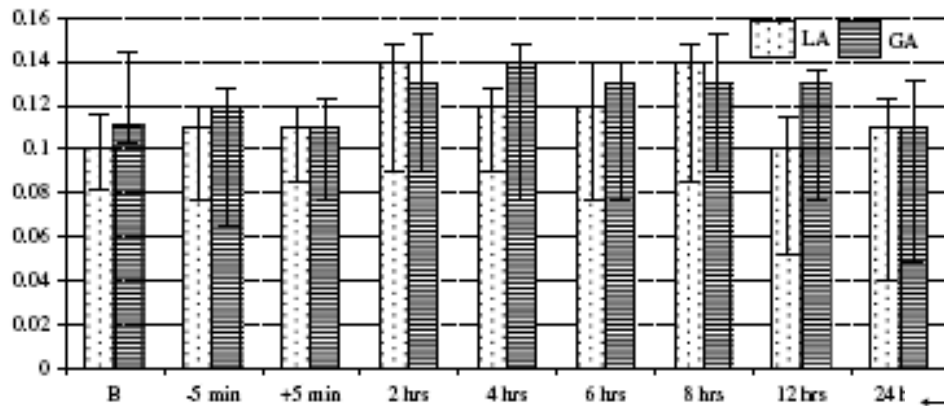
✓ **LA ile karotis cerrahisinde BIS azalması nörolojik bozulma ile ilgili deęil**

**Deogaonkar A, BJA 2005**



# Jugular Venous Neurone Specific Enolase (NSE) Increases Following Carotid Endarterectomy Under General, but Not Local, Anaesthesia

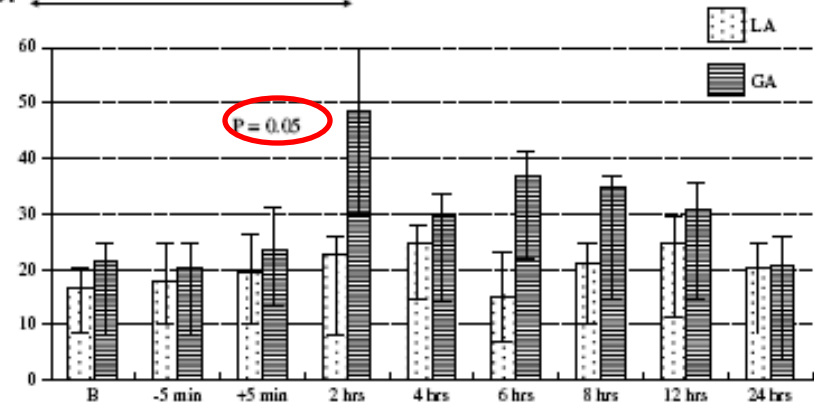
S.M. Wijeyaratne <sup>a</sup>, M.A. Collins <sup>b</sup>, J.H. Barth <sup>b</sup>, M.J. Gough <sup>a,\*</sup>



S100

P = 0.04

NSE

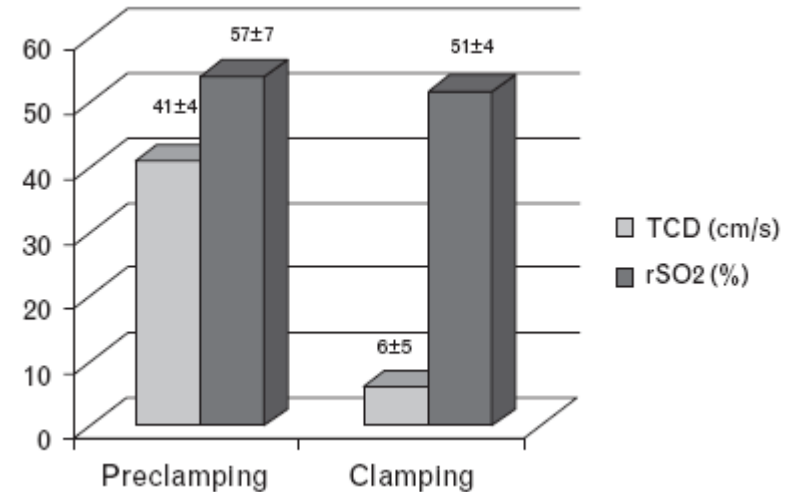
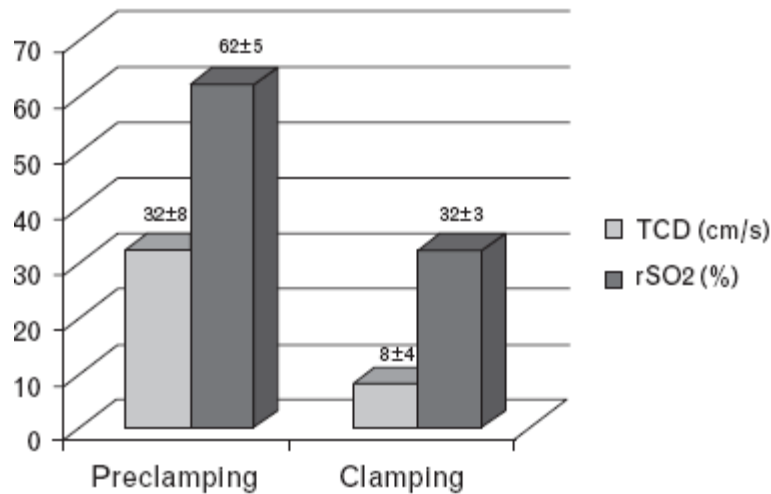


P = 0.05



# Regional cerebral saturation versus transcranial Doppler during carotid endarterectomy under regional anaesthesia

Francesco Pugliese<sup>a</sup>, Franco Ruberto<sup>a</sup>, Antonella Tosi<sup>a</sup>, Sabina Martelli<sup>a</sup>,  
European Journal of Anaesthesiology 2009



**Nörolojik defisit**

**Yalancı +**

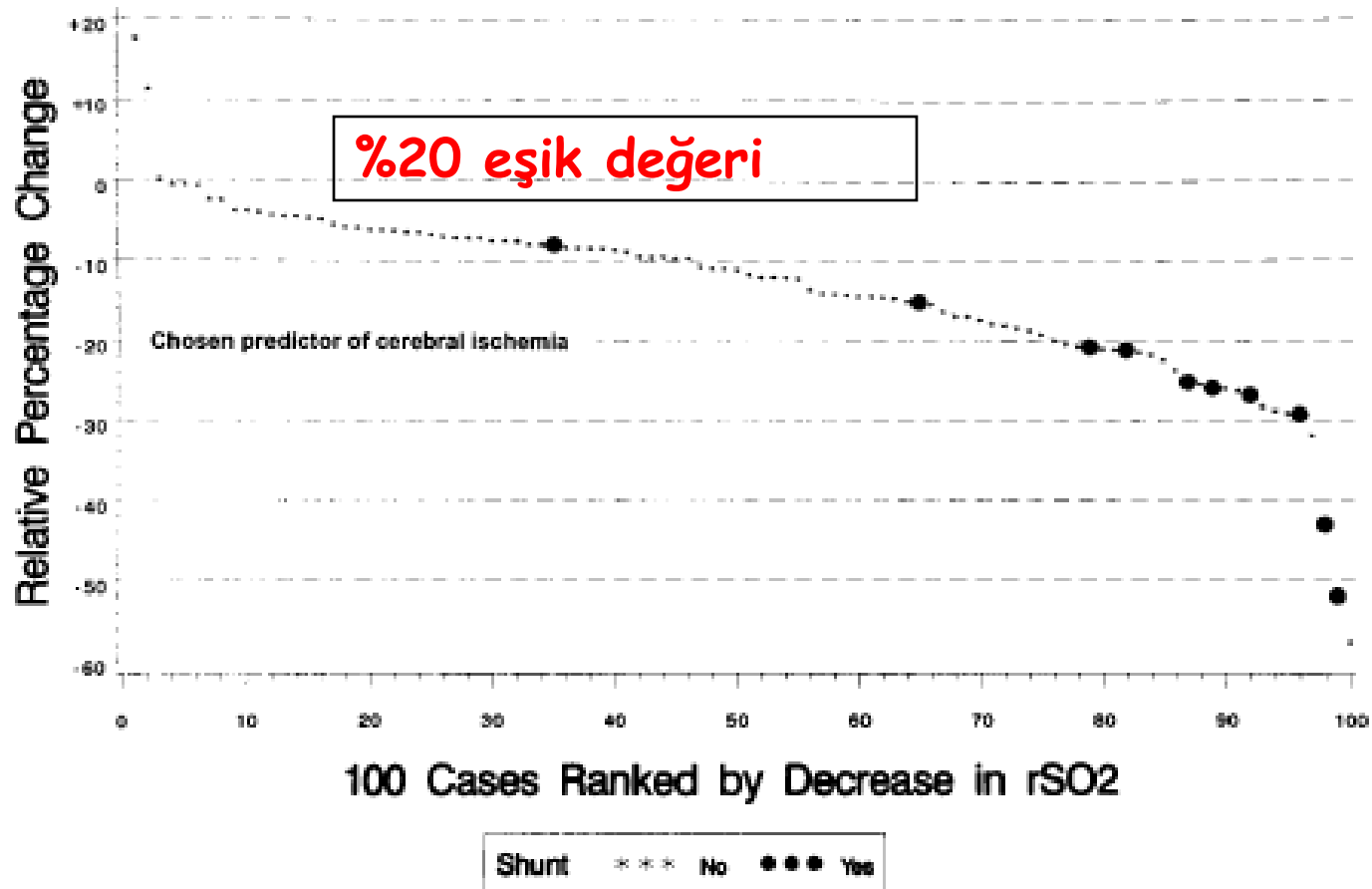
Indices	INVOS	TCD	<i>P</i>
Sensitivity	1	1	NS
Specificity	1	0.8	0.02
Positive predictive value	1	0.6	0.0001
Negative predictive value	1	1	NS
Accuracy	1	0.9	0.04

# NIRS

- Bölgesel serebral venöz oksijen saturasyonu
- Ölçüm için pulsatil akım  $\emptyset$
- noninvazif
- "trend" monitör
- ✓ giriş değerleri
- ✓ azalma oranı
- Gerçek zamanlı

# Evaluation of a Cerebral Oximeter as a Monitor of Cerebral Ischemia during Carotid Endarterectomy

Satwant K. Samra, M.D.,\* Eric A. Dy,† Kathy Welch, M.S., M.P.H.,‡ Pema Dorje, M.D.,§  
Gerald B. Zelenock, M.D.,|| James C. Stanley, M.D.||



# Near Infrared Spectroscopy Monitoring During Carotid Endarterectomy: Which Threshold Value is Critical?

T. Mille,<sup>1\*</sup> M. E. Tachimiri,<sup>1</sup> C. Klersy,<sup>2</sup> G. Ticozzelli,<sup>3</sup> G. Bellinzona,<sup>3</sup> I. Blangetti,<sup>3</sup>  
S. Pirrelli,<sup>4</sup> M. Lovotti<sup>4</sup> and A. Odero<sup>4</sup>

Eur J Vasc Endovasc Surg 27, 646–650 (2004)

>%20 düşüş şant endikasyonu  
>%20 ⇒ nörolojik semptom!  
Düşük kalma süresi!!

**Emboli?**

## CARDIOVASCULAR

### Near-infrared spectroscopy as an index of brain and tissue oxygenation

J. M. Murkin\*<sup>†</sup> and M. Arango

>%12 rSO<sub>2</sub>↓⇒ klempaj için  
güvenilir, duyarlı ve özgün  
sayılabilecek bir eşik

**Hiperperfüzyon sendromu!**




REVIEW

## The Value of Near-Infrared Spectroscopy Measured Cerebral Oximetry During Carotid Endarterectomy in Perioperative Stroke Prevention. A Review

C.W.A. Pennekamp <sup>a</sup>, M.L. Bots <sup>b</sup>, L.J. Kappelle <sup>c</sup>, F.L. Moll <sup>a</sup>,  
G.J. de Borst <sup>a,\*</sup>

- ✓ Şant endikasyonu için eşik değer
- ✓ Hiperperfüzyon öngörüsü?!
- ✓ Riskli hastalarda net bir eşik değer

- 
- Hemodinamik kontrol
  - Monitorizasyon
  - **Sedasyon**
  - Prognoz

# Superficial and Deep Cervical Plexus Block for Carotid Artery Surgery: A Prospective Study of 1000 Blocks

Michael J. Davies, F.A.N.Z.C.A., Brendan S. Silbert, F.A.N.Z.C.A., F.R.C.A.,

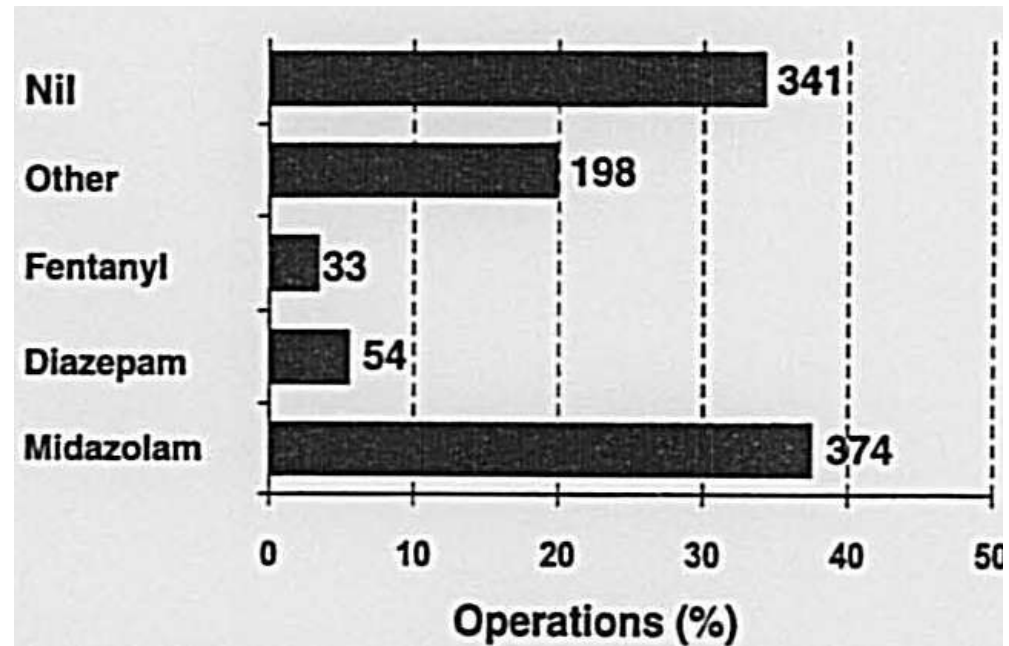
David A. Scott, F.A.N.Z.C.A., Russell J. Cook, F.A.N.Z.C.A., F.R.C.A.,

Regional Anesthesia 22(5):442–446, 1997

RA sedasyon gereksinimi %66

Ek LA gereksinimi %53

GA'ye geçiş %2.5





# Dexmedetomidine for Awake Carotid Endarterectomy: Efficacy, Hemodynamic Profile, and Side Effects

*Alex Y. Bekker, MD, PhD,\* John Basile, MD,\* Mark Gold, MD,\* Thomas Riles, MD,†  
J Neurosurg Anesthesiol 2004;16:126-*

## Dex vs plasebo

- ✓ sedasyon düzeyi
- ✓ postop. anitihipertansif gereksinimi
- ✓ derlenme odası, hastanede kalış
- ✓ cerrah, hasta memnuniyeti

# **A Comparison of Dexmedetomidine Versus Conventional Therapy for Sedation and Hemodynamic Control During Carotid Endarterectomy Performed Under Regional Anesthesia**

Craig A. McCutcheon, MBBS, FANZCA, Ruari M. Orme, MBBS, FANZCA,

David A. Scott, MBBS, PhD, FANZCA, Michael J. Davies, MBBS, MD, FANZCA,

Anesth Analg 2006;102:668

## **Dex vs midazolam+fentanyl**

- ✓ **Yeterli sedasyon**
- ✓ **Hemodinamik müdahale sayısı benzer (nedenler farklı)**
- ✓ **Hasta memnuniyeti**

# REGIONAL ANAESTHESIA AND PROPOFOL SEDATION FOR CAROTID ENDARTERECTOMY

CHRISTOPHER BARRINGER, JOHN M. WILLIAMS, ALASTAIR MCCRIRICK AND JONOTHAN J. EARNSHAW

*ANZ J. Surg.* 2005; 75: 546

## Hedef kontrollü propofol infüzyonu

- Yeterli ve nörolojik değerlendirmeye uygun
- GA ye geçiş ↓ (ajitasyon kaynaklı)

# **Remifentanil or propofol for sedation during carotid endarterectomy under cervical plexus block**

**H. Krenn<sup>1\*</sup>, E. Deusch<sup>2</sup>, H. Jellinek<sup>1</sup>, W. Oczenski<sup>1</sup> and R. D. Fitzgerald<sup>1 3</sup>**

## **Propofol vs remifentanil**

**(1mg/kg/s ve 3µg/kg/s)**

**✓ ASA III-IV**

**✓ remifenta ile solunum depresyonu**

# Remifentanil Conscious Sedation During Regional Anaesthesia for Carotid Endarterectomy: Rationale and Safety

M. M. Marrocco-Trischitta<sup>1</sup>, G. Bandiera<sup>1</sup>, S. Camilli<sup>1</sup>, F. Stillo<sup>1</sup>, C. Cirielli<sup>1</sup> and P. Guerrini\*<sup>2</sup>

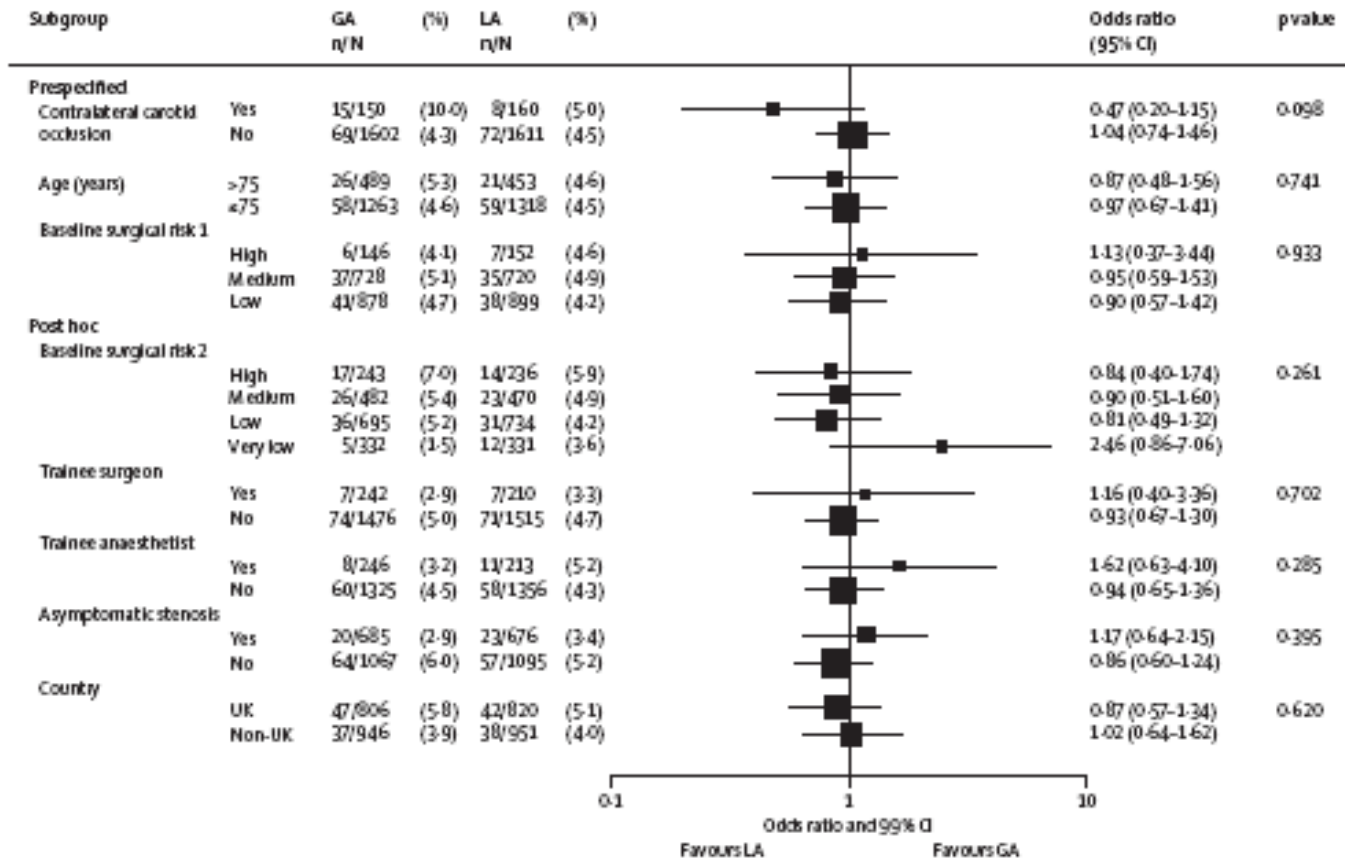
Eur J Vasc Endovasc Surg 22, 405

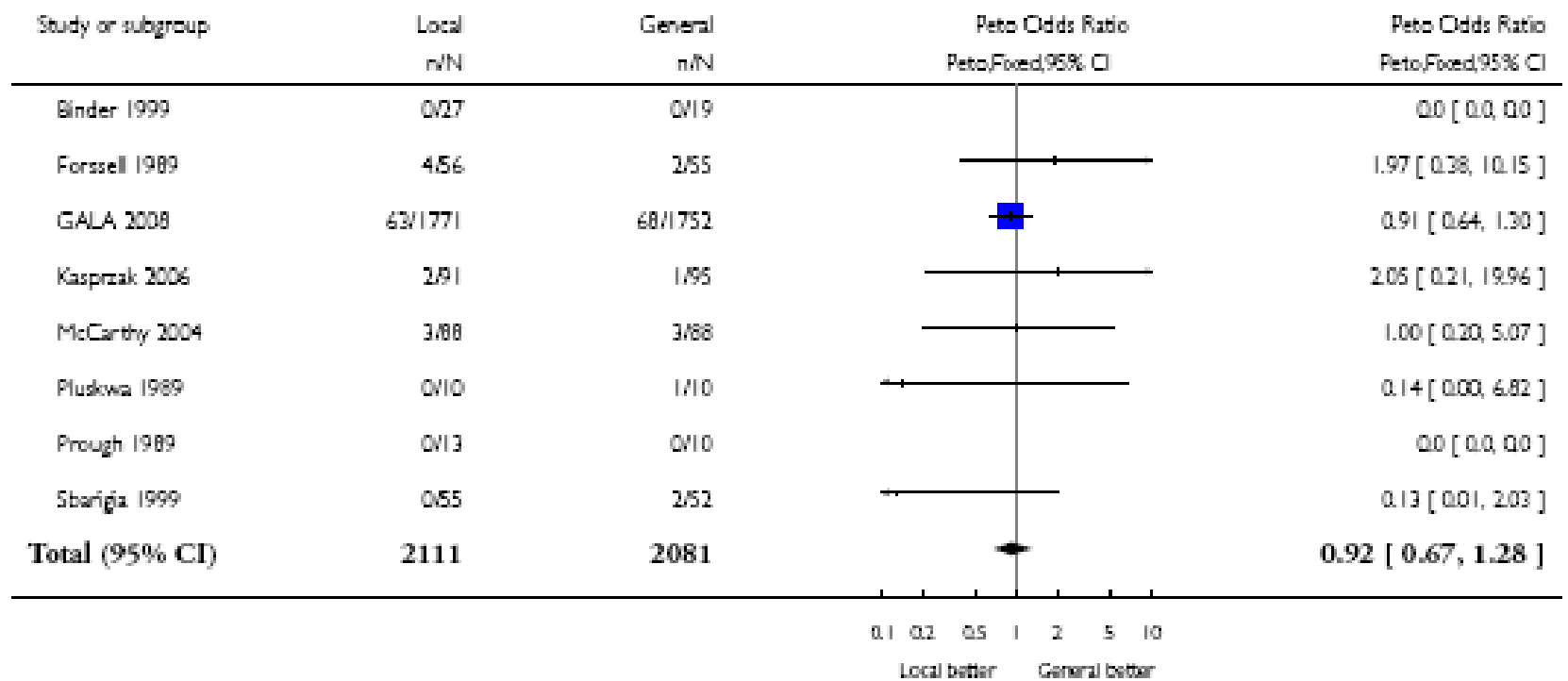
## Remifentanil

(0.04  $\mu$ g/kg/dak)

- ✓ Solunum sayısı ↓
- ✓ Bulantı-kusma
- ✓ TA ↓
- ✓ Bradikardi

# PROGNOZ???





# Karotis endarterektomi komplikasyonlar

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hematom	%5.5
acil cerrahi	%1.4
mortalite	%1



Research article

Open Access

## Quality of life after carotid endarterectomy

Fernando José Abelha\*<sup>1</sup>, Susana Quevedo<sup>1</sup> and Henrique Barros<sup>2</sup>

Address: <sup>1</sup>Department of Anesthesiology, Hospital de São João, Porto, Portugal and <sup>2</sup>Department of Hygiene and Epidemiology, Hospital de São João, University of Porto Medical School, Porto, Portugal

**Table 3: Dependency and self-reported changes in health in general, 6 months after PACU discharge (n = 38)**

Variable	Before surgery	6 months after EC	P
ADL			
Personal			
Katz scale	0.26 ± 0.82	0.56 ± 0.94	<b>0.047</b>
Dependency in P-ADL, n (%)	5 (12)	14 (33)	0.186
Instrumental			
Lawton scale	5.91 ± 2.20	4.28 2.43	<b>&lt; 0.001</b>
Dependency in I-ADL, n (%)	11 (26)	28 (65)	0.164

## Cerrahi sonrası hayat kalitesi

**%63** ↑

**%11** ↓



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*Anesth Analg*. 2008 August ; 107(2): 636–642. doi:10.1213/ane.0b013e3181770d84.

## A Study of Cognitive Dysfunction in Patients Having Carotid Endarterectomy Performed with Regional Anesthesia

Eric J. Heyer, MD, PhD<sup>\*,†</sup>, Mark I. Gold, MD<sup>‡</sup>, E. Will Kirby, BA<sup>\*</sup>, Joseph Zurica, BA<sup>\*</sup>, Elizabeth Mitchell, BA<sup>\*</sup>, Hadi J. Halazun, BA<sup>\*</sup>, Lauren Teverbaugh, BA<sup>\*</sup>, Robert R. Sciacca, EngScD<sup>§</sup>, Robert A. Solomon, MD<sup>||</sup>, Donald O. Quest, MD<sup>||</sup>, Thomas S. Maldonado, MD<sup>¶</sup>, Thomas S. Riles, MD<sup>¶</sup>, and E. Sander Connolly Jr, MD<sup>||,†</sup>

**RA altında POCD kontrol grubu ile benzer**

## Impact of General Versus Local Anesthesia on Early Postoperative Cognitive Dysfunction Following Carotid Endarterectomy: GALA Study Subgroup Analysis

Christian Friedrich Weber · Hannah Friedl · Michael Hueppe ·  
Gudrun Hintereder · Thomas Schmitz-Rixen · Bernhard Zwissler ·  
Dirk Meininger

- ✓ **KEA'de nörokognitif işlevin değerlendirildiği ilk**
- ✓ **RA ile POCD daha az**

- Karotis cerrahisi RA altında standartları yerleşik
- Anestezi yönetimi, nörolojik komplikasyon gelişimini erken öngörüsüne yönelik