

Kardiyak Cerrahide Anestezi Ajan Seçimi

İnhalasyon / İntravenöz

Dr. Elif Başađan Mođol

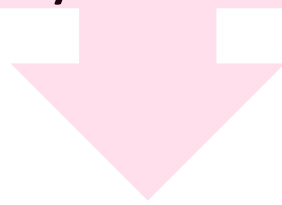
Uludađ Üniversitesi Tıp Fakóltesi
Anesteziyoloji ve Reanimasyon AD

Sunum Akışı

- Kardiyak cerrahide anestezinin hedefi
- Kardiyoproteksiyon tanımı ve yolları
- Kardiyoproteksiyon mekanizmaları
- İnhalasyon ajanları
- İntravenöz ajanlar
- Aralarındaki farkları gösteren çalışmalar

Kardiyak Cerrahi

- Kalbin manipulasyonu
- Koroner mikroembolizasyon
- İnflamasyon



- Perioperatif MI
- LV sistolik disfonksiyon
- Kalp yetmezliği

Postoperatif komplikasyonlar

Kardiyak
komplikasyonlar

Pulmoner
komplikasyonlar

Enfeksiyon

Reversible

Fatal

İnflamasyon

Cerrahi işlem

(operasyon – KPB – iskemi)

Mekanik ventilasyon

Kardiyak Anestezi Hedef

CABG

Valvüler cerrahi

Miyokard Hasarının
En Aza İndirilmesi

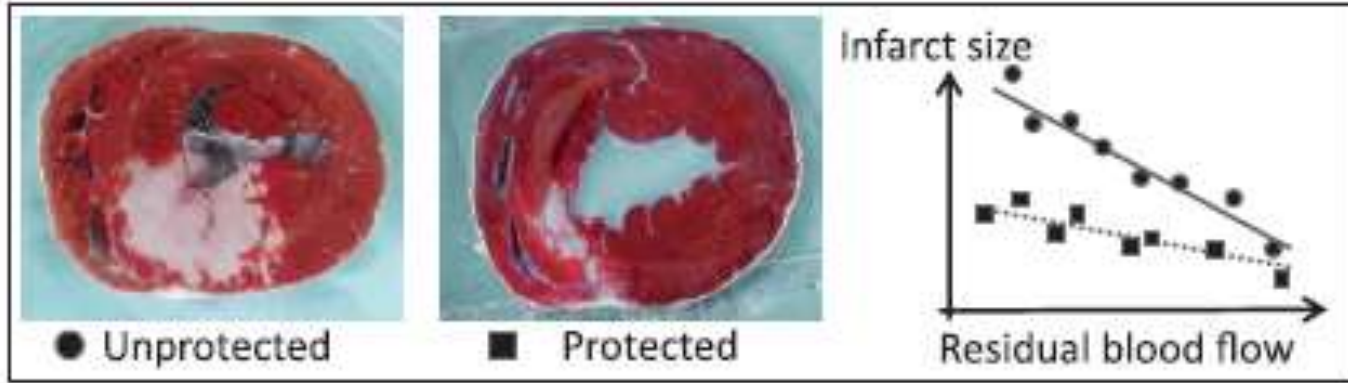
Ekstrakorporeal
Dolaşım

İskemi/Reperfüzyon
Hasarı

İskemi /reperfüzyon hasarı

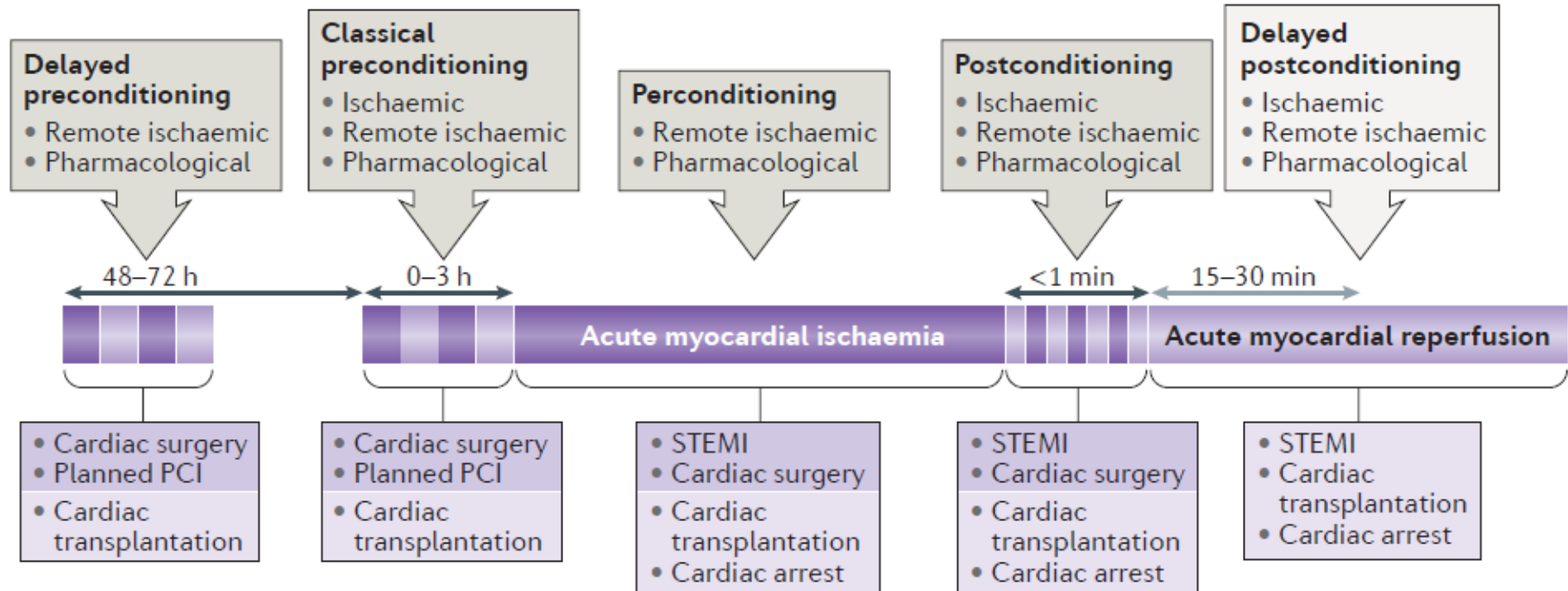
- Aritmi
- Miyokardiyal *stunning*
- Mikrovasküler obstrüksiyon
- Letal miyokardiyal reperfüzyon hasarı

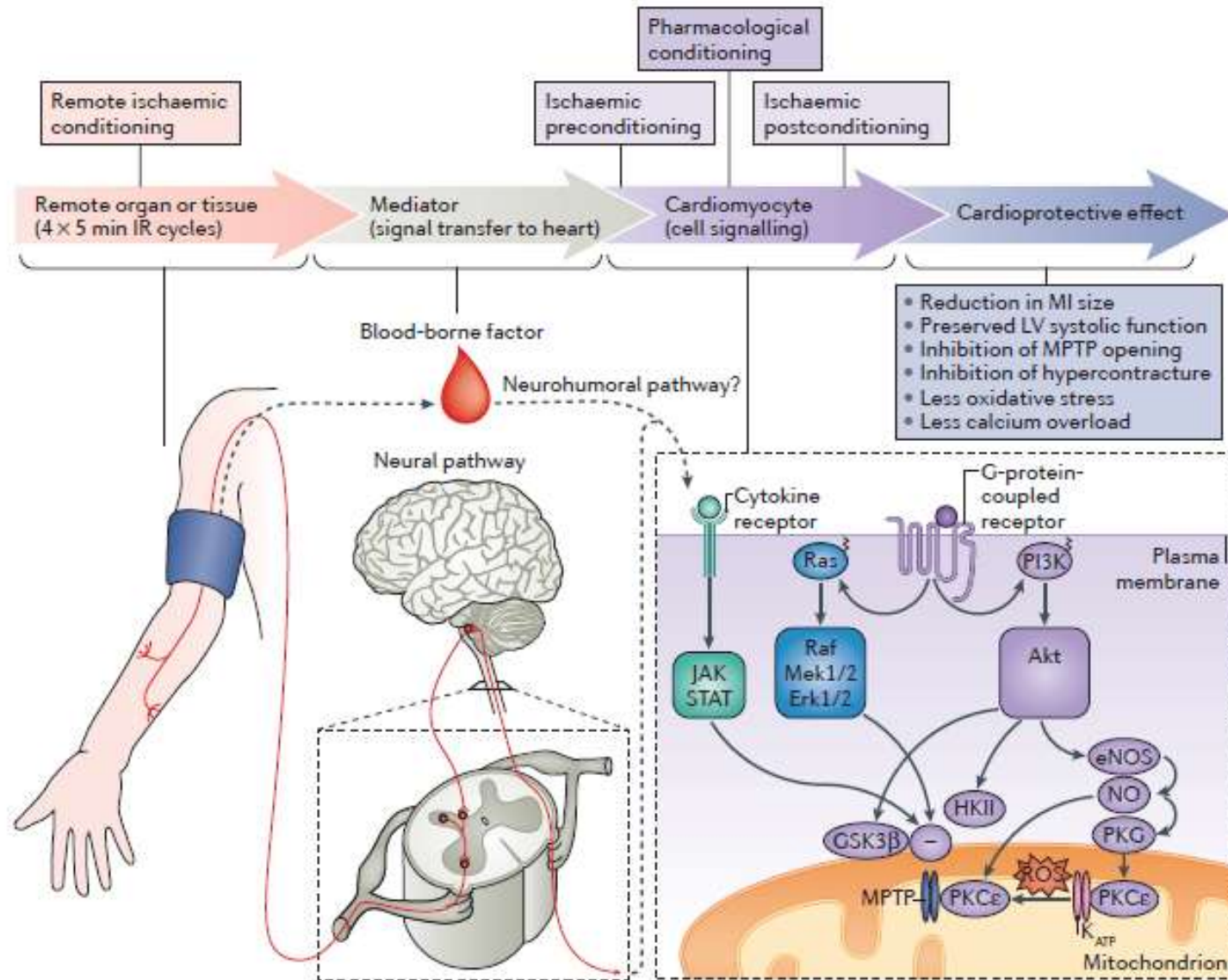
İskemi /reperfüzyon Hasarı ve İskemik Koşullama



- Murray ve ark 1986
- İskemik önkoşullama MI boyutunu azaltan en güçlü müdahale

İskemik Koşullama





Reperfüzyon Injury Salvage Kinaz (**RISK**) yolağı: PI3K-Akt ve Mek1/2-Erk1/2

Survivor Activator Factor Enhancement (**SAFE**) yolağı: TNF ve JAK-STAT

cGM- protein kinaz G yolağı: PKG

Anestezik Ajanların Kardiyovasküler Etkileri

Cardiovascular Effects of Inhalational Anesthetics

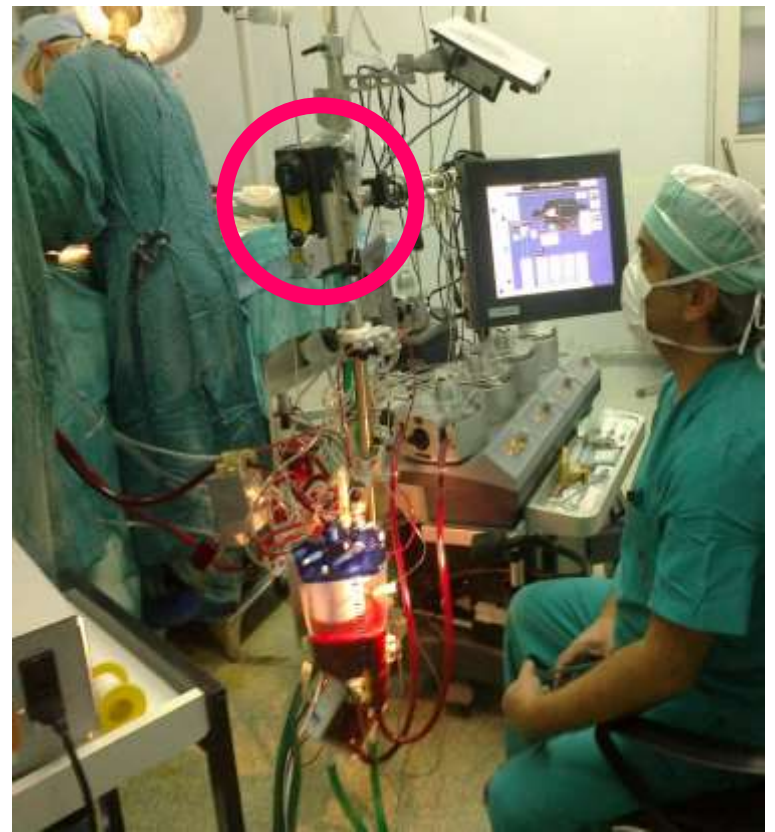
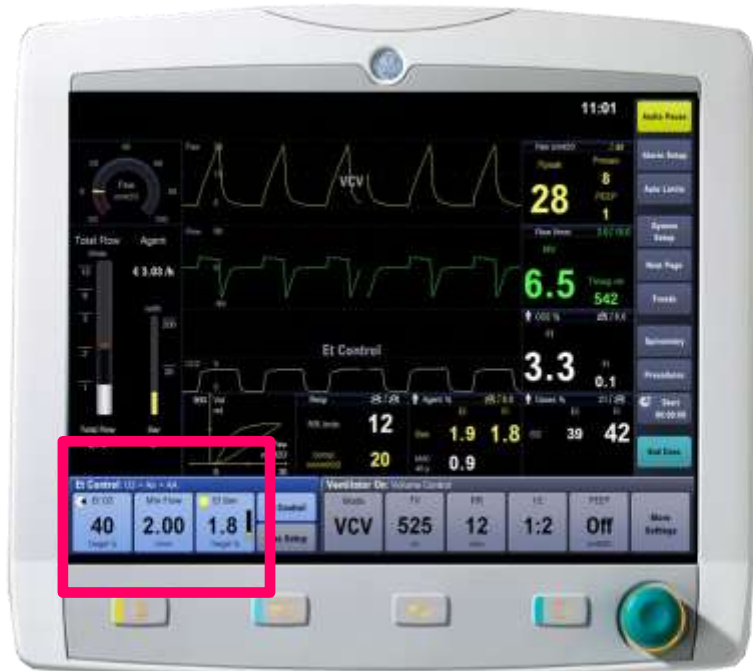
	<i>Heart rate</i>	<i>Blood pressure</i>	<i>Systemic vascular resistance</i>	<i>Cardiac output</i>	<i>Sensitize to epinephrine</i>	<i>Coronary dilation</i>
Desflurane	+	-	--	0/-	0/+	+
Halothane	0	--	0/-	-	+++	+
Isoflurane	+	--	--	-	0/+	++
Sevoflurane	0	--	-	0/-	0/+	0
Nitrous oxide	+	0	0	0	0	0

0, no change; +, increased; ++, more increased; +++, most increased; -, decreased; --, more decreased; ---, most decreased.

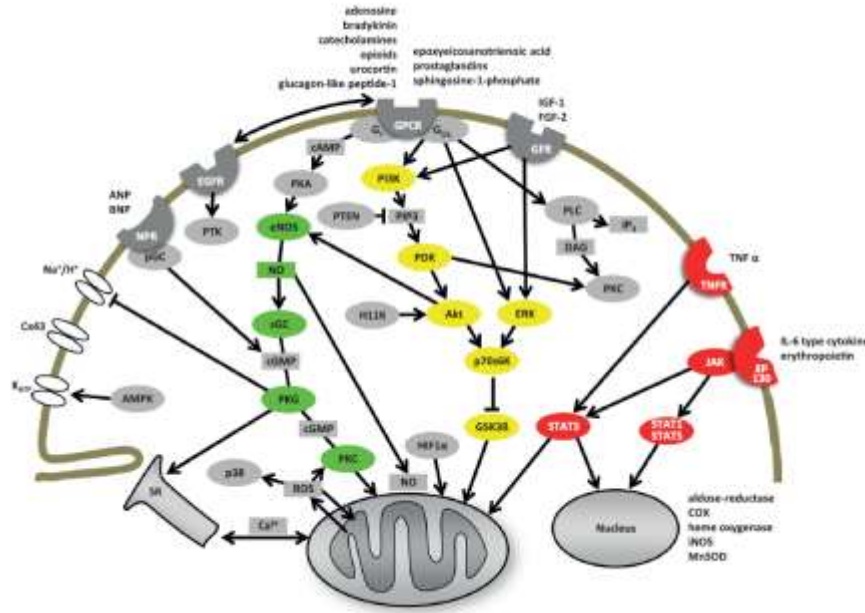
Cardiovascular Effects of Intravenous Anesthetics

	<i>Heart rate</i>	<i>Blood pressure</i>	<i>Systemic vascular resistance</i>	<i>Cardiac output</i>
Thiopental	+	-	-	+
Ketamine	++	++	+	++
Propofol	0/-	--	--	-
Etomidate	0	0/-	0	0
Fentanyl	0/-	0	0	0
Morphine	0/-	0/-	0/-	0
Midazolam	0	0	0	0
Methohexital	++	-	-	0/-
Meperidine	++	0/-	0/-	0/+

0, no change; +, increased; ++, more increased; +++, most increased; -, decreased; --, more decreased; ---, most decreased.



Anestezik ajanların kardiyoprotektif etkisi



- 1-Reperfüzyon İnjury Salvage Kinaz (**RISK**) yolağı: PI3K-Akt ve Mek1/2-Erk1/2
- 2-Survivor Activator Factor Enhancement (**SAFE**) yolağı: TNF ve JAK-STAT
- 3- **cGM**- protein kinaz G yolağı: PKG

- 1970: halotan IRI karşı koruyucu – köpekte-
- 1980: halotan, enfluran, izofluran koruyucu etki +
- 1997: anestezik stimulusla önkoşullama –köpek ve tavşan-

Anestezi koşullama

- Koşullamanın tetiği anestezi ajandır
- Hücreler ve moleküler mekanizmalar iskemik ön ve sonradan koşullanmaya benzer etki
- Hastalara ait özellikler deneysel ve klinik çalışmalarda fark yaratır
 - Yaş, obezite, diyabet,
- Volatil anestezi
- Propofol
 - Serbest radikalleri temizleme
 - Kalp L-tipi kalsiyum kanallarının inhibisyonu
- Barbitüratlar / amobarbital
 - Kalp hasarı ↓, mitokondri fonksiyonunu iyileştirir
- Opioidler

- Anestezi koşullamanın deneysel ve klinik çalışmaları
- Deneysel çalışmalar
 - Propofol: VA'ya bağlı koşullanmayı engelleyebilir
 - + Propofol: NO sentaz aktivitesini düzenleyerek IRI'den korur
 - + İzofluran ile koşullama + KPB ve sonrasında propofol → koruma ↑
 - + Morfin, Remifentanil ve sufentanil: Kardiyoprotektif
 - VA'ya bağlı koşullanmayı engelleyebilir:
 - Sulfonilüre
 - Metoprolol
 - Diyabet/hiperglisemi/obezite
 - İleri yaş

- **Anestezi koşullamanın klinik kanıtları**
 - Serum biyobelirteçleri klinik sonuç göstergesi olarak kabul ediliyor
 - Prospektif, randomize kontrollü, *proof-of-concept* çalışmaları
- VA'in postop iskemi seviyesini daha fazla ↓ gösteren çalışmalar
 - **Aortik kros klemp öncesi tek uygulama:**
 - İzofluran : KPB başlangıcında 15 dk. 2,5 MAC → Tn I ↓
 - İzofluran %2 anestezi önkoşullama = iskemik önkoşullama → Tn I ↓
 - Desfluran: KPB'den önce → Tn I ↓

 - **Tüm op boyunca:**
 - Sevofluran → Tn I ↓
 - Desfluran: KPB süresi dışında → Tn I ↓

Anestezi koşullamanın klinik kanıtları

- VA'in postop iskemi seviyesini daha fazla ↓ gösteren çalışmalar
 - İntermitant VA uygulaması –KPB öncesi:-
 - Sevofluran : iskemik biyobelirteçleri ↓ > pre-KPB sürekli uygulama
 - Sevofluran : iskemik biyobelirteçleri ↓ > pre-KPB 5-dk uygulama
 - Proteksiyon: İzofluran + propofol > izofluran veya propofol
 - ❖ Off-pump cerrahi: izo, des, sevo → Tn I ↓
 - ❖ Off-pump : 1 MAK sevo = >1 MAK sevo > 0.75 MAK sevo

Anestezi koşullamanın klinik kanıtları

- VA'in iskemi üzerine farklı etkisi olmadığını gösteren çalışmalar
 - ↑ doz propofol > izofluran ve ↓ doz propofol → Tn I ↓
 - ↑ propofol KPB'dan 10dk önce – aort klemp açılışından 15dk sonra
- Tüm operasyon süresi: İzofluran = propofol
- ☐ Propofol = intra-op sevofluran = intra-post op sevofluran
- ✓ 1 MAK izo 5 dk / 5 dk washout KPB öncesi → Tn I fark yok
- ✓ 1 MAK sevo 15 dk KPB öncesi → Tn I fark yok

Anestezi koşullamanın klinik kanıtları

- Çok merkezli çalışma: VA x propofol
- Tn I: fark yok
- 1 yıllık mortalite: propofol %12.3, sevo %3.3, des % 6.7
- Hastanede yatış: VA < propofol
- ❑ Off-pump: sevo = des = propofol → Tn I fark yok
- ❖ Sevofluran %2 kardiyoplejide: postop inflamatuvar yanıt ↓
- 34 310 hasta + 10 535 hasta içeren longitudinal çalışma:
- 30 günlük mortalite: VA ile ↓
- Geniş hasta sayısına sahip çalışmaların metaanalizi: 3642 hasta
- Postop mortalite: VA → %1.3 TİVA → %2.6

Sevoflurane Versus Total Intravenous Anesthesia for Isolated Coronary Artery Bypass Surgery With Cardiopulmonary Bypass: A Randomized Trial

- En geniş RKÇ : 431
- TİVA : 431
- İndüksiyonda propofol: 269
- CABG / CPB : 168
- Sevofluran: 437
- Tümüyle sevofluran :168

Table 2. Cardiac Biomarkers and Length of Hospital Stay in Patients Randomly Assigned to Receive Propofol-Based Total Intravenous Anesthesia or Sevoflurane

	TIVA Group			Sevoflurane Group			
Subgroup	Mortality	Mortality	Mortality	Stay	24 h, ng/mL	24 h, pg/mL	48 h, pg/mL
With propofol, n = 700	2.0%	4.7%	22.7%	11 (10-14)	0.36 (0.13-0.78)	807 (535-1,574)	711 (514-1,542)
Without propofol, n = 168	0%	2.4%	16.5%	10 (9-10)	0.18 (0.11-0.30)	547 (393-880)	432 (228-668)
p value	0.085	0.21	0.15	<0.01	<0.01	<0.01	<0.01

Sevofluranın yarattığı kardiyoprotektif etkiyi propofol inhibe ediyor

Table 4. Cardiac Biomarkers, Length of Hospital Stay, and Mortality in Patients Randomly Assigned to Receive Sevoflurane Divided into 2 Groups According to Administration of Anesthesia

Anesthesia	7-day Mortality	1-month Mortality	1-year Mortality	Hospital Stay	Troponin T After 24 h, ng/mL	NT-proBNP After 24 h, pg/mL	NT-proBNP After 48 h, pg/mL
Propofol at anesthesia induction, then sevoflurane, n = 269	2.2%	4.8%	18.6%	10 (10-11)	0.19 (0.13-0.36)	721 (517-1,192)	514 (257-686)
Only sevoflurane throughout the entire surgery, n = 168*	0%	2.4%	16.5%	10 (9-10)	0.18 (0.11-0.30)	547 (393-880)	432 (228-668)
p value	0.087	0.31	0.64	<0.01	0.03	<0.01	0.15

Volatile compared with total intravenous anaesthesia in patients undergoing high-risk cardiac surgery: a randomized multicentre study

G. Landoni^{1*}, F. Guarracino², C. Cariello², A. Franco¹, R. Baldassarri², G. Borghi¹, R. D. Covello¹, C. Gerli¹, M. Crivellari¹ and A. Zangrillo¹

Table 1 Baseline subject characteristics. Dichotomic data are presented as number (%); continuous data are presented as mean (standard deviation) or as median (25–75th percentiles). No significant difference was found between the two groups. EuroSCORE, European System for Cardiac Operative Risk Evaluation; IABP, intra-aortic balloon pump counterpulsation

	Propofol (control) group (n=100)	Sevoflurane (study) group (n=100)
Age (yr)	70 (extreme range 50–90)	68 (extreme range 24–84)
Female sex	36 (36%)	28 (28%)
Weight (kg)	72 (11.6)	75 (15.2)

	Propofol (control) group (n=100)	Sevoflurane (study) group (n=100)	P-value (RR; 95% CI) or (difference between medians; 95% CI)
Primary endpoint			
Death during the first hospital stay and/or prolonged ICU stay	36 (36%)	41 (41%)	0.5 (1.14; 0.8–1.62)
Secondary endpoints and biomarkers			
Perioperative myocardial infarction	6 (6%)	4 (4%)	0.8 (0.67; 0.19–2.29)
Time on mechanical ventilation (h)	15 (10.7–26)	12 (8–23)	0.2 (1.5–1.16)

Yüksek riskli kardiyak hastalarda TİVA ve Sevofluran anestezi arasında fark yok

Previous history of cerebrovascular accident	7 (7%)	7 (7%)
Carotid artery disease	12 (12%)	8 (8%)
Peripheral vascular disease	9 (9%)	5 (5%)
Drug therapy		
Angiotensin-converting enzyme inhibitors	0%	0%
β-Blockers	0%	0%
Calcium channel antagonists	0%	0%
Diuretics	5%	5%
Statins	4%	4%
Nitrates	0%	0%
Digitalis	0%	0%
Preoperative data		
Additive EuroSCORE	4–51	4–51
Ejection fraction (%)	5%	5%
Rheumatic/degenerative/post-endocarditis mitral regurgitation	0%	0%
Functional (ischaemic/dilated cardiomyopathy) mitral regurgitation	0%	0%
End-diastolic diameter (cm)	0%	0%
End-diastolic volume (ml)	0%	0%
End-systolic diameter (cm)	5%	5%
End-systolic volume (ml)	0%	0%
Pulmonary artery pressure (mm Hg)	25 (15)	26 (15)
Intra-ventricular septum (mm)	13 (3.1)	13 (3.5)
Preoperative positioning of IABP	3 (3%)	0 (0%)
Type of surgery		
Number of coronary artery bypass graft	1 (1–2)	1 (1–2)
Mitral valve surgery	36 (36%)	46 (46%)
Aortic valve surgery	67 (67%)	56 (56%)

Hastaların tümünün yoğun bakımdaki sedasyonu propofol ile sağlanmış

Type 1 neurological damage	2 (2%)	1 (1%)	0.9
Type 2 neurological damage	7 (7%)	3 (3%)	0.2
Reintubation	6 (6%)	7 (7%)	0.8
Time on mechanical ventilation (h)	15 (10.7–26)	12 (8–23)	0.2 (1.5–1.16)
Time on ventilator (h)	15 (10.7–26)	12 (8–23)	0.2 (1.5–1.16)
Time on ventilator > 24 h	0%	0%	0.9
Time on ventilator > 48 h	0%	0%	0.12
Time on ventilator > 72 h	0%	0%	0.9
Time on ventilator > 96 h	5%	5%	0.8
Time on ventilator > 120 h	4%	4%	0.6
Time on ventilator > 144 h	0%	0%	0.3
Time on ventilator > 168 h	4–92	4–92	0.6
Time on ventilator > 192 h	4–51	4–51	0.8
Time on ventilator > 216 h	5%	5%	0.4
Time on ventilator > 240 h	0%	0%	0.5 (1.14; 0.8–1.64)
Time on ventilator > 264 h	0%	0%	0.4 (1.75; 0.53–5.79)
Time on ventilator > 288 h	0%	0%	0.4 (1.6; 0.54–4.72)
Time on ventilator > 312 h	5%	5%	0.9 (1.00; 0.52–1.93)
Time on ventilator > 336 h	0%	0%	0.9 (1.00; 0.45–2.20)
Time on ventilator > 360 h	1%	1%	0.9 (1.00; 0.45–2.20)
30 day and 1 yr follow up			
All-cause mortality at 30 days	7/100 (7%)	8/100 (8%)	0.8 (1.14; 0.43–3.03)
All-cause mortality at 1 yr	11/100 (11%)	11/100 (11%)	0.9 (1; 0.45–2.19)
New hospitalization among survivors at 30 days	16/93 (17.2%)	8/92 (8.7%)	0.08 (0.51; 0.23–1.22)
New hospitalization among survivors at 1 yr	20/89 (22.5%)	11/89 (12.4%)	0.075 (0.54; 0.23–1.28)
Adverse cardiac events among survivors at 30 days	7/93 (7.5%)	5/92 (5.4%)	0.6 (0.73; 0.24–2.22)
Adverse cardiac events among survivors at 1 yr	10/89 (11.2%)	9/89 (10.1%)	0.8 (0.67; 0.20–2.31)

Sevoflurane vs. propofol in patients with coronary disease undergoing mitral surgery: a randomised study

E. BIGNAMI¹, G. LANDONI^{1,2}, C. GERLI¹, V. TESTA¹, A. MIZZI¹, G. FANO¹, M. NUZZI¹, A. FRANCO¹ and A. ZANGRILLO¹

- KAH (+) 100 hasta
- Mitral kapa
- Sevofluran
- Propofol
- Primer sonu
 - Postop troponin düzeyi
- Fark yok

Tüm hastalara
KPB sırasında ve YB'da
Propofol uygulanmış



centiles) post-operative troponin I the post-operative values measured first and second post-operative day) and in those receiving TIVA.

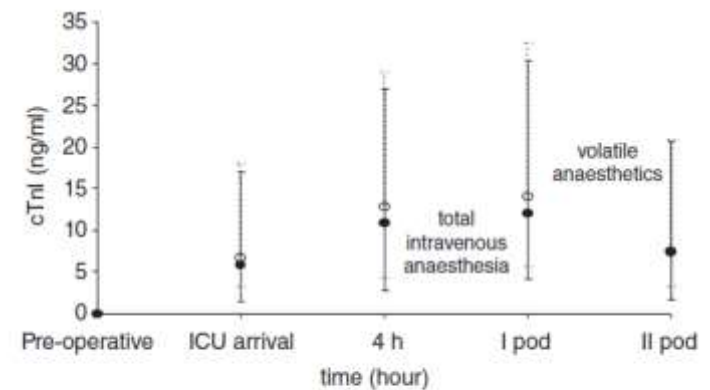


Fig. 3. Median (25th–75th percentiles) of troponin release at ICU arrival, 4 h later and on first and second post-operative day in patients receiving either volatile anaesthetics or TIVA. Pod, post-operative day.

Cardioprotective efficacy of sevoflurane vs. propofol during induction and/or maintenance in patients undergoing coronary artery revascularization surgery without pump: A randomized trial

J.L. Guerrero Orriach, M. Galán Ortega, A. Ramirez Fernandez, M. Ramirez Aliaga, M.I. Moreno Cortes, D. Ariza Villanueva, A. Florez Vela, J. Alcaide Torres, C. Santiago Fernandez, E. Matute Gonzalez, E. Alsina Marcos, J.J. Escalona Belmonte, M. Rubio Navarro, L. Garrido Sanchez, J. Cruz Mañas

- 90 *off-pump* hasta

Figure 2. Troponin I levels at basal, 6, 12, 24 and 48 postoperative hours in the three groups of the study



Off-pump cerrahide

Sevofluran intraop + postop uygulandığında:

- Miyokard hasarı ↓
- İnotropik destek ↓
- YB'da kalış süresi ↓
- Renal koruma ↑
- Koruyucu yararlı enzimlerin fazla salınmasına bağlı

Ng/ml	ng/ml PP: 17.84+/-44.4 ng/ml	ng/ml *PP: 39.4.16+/-59 ng/ml	
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Comparison of the myocardial protective effect of sevoflurane versus propofol in patients undergoing heart valve replacement surgery with cardiopulmonary bypass

Xiao-Lin Yang^{1*}, Dan Wang¹, Guo-Yuan Zhang² and Xiao-Lan Guo²


- Sevo X Propofol
- cTnI ve CK-MB : primer biyobelirteçler
- Sistemik inflamatuvar etki
- IL-6, IL-10
- Sevofluran 

Table 1 Patient characteristics

Patient characteristics	Propofol (n = 37)	Sevoflurane (n = 36)
Preoperative data		
Age (yr)	50.7 (6.6)	50.5 (6.4)
Weight (kg)	54.5 (7.9)	56.5 (11.8)
Sex (M/F)	18 / 19	16 / 20
ASA class	II-IV	II-IV
EF (%)	57.2 (5.6)	55.9 (5.4)
Types of surgery (n, %)		
Replacement of mitral valve	15 (40)	14 (39)
Replacement of aortic valve	9 (24)	10 (28)
Replacement of tricuspid valve	4 (10)	4 (11)
Replacement of mitral valve and shaping of tricuspid valve	9 (24)	8 (22)
Intraoperative data		
Operating time (min)	198 (28)	183 (34)
CPB time (min)	95 (18)	96 (17)
Aortic clamp time (min)	62 (21)	64 (18)

Table 3 Perioperative markers of myocardial injury and systemic inflammation

Marker	T ₀	T ₁	T ₂	T ₃	T ₄
cTnI (ng/ml)					
Propofol	0.01 (0.02)	18.26 (9.67) [#]	26.66 (9.10) [#]	13.71 (6.14) [#]	8.72 (4.83) [#]
Sevoflurane	0.02 (0.02)	10.17 (6.63) ^{**}	15.17 (8.73) ^{**}	9.00 (6.43) ^{**}	4.62 (3.40) ^{**}
CK-MB (μ/l)					
Propofol	0.87 (0.50)	47.73 (9.30) [#]	86.12 (7.50) [#]	31.79 (6.29) [#]	14.35 (4.31) [#]
Sevoflurane	0.88 (0.60)	28.54 (7.69) ^{**}	61.29 (8.80) ^{**}	20.60 (7.84) ^{**}	8.28 (2.16) ^{**}
IL-6 (pg/ml)					
Propofol	15.86 (4.45)	36.89 (6.71) [#]	59.69 (7.53) [#]	25.80 (6.15) [#]	17.14 (5.17)
Sevoflurane	13.91 (5.00)	27.87 (7.83) ^{**}	42.67 (8.89) ^{**}	22.64 (6.92) [#]	15.44 (4.54)
IL-10 (pg/ml)					
Propofol	19.07 (4.75)	56.72 (8.36) [#]	73.73 (7.44) [#]	28.35 (6.90) [#]	20.58 (7.56)
Sevoflurane	16.79 (4.74)	38.24 (7.90) ^{**}	54.29 (8.08) ^{**}	23.70 (6.51) [#]	18.88 (5.50)

Cardioprotection Effects of Sevoflurane by Regulating the Pathway of Neuroactive Ligand-Receptor Interaction in Patients Undergoing Coronary Artery Bypass Graft Surgery
Jinquan Wang,¹ Jian Cheng,² Chao Zhang,¹ and Xiaojun Li¹

- Sevofluran
 - İnfarkt alanını ↓
 - Kalsiyum yükünü ↓
- Koruyucu moleküler mekanizma?
- CABG operasyonu
- Gen ekspresyon profili
- Gen ekspresyon regülasyonu
- Hedef: GHSR ve GNRHR genleri
- Nöroaktif ligand-reseptör etkileşiminin regülasyonu

The Current Role of Total Intravenous Anesthesia in Cardiac Surgery: Total Intravenous Anesthesia and Cardiopulmonary Bypass

Stefan Schraag, MD, PhD, FRCA, FFICM

- Propofol

- Hafif vazodilatör
- Miyokard kontraktilesini etkilemez
- Aritmojenik miyokard eşiğini deęiřtirmez
- Hipotermik KPB'de O₂ tüketimi ↓
- Ca²⁺ homeostazını stabilize eder
- Serbest oksijen radikallerinin potent temizleyicisi
- IRI'nı azaltır

- Opioidler

- Remifentanil ve sufentanil

- Analjezi, hemodinamik stabilite
- Kardiyoproteksiyon: Delta opioid resept aktivasyonu ile ön ve sonradan koşullama

- Organların korunması

- Propofol

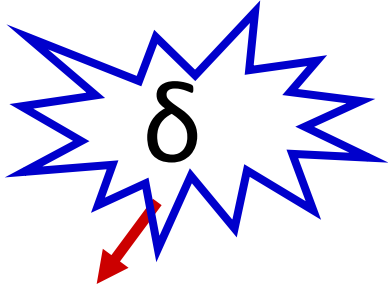
- Beyin fonksiyonlarının bütünlüğü ve nörokognitif etki

- VA ile Alzheimer hastalarında plak ↑

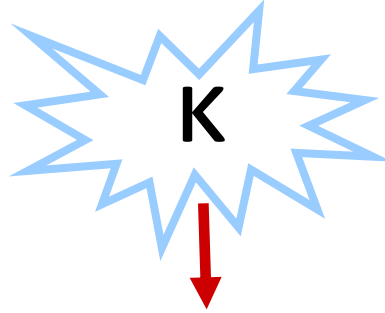
- Propofol nöroprotektif:

- KPB sırasında inflamatuvar yanıtı ↓
- Beyin hasarı ile ortaya çıkan hidroksil radikalleri temizler
- Beyindeki infarkt alanını ↓

Opioid reseptörü ?



Morfin
Remifentanil
Sufentanil
Fentanil



Morfin
Remifentanil
Sufentanil
Fentanil

μ

Morfin
Fentanil
Remifentanil

- Ön koşullamada rolü olan opioid reseptörleri
- κ ve δ reseptörler
- δ₁ alt grup reseptörü

Role of Endogenous Opioid System in Ischemic-Induced Late Preconditioning

Jan Fraessdorf^{1,2}, Markus W. Hollmann^{2*}, Iris Hanschmann¹, André Heinen³, Nina C. Weber², Benedikt Preckel², Ragnar Huhn¹

- OR iskemik geç önkoşullamadaki rolü?
- Tetikleme fazı? Yayılma fazı?
- İskemik geç önkoşullama özellikle delta OR'ın artışı ile ilişkili
- Endojen opioid sistemin aktivasyonu her 2 fazda da gerekli

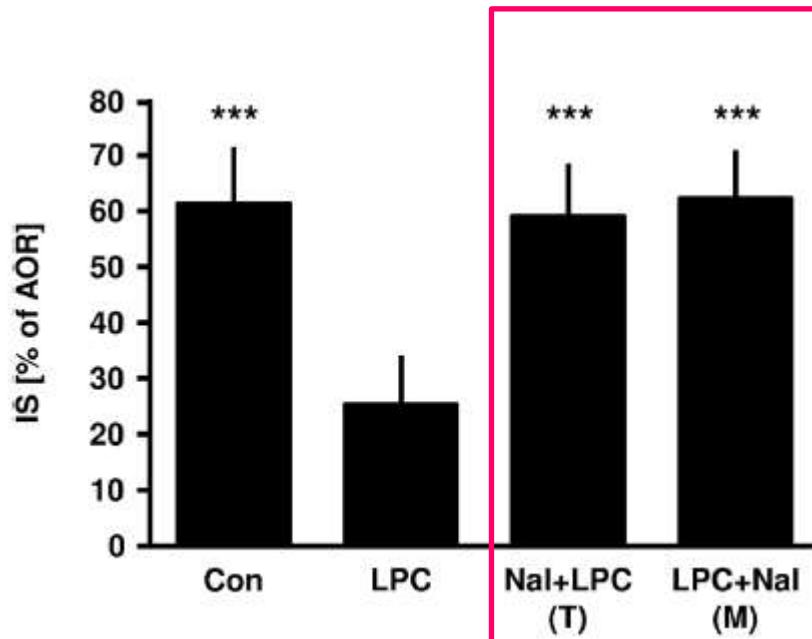


Fig 2. Infarct size measurement. f

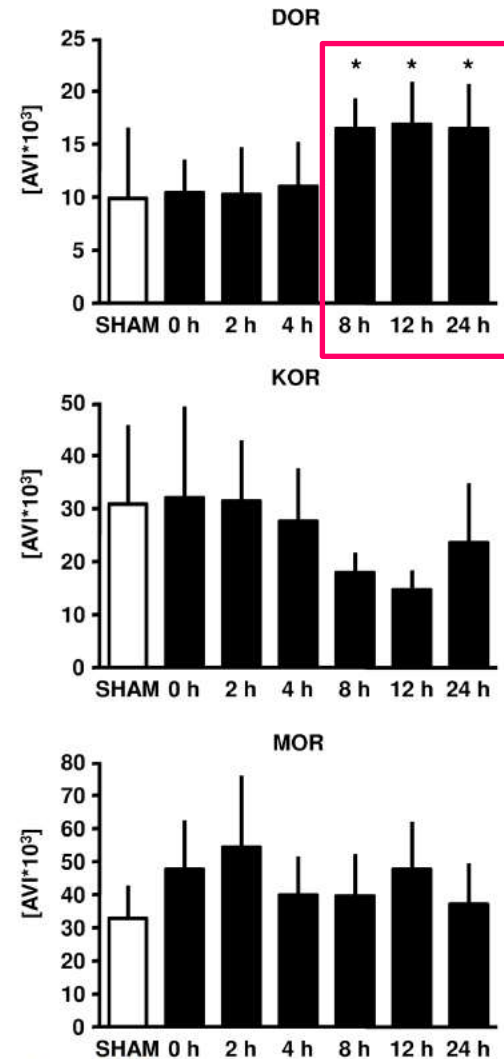
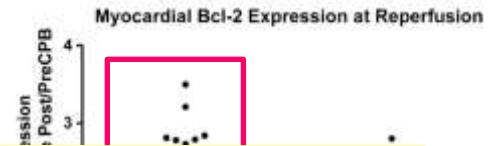


Fig 3. DOR, KOR and MOR expression in rat myocardium upon ischemic late preconditioning (LPC).

Propofol cardioprotection for on-pump aortocoronary bypass surgery in patients with type 2 diabetes mellitus (PRO-TECT II): a phase 2 randomized-controlled trial

David M. Ansley, MD · Koen Raedschelders, PhD · Peter T. Choi, MD · Baohua Wang, PhD · Richard C. Cook, MD · David D. Y. Chen, PhD

- CABG / normotermik- kan kardiyopleji- CPB – ACC
- 137 DM2, LVEDP > 15 mmHg, LVEF < % 50 → %50 ↑



Propofol

DM2'da intraoperatif preemtif

kardiyoproteksiyon etkili bir ajan olabilir

	Propofol	Isoflurane	<i>P</i> value
In-hospital incidence, <i>n</i> (%)	3/62 (4.8)	17/63 (26.9)	0.001
Death	0	1 (1.6)	1.00
Myocardial Infarction	0	4 (6.3)	0.12
Stroke	1 (1.6)	3 (4.7)	0.62
Graft Revision/PCI	0	3 (4.7)	0.11
Unstable Angina	3 (4.8)	3 (4.7)	1.00
Heart Failure Events	0	14 (22.2)	< 0.0001
Prolonged LCOS	0	9 (14.3)	0.003
CHF	0	5 (7.9)	0.06

CHF = congestive heart failure; LCOS = low cardiac output syndrome; PCI = percutaneous coronary intervention

Propofol cardioplegia: A single-center, placebo-controlled, randomized controlled trial

Chris A. Rogers, PhD,^a Alan J. Bryan, DM, FRCS (CTh),^b Rachel Nash, MSc,^a M. Saadeh Suleiman, PhD, DSc,^b

- 101 hasta: 61-CABG / AVR- 40
- Kardiopleji solüsyonunda ek
 - Propofol (6mcg/mL)
 - İntralipid
- cTnl
- Propofol kardiyoprotektif

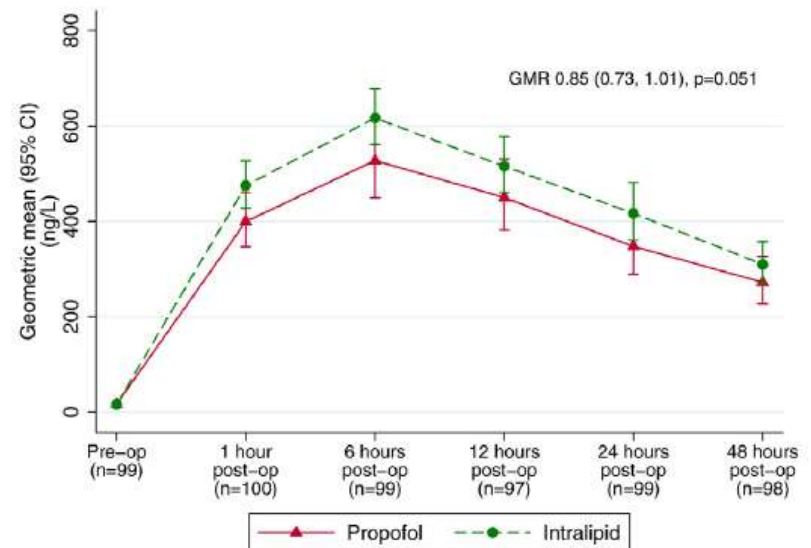


FIGURE 2. Cardiac troponin T response over time.

Dexmedetomidine Attenuates Myocardial Injury in Off-Pump Coronary Artery Bypass Graft Surgery

Xiaohui Chi, MD, Mingfeng Liao, MD, Xin Chen, MD, Yilin Zhao, MD, PhD, Liu Yang, MD, Ailin Luo, MD, PhD, and Hui Yang, MD, PhD

- OPCABG 105 hasta

Yüksek doz deksmedetomidin infüzyonu ile miyokard hasarı azalmaktadır

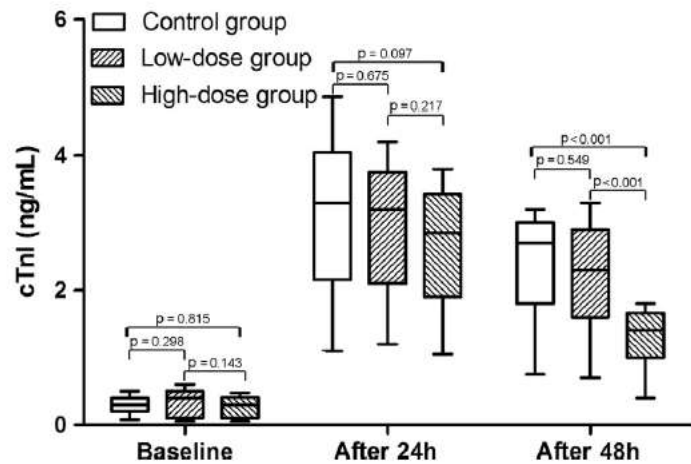


Fig 4. Changes in the serum cardiac troponin I

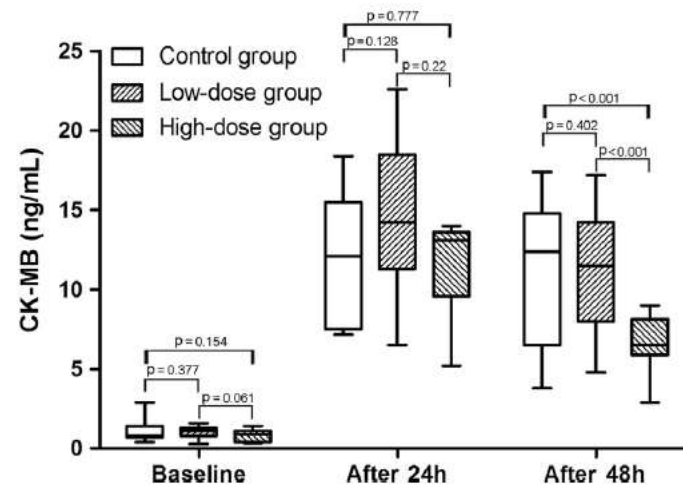






Fig 5. Changes in the serum creatine kinase MB





Ketamine in adult cardiac surgery and the cardiac surgery Intensive Care Unit: An evidence-based clinical review

Michael Mazzeffi, Kyle Johnson, Christopher Paciullo¹

• Ketaminin etkileri:

- İnflamatuvar biyomarkerlar 
- Postop ağrı 
- Postop hasta memnuniyeti 
- Hemodinami ?
- Miyokard hasarı ?
- Pulmoner fonksiyonlar 

• Kardiyovasküler etkileri

- Bozuk vent fonk 
- Sempatomimetik
- CO ↑ ?
- Taşikardi 
- Nöroproteksiyon 
- Depresyon tedavisi 

- *Offpump* cerrahide anesteziyelerin klinik sonuca etkisi?
- TIVA: 192 hasta, İzofluran: 662 hasta
- Hastanedeki majör advers olay \emptyset
- 1 yıllık majör kardiyovasküler advers olay ve serebral olay \emptyset
- Yüksek riskli hastalar sınıflandırıldı ve karşılaştırıldı \emptyset
- Atriyal fibrilasyon TIVA'da \uparrow

Table 2. Risks of postoperative complications according to the anesthetic method based on matched data.

	TIVA (n = 192)	Isoflurane (n = 662)	OR or HR	95% CI	P-value
Composite of in-hospital MAEs	49 (25.5)	139 (21)	1.29	0.88–1.88	0.2
In-hospital death	0 (0)	1 (0.2)			
In-hospital myocardial infarction	11 (5.7)	47 (7.1)	0.8	0.41–1.57	0.52
In-hospital revascularization	1 (0.5)	4 (0.6)	0.86	0.09–7.79	0.89
In-hospital stroke	2 (1)	7 (1.1)	0.99	0.21–4.78	0.99
Prolonged mechanical ventilation (>72h)	23 (12)	67 (10.1)	0.84	0.18–3.98	0.83
Acute kidney injury	5 (2.6)	24 (3.6)	0.7	0.25–1.93	0.49
In-hospital new arrhythmia \Rightarrow	38 (19.8) \Rightarrow	82 (12.4) \Rightarrow	1.72 \Rightarrow	1.12–2.63 \Rightarrow	0.01 \Rightarrow
New atrial fibrillation \Rightarrow	32 (16.7) \Rightarrow	74 (11.2) \Rightarrow	1.58 \Rightarrow	1.01–2.45 \Rightarrow	0.04 \Rightarrow
Postoperative ventricular arrhythmia	6 (3.1)	8 (1.2)	2.55	0.96–6.75	0.06
One year MACCEs	14 (7.3)	58 (8.8)	0.81	0.46–1.42	0.46
Death	1 (0.5)	2 (0.3)	2.22	0.20–25.05	0.52
Myocardial infarction	11 (6)	44 (6.6)	0.8	0.42–1.53	0.51
Revascularization	1 (0.5)	9 (1.4)	0.39	0.05–3.10	0.37
Stroke	2 (1)	9 (1.4)	0.89	0.19–4.18	0.89
Other postoperative outcomes					
Prolonged ICU stay (>72h)	23 (12)	67 (10.1)	0.83	0.51–1.35	0.45
In-hospital wound problem	5 (2.6)	15 (2.3)	1.14	0.39–3.30	0.81
Bleeding-related reoperation	4 (2)	7 (1.1)	1.96	0.57–6.68	0.28
Time to extubation, hr	8 [6–12]	8 [6–12]			0.71*
Length of stay at ICU, hr	34.5 [20–45.63]	35.75 [22–48]			0.49*
CKMB _{max}	9.94 [6.79–15.65]	10.9 [7.01–16.89]			0.44*
Troponin I _{max}	2.29 [1.33–4.73]	2.70 [1.32–5.07]			0.68*
NT-proBNP _{max}	361.3 [155–711.9]	346.97 [154.57–713.91]			0.26*

Data are presented as number (%) or median [interquartile range].

Sonuç olarak

Kardiyak cerrahide

- Anestezi ajanlarının çoğunun klinik uygulama dozlarında miyokardı koruyucu etkisi vardır
- Volatil anesteziğin kardiyoprotektif özellikleri daha üstündür
- Diğer organların korunmasında da etkili
- Propofolün miyokardı koruyucu etkisi VA' a göre tartışmalı ancak nöroproteksiyonda etkili olabilir
- Opioidlerin kardiyoproteksiyonda yeri vardır
- Deksmetomidin yararlı etkileri ile intraoperatif ve postoperatif kullanılabilir



23. ULUSAL KONGRESİ

Göğüs Kalp Damar Anestezi ve Yoğun Bakım Derneği

25-28 Mayıs 2017
Marriot Hotel Asia
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