

AÇIK KALP CERRAHİSİNDE
FAST TRACK

İYİDİR



Dr. Engin Ertürk

KTÜ Tıp Fakültesi
Anesteziyoloji ve Reanimasyon AD



Fast Track



- Tanım
- Neden
- Ne zamandan beri
- Çalışmalardaki yeri
- Klinik uygulamalardaki yeri
- Avantaj&Dezavantajlar
- Kendi uygulamalarımız

Fast Track

Erken ekstübasyon

Erken YB çıkışı

Erken taburculuk

Fast Track

REVIEW ARTICLE

David C. Warltier, M.D., Ph.D., Editor

Anesthesiology 2003; 99:982-7

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A Systematic Review of the Safety and Effectiveness of Fast-track Cardiac Anesthesia

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include early tracheal extubation and decreased length of ICU and hospital stay with subsequent cost reduc-

This article is accompanied by an Editorial View. Please see: Wallace AW: Is it time to get on the fast track or stay on the slow track? ANESTHESIOLOGY 2003; 99:982-987.

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Received from the Department of Anaesthesia and Pain Management, Alfred Hospital, Melbourne, Australia. Submitted for publication August 2, 2002. Accepted for publication January 22, 2003. The funding required for this project was obtained from the Alfred Hospital Department of Anaesthesia Research Fund. Dr. Myles is supported by an Australian National Health and Medical Research Council Practitioner Fellowship award (Canberra, Australia).

Materials and Methods

This systematic review and meta-analysis followed a protocol that specified the aims, inclusion criteria, anesthetic regimens, and outcome assessments from previously published trials.²⁵ We chose to include all randomized trials of adult cardiac surgical patients undergoing coronary artery bypass graft (CABG) or valve surgery with cardiopulmonary bypass. Patients undergoing off-pump cardiac surgery or having major regional blockade (spinal or epidural techniques) were not included in the analysis. We compared FTCA with TCA. The former group was defined by the use of a reduced dose of opioids (fentanyl, $\leq 20 \mu\text{g}/\text{kg}$, or equivalent) and the intention to promote early ($< 10 \text{ h}$) tracheal extubation.

The TCA group was defined by the use of high-dose opioids (fentanyl, $> 20 \mu\text{g}/\text{kg}$).

Fast Track

Independent Risk Factors for Fast-track Failure Using a Predefined Fast-track Protocol in Preselected Cardiac Surgery Patients

Zakhary Waseem, MD,* Jacob Lindner, MD,† Sophia Sgouropoulou, MD,* Sarah Eibel, MD,* Stefan Probst, MD,* Markus Scholz, PhD,‡ and Joerg Ender, MD*

Objectives: The purpose of this study was to identify the independent risk factors for fast-track failure (FTF) in cardiac surgery patients.

Design: A retrospective analysis.

Setting: A university-affiliated heart center.

The rates of FTF reported in the literature vary from 15.6% to 45.5% in mixed-age populations.^{6,7} This can be explained by the different definitions of FTF and by patient selection. Based on different organizational structures of each hospital, a number of different local FT protocols exist, resulting in various definitions of a successful FT concept. A common definition of a successful FT is extubation within 6 hours postsurgery and ICU LOS <24 hours.¹¹ Successful FT should lead to reduction of ICU stay and economic benefits for the hospital compared with conventional treatment.

A meta-analysis of 25 prospective studies showed that there

transferred from the intermediate care unit or ward to the ICU. FTF rate was 11.6% for primary and 5.6% for secondary FTF. In the multivariate regression analysis, age >70 years, female sex, prolonged surgery, and prolonged cross-clamp time could be defined as independent risk factors for FTF.

A comparable FTF of 15.6% also has been reported. The LOS in an FT unit within the ICU was <48 hours. It was reported that extubation of the FT patients mainly was nurse-driven, and the decision of weaning from mechanical ventilation was made by the cardiothoracic team. Anesthesiologists or intensivists were only involved if respiratory problems occurred.⁶ In contrast, the PACU in the present study was

Table 6. Independent Risk Factors After Multivariate Analysis for Primary FTF Patients

Fast Track

Trends und Medizinökonomie

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Leipziger „Fast-track“- Protokoll in der Kardioanästhesie

After surgery, patients were admitted to the PACU if they were in stable hemodynamic condition without inotropic support, without excessive bleeding, and with a core temperature of at least 36°C. Only patients scheduled for elective cardiac surgery were admitted to the PACU. Postoperative analgesia consisted of a bolus of piritramide (0.1 mg/kg) as required and paracetamol (1 g every 6 h) to achieve a pain score between 2 to 4 on an analogue pain scale from 0 to 10. Immediately after extubation, all patients underwent a noninvasive ventilation period of 1 h (Elisee 350[®], Saime, France). The PACU operated daily Monday to Friday from 10:00 AM to 6:30 PM.

421). Control patients were identified through our database, having undergone surgery during an 8-month period (August 2004 to April 2005) 1 yr prior to implementation of the fast-track protocol. The control patients came from a sufficiently large cohort (n = 2266) to enable 1:1 propensity-score matching on many variables. The propensity score represented the probability of a patient being assigned to the fast-track group given the comorbidities of that patient. It was calculated for each patient using a logistic regression model that included variables known to affect postoperative lengths of stay, including type of surgery, coexisting diseases, left ventricular ejection fraction, and European System for Cardiac Operative Risk Evaluation score [3,14]. All patients

Ultra-Fast Track

The Impact of Immediate Extubation in the Operating Room After Cardiac Surgery on Intensive Care and Hospital Lengths of Stay

Dmitri Chamchad, MD,*‡ Jay C. Horrow, MD, MS,‡ Lev Nakhmchik, MSc,* Francis P. Sutter, DO,† Louis E. Samuels, MD,†‡ Candace L. Trace, RN, BA,† Francis Ferdinand, MD,† and Scott M. Goldman, MD†

Objective: To determine if lengths of stay in intensive care and the hospital are associated with extubation in the operating room at the conclusion of cardiac surgery.

Design: A nonrandomized, observational study with propensity score-guided case-control matching of prospectively collected data.

Setting: Three interrelated, university-affiliated, community hospitals.

propensity score for each of the 2,595 patients with complete data, representing the likelihood of immediate extubation (c-statistic = 0.727). A “greedy 5 to 1” propensity score-matching technique created 713 matched pairs of patients by extubation pathway. Those undergoing immediate extubation had reductions in intensive care duration by 23 hours on average (median from 46 to 27 hours, $p < 0.0001$) and in hospital length of stay by 0.8 days on average (median = 6

Fast Track

Ameliyat
bitişi

Pro

2. saat

Ali Fuat

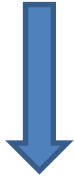


Neden Fast track

Erken ekstübasyon, mobilizasyon ve derlenme



Yoğun bakımda kalış süresinde azalma



Hastanede kalış süresinde azalma

Vaka iptallerinde azalma

Maliyette azalma

Fast track ne zamandan beri???

Abstract ▾

Send to: ▾

Anesthesiology. 1980 Feb;52(2):135-41.

Postoperative respiratory care: a controlled trial of early and late extubation following coronary-artery bypass grafting.

Quasha AL, Loeber N, Feeley TW, Ulliyot DJ, Roizen MF.

- 38 hasta, aynı anestezi yöntemi
- Erken ekstübasyon: 2 ± 2 sa
- Geç ekstübasyon: 18 ± 3 sa



- YB kalış süresi
- Hemodinamik performans
- Stres yanıt (NA seviyesi)
- YB sedatif analjezik kullanımı
- Morbidite

YB süresi, hemodinami, NA seviyesi fark yok
Daha az morfin diazepam kullanımı
Daha düşük Kardiyopulmoner morbidite



Morbidity outcome in early versus conventional tracheal extubation after coronary artery bypass grafting: A prospective randomized controlled trial ☆☆☆★★◇

Presented in part at the Canadian Anaesthetists Society Annual Meeting, June 1994, and at the American Society of Anesthesiologists Annual Meeting, Oct. 1994.

Davy C.H. Cheng, MDa, Jacek Karski, MDa, Charles Peniston, MDb, Buvanendran Asokumar, MDa, Ganesh Raveendran, MDa, Jo Carroll, RNA, Hillary Nierenberg, RNA, Sandra Roger, RNA, Don Mickle, MDc, Jeff Tong, PhDc, J. Zelovitsky, MDd, Tirone David, MDb, Alan Sandler, MBa

Erken ekstübasyon (1-6 saat):
15µg/kg fentanil

60/60
hasta

Konvansiyonel grup (12-24 saat):
50µg/kg fentanil

Kardiyak morbidite
Respiratuar morbidite
Hemodinami
Mortalite
YB ve hastanede kalış süresi

Ekstübasyon zamanı
YB'da kalış süresi
Hastanede kalış süresi
Intrapulmoner shunt (ilk 4 saat)



4 hasta postop MI
3'ü eks

Fast track güvenli
mi???

-Mortalite
-Morbidite



Fast Track

- **Güvenli**

- Quasha AL, Anesthesiology 1980;52:135-41
- Ramsay JG, Anesth Analg 1994;78:867-75
- Bell J, Br J Anaesth 1994;73:162-6
- Mora CT, Anesth Analg 1995;81:900-10
- Cheng DC, Anesthesiology 1996;85:1300-10
- Myles PS, Anesth Analg 1997;84:12-9
- Myles PS, Anesth Analg 2002;95:805-12
- Silbert BS, Chest 1998;113:1481-8

- **YB kalış süresini azaltır**

- Bell J, Br J Anaesth 1994;73:162-6
- Cheng DC, Anesthesiology 1996;85:1300-10

- **Maliyeti azaltır**

- Cheng DC, Anesthesiology 1996;85:1300-10
- Sherry KM, Anaesthesia 1996;51:312-7
- Cheng DCH, Anesthesiology 2003;98:651-7

■ REVIEW ARTICLE

David C. Warltier, M.D., Ph.D., Editor

Anesthesiology 2003; 99:982-7

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A Systematic Review of the Safety and Effectiveness of Fast-track Cardiac Anesthesia

Paul S. Myles, M.B.B.S., M.P.H., M.D., F.C.A.R.C.S.I., F.A.N.Z.C.A.,* David J. Daly, M.B.B.S., F.A.N.Z.C.A.,†
George Djalani, M.D., D.E.A.A., F.R.C.A.,‡ Anna Lee, B.Pharm., M.P.H., Ph.D.,§
Davy C. H. Cheng, M.D., M.Sc., F.R.C.P.C.||

- 10 çalışma, 1800 hasta (CABG veya Kapak operasyonları)
- Fenataniil < 20 µg/kg, ekstübasyon < 10 sa Fast track
- Fenataniil > 20 µg/kg, ekstübasyon > 10 sa Geleneksel yöntem

Primer amaç



Mortalite

Sekonder amaç



Major morbidite

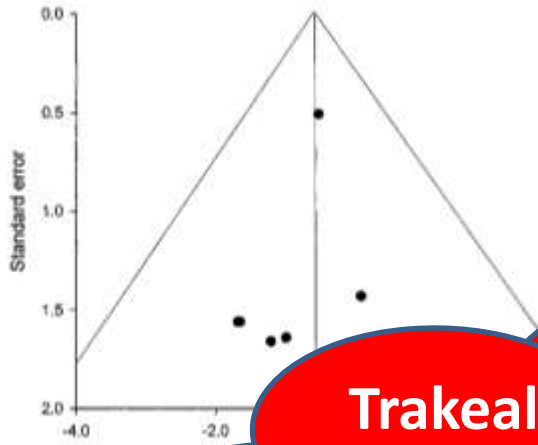


Figure 2. Begg's test of the estimate of the estimate. There was no evidence of publication bias.

**Trakeal ektübasyon süresi
8.1 sa kısa
YB kalış süresi 5.4 sa az**

**Mortalitede
fark yok**

Table 2. Risk of Major Morbidities Comparing a Low-dose Opioid Regimen (Fast-track Cardiac Anesthesia) with a High-dose Opioid Regimen (Traditional Cardiac Anesthesia)

| Morbidity | FTCA | | TCA | | OR (95% CI) |
|------------------------|--------|-----|--------|-----|------------------|
| | No. | % | No. | % | |
| Myocardial infarction* | 40/993 | 4.0 | 19/471 | 4.0 | 1.0 |
| Major sepsis | 1/98 | 1.0 | 1/102 | 1.0 | 1.0 |
| Wound infection | 2/84 | 2.4 | 3/84 | 3.6 | 0.82 |
| Stroke | 1/84 | 1.2 | 2/84 | 2.4 | 0.74 (0.05-10.5) |
| Acute renal failure | 2/44 | 4.5 | 0/43 | 0 | 2.92 (0.32-27.1) |
| Prolonged ICU stay | 5/160 | 3.1 | 7/171 | 4.1 | 0.84 (0.27-2.65) |
| Major bleeding | 1/118 | 0.9 | 6/121 | 5.0 | 0.31 (0.06-1.53) |

**Morbiditede
fark yok**

Not all relevant morbidity data were available in the original publications or from the authors. This is represented by the denominator of the incidence in each group.

Fast track güvenli mi???

(Anesth Analg 2009;108:727-33)

Fast-Track Anesthesia and Cardiac Surgery: A Retrospective Cohort Study of 7989 Patients

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Karel G. M. Moons, PhD*‡

George J. Brandon Bravo Bruinsma,
MD, PhD§

Cor J. Kalkman, MD, PhD*

Diederik van Dijk, MD, PhD*||

BACKGROUND: Fast-track cardiac anesthesia (FTCA) has been widely implemented but its safety has not been evaluated in sufficiently powered studies.

METHODS: We compared outcomes of patients undergoing FTCA with a historical control group undergoing conventional high-dose opioid cardiac anesthesia (CCA). The primary outcome measure was the incidence of in-hospital mortality. Secondary outcome measures were the incidence of in-hospital acute myocardial infarction, renal failure, and stroke. We also compared duration of mechanical ventilation and length of hospitalization in the intensive care unit and postoperative ward.

RESULTS: The CCA group comprised 4020 patients and the FTCA Group 3969 patients. The patients in the FTCA group were slightly older, had more comorbidities, and were more likely to undergo valve surgery than the CCA group. The incidence of in-hospital mortality was 1.9% in the CCA group and 2.3% in the FTCA group. Compared with the CCA group, the crude odds ratio for mortality in the FTCA group was 1.20 (95% confidence interval 0.88–1.64, $P = 0.25$) and the adjusted odds ratio was 0.92 (95% confidence interval, 0.65–1.32, $P = 0.66$). The incidence of myocardial infarction and stroke in the CCA and FTCA groups were 5.2% and 5.5% ($P = 0.61$), and 0.9% and 1.3%, ($P = 0.06$), respectively, whereas the incidence of acute renal failure was similar in both groups (0.8%, $P = 0.84$). The duration of mechanical ventilation was shorter in the FTCA patients compared with the CCA group (6 vs 12 h, $P \leq 0.001$), but their median intensive care stay was 1 h longer (23 vs 22 h, $P \leq 0.001$). Although the median duration of hospitalization was 6.0 days in both groups, the 90th percentile of the hospitalization time was 13 days in the CCA group and 18 days in the FTCA group ($P \leq 0.001$).

CONCLUSIONS: These data from 7989 cardiac surgical patients showed no evidence of an increased risk of adverse outcomes in patients undergoing FTCA.

(Anesth Analg 2009;108:727-33)

Fast track:

Remifentanil

1-3 μ g/kg bolus

5-10 μ g/kg/sa inf

3969 hasta

Konvansiyonel:

Sufentanil

2-4 μ g/kg bolus

0.5-2 μ g/kg/sa inf

4020 hasta

Fark yok

Leipziger „Fast-track“- Protokoll in der Kardioanästhesie

Effektiv, sicher und ökonomisch sinnvoll

PACU: 3 yataklı 10.00-18.30, anestezist+hemşire 421 hasta

Fast track protokolü:

İndüksiyon: prop(1-2mg/kg), sufenta(0.5-1µg/kg),
rokuronyum(0.6mg/kg)

İdame: Sevo+ remifenta(0.2µg/kg/dk), pompada 3mg/kg/sa
propofol

Cilt kapanmadan 1g parasetamol

Postop analjezi 0.1mg/kg pritramid bolusları ve parasetamol
1g/ 6 saatte bir

Ekstübasyon sonrası 1 sa maske ile NIV

Konvansiyonel grup

İndüks: Prop, sufenta,
pankuronyum

İdame: prop(3mg/kg/sa),
sufenta(1-2µg/kg/sa)

Postop YB'da sufenta inf.

PACU'ya alma kriterleri

- Stabil hemodinami
- İnotropik destek yok
- Aşırı kanama yok
- İsi > 36

Cardiac Surgery Fast-track Treatment in a Postanesthetic Care Unit

Six-month Results of the Leipzig Fast-track Concept

Joerg Ender, M.D.,* Michael Andrew Borger, M.D., Ph.D.,† Markus Scholz, Ph.D.,‡ Anne-Kathrin Funkat, Ph.D.,§ Nadeem Anwar, M.D.,|| Marcus Sommer, M.B.A.,# Friedrich Wilhelm Mohr, M.D., Ph.D.,** Jens Fassl, M.D.||

Table 2. Postoperative Data for the Entire Group

| | Fast Track | Control | P Value |
|--|-------------|-----------------|---------|
| No. | 421 | 421 | |
| Time to extubation, min | 75 [45-110] | 900 [600-1,140] | < 0.01 |
| PACU/ICU, h | 4 [3-5] | 20 [16-25] | < 0.01 |
| Intermediate care, h | 21 [17-39] | 26 [19-49] | < 0.01 |
| Hospital, days | 10 [8-12] | 11 [9-14] | < 0.01 |
| Intermediate care readmission (%) | 61 (14.5) | 42 (9.7) | 0.6 |
| LOS for intermediate care readmission, h | 18 [7-33] | 14 [5-25] | 0.23 |
| ICU readmission (%) | 24 (5.7) | 32 (7.6) | 0.33 |
| LOS for ICU readmission, h | 25 [13-53] | 19 [10-120] | 0.75 |
| Myocardial infarction (%) | 1 (0.2) | 4 (1.0) | 0.37 |
| Low cardiac output (%) | 2 (0.5) | 12 (2.9) | < 0.05 |
| Renal failure (%) | 4 (1.0) | 9 (2.1) | 0.25 |
| Stroke (%) | 5 (1.2) | 10 (2.4) | 0.30 |
| Mediastinitis (%) | 1 (0.2) | 2 (0.5) | 0.88 |
| Mortality (%) | 2 (0.5) | 14 (3.3) | < 0.01 |

FT'ta daha düşük mortalite:
Erken ekstübasyon sonucu
infeksiyon ve sepsis (VILI)

RESEARCH

Open Access

A specialized post-anaesthetic care unit improves fast-track management in cardiac surgery: a prospective randomized trial

Stefan Probst^{1*†}, Christof Cech^{1,2†}, Dirk Haentschel³, Markus Scholz⁴ and Joerg Ender¹

Fast track protokolü: 100 hasta
İndüksiyon: prop(1-2mg/kg), fenta(200µg)
rokuronyum(0.6mg/kg)

İdame: remifenta

Cilt kapanmadan 1g parasetamol
Postop analjezi: pritramid bolusları ve parasetamol
Ekstübasyon sonrası 1 sa maske ile NIV

Konvansiyonel grup: 100 hasta
İndüks: Aynı

İdame: Sufenta

Postop YB'da pritramid bolusları
(hemşire gözlemine göre) +
parasetamol

Ekstübasyon süresi, PACU ve YB kalış süreleri
Hastane kalış süresi, mortalite, düşük CO sendromu, yeni aritmi,
reentübasyon, uzamış ventilasyon ve resp yetersizlik

Table 4 Median extubation time and length of stay (LOS) and corresponding interquartile ranges

| | PACU group (n = 100) | ICU group (n = 100) | P value |
|---|----------------------|---------------------|---------|
| Primary extubation time (min) | 90 [50; 140] | 478 [305; 643] | <0.001 |
| Extubation within 6 h (n) | 97 | 33 | <0.001 |
| Reintubation (n) | 5 | 10 | 0.28 |
| Reintubation time (min) | 930 [330; 1315] | 990 [646; 6375] | 0.68 |
| Total ventilation time (incl. reintubation) (min) | 105 [70; 175] | 513 [320; 705] | <0.001 |
| PACU/ICU LOS (hours) | 3.3 [2.7; 4.0] | 17.9 [10.3; 24.9] | <0.001 |
| Readmission to ICU (n) | 4 | 7 | 0.54 |
| Secondary PACU/ICU LOS (hours) (incl. readmission from IMC to ICU and transfer from PACU to ICU) | 3.5 [2.8; 5.1] | 17.9 [10.3; 26] | <0.001 |
| Secondary PACU/ICU LOS <24 hours (n) | 95 | 71 | <0.001 |
| Primary IMC LOS (hours) | 23.0 [19.9; 41.8] | 21.0 [10.5; 28.8] | 0.0035 |
| Readmission IMC (n) | 13 | 8 | 0.09 |
| Primary ICT LOS (hours) | 26.9 [23.2; 46.0] | 41.1 [24.8; 60.2] | 0.02 |
| PACU + ICU + IMC excl. readmission | | | |
| Total ICT LOS (hours) | 30.9 [23.9; 59.9] | 43.9 [24.9; 65.4] | 0.08 |
| PACU + ICU + IMC incl. readmissions and transfer from PACU to ICU | | | |
| Hospital LOS (d) | 9 [8; 11] | 9 [8; 12] | 0.42 |

Table 5 Postoperative complications

| | PACU group (n = 100) | ICU group (n = 100) | P value |
|---|-------------------------|------------------------|---------|
| Cardiac arrhythmia (n) | 25 | 41 | 0.02 |
| Unstable sternum (n) | 1 | 1 | 1 |
| Pleural or pericardial effusion (n) | 22 | 14 | 0.20 |
| Renal failure (n) | 2 | 2 | 1 |
| Reoperation (n) | 5 | 11 | 0.19 |
| Stroke (n) | 0 | 2 | 0.50 |
| Prolonged respiratory insufficiency >24 hours (n) | 1 | 7 | 0.07 |
| Low cardiac output (n) | 0 | 3 | 0.25 |
| Cardiopulmonary resuscitation (n) | 0 | 5 | 0.06 |
| Mortality (n) | 0 | 3 | 0.25 |

PACU, post-anaesthetic care unit; ICU, intensive care unit.

**Fast track hasta
güvenliğini riske atmadan
erken ekstübasyona ve
YB'dan çıkışa imkan tanır**

Fast-track cardiac care for adult cardiac surgical patients.

Zhu F¹, Lee A, Chee YE.

25 çalışma, 4118 hasta
Fast track & Konvansiyonel
Erken & Geç ekstübasyon
Düşük doz & Yüksek doz opioid

Primer → Mortalite

Sekonder → Postoperatif kompl
Reentübasyon
Ekstübasyon süresi
YB'da kalış süresi
Hastane kalış süresi

Mortalitede fark
yok

Komplikasyon;
fark yok

Fast track
maliyeti
azaltıyor

sa

Masada ekstübasyon????

The Impact of Immediate Extubation in the Operating Room After Cardiac Surgery on Intensive Care and Hospital Lengths of Stay

Dmitri Chamchad, MD,*‡ Jay C. Horrow, MD, MS,‡ Lev Nakhamchik, MSc,* Francis P. Sutter, DO,† Louis E. Samuels, MD,†‡ Candace L. Trace, RN, BA,† Francis Ferdinand, MD,† and Scott M. Goldman, MD†

Journal of Cardiothoracic and Vascular Anesthesia, Vol 24, No 5 (October), 2010: pp 780-784

3 merkez, 3317 hasta
Masada (IE) veya YB'da (FT)
ekstübasyon

%69 masada, %31 YB'da ekstübe

Masada ekstübasyon

- Preoperatif medikal durum
- NYHA Class
- KOAH
- DM
- Yeni akut koroner olay
- İntraaortik balon pompası
- Cerrahi tipi
 - Hastanın durumu ve klinik tecrübeye göre

Masada ekstübe olan hastalar:

- Daha genç
- Erkek
- NYHA Class daha iyi
- Daha basit operasyon



Bi dünya opioid yap
nasıl uvanacak???

Analjeziyi nasıl
sağlayacağız?

Kas gücünü o kadar
çabuk nasıl
getireceğiz?

Anestezi derinliği
nasıl kontrol edeceğiz???

Intraop serebral bir
hadise yaşandı mı???

Hemodinamiyi nasıl sıkı
takip edeceğiz???

Bunu her hastada
uygulayacak mıyız???

Kas gücü

- Eskisi kadar uzun etkili kas gevşetici kullanmıyoruz. Pankuronyum → Vekuronyum

Alternatif var: Cisatrakuryum, Rokuronyum

[Downloaded free from <http://www.annals.in> on Monday, April 18, 2016, IP: 194.27.90.188]

Review
Article

Neuromuscular blockade in cardiac surgery: An update for clinicians

Thomas M Hemmerling, Gianluca Russo, David Bracco

Department of Anaesthesiology, McGill University, Montreal General Hospital, Montreal, Canada

at the end of surgery, monitoring of the corrugator supercilii muscle better reflects neuromuscular blockade at more central, profound muscles, such as the diaphragm, larynx, or thoraco-abdominal muscles. In conclusion, cisatracurium or rocuronium is recommended for neuromuscular blockade in modern cardiac surgery.

Kas gücü

- Kas gevşeticileri ezbere kullanmayabiliriz
- Nöromuskuler monitörizasyon



Steroid yapılı kas gevşetici

Sugammadex

Analjezi

Postoperatif myokard
iskemisinde azalma

Pulmoner
fonksiyonlarda iyileşme

Erken mobilizasyon

İyi
bir
anal
jezi

Analjezi

Torakal epidural analjezi → ALTIN STANDART

- Tenenbein PK et al. Can J Anaesth. 2008 Jun;55(6):344-50
- Salvi L et al. J Cardiothorac Vasc Anesth. 2007 Dec;21(6):810-5
- Onan B et al. J Card Surg. 2013 May;28(3):248-53.

Immediate Extubation After Aortic Valve Surgery Using High Thoracic Epidural Analgesia or Opioid-Based Analgesia

Thomas M. Hemmerling, MD, DEAA,* Nɦien L ,* Jean-Fran ois Olivier, MD,*
Jean-Luc Choini re, MD, FRCPC,* Fadi Basile, MD, FRCP(S),† and Ignatio Prieto, MD, FRCP(S)†

Journal of Cardiothoracic and Vascular Anesthesia, Vol 19, No 2 (April), 2005: pp 176-181

Hemodinamiyi
bozmaksızın
Fentanilden
daha iyi
analjezi

Analjezi

Intratekal morfin



Journal of Cardiothoracic and Vascular
Anesthesia

Volume 19, Issue 6, December 2005, Pages 708–713



Original article

**Combination of Intrathecal Morphine and Remifentanyl Infusion
for Fast-Track Anesthesia in Off-Pump Coronary Artery Bypass
Surgery**

Gurkan Turker, MD  , Suna Goren, MD, Sukran Sahin, MD, Gulay K. MD, Ekan Sayan, MD

Postoperatif
iyi bir
analjezi

Analjezi

Deksmedetomidin

Lin et al. *Critical Care* 2012, **16**:R169
<http://ccforum.com/content/16/5/R169>



RESEARCH

Open Access

Can dexmedetomidine be a safe and efficacious sedative agent in post-cardiac surgery patients? a meta-analysis

Yi Yun Lin^{1†}, Bin He^{2†}, Jian Chen¹ and Zhi Nong Wang^{1*}

Conclusions: Dexmedetomidine was associated with shorter length of mechanical ventilation and lower risk of delirium following cardiac surgery. Although the risk of bradycardia was significantly higher compared with traditional sedatives, it may not increase length of hospital stay and hospital mortality. Moreover, dexmedetomidine may decrease the risk of ventricular tachycardia and hyperglycemia. Thus, dexmedetomidine could be a safe and efficacious sedative agent in cardiac surgical patients.

Opioid

Kısa etkili: Remifentanil

Probst *et al. Critical Care* 2014, **18**:468
<http://ccforum.com/content/18/4/468>



RESEARCH

Open Access

A specialized post-anaesthetic care unit improves fast-track management in cardiac surgery: a prospective randomized trial

Stefan Probst^{1**†}, Christof Cech^{1,2†}, Dirk Haentschel³, Markus Scholz⁴ and Joerg Ender¹

Opioid

Kısa etkili: Remifentanil



Journal of Cardiothoracic and Vascular
Anesthesia

Volume 21, Issue 1, February 2007, Pages 35–40



Original article

Fast-Track Cardiac Anesthesia: Efficacy and Safety of Remifentanil Versus Sufentanil

Susanne Lison, MD*, Markus Schill, MD†, Peter Conzen, MD, PhD*  

İzoflurana ilave remifentanil & sufentanil
Güvenilirlik ve etkinlik benzer
Remifentanil → erken ekstübasyon

**Yüksek doz opioid GIS
motilitesini bozarak süreyi
uzatıyor**

Anestezi derinliđi

Klinik bulgular + tecrübe



**Farkındalık & Gereksiz
yüksek doz**

BIS



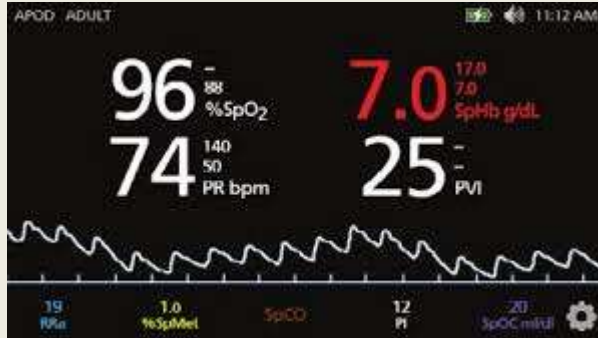
Serebral hadise?

Serebral doku oksijenizasyon monitörleri



Hemodinamik monitörizasyon

- İnvaziv-Noninvaziv CO monitörleri
- EKO
- Pleth Variable Index



Kas gücünü o kadar
çabuk nasıl geri
getireceğiz???

Analjeziyi nasıl
sağlayacağız?

Bi dünya opioid yaptık,
nasıl uyanacak???


Anestezi derinliği ne

Hemodinamiyi nasıl sıkı
takip edeceğiz???

intraop serebral bir
hadise yaşandı mı???



Şimdi ikna oldum,
galiba...



Bunu her hastada
uygulayacak
miyiz???

Hep mi iyi???

Her hastada yapalım mı???

- Fast track başarısızlığına yol açan nedenleri göz önünde bulunduralım:

FT kimlerde başarısız, kimlere dikkat edelim?



Journal of Cardiothoracic and Vascular
Anesthesia

Volume 29, Issue 6, December 2015, Pages 1461–1465



Original Article

Independent Risk Factors for Fast-Track Failure Using a Predefined Fast-Track Protocol in Preselected Cardiac Surgery Patients

Waseem Zakhary, MD¹, Jacob Lindner, MD², Sophia Sgouroupolou, MD³, Sarah Eibel, MD⁴, Stefan Probst, MD⁵, Markus Scholz, PhD², Joerg Ender, MD⁶

Table 6. Independent Risk Factors After Multivariate Analysis for Primary FTF Patients

| Parameters | p Value | OR |
|------------------|---------|----------------|
| Age > 70 y | <0.01* | 2.2 |
| Surgery duration | <0.01* | 1.4/h > 3 h |
| Cross-clamp time | <0.01* | 1.5/h > 65 min |
| Female sex | <0.01* | 1.5 |

Leipzig protokolü

2 yıllık periyot; 1704 hasta

Hastalar önce PACU → Ara Bakım Ünit

PACU → YB: Primer FT başarısızlığı

Ara bakım ünit → YB: Sekonder FT başarısızlığı

Sekonder FT başarısızlığı:

- KOAH
- DM
- Renal yeters
- Uzun cerrahi süre

FT kimlerde başarısız, kimlere dikkat edelim?

[Heart Surg Forum](#), 2010 Aug;13(4):E212-7. doi: 10.1532/HSF98.20101009.

Readmission to the intensive care unit after fast-track cardiac surgery: an analysis of risk factors and outcome according to the type of operation.

[Toraman F](#)¹, [Senay S](#), [Gullu U](#), [Karabulut H](#), [Alhan C](#).

1999-2008 arası 4270 hasta
CABG:3754
Kapak: 353
CABG+Kapak: 163

98 hasta (%2.2)
CABG: 73 (%1.9)
Kapak: 16(%4.5)
CABG+Kapak: 9 (%5.5)

**Solunum yetmezliği
ana neden**

Tekrar YB yatış riks faktörleri

CABG için:

- Yaş>65
- Periferik arter hast varlığı
- Drenaj>500ml

Kapak için:

- Preop konjestif kalp yetm varlığı

FT kimlerde başarısız, kimlere dikkat edelim?

Kiessling et al. *Journal of Cardiothoracic Surgery* 2013, **8**:47
<http://www.cardiothoracicsurgery.org/content/8/1/47>



JOURNAL OF
CARDIOTHORACIC SURGERY

RESEARCH ARTICLE

Open Access

Risk factor analysis for fast track protocol failure

Arndt H Kiessling^{1*}, Patrick Huneke¹, Christian Reyher², Tobias Bingold², Andreas Zierer¹ and Anton Moritz¹

Fast track başarısızlık için risk faktörleri

- ASA>3
- NYHA Class>III
- Cerrahi süre>267 dk

Postop komplikasyon gelişmesi için

- Kötü EF
- YB' a tekrar yatış

Riskli hastalar da Fast track için uygun mu?



ELSEVIER

European Journal of Cardio-thoracic Surgery 23 (2003) 678–683

EUROPEAN JOURNAL OF
CARDIO-THORACIC
SURGERY

www.elsevier.com/locate/ejcts

Yüksek risk: EuroSCORE \geq 6
158 hasta

Düşük risk: EuroSCORE $<$ 6
1004 hasta

Fast track recovery of high risk coronary bypass surgery patients[☆]

Cem Alhan*, Fevzi Toraman, Esref Hasan Karabulut, Sümer Tarcan, Sinan Dağdelen,
Nevnihal Eren, Nuri Çağlar

| Outcome | Low risk group | High risk group | P value |
|---|----------------|-----------------|-----------------|
| Bypass time > 90 min (%) | | 11.5 | ns ^a |
| Cross clamp time > 60 min (%) | | 18.7 | ns |
| Number of distal anastomoses | | 2.9 ± 1 | ns |
| Time to extubation (min) | | 299 ± 253 | 0.003 |
| Post operative blood loss > 1000 ml (%) | | 13.4 | ns |
| Intensive care unit stay (hour) | | 25.6 ± 28.7 | ns |
| Pulmonary complication (%) | | 3.8 | 0.04 |
| Renal complication (%) | | 2.5 | 0.01 |
| Neurological complication (%) | 0.5 | 1.3 | ns |
| Infective complication (%) | 0.5 | 1.9 | ns |
| Any red blood cell transfusion (%) | 19.9 | 37.3 | 0.001 |
| Intensive care unit readmission (%) | 2 | 5.1 | 0.04 |
| Postoperative length of stay (day) | 5.6 ± 2.7 | 5.8 ± 2.4 | ns |
| Ventilated > 6 h (%) | 7.4 | 19.1 | 0.001 |
| Intensive care unit stay > 24 h (%) | 4.3 | 13.3 | 0.001 |
| Postoperative length of stay > 5 days (%) | 25.6 | 33.3 | 0.05 |
| Hospital readmission (%) | 2.3 | 2.5 | ns |
| Mortality (%) | 0.6 | 3.2 | 0.01 |

ES transfüzyonu

- Gecikmiş ekstübasyon
- YB'da kalış süresinde uzama
- Artmış mortalite
- Hastaneye tekrar yatış

Bu anlattıklarına
gerçekten inanıyor ve
uyguluyor musun?



Kendi uygulamamız

- Ameliyat masasında Epidural kateter, invaziv arteriyel monitörizasyon (sedoanaljezi altında)
 - Epidural bolus (30-40mg bupivakain/10ml)
- İndüksiyon (Tiopental/propofol, fentanil, rokuronyum)
- BIS, rSO2 monitörizasyonu
- Epidural infüzyon (8-10mg/sa 3-4ml hacim)(En az postop 48. saate kadar)
- Anestezi idamesi: Sevo(kons: BIS'e göre), Oks, hava
- Kas gevşetici, midazolam (pompada bazen)

Kendi uygulamamız

- Postop 1-4. saatte ekstübasyon
- Solunum fizyoterapisi
 - (triflow, balon vs)
- Ek analjezi/sedasyon için (nadiren)
 - Deksmetomidin
 - Tramadol
 - NSAID



Kendi uygulamamız

700 hasta

- Epidurale baęlı komplikasyon yok
- Reentübasyon oranı %1
- Major morbidite çok az (Literatürle benzer)
- YB kalış süresi 24-48 saat ????
- Hastanede kalış süresi 6-7 gün ???

CABG cerrahisinde TEA'nin etkileri

TEA+Genel

Genel

TEA:
Levo/bupivakain
intra+postop

İntraop: Fenatnil
Postop:
Deksmedetomidin

Hemodinami
Kan gazı değerleri
Ekstübasyon süreleri
VAS değerleri
ACTH, Kortizol değerleri

Postop ACTH, Kortizol düzeyleri TEA'da düşük
Ekstübasyon süreleri benzer (ama kısa: 2.4 sa)
VAS değerleri TEA'da düşük

T.C.
KARADENİZ TEKNİK ÜNİVERSİTESİ
TIP FAKÜLTESİ
ANESTEZİYOLOJİ VE REANİMASYON ANABİLİM DALI

KORONER ARTER BYPASS GREFT OPERASYONLARINDA TORAKAL
EPİDURAL ANESTEZİNİN PEROPERATİF ETKİLERİ

THE PEROPERATIVE EFFECTS OF THORACIC EPIDURAL ANESTHESIA IN
CORONARY ARTERY BYPASS GRAFT OPERATIONS

UZMANLIK TEZİ

Dr. Sibel TETİK

TEZ DANIŞMANI
Doç. Dr. Ergin ERTÜRK

TRABZON - 2013

TEA'nin reperfüzyon hasarına etkisi

T.C.
KARADENİZ TEKNİK ÜNİVERSİTESİ
TIP FAKÜLTESİ
ANESTEZİYOLOJİ VE REANİMASYON ANABİLİM DALI

AÇIK KALP CERRAHİSİNDE GENEL ANESTEZİYLE BİRLİKTE
OLAN TORAKAL EPİDURAL ANESTEZİ VE ANALJEZİNİN
REPERFÜZYON HASARI ÜZERİNE OLAN ETKİLERİ

THE EFFECT OF THORACIC EPIDURAL ANESTHESIA AND
ANALGESIA WITH GENERAL ANESTHESIA ON REPERFUSION
INJURY IN OPEN HEART SURGERY

Uzmanlık Tezi

Dr. Sevim KAVRAZ ELTEMİZ

Tez Danışmanı
Doç. Dr. Engin ERTÜRK

TRABZON 2011

TEA+Genel


Genel

TEA:
Levo/bupivakain
intra+postop

İntraop: Fenatnil
Postop:
Deksmedetomidin

İskemi modifiye albümin (İMA)
Malonil dialdehit (MDA)
Total oksidan kapasite(TOS)
Total antioksidan kapasite (TAS)
Kan gazı değerleri
Hemodinamik değerler

Postop İMA, TOS düzeyleri TEA'da düşük
TAS değerleri TEA'da yüksek



**İyi de, bu araç gereç
donanım ve tecrübe
her yerde yok**

**Yine de hangi
gerekçyle FT
yapalım?**

Acı tecrübe

- 62 yaş erkek hasta
- İzole 2 damar CABG
- Sorunsuz anestezi, cerrahi
- Pompadan düşük doz inotropi ile çıkış
- **Fast track uygula(ya)madık!!!!**
- YB'da 3. saatte arrest
- 45 dk resüsitasyon → Kalp ritmi döndü
- Progresif süreç → **3. gün EXITUS**

Neden arrest???

- Başka hastaya PA akciğer filmi
- Seyyar röntgen cihazı sigorta attırıyormuş
- Doktor ve personel yetersiz
- Arrest fark edilememiş

Aaahh!

Keşke...

Son olarak



- ASA<4
- NYHA Class<IV
- Komorbiditesi düşük (EuroSCORE<5)
- Fazla kompleks olmayan vakalar hastalar
- Uzun olmayan kros klemp süresi (<70dk)
- Preop ve postop solunum terapisi, mental hazırlık
- İyi hazırlanmış ve eğitilmiş bir ekip eşilğinde



teşekkürler