KARDİYOTORASİK ANESTEZİ VE YOĞUN BAKIMDA KALİTE YÖNETİMİ

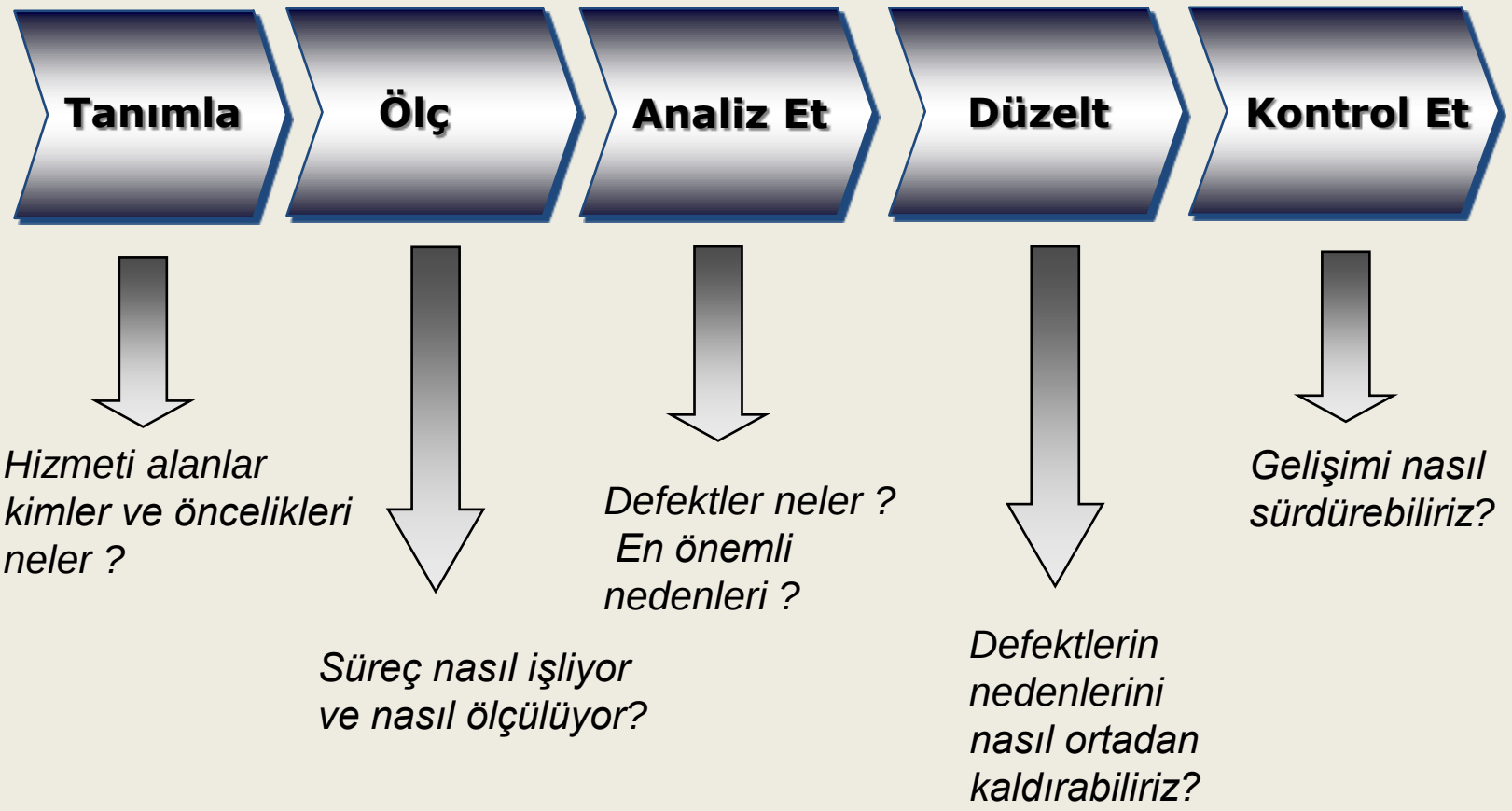
Prof. Dr. Seden Kocabaş

Kalite Yönetimi

- Organizasyonun müşterilerine yüksek kaliteli ürün ve servis sunma yeteneğini geliştirebileceği bir iklimi başlatmak ve kalıcı kılmak için:

Organizasyon çapında harcanan eforların tümü

Kalite Yönetimi



Organizasyona Ait Ürün veya Servisi Geliştirmek İçin…

Kalite Yönetimi

- İlk kez ABD'de 1980'li yıllarda tanıtılmıştır
- 1990'lı yıllarda - Japon otomobil endüstrisi başta olmak üzere- endüstriler memnuniyetle karşılamıştır
- Medikal endüstriye uyarlama çabası başlangıçta tıp çevreleri tarafından direnç ile karşılanmıştır

Kalite Yönetimi

- Zaman içerisinde, güvenlik konularının tartışılması, hedefler konulması ve hasta bakımında gelişme sağlanması ile tıp alanında desteklenmiştir

Kalite ve Güvenlik: En az diğer endüstrilerde olduğu kadar sağlık hizmetinin de ayrılmaz iki yönü…

INSTITUTE OF MEDICINE

Shaping the Future for Health

TO ERR IS HUMAN:
BUILDING A SAFER HEALTH SYSTEM

Health care in the United States is not as safe as it should be--and can be. At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, according to estimates from two major studies. Even using the lower estimate, preventable medical errors in hospitals exceed attributable deaths to such feared threats as motor-vehicle wrecks, breast cancer, and AIDS.

Medical errors can be defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. Among the problems that commonly occur during the course of providing health care are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken patient identities. High error rates with serious consequences are most likely to occur in intensive care units, operating rooms, and emergency departments.

Beyond their cost in human lives, preventable medical errors exact other significant tolls. They have been estimated to result in total costs (including the expense of additional care necessitated by the errors, lost income and household productivity, and disability) of between $17 billion and $29 billion per year in hospitals nationwide. Errors also are costly in terms of loss of trust in the health care system by patients and diminished satisfaction by both patients and health professionals. Patients who experience a long hospital stay or disability as a result of errors pay with physical and psychological discomfort. Health professionals pay with loss of morale and frustration at not being able to provide the best care possible. Society bears the cost of errors as well, in terms of lost worker productivity, reduced school attendance by children, and lower levels of population health status.

A variety of factors have contributed to the nation's epidemic of medical errors. One oft-cited problem arises from the decentralized and fragmented nature of the health care delivery system--or "nonsystem," to some observers. When patients see multiple providers in different settings, none of whom has access to complete information, it becomes easier for things to go

Errors...are costly in terms of loss of trust in the health care system by patients and diminished satisfaction by both patients and health professionals.

"The Institute of Medicine" sağlık hizmetinin kalitesini aşağıdaki kavramlar ile tanımlamıştır:

- Güvenlik
- Güncellik
- Verimlilik
- Etkinlik
- Hakkaniyet
- Hasta Odaklılık

Hasta bakım kalitesini tanımlamada kullanılmış olan üç farklı model:

- WHO: Filozofik - yüksek kaliteli sağlık bakımı evrensel bir haktır
- Donabedian: Organizasyonel - sağlık sistemlerini araştırır
- Bamako: Girişimsel - ekonomik yönlerini araştırır

En sık kullanılan: Donabedian Modeli

Kalite Yönetimi

- **Donabedian Modeli:**

- Medikal bakımın kalitesinin nasıl değerlendirileceği ve garanti edilebileceğini açıklayan üç boyutlu model

- Tıp alanında kabul edilebilir bir kalite düzeyi için ulaşılması gereken yapı, süreç ve sonuç kriterleri

Donabedian A. The quality of care: how can it be assessed? *JAMA* 1988; 260(12): 1743-48.
Visnjic A, et al. Measures for improving the quality of health care.
Scientific Journal of the Faculty of Medicine 2012; 29(2): 53-8.

Kalite Yönetimi

- **Donabedian Modeli:**

Yapı: Kardiyak cerrahi ve anestezi hasta bakımının sunulduğu alanın fiziksel ve organizasyonel özellikleri

- Yeterli hastane, operasyon salonu ve YB alt yapıları*
- Yeterli eğitim almış medikal, paramedikal personel

* YB, dahili-cerrahi tıp alanları, laboratuvar, eczane, kan bankası gibi birimlerin kendine ait ulusal / uluslararası standartları var

Kalite Yönetimi

- **Donabedian Modeli:**

Süreç: Kardiyak cerrahi ve anestezide uygulanan tüm medikal, administratif, ekonomik görevleri içerir

- Preop.dönemden, cerrahi ve YB süreci boyunca taburculuğa dek ve ötesinde uygulanan medikal ve cerrahi bakım*

  - Rehberler mevcut olup, kanıta dayalı bakım her zaman kişisel görüşlerden önde tutulmalıdır. Bakım süreçleri, yazılı doküman (protokol) olarak sunulur

Kalite Yönetimi

- **Donabedian Modeli:**

Sonuç: Kardiyak cerrahi ve anestezi hasta bakımının hastanın durumu üzerine ve hasta popülasyonu üzerine etkileri

- Hastanın bilgi ve davranışındaki gelişmeleri ve hasta memnuniyet derecesini de içerebilir

Kalite Yönetimi

- Donabedian modeli, sonraki yıllarda sonuca etki edebilecek bazı koşulları içerecek şekilde modifiye edilmiştir:

  - Komorbiditeler
  - Risk faktörleri
  - Sosyodemografik faktörler

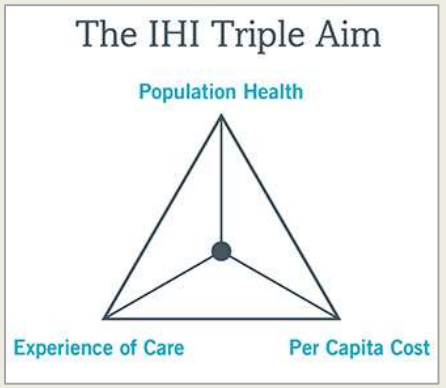
- Bu faktörlerin çoğu kolaylıkla ölçülebilir iken, çalışanların tutumu ve insan faktörleri gibi bazı kültürel yönler ?

The Triple Aim: Care, Health, And Cost

The remaining barriers to integrated care are not technical; they are political.

by Donald M. Berwick, Thomas W. Nolan, and John Whittington

ABSTRACT: Improving the U.S. health care system requires simultaneous pursuit of three aims: improving the experience of care, improving the health of populations, and reducing per capita costs of health care. Preconditions for this include the enrollment of an identified population, a commitment to universality for its members, and the existence of an organization (an "integrator") that accepts responsibility for all three aims for that population. The integrator's role includes at least five components: partnership with individuals and families, redesign of primary care, population health management, financial management, and macro system integration. [*Health Affairs* 27, no. 3 (2008): 759–769; 10.1377/hlthaff.27.3.759]



- **Hasta bakım deneyiminin geliştirilmesi: Güvenlik, kalite, memnuniyeti içerir**
- **Toplum sağlığının geliştirilmesi**
- **Kişi başına düşen sağlık masrafının azaltılması**

Improving the Quality and Safety of Patient Care in Cardiac Anesthesia

Alan F. Merry, FANZCA,*† Jennifer Weller, MD, FANZCA,† and Simon J. Mitchell, PhD, FANZCA*†‡

- Kardiyak Anestezide kalitenin sürdürülebilmesinde Triple Aim geçerli

- Yapıların, süreçlerin ve sonuçların dokümantasyonu
- Verilerin idaresi ve analizi
- Spesifik kalite kontrol önlemleri alınması

Anesthesia, Vol 28, No 5 (October), 2014: pp 1341–1351

Kalite Yönetimi

- Sonuçların Öngörülmesi ve Kıyaslanması
- Pre ve Postoperatif Risklerin Belirlenmesi
- Karar Verme ve Danışmanlık
- Kaynakların Planlanması ve Kullanımı

Kalite Yönetimi

- Yapı, Süreç ve Sonuç endikatörleri belirlenmeli
  - Uniform olmalı, kolay ölçülebilmeli
  - Makul bir prevalansa sahip olmalı
  - Net tanımlanabilir ve standardize olmalı
  - Ölçülebilen değerler öncelikle tercih edilmeli

Preoperatif Döneme Ait Endikatörler:

- Demografik: Yaş, cinsiyet, ırk, boy, vücut ağırlığı
- Yatış süreleri: YB, Hastane
- Sigara, alkol, madde kull.
- Kalp hastalığı, geçirilmiş Mİ, kalp yetm. NYHA sınıf., kardiyojenik şok, aritmi, geçirilmiş KV girişimler,
- Hemodinamik, EKO, kateterizasyon verileri

-Eşlik eden morbiditeler: DM, dislipidemi, Böbrek yetm., hipertansiyon, endokardit, akciğer hast., periferik arter hast., serebrovasküler hast.

- Lab. değerleri: Hematokrit, lökosit, rutin biyokimya
- Preop. İlaçlar: Evet /Hayır, kontrendike /endike değil

İntraoperatif Döneme Ait Endikatörler:

- Cerrah - anesteziyolog adı
- Hastanın tanısı
- Primer-sekonder girişimler
- Operasyon başlangıç bitiş zamanları, Anestezi başlangıç bitiş zamanları,
- Operasyonun statüsü: elektif, acil veya palyatif
- Antibiyotik seçimi ve
- uygulama zamanı
- Monitorizasyon, anestezi tekniği ve ajanları,
- Advers anestezi olayları, kan ürünü uygulamaları

- Kardiyopulmoner baypas ve bununla ilgili sirkülatuvar arrest kullanımı, aortik kros klemp, kardiyopleji özellikleri

- Vazoaktif medikasyonlar, İABP desteği gereksinimi

- Koroner arter baypas cerrahisi için uygulanan anastomoz sayıları, valv cerrahisi için girişim tipi, kullanılan protez tipi

Postoperatif Döneme Ait Endikatörler:

- İntübasyon ve mekanik ventilasyon süresi
- Kan ürünleri transfüzyonu ve bununla ilişkili komplikasyonlar
- Postoperatif medikasyonlar
- Reoperasyon gereksinimi
- Kardiyak, nörolojik, renal, pulmoner infeksiyöz, vasküler komplikasyonlar

- Diğer (gastrointestinal, ürolojik, hematolojik) komplikasyonlar
- Hastanın taburculuk anındaki durumu, taburculuğa dek geçen süre, taburculuk anında kullanılan ilaçlar önemli
- Hastaneye yeniden yatış söz konusu ise, nedeni ?

Kalite Yönetimi

- **Sonuç**

  - Mortalite: istatistiksel analiz açısından zaman periyodu verilmesi tercih edilir
  - Kombine sonuçlar: örneğin MACE

    MACE (Mortalite ve Advers Kardiyak Olaylar)
  - Hastane / Yoğun Bakım'da Yatış Süreleri
  - Maliyet (Hasta Bakımı ve Süreç)

Kalite Yönetimi

- Risk Skorlamasına Neden Gereksinim Var?
  - Bildirimlerin standardize edilmesi
  - Hastalığın seyrinin daha iyi anlaşılması
  - Tedavi etkilerinin değerlendirilmesi olanağı
- Kısıtlılıkları?
  - Kompleks klinik durumlarda ölçüm güçlüğü
  - Nadir katastrofik olaylar
  - Örneklemede değişkenlikler

Kalite Yönetimi

- Preoperatif Risk Değerlendirme:
  - EuroSCORE I, EuroSCORE II
  - EuroSCORE I: beklenen mortalite oranını bir miktar yüksek tahmin eder
  - STS / STS-PROM skoru
  - Parsonnet skoru
- Postoperatif Risk Değerlendirme:
  - SOFA skoru, SAPS ve APACHE IV skorlamaları
  - CASUS skorlaması

Parsonnet score is a good predictor of the duration of intensive care unit stay following cardiac surgery

D R Lawrence, O Valencia, E E J Smith, A Murday, T Treasure

Table 1 The Parsonnet score

Risk factor	*Score*
Female	1
Obesity, > 1.5 times ideal weight	3
Diabetes	3
Hypertension	3
Ejection fraction (%)	
> 50	0
30–49	2
< 30	4
Age (years)	
71–74	7
75–79	12
⩾ 80	20
First reoperation	5
Second reoperation	10
Preoperative IABP	2
Emergency from procedures laboratory	10
Dialysis dependent	10
Catastrophic states	10
Valve surgery	
Mitral	5
PAP > 60 mm Hg	3
Aortic	5
Gradient > 120 mm Hg	2
CABG with valve	2

CABG, coronary artery bypass graft; IABP, intra-aortic balloon pump; PAP, pulmonary artery systolic pressure.

Parsonnet skoru 0-9 ise:
YB yatış süresi 1.49 gün

Parsonnet skoru 10+ ise:
YB yatış süresi 2.89 gün
($p = 0.01$).

Strok, İABP, hemofiltrasyon, Trakeostomi, reoperasyon;
PS 0–9 ise anlamlı azalır
($p < 0.01$)

İzole tek komplikasyon riski:
% 4.7 (PS 0–9) *vs.*
% 15.2 (PS 10+) ($p < 0.01$).

Heart 2000;**83**:429–432

Limitations of the Parsonnet score for measuring risk stratified mortality in the north west of England

K Wynne-Jones, M Jackson, G Grotte, B Bridgewater, on behalf of the North West Regional Cardiac Surgery Audit Steering Group

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CABG, coronary artery bypass graft; IABP, intra-aortic balloon pump; PAP, pulmonary artery systolic pressure.

İngiltere'de opere edilen
8210 kardiyak cerrahi hastası
Operatif mortalite: %3.5

Parsonnet skoru prediktif değeri: AUC=0.74

Parsonnet skoru, ile öngörülen mortalitenin %51'i gözlendi

Mortalite ile ilişkili olmayan birkaç risk F içeriyor,
Bazı risk F ise eksik ?.

Heart 2000;84:71–78

Using Society of Thoracic Surgeons Risk Models for Risk-Adjusting Cardiac Surgery Results

Ruyun Jin, MD, Anthony P. Furnary, MD, Stephanie C. Fine, MA,
Eugene H. Blackstone, MD, and Gary L. Grunkemeier, PhD

Medical Data Research Center, Providence Health & Services, Portland, Oregon; and Department of Thoracic and Cardiovascular Surgery and Department of Quantitative Health Sciences, Cleveland Clinic, Cleveland, Ohio

Procedures

1. Isolated CABG
2. Isolated valve procedure (aortic valve replacement; mitral valve replacement or repair)
3. Isolated valve procedure plus CABG

End points

1. Operative mortality
2. Reoperation for any reason
3. Permanent stroke
4. Renal failure
5. Deep sternal wound infection
6. Prolonged ventilation time (>24 hours)
7. Operative death or major morbidity (of the five types above)
8. Short postoperative length of stay (<6 days and discharged alive)
9. Long postoperative length of stay (>14 days)

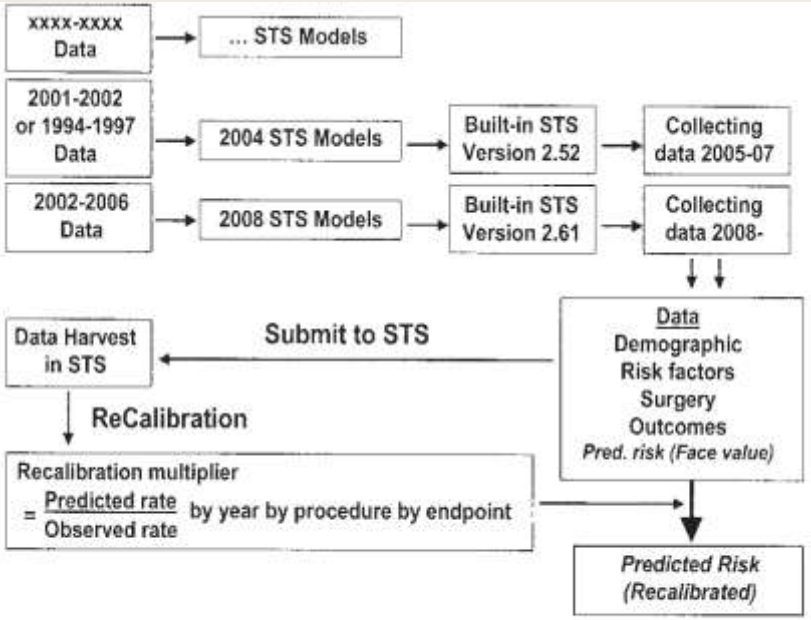

Fig 1. Diagram shows Society of Thoracic Surgeons (STS) models and the calibration process.

(Ann Thorac Surg 2010;89:677–82)

European system for cardiac operative risk evaluation (*Euro*SCORE)☆

S.A.M. Nashef*, F. Roques, P. Michel, E. Gauducheau, S. Lemeshow, R. Salamon, the *Euro*SCORE study group

Papworth Hospital, Cambridge CB3 8RE, UK

Table 2
Risk factors, definitions and weights (score)

	Definition	Score
Patient-related factors		
Age	Per 5 years or part thereof over 60 years)	1
Sex	Female	1
Chronic pulmonary disease	Longterm use of bronchodilators or steroids for lung disease	1
Extracardiac arteriopathy	Any one or more of the following: claudication, carotid occlusion or >50% stenosis, previous or planned intervention on the abdominal aorta, limb arteries or carotids	2
Neurological dysfunction	Disease severely affecting ambulation or day-to-day functioning	2
Previous cardiac surgery	Requiring opening of the pericardium	3
Serum creatinine	>200 μmol/l preoperatively	2
Active endocarditis	Patient still under antibiotic treatment for endocarditis at the time of surgery	3
Critical preoperative state	Any one or more of the following: ventricular tachycardia or fibrillation or aborted sudden death, preoperative cardiac massage, preoperative ventilation before arrival in the anaesthetic room, preoperative inotropic support, intraaortic balloon counterpulsation or preoperative acute renal failure (anuria or oliguria < 10 ml/h)	3
Cardiac-related factors		
Unstable angina	Rest angina requiring i.v. nitrates until arrival in the anaesthetic room	2
LV dysfunction	Moderate or LVEF 30–50%	1
	Poor or LVEF < 30	3
Recent myocardial infarct	(<90 days)	2
Pulmonary hypertension	Systolic PA pressure >60 mmHg	2
Operation-related factors		
Emergency	Carried out on referral before the beginning of the next working day	2
Other than isolated CABG	Major cardiac procedure other than or in addition to CABG	2
Surgery on thoracic aorta	For disorder of ascending, arch or descending aorta	3
Postinfarct septal rupture		4

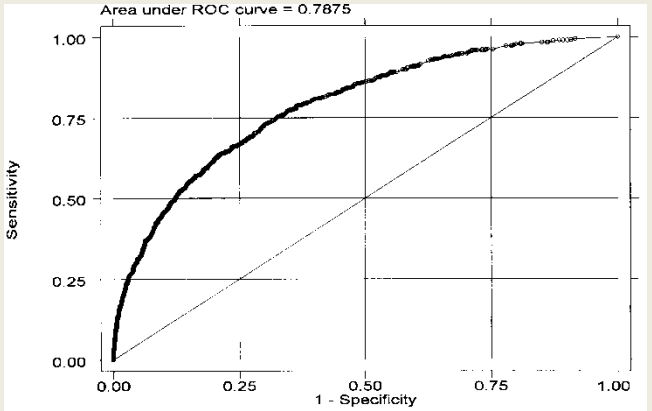

Fig. 1. ROC curve graphs for the developmental dataset ($n = 13302$).

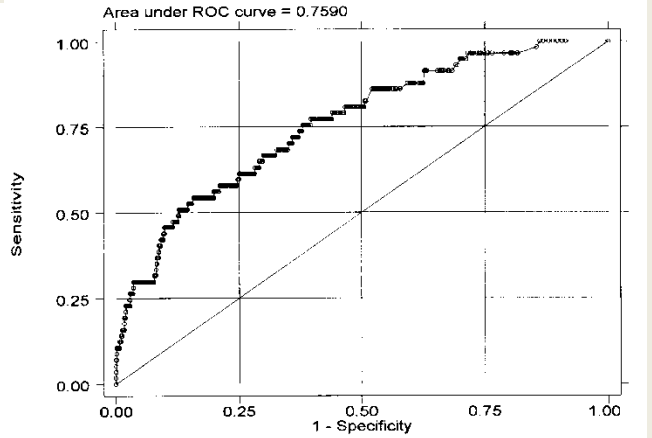

Fig. 2. ROC curve graphs for the validation dataset ($n = 1497$). The irregular form of the curve is due to the smaller sample size in the validation dataset.

European Journal of Cardio-thoracic Surgery 16 (1999) 9–13

Comparison of 19 pre-operative risk stratification models in open-heart surgery

Johan Nilsson[1]*, Lars Algotsson[2], Peter Höglund[3], Carsten Lührs[1], and Johan Brandt[1]

[1] *Department of Cardiothoracic Surgery, Heart and Lung Centre, Lund University Hospital, SE 221 85 Lund, Sweden;*
[2] *Department of Cardiothoracic Anesthesiology, Heart and Lung Centre, Lund University Hospital, Lund, Sweden; and*
[3] *Competence Centre for Clinical Research, Lund University Hospital, Lund, Sweden*

Table 2 ROC area for the five risk algorithms with best performance and accuracy in CABG-only surgery ($n = 4351$)

	30-day mortality ROC area (95% CI)	1-year mortality ROC area (95% CI)
EuroSCORE (logistic)	0.86 (0.82–0.90)	0.75 (0.72–0.79)
EuroSCORE (additive)	0.85 (0.81–0.89)	0.75 (0.71–0.78)
NYS	0.84 (0.80–0.88)	0.75 (0.72–0.79)
Cleveland Clinic	0.84 (0.80–0.88)	0.75 (0.71–0.78)
Parsonnet (modified)	0.84 (0.80–0.88)	0.73 (0.69–0.77)

Cleveland Clinic risk score algorithm is also known as Higgins score.

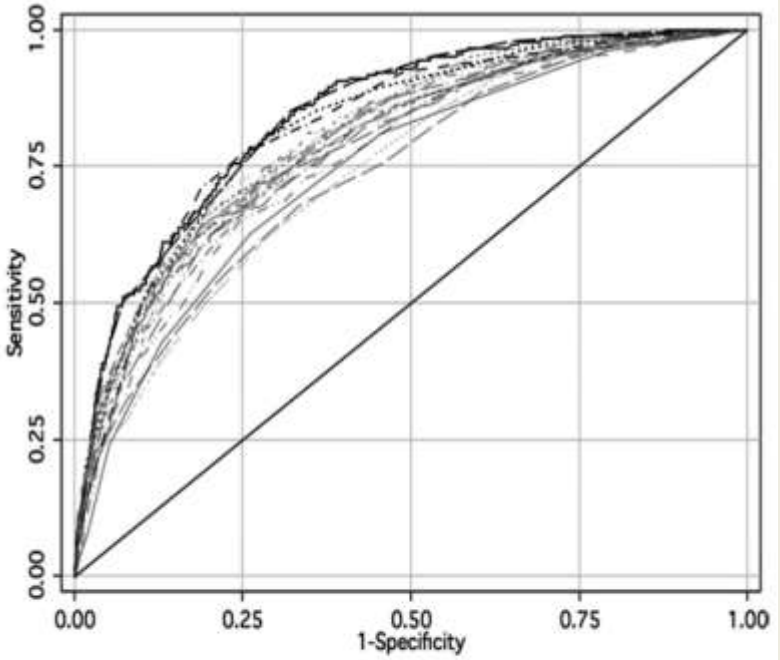

Figure 2 The ROC curves. The sensitivity of prediction of 30-day mortality vs. 1-specificity for the 19 risk algorithms is plotted. The solid line represents the absence of discrimination. Open-heart surgery ($n = 6222$).

European Heart Journal (2006) **27**, 867–874

EuroSCORE II†

Samer A.M. Nashef[a,*], François Roques[b], Linda D. Sharples[c], Johan Nilsson[d], Christopher Smith[a], Antony R. Goldstone[e] and Ulf Lockowandt[f]

Table 3: EuroSCORE II demographics and comorbidity (n = 22 381)

Variable	Frequencies (%) or mean (SD) [range]
Patient-related factors	
Age (years)	64.6 (12.5) [18–95]
Female	6919 (30.9%)
Weight (kg)	77.9 (15.9) [30–182]
Height (cm)	168.5 (9.6) [100–213]
BMI (calculated) (kg/m^2)	27.4 (4.8) [9.6–82.6]
Body surface area (calculated)	1.87 (0.21) [1.04–2.90]
Diabetes—no	16 783 (75.0%)
Diet only	803 (3.6%)
Oral therapy only	3103 (13.9%)
Insulin	1705 (7.6%)
Pulmonary disease	2384 (10.7%)
Neurological dysfunction	713 (3.2%)
Serum creatinine (μmol/l)	96.4 (57.1)
Serum creatinine (mg/dl)	1.13 (0.92)
Serum creatinine > 200 μmol/l	562 (2.6%)
CC (calculated)	83.6 (50.9)
On dialysis	244 (1.1%)
Serum albumin (g/l)	31.6 (19.0)
Active endocarditis	497 (2.2%)
Critical preoperative state	924 (4.1%)
Pre-op VT/VF or aborted sudden death	137 (0.6%)
Pre-op cardiac massage	94 (0.4%)
Pre-op ventilation	251 (1.1%)
Pre-op inotropes	475 (2.1%)
Pre-op IABP	384 (1.7%)
Pre-op acute renal failure	108 (0.5%)

VT: ventricular tachycardia; VF: ventricular fibrillation; IABP: intra-aortic balloon pump.

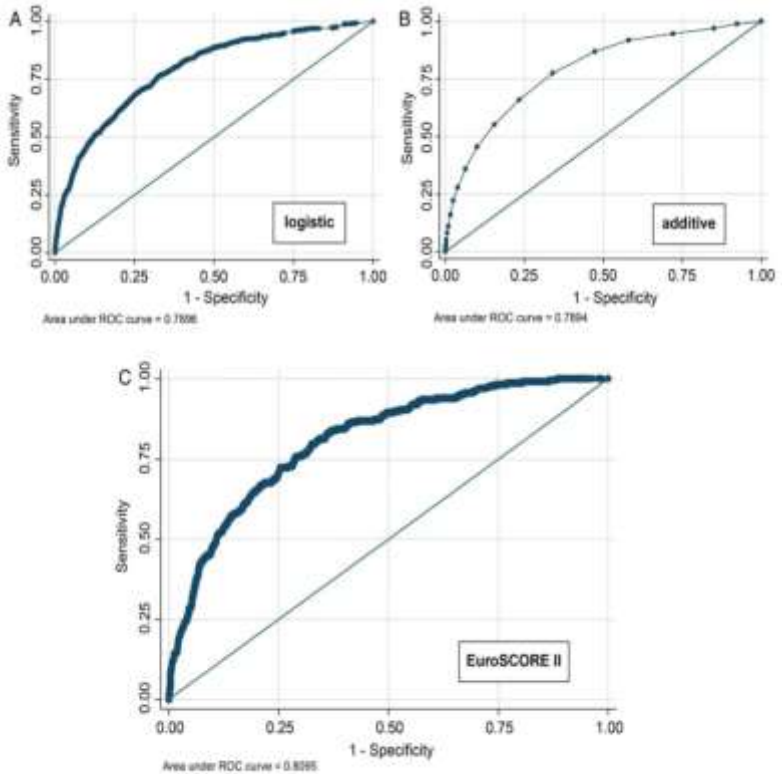

Figure 2: Areas under the ROC curve for the previous additive and logistic models applied to current data, and the new logistic EuroSCORE II model applied to the validation data set of 5553 patients.

European Journal of Cardio-Thoracic Surgery 41 (2012) 734–745

Comparison of the EuroSCORE II and Society of Thoracic Surgeons 2008 risk tools†

Bilal H. Kirmani, Khurum Mazhar, Brian M. Fabri and D. Mark Pullan*

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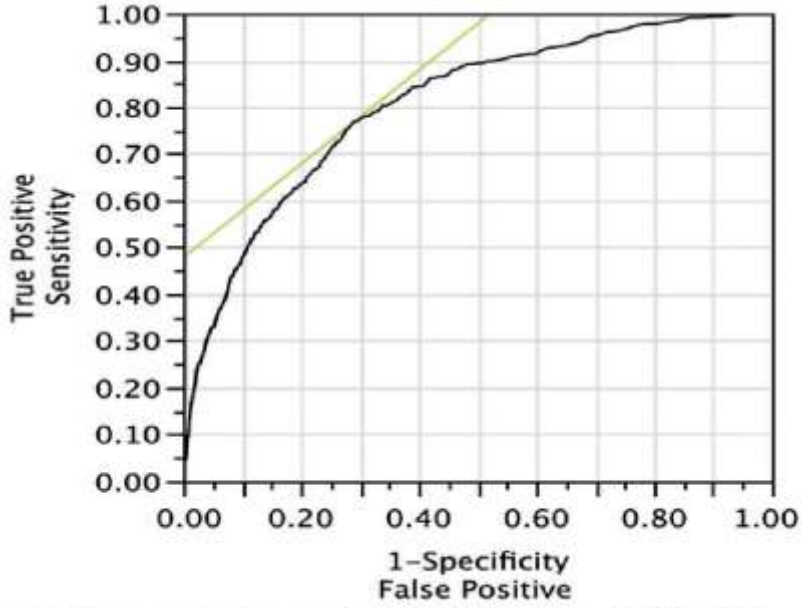

Figure 2: Receiver operator curve for STS 2008 in all cases, AUROC: 0.805.

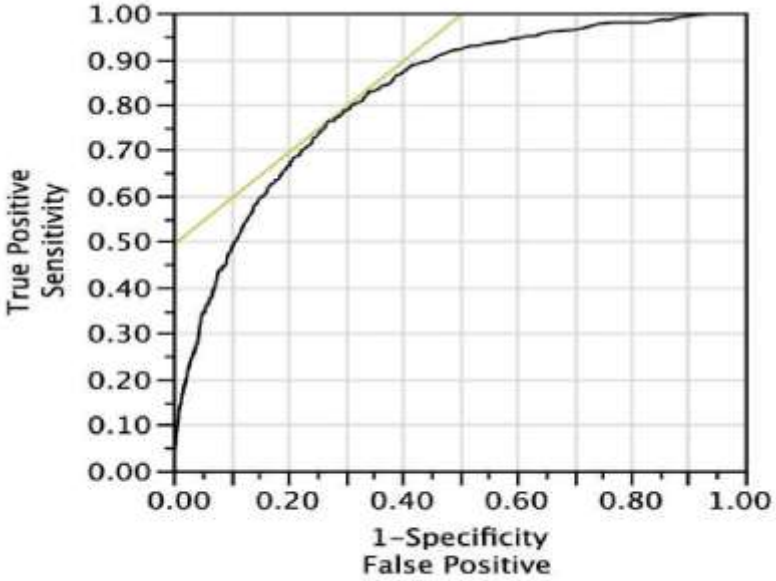

Figure 1: Receiver operator curve for EuroSCORE II in all cases, AUROC: 0.818.

European Journal of Cardio-Thoracic Surgery 44 (2013) 999–1005

Comparison of the EuroSCORE II and Society of Thoracic Surgeons 2008 risk tools†

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CONCLUSIONS: EuroSCORE II and STS both provide equivalent discrimination in predicting mortality in a British population, including those undergoing procedures for which the STS does not normally predict. Accounting for decile-grouped Hosmer-Lemeshow tests not being ideal for the assessment of calibration, both tools show good calibration for patients with low to moderate risk, with divergence from ~15% predicted risk.

European Journal of Cardio-Thoracic Surgery 44 (2013) 999–1005

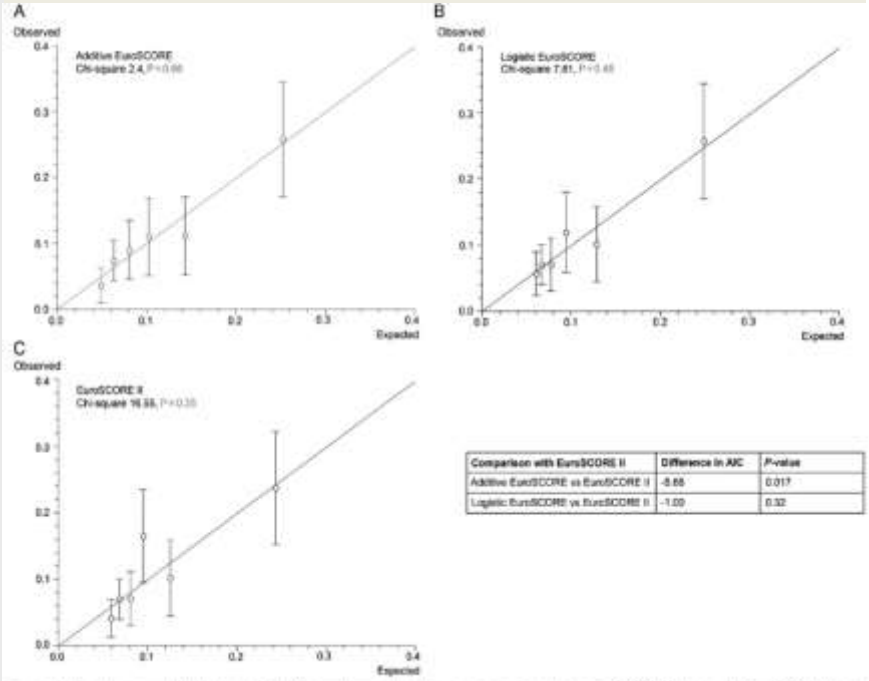
The new EuroSCORE II does not improve prediction of mortality in high-risk patients undergoing cardiac surgery: a collaborative analysis of two European centres†

Neil J. Howell[a,b,†], Stuart J. Head[c,†], Nick Freemantle[d], Taco A. van der Meulen[c], Eshan Senanayake[a,b], Ashvini Menon[a,b], A. Pieter Kappetein[c] and Domenico Pagano[a,b,e,*]

European Journal of Cardio-Thoracic Surgery 44 (2013) 1006–1011

Table 1: Patient demographics by EuroSCORE II variable

Variable	No. of patients (%)
Age, median (interquartile range)	74.3 (68–78.4)
Male	536 (57.5)
Renal impairment	
Dialysis	21 (2.3)
Severe	369 (39.5)
Moderate	439 (47.1)
Normal	104 (11.1)
Extracardiac arteriopathy	243 (26)
Poor mobility	67 (7.2)
Previous cardiac surgery	181 (19.4)
Chronic lung disease	260 (27.9)
Active endocarditis	58 (6.2)
Critical preoperative state	221 (23.7)
Diabetic on insulin	84 (9)
New York Heart Association Class III	333 (35.7)
New York Heart Association Class IV	322 (34.5)
Canadian Cardiovascular Society IV	255 (27.3)
Left ventricle function	
Good	390 (41.8)
Moderate	412 (44.2)
Poor	104 (11.1)
Very poor	27 (2.9)
Recent myocardial infarction	313 (33.5)
Pulmonary hypertension	
Severe	183 (19.6)
Moderate	151 (16.2)
Normal	599 (64.2)
Urgency	
Elective	376 (40.3)
Urgent	468 (50.2)
Emergency	86 (9.2)
Salvage	3 (0.3)
Weight of the intervention	
Isolated CABG	271 (29)
Single non-CABG	185 (19.8)
Two procedures	304 (32.6)
Three procedures	173 (18.5)
Additive EuroSCORE, median (interquartile range)	10 (9–11)
Logistic EuroSCORE, median (interquartile range)	15.3 (12.0–24.1)
EuroSCORE II, median (interquartile range)	9.28 (5.8–15.5)



Comparison with EuroSCORE II	Difference in AIC	P-value
Additive EuroSCORE vs EuroSCORE II	-8.88	0.017
Logistic EuroSCORE vs EuroSCORE II	-1.00	0.32

Figure 1: Observed vs expected risk of mortality (±95% confidence interval) for risk strata of the additive EuroSCORE (A), the logistic EuroSCORE (B) and the EuroSCORE II (C).

Comprehensive assessment of frailty for elderly high-risk patients undergoing cardiac surgery☆

Simon Sündermann[a,b,1,*], Anika Dademasch[a,1], Julian Praetorius[a], Jörg Kempfert[a], Todd Dewey[c], Volkmar Falk[b], Friedrich-Wilhelm Mohr[a], Thomas Walther[a]

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[c] *The Medical City Dallas Hospital, Department of Cardiac Surgery, 7777 Forrest Lane, Dallas TX 75230, USA*

European Journal of Cardio-thoracic Surgery 39 (2011) 33–37

Table 1
Baseline characteristics of patients included for assessment of the CAF.

n	400
Age (years)	80.1 ± 4.0
Weight (kg)	75.1 ± 13.3
Height (cm)	166 ± 0.09
BMI (kg/m^2)	27.4 ± 4.2
BNP (pg/ml)	2081 ± 3079
CAF	11 [7; 15]
Logistic EuroSCORE (%)	8.5 [5.8; 13.9]
STS score (%)	3.3 [2.1; 5.1]
CABG (%)	22.5
Single valve (except trans-catheter) (%)	32
Trans-apical valve (%)	11.3
Transfemoral valve	3.5
Combined procedures (%)	30.7
30-day mortality (%)	5.5

BMI: body mass index; BNP: brain natriuretic peptide; CAF: comprehensive assessment of frailty; and CABG: coronary artery bypass grafting.

Table 2
Distribution of frailty points in percent (%) in the three risk groups concerning to the parameters of the CAF.

Frailty test	Frailty points	Not frail	Moderately frail	Severely frail
Grip strength	0	75	46	19
	1	25	54	81
Walking speed	0	97	68	0
	1	3	32	100
Balance	0	64	26	0
	1	29	29	4
	2	7	26	4
	3	0	16	33
	4	0	3	59
Rise up from chair	0	26	1	0
	1	44	8	0
	2	20	18	4
	3	10	58	0
	4	0	15	96
Pick up a pen	0	41	5	0
	1	52	54	7
	2	7	24	8
	3	0	9	15
	4	0	8	70
Put on and remove a jacket	0	73	23	11
	1	20	41	4
	2	7	20	15
	3	0	16	40
	4	0	0	30

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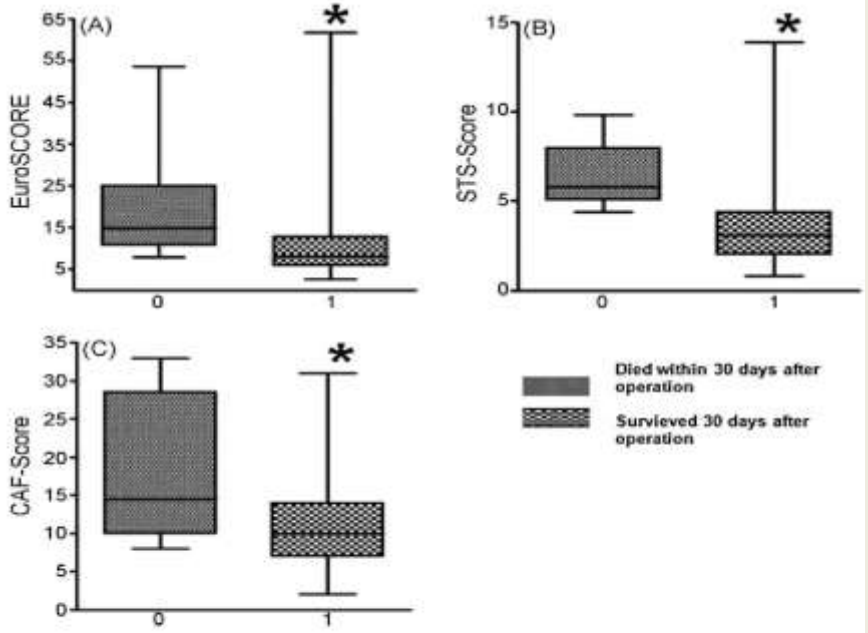

Fig. 1. Differences of risk-score values between patients who died within 30 days and patients who survived 30 days; (A) EuroSCORE, (B) STS score, (C) CAF score; 0 = died within 30 days, 1 = survived 30 days after operation. *Means a significant difference between the means with a $p < 0.05$

Table 3
Mortality rate among each CAF category.

	CAF category		
	Not frail (1–10 points)	Moderately frail (11–25 points)	Severely frail (26–35 points)
Survival			
Alive % within CAF category	96.4	92.2	78.3
Dead % within CAF category	3.6	7.8	21.7

Comprehensive assessment of frailty for elderly high-risk patients undergoing cardiac surgery☆

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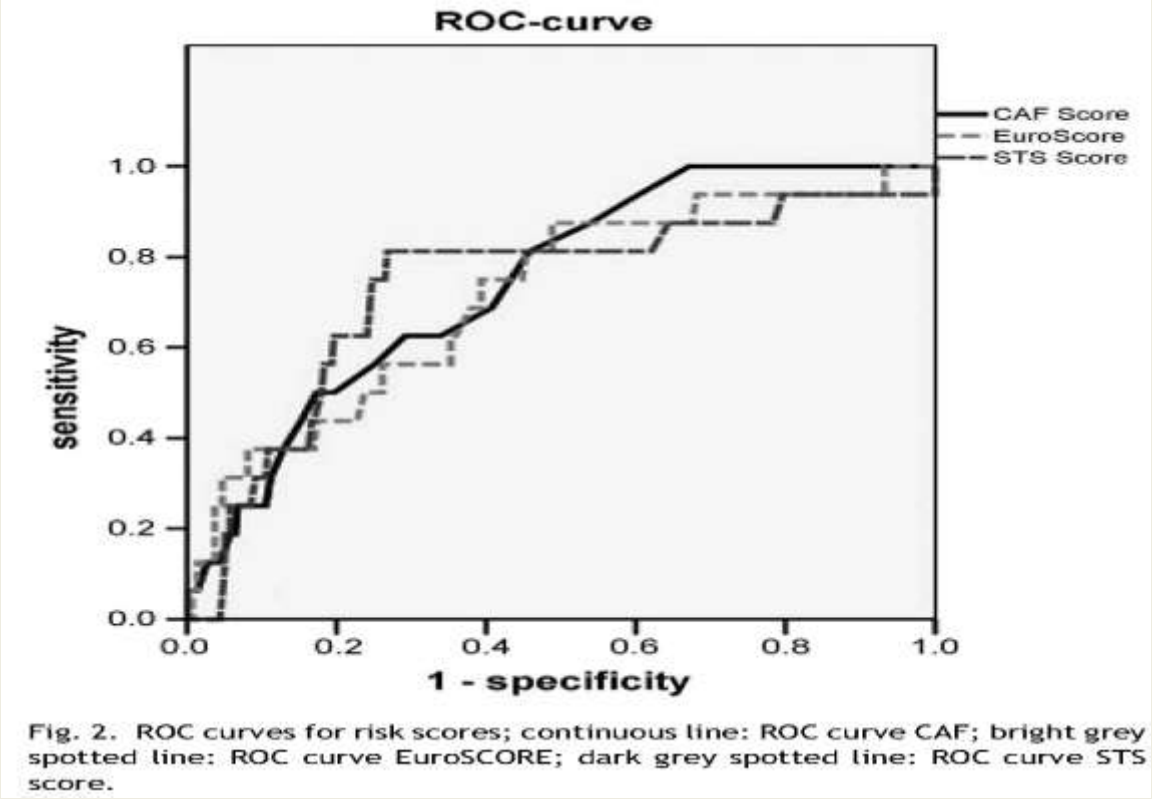


Fig. 2. ROC curves for risk scores; continuous line: ROC curve CAF; bright grey spotted line: ROC curve EuroSCORE; dark grey spotted line: ROC curve STS score.

Kalite Yönetimi

- Anesteziyologlar, diğer klinisyenlere oranla total kalite yönetimine oldukça erken uyum sağlamışlardır

  - Güvenli cerrahi kontrol listelerinin kullanılması
  - Advers anestezi olaylarının raporlanması
  - Kontinü kalite geliştirme formlarının kullanılması
  - Advers olaylarda kökene yönelik analiz uygulanması

Kalite Yönetimi

Kalite yönetimini, referans bir ölçüm ile kantifikasyonu mümkün kılan standardizasyon kavramı takip etmiştir

- Kardiyak anestezi: Standardizasyon için iyi model

- Kapak/iskemik kalp hast.da anestezi uygulaması
- Rehberlere uygun olarak TEE uygulaması
- KPB'ın başlatılması ve baypasdan ayrılma
- Postop. mekanik ventilasyondan ayrılma

Standardized multidisciplinary protocol improves handover of cardiac surgery patients to the intensive care unit*

Brian F. Joy, MD; Emily Elliott, RN, MSN, CPNP; Courtney Hardy, MD; Christine Sullivan, MBA, MS; Carl L. Backer, MD; Jason M. Kane, MD, MS

THIS FORM IS NOT PART OF THE MEDICAL RECORD

ANESTHESIA HANDOFF TEMPLATE

CV surgery to Pediatric ICU Handoff

PATIENT LABEL

PATIENT DETAILS Name _____ Age ____ Wt ____ kg

Pre-op Dx _____ Allergy _____ ☐ NKDA

OPERATIVE COURSE

Anesthesia Technique _____ ETT size _____

Operation Performed _____

Weaning from CPB & course _____

CPB time* _____ PA pressures _____

Cross Clamp* _____ Arrhythmias _____ ☐ None

Circ Arrest* _____

*Estimate - See Perfusion Record for actual time

Post TEE/Echo findings _____

Blood products given: Bleeding issues _____ ☐ None

PRBC _____

Cell Saver _____ Crystalloid _____ mL

Platelet _____ Ultrafiltrate _____ mL

FFP _____ UOP _____ mL

Cryo _____ UOP(bypass) _____ mL

ACCESS

Type/Location _____

Size _____

Placed by _____

Type/Location _____

Size _____

Placed by _____

Type/Location _____

Size _____

Placed by _____

Type/Location _____

Size _____

Placed by _____

PRESENT STATUS HR ____ BP ____ MAP ____ CVP ____ Brain NIRS ____ Renal NIRS ____

(Current Vitals on Transport)

Current Rhythm _____ ☐ NSR Ventilation Issues in OR _____ ☐ None

Pacing Wires: ☐ Atrial ☐ Ventricular ☐ None FIO_2 _____

Temporary Pacemaker setting _____ Plans for extubation: ☐ Wake & Wean

☐ Leave Intubated

Medications/infusions

Dopamine ____mcg/kg/min

Dobutamine ____mcg/kg/min

Milrinone ____mcg/kg/min

Epinephrine ____mcg/kg/min

Nicardipine ____mcg/kg/min

Esmolol ____mcg/kg/min

☐ Amicar _33_mg/kg/hr

Nitric oxide ____ppm Indication _____

Antibiotic doses _____

Total opioid dose _____

Last opioid dose _____

☐ Post-op PCA written

Last muscle relaxant dose _____ ☐ Reversed

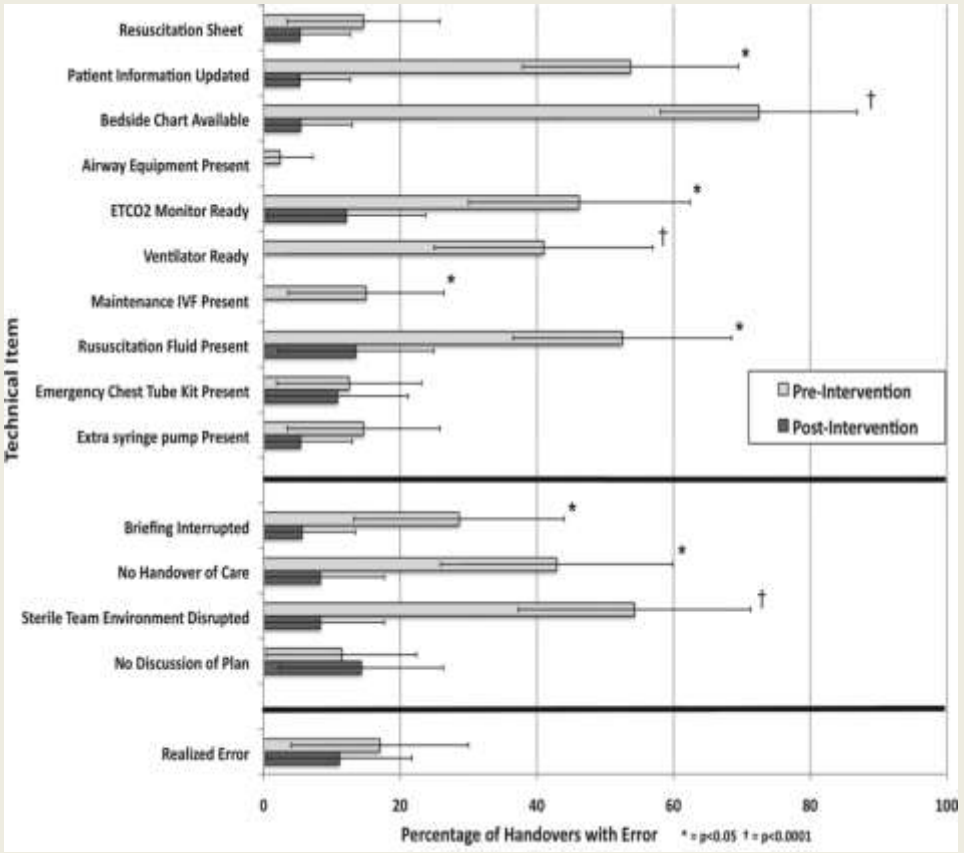
Other Meds _____

Last Hgb/Hct _____ Time _____

Last ABG _____ Time _____

COMMENTS:

Physician signature _____ Date_____ Time_____



Pediatr Crit Care Med 2011 Vol. 12, No. 3

Kalite Yönetimi

- Postoperatif Risk Değerlendirme:

  - APACHE IV, SAPS, SOFA

  - CASUS: Kardiyak cerrahi hastaları için geliştirilmiştir

Prediction of mortality in intensive care unit cardiac surgical patients☆

Khosro Hekmat[a,*], Fabian Doerr[a], Axel Kroener[b], Matthias Heldwein[a], Torsten Bossert[a], Akmal M.A. Badreldin[a], Artur Lichtenberg[c]

[a] Department of Cardiothoracic Surgery, Friedrich-Schiller-University, Jena, Germany
[b] Department of Cardiothoracic Surgery, University of Cologne, Cologne, Germany
[c] Department of Cardiac Surgery, University of Duesseldorf, Duesseldorf, Germany

Table 1
The CASUS.

Descriptor	0 points	1 point	2 points	3 points	4 points
PO_2/F_iO_2	Extubated	>250	151–250	75–150	<75
Serum creatinine (mg dl^{-1})	<1.2	1.2–2.2	2.3–4.0	4.1–5.5	>5.5
Serum bilirubin (mg dl^{-1})	<1.2	1.2–3.5	3.6–7.0	7.1–14.0	>14.0
PAR = HR × CVP/MAD	<10.1	10.1–15.0	15.1–20.0	20.1–30.0	>30.0
Lactic acid (mmol l^{-1})	<2.1	2.1–4.0	4.1–8.0	8.1–12.0	>12.0
Platelets (ml × 10^{-3})	>120	81 – 120	51 – 80	21 – 50	<21
Neurologic state	Normal status	–	Confused conversation	Sedated	Diffuse neuropathy
Intra-aortic balloon pump	No	–	–	–	Yes
Ventricular assist device	No	–	–	–	Yes
CVVH/dialysis	No	–	–	–	Yes

Increasing abnormality was graded on a scale from 0 to 4 score points, a score of 0 representing normal or minimally deranged function, a score of 4 correlating with a markedly deranged function. The Glasgow Coma Scale was replaced by the neurological state, which is more appropriate for postoperative cardiac surgical patients. Diffuse neuropathy includes signs and symptoms of stroke or cerebral haemorrhage. In contrast to the APACHE II abnormal values are scored in one direction only. PO_2/F_iO_2 = ratio of arterial PO_2 in mmHg and fractional inspired oxygen concentration. PAR: the pressure-adjusted heart rate (PAR) is calculated as the product of heart rate (HR) multiplied by the ratio of the central venous pressure (CVP) to the mean arterial pressure (MAD). CVVH: continuous venovenous haemofiltration.

European Journal of Cardio-thoracic Surgery 38 (2010) 104–109

A comparative study of four intensive care outcome prediction models in cardiac surgery patients

Fabian Doerr[1], Akmal MA Badreldin[1], Matthias B Heldwein[1], Torsten Bossert[1], Markus Richter[1], Thomas Lehmann[2], Ole Bayer[3], Khosro Hekmat[1*]

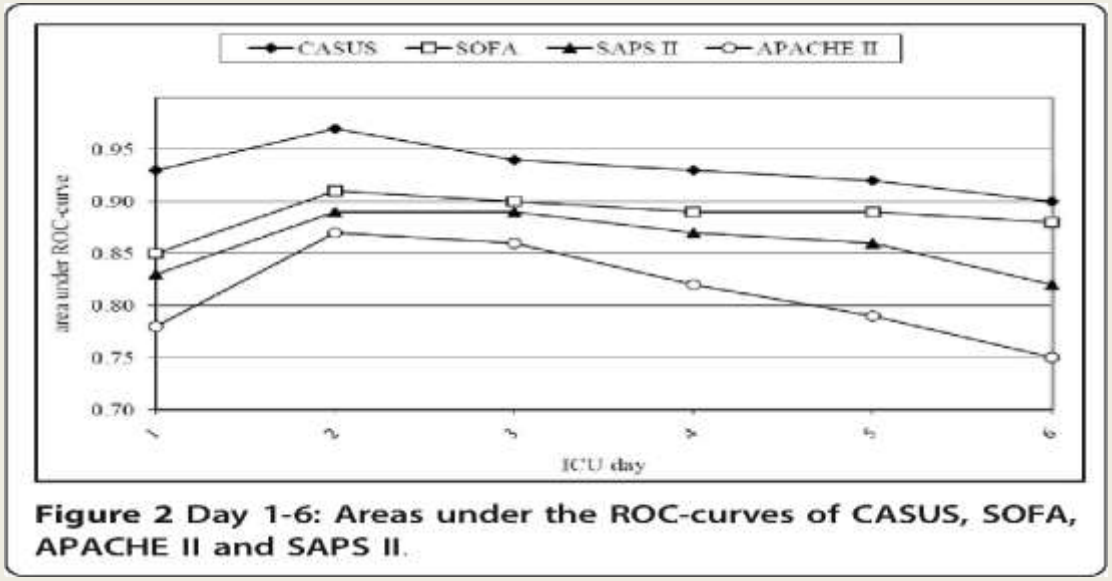


Figure 2 Day 1-6: Areas under the ROC-curves of CASUS, SOFA, APACHE II and SAPS II.

Conclusions: CASUS and SOFA are reliable ICU mortality risk stratification models for cardiac surgery patients. SAPS II and APACHE II did not perform well in terms of calibration and discrimination statistics.

Doerr *et al. Journal of Cardiothoracic Surgery* 2011, **6**:21

Kalite Yönetimi

- Her iyi kardiyak cerrahi programı sonuçlarını monitorize etmelidir
- Klinik veriler aktif olarak kayıt edilmeli, monitorize ve analiz edilmeli
- Veri kayıt edilmesi, tek başına bir amaç olmamalı, fakat Deming tarafından önerilen 'planla–yap–kontrol et- ayarla' siklusuna göre, kontinü kalite gelişimine önderlik etmelidir

Kalite Yönetimi

- Herhangi bir stratejinin başarılı olup olmadığına karar verilmeden önce, hasta grubunda olumlu gelişmeye neden olup olmadığına bakılmalı

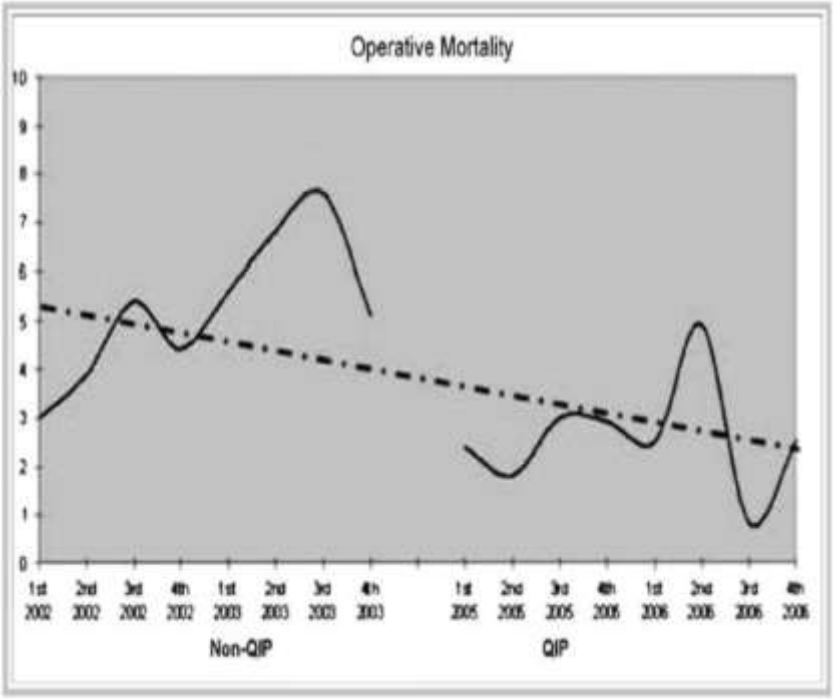
- Hasta sonuç parametrelerinde gelişmelerin olması,stratejinin başarısını gösteren nihai kriter

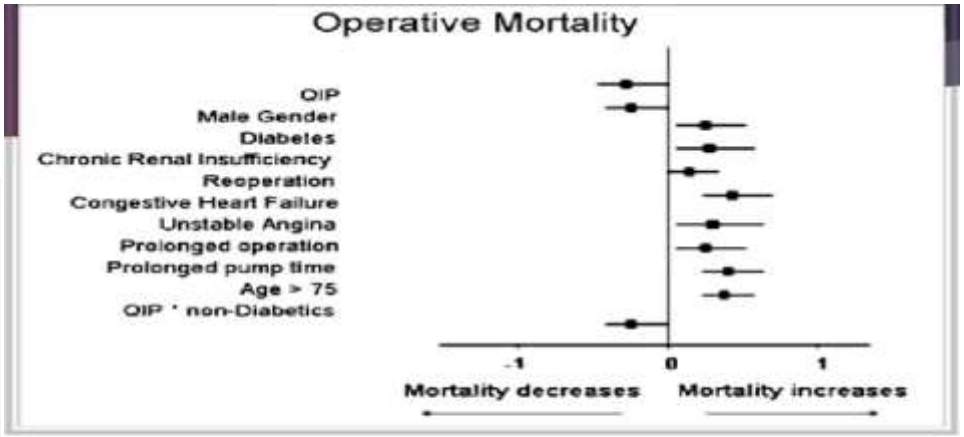
Quality improvement program decreases mortality after cardiac surgery

The Journal of Thoracic and Cardiovascular Surgery • August 2008

Sotiris C. Stamou, MD, PhD, Sara L. Camp, NP, Robert M. Stiegel, MD, Mark K. Reames, MD, Eric Skipper, MD, Larry T. Watts, MD, Marcy Nussbaum, MS, Francis Robicsek, MD, PhD, and Kevin W. Lobdell, MD

48% decline in operative mortality after implementation of a QIP



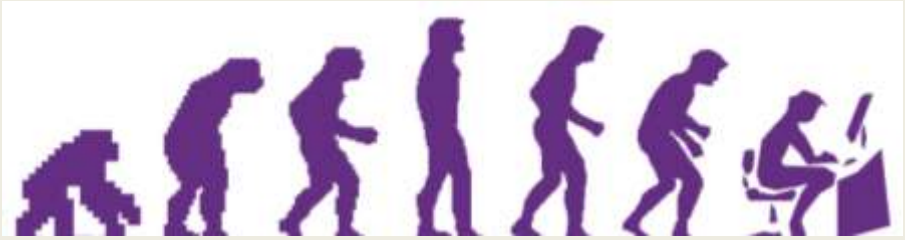


C STATISTIC FOR THE MODEL IS 0.8

	Coefficient	SE	Odds ratio	Confidence interval	P value
QIP	−0.29	0.14	0.6	0.3–1.0	.04
Male sex	−0.26	0.14	0.6	0.4–0.9	.03
Diabetes	0.34	0.13	1.2	1.2–3.2	.01
Chronic renal insufficiency	0.37	0.19	2.7	1.0–4.2	.05
Reoperation	0.24	0.12	1.6	1.0–2.5	.04
Congestive heart failure	0.51	0.12	2.8	1.8–4.5	.01
Unstable angina	0.40	0.14	2.2	1.3–3.8	.01
Age >75 y	0.41	0.13	2.3	1.3–3.6	.01
Prolonged pump time	0.46	0.14	2.5	1.4–4.2	.01
Prolonged operative time	0.27	0.14	1.7	1.0–3.0	.05
QIP and no diabetes	−0.26	0.13	0.6	0.4–0.9	.04

Kalite Analizinin Organizasyonu

- Bilişim, veritabanı idare sistemi ve standardizasyon oluşturulması kendi kalite kontrol araçlarının kullanılmasını gerektiren ve personel gereksinimi doğuran yorucu bir süreç…



Kalite Analizinin Organizasyonu

- Klinisyenler, yoğun klinik programlarının ortasında kalite konuları ile ilgili veri toplamada zorlanmakta

- Sağlık hizmeti yöneticileri günlük bazda veri toplama işlemi için destek personel sağlamalıdır

Kalite Analizinin Organizasyonu

- Veri tabanları, kardiyotorasik cerrahi ve anestezi, istatistik konularında kapsamlı bilgiye sahip olan, verileri idare eden ve süreci analiz eden bağımsız bir ekibe gereksinim var
- Ortak bir veri tabanı kullanılması avantajlı: Kardiyovasküler cerrah, Anesteziyolog ve Yoğun Bakımcının iştirak edebilmesi önemli
- Konvansiyonel risk modelleri, tanımlar kullanılmalı
- Verilerin denetimi: tam, doğru, tutarlı olmalı

Veri Kayıt Sistemi

- Prospektif olarak oluşturulan klinik bir veri tabanı kullanılmalı

- Kalite kontrol önlemleri alınmalı:

  - Tüm ardışık vakalar kayıt edilmeli, hiçbir vaka atlanmamalı

  - Veriler– otomatik / manuel her ne şekilde girilmiş ise, aşağıdaki özellikleri taşımalı:
    - Kesin tanımlanabilir - Her zaman ulaşılabilir
    - Veri tabanı amacına uygun -Tercihen kanıta dayalı

Veri Kayıt Sistemi

- Ulusal veya Society of Thoracic Surgeons (STS) kardiyovasküler veri tabanı gibi uluslararası bir kalite analiz sistemine katılımın avantajı:

  Kurumlar arasında klinik sonuç verilerinin karşılaştırılması ve kıyaslamaya olanak tanır

Sonuç

- Modern kardiyak cerrahide kalite analizi için risk değerlendirme bir gereklilik
- Kalite analizinde süreç ve sonuç odaklı bir yaklaşım kullanılmalı
- Risk modellerinin temel prensiplerinin klinisyen tarafından anlaşılması önemli

Sonuç

"Orduların işgaline karşı konulabilir, fakat zamanı gelmiş bir fikre karşı konulamaz."

Victor Hugo

Kalite yönetimini uygulayacağımız zaman gelmiştir, bu fikre uzun süre karşı koymak olası görünmemektedir.

TEŞEKKÜRLERİMLE...