GKDA ve YB Derneği, 17.Ulusal kongresi, 13-17 Nisan 2011

Yoğun Bakımda Kalışı Uzatan Cerrahi Nedenler

Dr Atalay Mete, KSÜ Tıp F. Kalp-Damar C ABD, 2011

"Prolonged ICU stay"

Mortality was dependent on renal, respiratory, and heart failure, as well as age, elevated APACHE II scores, and reexploration.

Table 1. Baseline and Outcome Variables

Variable n ICU Stay (days) Hospital Stay (days) ICU Mortality n (%) Hospital Mortality n (%)

All patients 2,683 2 (2–3) 20 (15–27) 129 (4.8%) 171 (6.4%)

Patients with an **ICU stay more than 3 days**

685 (26%) 5 (4–11) 25 (17–39) 110 (16%) **133 (19%)**

Patients with an **ICU stay less than 3 days**

1,998 (74%) 2 (2–2) 19 (15–24) 19 (1.0%) **38 (1.9%)**

Median (25th quartile–75th quartile). The ICU and hospital mortality was significantly higher in the patients with an ICU stay 3 days in comparison to the patients with an ICU stay 3 days (*p* 0.001).

Long-term survival analyses demonstrated a significantly lower survival in patients with longer ICU stay. However, the 6-month to 3-year long-term survival was comparable with survival in patients without prolonged ICU stay.

RISK FACTORS FOR ICU PROLONGED STAY IN CARDIAC SURGERY
Ann Thorac Surg VARGAS HEIN ET AL 8812006;81:880–5 2006

"Prolonged ICU stay"

Survival and Quality of Life After Cardiac Surgery Complicated by Prolonged Intensive Care

Aim: To determine survival, factors determining survival and evaluate quality of life (QOL) after 1 year, in patients who had prolonged intensive care unit stay after CVS . patients requiring **ICU stay of ≥5 days** constituted the study group.

At the end of 1 year the **mortality in the study group was 34%.** The independent predictors of mortality were: preoperative cardiac support, lower ejection fraction, higher Parsonnet score, higher Euroscore, pulmonary complications, renal failure necessitating hemofiltration, CNS complications, and failure of three or more organ systems.

The QOL was lower in the study group than the control group in all eight dimensions measured (Short Form Health Survey (SF36)). significant in five $p < 0.05$): Physical function, Role physical, Vitality, Mental health, General health, and Bodily pain.three remains ns (role emotional, mental health, social function).

Conclusion: One year mortality in patients with **prolonged ICU** stay after cardiac surgery remains high. Identification of risk factors will help to reduce the mortality with help of regular follow up. The QOL remains low in all dimensions especially those measuring physical aspects and pain.

Vinayak Bapat, Darrell Allen, Christopher Young, James Roxburgh, Mohamed Ibrahim
Department of Cardiothoracic Surgery, St. Thomas' Hospital 2005

“Prolonged ICU stay”

Survival and Quality of Life in Cardiac Surgery Patients With Prolonged Intensive Care

One third of all patients with a postoperative ICU stay
longer than 10 days
died within 30 days or before hospital discharge.

Survival at 1 and 5 years was 62% and 52%, respectively.

In patients who could be discharged alive, two thirds had a close to normal functional capacity, but both physical and mental aspects of health-related quality of life were lower compared with an age- and sex-matched reference group from the general population.

Sixty-two percent were readmitted at least once, and there was a tendency toward lower functional status and quality of life in this group compared with patients without need for hospital readmission.

Emma Lagercrantz, Dan Lindblom, Ulrik Sartipy
Department of Cardiothoracic Surgery and Anesthesiology, Karolinska University Hospital, Stockholm, Sweden 2009

"Prolonged ICU stay"

Preoperative calculation of risk for prolonged intensive care unit stay following coronary artery bypass grafting

Criteria for discharge from the ICU included:

cardiovascular stability,
minimal or no respiratory assistance,
evidence of adequate renal function with normal serum electrolyte levels,
evidence of adequate neuropsychological function.

Days spent in the ICU were counted by patient census at midnight each day. Patients who stayed in the ICU for more than 3 consecutive days on the initial admission were classified as having a prolonged ICU stay, while patients staying 3 days or less were classified as having a normal ICU stay.

Sanjay V Ghotkar1, Antony D Grayson2, Brian M Fabri, Walid C Dihmis and D Mark Pullan Department of Cardiothoracic Surgery, The Cardiothoracic Centre, Liverpool, UK 2006

"Prolonged ICU stay"

Prediction Models for Prolonged Intensive Care Unit Stay After Cardiac Surgery. Systematic Review and Validation Study

After a systematic review of the literature, the identified models were applied on a large registry database comprising 11 395 cardiac surgical interventions. The probabilities of prolonged ICU length of stay based on the models were compared with the actual outcome to assess the discrimination and calibration performance of the models.

In this validation of prediction models for prolonged ICU length of stay, 2 widely implemented models (**Parsonnet, EuroSCORE**), although originally designed for prediction of mortality, were superior in identifying patients with prolonged ICU length of stay.

Roelof G.A. Ettema et al. University Medical Center Utrecht, Utrecht; and Department of Anesthesiology and Intensive Care. Netherlannds. 2010

Parsonnet score (initial)

Female gender 1
Morbid obesity (p1,5 x ideal weight) 3
Diabetes 3
Hypertension (systolic blood pressure\140 mmHg 3
Ejection fraction
> 50% 0
30–49% 2
< 30% 4
Age
70–74 7
75–79 12
> 80 20
Re-operation
First 5
Second 10
Preoperative intra-aortic balloon pump 20
Left ventricular aneurysm 5
Emergency surgery following PTCA or catheterisationcomplications 10

Dialysis dependency (peritoneal dialysis or hemodialysis) 10

! Catastrophic states (acute structural defect, cardiogenic shock, acute renal failure) 10 – 50

! Other rare circumstances (paraplegia, pacemaker dependency, severe asthma, congenital heart disease in adult) 2 – 10

Mitral surgery 5
Mitral surgery and pulmonary artery pressure > 60 mmHg 8
Aortic surgery 5
Aortic surgery and pressure gradient > 120 mmHg 7
CABG at the time of valve surgery 2

Parsonnet score (modified)

Morbid obesity (p1.5 x ideal weight) 3
Diabetes 3
Hypertension (systolic BP\140 mm Hg) 3
Ejection fraction, > 50% 0;30–49% 2;< 30% 4
Age
70–74 7; 75–79 12; > 80 20
Reoperation, First 5; Second 10
Preoperative intra-aortic balloon pump 20
Left ventricular aneurysm 5
Emergency surgery following PTCA 10
Dialysis dependency (peritoneal dialysis or hemodialysis) 10
! Catastrophic states (acute structural defect, cardiogenic, shock, acute renal failure) 10 – 50
! Other rare circumstances (paraplegia pacemaker dependency, severe asthma, congenital heart disease in adult) 2 – 10

Mitral surgery 5
Mitral surgery and pulmonary artery pressure > 60 mmHg 8
Aortic surgery 5
Aortic surgery and pressure gradient > 120 mmHg 7
CABG at the time of valve surgery 2
Left main coronary stenosis > 90% 3
Unstable angina 3
Ventricular tachycardia or fi brillation 5
Cardiogenic shock 25
Myocardial infarction drng the last 48 h 7
Cardiac insuffi ciency 5
Permanent pacemaker in place 2

Parsonnet score (modified) cont.

Active endocarditis 10
Post-MI septal defect 20
Chronic pericarditis 5
Adult congenital heart disease 10
Chronic pulmonary obstructive disease 5
Mean pulmonary pressure p 30 mmHg 10
Idiopathic thrombopenic purpura 10
Pre-operative intubation 5
Severe asthma 15
Lower limb arterial disease 2
Carotid arterial disease 7

Abdominal aortic aneurysm 5
Aortic dissection 10
Severe neurological disease 5
Severe hyperlipidaemia 3
Jehovah's witness 10
Preop therapy with antiplatelet agents 2
Severe chronic intoxication 3
Active AIDS 10
Active cancer 5
Long term corticosteroids or immunosuppressive therapy

Parsonnet score

a score of 0-4 translated to an average operative mortality of 1% (*low risk*).

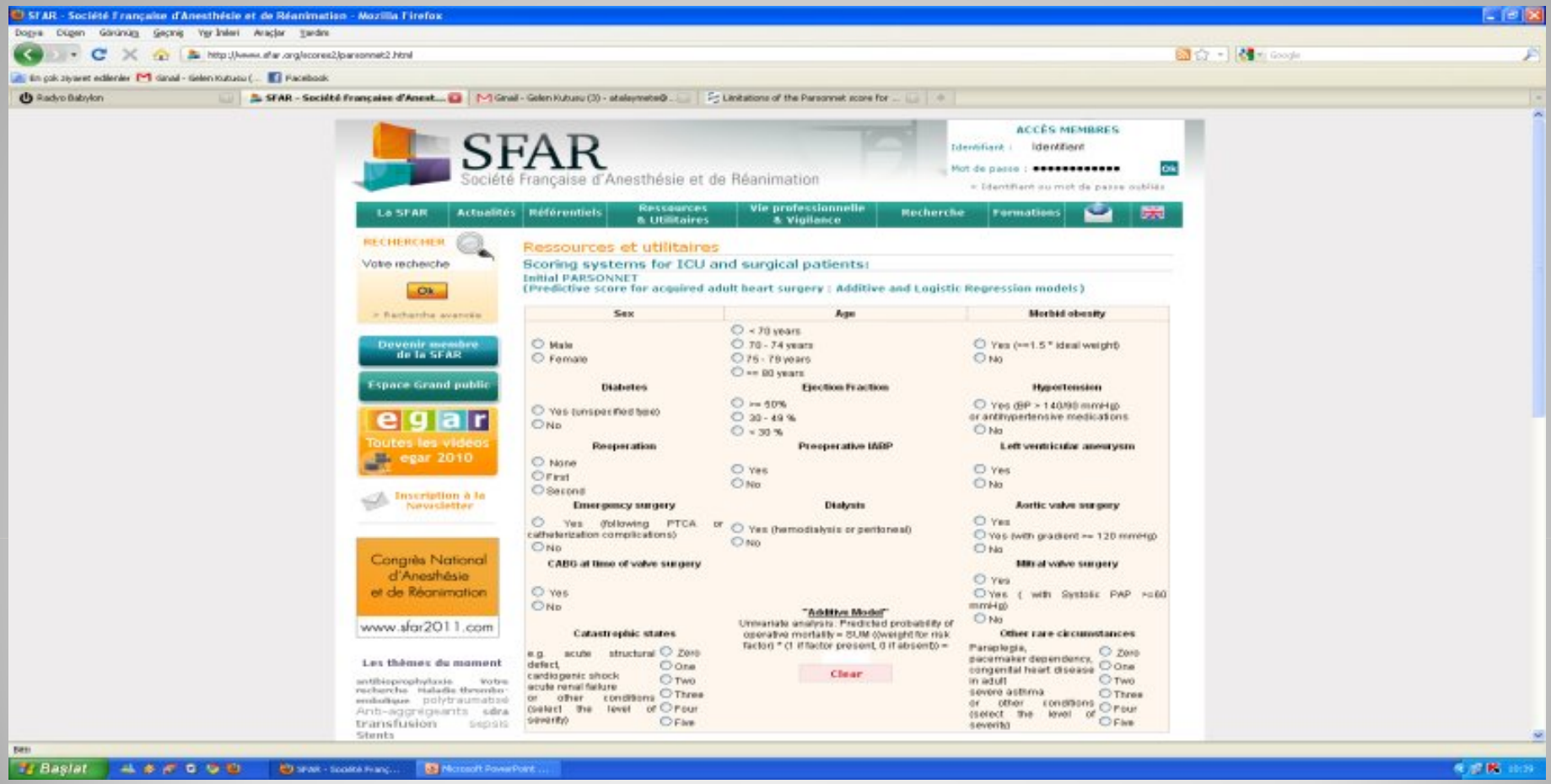
a score of 5-9 an operative mortality of 5% (*elevated risk*).

a score of 10 – 14 a mortality of 9% (*significantly elevated risk*).

a score of 15 – 19 a mortality of 17% (*high risk*).

a score of over 19 a mortality of 31% (*very high risk*).

Parsonnet score



Parsonnet score

“The Parsonnet score was the first simple, validated, additive scoring system for predicting risk in cardiac surgery. It is widely used in the UK, but its weakness is that it allows subjective scoring (shaded variables).”

A method of Uniform Stratification of Risk for evaluating the results of surgery in acquired adult heart disease *Circulation* (1989) 79: Suppl I:

“Problems with the Parsonnet score of subjectivity, inclusion of many items not associated with mortality, and the overprediction of mortality have been highlighted.”

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, and W North

Departments of Cardiothoracic Surgery and Clinical Audit, Wythenshawe Hospital, Southmoor Road, Manchester M23 9LT, UK. 2000

European System for Cardiac Operative Risk Evaluation (EuroSCORE).

OBJECTIVE: To construct a scoring system for the prediction of early mortality in cardiac surgical patients in Europe on the basis of objective risk factors.

Nearly 20 thousand consecutive patients from 128 hospitals in eight European countries were studied. Information was collected on 97 risk factors in all the patients. The outcome (survival or death) was related to the preoperative risk factors. The most important, reliable and objective risk factors were then used to prepare a scoring system. The scoring system was prepared from part of the database and tested and validated on another part.

The original papers on EuroSCORE were presented at the Brussels 1998 meeting of the European Association for Cardio-Thoracic Surgery.

European system for cardiac operative risk evaluation (
Nashef SA, Roques F, Michel P, Gauducheau E, Lemeshow S, Salamon R. Papworth Hospital, Cambridge, UK. 1999

European System for Cardiac Operative Risk Evaluation (EuroSCORE).

Patient-related factors:

age over 60 (one per 5 years or part thereof),
female (1),
chronic pulmonary disease (1),
extracardiac arteriopathy (2),
neurological dysfunction (2),
previous cardiac surgery (3),
serum creatinine >200 micromol/l (2),
active endocarditis (3)
and critical preoperative state (3).

European system for cardiac operative risk evaluation (EuroSCORE).

Cardiac factors:

unstable angina on intravenous nitrates (2) ***,**

reduced left ventricular ejection fraction (30-50%: 1, <30%: 3),

recent (<90 days) myocardial infarction (2) ***,**

and pulmonary systolic pressure >60 mmHg (2**).**

*** SGK !**

European system for cardiac operative risk evaluation (EuroSCORE).

Operation-related factors:

emergency (2),
other than isolated coronary surgery (2),
thoracic aorta surgery (3)

surgery for postinfarct septal rupture (4).

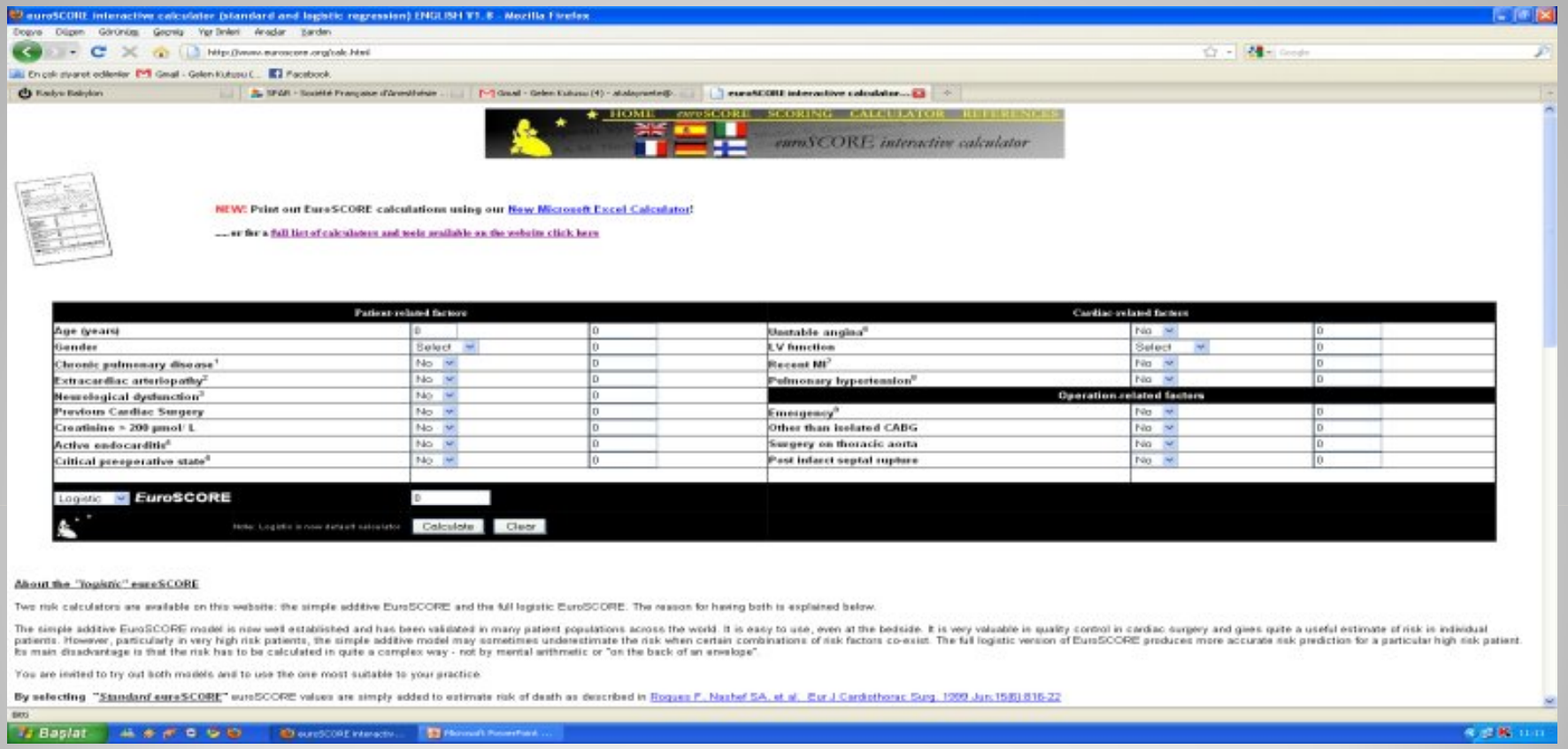
EuroSCORE

2 or less points were allocated to low risk group,

with 3 to 5 points to moderate risk group,

and with 6 or more to high risk group.

EuroSCORE


euroSCORE interactive calculator (standard and logistic regression) ENGLISH V1.8 - Mozilla Firefox
HOME
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CALCULATOR
REFERENCES
euroSCORE interactive calculator
NEW! Print out EuroSCORE calculations using our New Microsoft Excel Calculator!
...or for a full list of calculators and tools available on the website click here
Patient-related factors
Age (years)
Gender
Chronic pulmonary disease
Extracardiac arteriopathy
Neurological dysfunction
Previous Cardiac Surgery
Creatinine > 200 µmol/ L
Active endocarditis
Critical preoperative state
Cardiac-related factors
Unstable angina
LV function
Recent MI
Pulmonary hypertension
Operation-related factors
Emergency
Other than isolated CABG
Surgery on thoracic aorta
Post infarct septal rupture
Logistic EuroSCORE
Calculate
Clear
About the "logistic" euroSCORE
Two risk calculators are available on this website: the simple additive EuroSCORE and the full logistic EuroSCORE. The reason for having both is explained below.
The simple additive EuroSCORE model is now well established and has been validated in many patient populations across the world. It is easy to use, even at the bedside. It is very valuable in quality control in cardiac surgery and gives quite a useful estimate of risk in individual patients. However, particularly in very high risk patients, the simple additive model may sometimes underestimate the risk when certain combinations of risk factors co-exist. The full logistic version of EuroSCORE produces more accurate risk prediction for a particular high risk patient. Its main disadvantage is that the risk has to be calculated in quite a complex way - not by mental arithmetic or "on the back of an envelope".
You are invited to try out both models and to use the one most suitable to your practice.
By selecting "Standard euroSCORE" euroSCORE values are simply added to estimate risk of death as described in Roques F, Nashef SA, et al. Eur J Cardiothorac Surg. 1999 Jun;15(6):816-22
Başlat

European System for Cardiac Operative Risk Evaluation(EuroSCORE).

EuroSCORE Predicts Intensive Care Unit Stay and Costs of Open Heart Surgery

Johan Nilsson MD et al. Heart and Lung Center, University Hospital, Lund, Sweden 2004

EuroSCORE Predicts Intensive Care Unit Stay and Costs of Open Heart Surgery

The study included 3,404 patients. The mean cost for the surgery was $7,300, in the ICU $3,746, and in the ward $3,500. Total cost was significantly correlated with EuroSCORE, with a correlation coefficient of 0.47 ($p < 0.0001$); the correlation coefficient was 0.31 for the surgery cost, 0.46 for the ICU cost, and 0.11 for the ward cost.

The Hosmer-Lemeshow p value for EuroSCORE prediction of more than 2 days' stay in the ICU was 0.40, indicating good accuracy. The area under the receiver operating characteristics curve was 0.78. The probability of an ICU stay exceeding 2 days was more than 50% at a EuroSCORE of 14 or more.

Ann Thorac Surg 2009;88:468-475

Tossios, Parwis Massoudy, Markus Kamler and Heinz Jakob

Daniel Wendt, Brigitte R. Osswald, Katrin Kayser, Matthias Thielmann, Paschalis

Mortality in High Risk Patients Undergoing Isolated Aortic Valve Replacement Society of Thoracic Surgeons Score Is Superior to the EuroSCORE Determining

The Association of Complication Type with Mortality and Prolonged Stay After Cardiac Surgery with Cardiopulmonary Bypass

	All cases				LOS[b]		ICU days[c]	
Complication[d]	***n***	**%**	**Death (%)[e]**	**Adverse outcome[a] (%)[e]**	**Mean**	**Median**	**Mean**	**Median**
None	1618	62	1.1	5.4	6.2	6	1.5	1
Cardiac	763	29.2	8.0	29.4	10.2	7	3.1	1
Respiratory	196	7.5	21.4	64.3	17.6	11	**7.6**	**4**
Infectious	130	5.0	13.9	63.9	19.9	12	6.8	2
Neurological	122	4.7	23.0	70.5	16.6	12	7.0	3
Bleeding	62	2.4	4.8	48.4	13.3	9	4.7	3
Gastrointestinal	54	2.1	31.5	70.4	18.5	12	6.2	2
Renal	51	2.0	41.2	74.5	14.1	12	5.2	3
Miscellaneous	7	0.3	0	42.9	28.9	7	5.1	3
Thrombotic	5	0.2	0	40.0	19.8	10	5.8	2

The Association of Complication Type with Mortality and Prolonged Stay After Cardiac Surgery with Cardiopulmonary Bypass

J. Welsby, FRCA, Box 3094, Department of Anesthesiology, Duke University Medical Center 2002

Early cardiac complications of cardiac surgery

CARDIAC COMPLICATIONS

Perioperative MI
Cardiomegaly
Long time on cardiopulmonary bypass
Repeat CABG (6.1 percent in one report)
CABG combined with other cardiac surgery

Q wave MI , Elevated biochemical markers, Vent disfunction

Early graft occlusion, prosthetic dysfunction, insufficient correction

Low cardiac output

Vasodilatory shock

Arrhythmias

Pericarditis, pericardial effusion, and tamponade

Sary Aranki, MD, Donald Cutlip, MD, Julian M Aroesty, MD

FACTORS CONTRIBUTING TO POSTOPERATIVE PULMONARY DYSFUNCTION

Pulmonary Protection During Cardiac Surgery: Systematic Literature Review
Enisa MF Carvalho, BSc, Edmo A Gabriel, MD, Tomas A Salerno, MD Division of Cardiothoracic Surgery, University of Miami Miller School of Medicine and Jackson Memorial Hospital Miami, USA 2008

GENERAL ANESTHESIA

Using computed tomography, researchers have found that general anesthesia induces atelectasis in nearly all patients. However, CPB appears to cause additional lung injury and delays pulmonary recovery compared to other types of major surgery, generally believed to be due to the damaging effects of the systemic inflammatory response associated with CPB. The best strategy to combat this is use of a modifying CPB circuit, with early extubation, leading to fast-track recovery

SYSTEMIC TEMPERATURE

FREE RADICALS

FACTORS CONTRIBUTING TO POSTOPERATIVE PULMONARY DYSFUNCTION

Mechanisms of pulmonary dysfunction after on-pump and off-pump cardiac surgery: a prospective cohort study

Department of Intensive Care, VU University Medical Center, Amsterdam, The Netherlands *Journal of Cardiothoracic Surgery* 2007, 2:11

To test the hypothesis that lung vascular injury and atelectasis are not related to CPB per se, we studied consecutive patients undergoing on- and off-pump surgery with respect to transfusion history, PLI, EVLW (transpulmonary dilution), and ventilatory and radiographic variables, within 3 h after admission to the intensive care unit (ICU).

Conclusion The lung vascular injury in about half of patients after cardiac surgery is not caused by CPB perfusion but by trauma necessitating RBC transfusion, so that off-pump surgery may not afford a benefit in this respect. However, atelectasis rather than lung vascular injury is a major determinant of postoperative pulmonary dysfunction, irrespective of CPB perfusion.

Early reintubation after cardiac operations: impact of nasal continuous positive airway pressure (nCPAP) and noninvasive positive pressure ventilation (NPPV).

Early reintubation after cardiac operations: impact of nasal continuous positive airway pressure (nCPAP) and noninvasive positive pressure ventilation (NPPV).

Boeken U, Schurr P, Kurt M, Lichtenberg A Department of Thoracic and Cardiovascular Surgery, University Hospital, Duesseldorf, Germany 2010

There were three groups of patients: A = patients required immediate reintubation (n=125); B = patients had nCPAP with intermittent mask CPAP (n=264); and C = patients had NPPV (n=36).

The ICU stay and in-hospital stay were significantly prolonged in Group A.

The incidence of pulmonary infections (A: 24%, B: 10.6%, C: 13.8%; $P<0.05$) and the need for catecholamines were significantly increased in Group A,

whereas nCPAP patients suffered significantly more often from impaired sternal wound healing (A: 4.8%, B: 8.3%; $P<0.05$).

We conclude that reintubation after cardiac operations should be avoided since nCPAP and NPPV are safe and effectively improve arterial oxygenation in the majority of patients with nonhypercapnic oxygenation failure. However, it is of great importance to pay special care to sternal wound complications in these patients.

İnfectious Complications

Decrease of deep sternal surgical site infection rates after cardiac surgery by a comprehensive infection control program

Karolin Grafa,*, Dorit Sohrb, Axel Haverichc, Christian Kühnc, Petra Gastmeiera and Iris F. Chabernya Hannover Medical School, Germany 2009

When we noticed an increasing incidence of deep sternal surgical site infections (DSSI), a bundle of interdisciplinary infection control measures was initiated in order to prevent further cases of DSSI.

Adherence to infection control measures was re-inforced, which included (1) methicillin-resistant *Staphylococcus aureus* (MRSA) screening, (2) bacterial decolonisation measures, (3) hair clipping instead of shaving, (4) education, (5) good stewardship for antibiotic prophylaxis, (6) change of surgical gloves after sternotomy and after sternal wiring, (7) new bandage techniques, (8) leaving the wound primarily covered for at least 48 h. We checked for potential risk factors in a case–control study (120 patients each) by multivariate analysis. A significant decrease of DSSI from 3.61% (CI 95: 2.98–4.35) down to 1.83% (CI 95: 1.08–2.90) occurred.

Independent significant risk factors for DSSI were age >68 years (OR=2.47; CI 95: 1.33–4.60), diabetes mellitus (OR=4.84; CI 95: 2.25–10.4), and intra-operative blood glucose level >8 mmol/l (OR=2.27; CI 95: 1.17–4.42).

Protective factors were preoperative antibiotic prophylaxis (OR=0.31; CI 95: 0.13–0.70) and extubation on the day of surgery (OR=0.25; CI 95: 0.11–0.55). Close co-operation between clinical physicians and the infection control team significantly reduced the rate of DSSI. Thus, cardiac surgeons should know the local baseline DSSI rate, e.g. by surveillance, and should be aware of the risk factors for DSSI cases.

İnfectious Complications

Positive cultures from cardiopulmonary bypass: prevalence and relevance regarding postoperative infection.

Hamers LA, Linssen CF, Lancé MD, Maessen JG, Weerwind P, Winkens B, Bergmans DC, van Mook WN.

Department of Intensive Care Medicine, Maastricht University Medical Centre and Maastricht University, Maastricht, The Netherlands. Eur J Cardiothorac Surg. 2011 Jan 17.

Conclusions: Positive cultures from both CPB priming fluid and CPB blood samples were not a rarity and mainly involved skin bacteria, arguing that contamination may have played a role. The risk of postoperative infection within 30 days after surgery was not increased in CPB-culture-positive patients. Therefore, no evidence was found to support routine culturing of CPB samples in patients undergoing cardiothoracic surgery.

GI Complications

Gastrointestinal complications and its predictors after cardiac surgery

Kalp cerrahisi sonras› gastrointestinal komplikasyonlar ve prediktörleri
Nihan YAPICI1, Can ‹NCE2
Department of 1Anesthesiology, Siyami Ersek Thoracic and Cardiovascular Surgery Center, ‹stanbul
Department of 2Intensive Care, 2Erasmus MC, University Medical Center Rotterdam, the Netherlands
Turk J Gastroenterol 2010; 21 (1): 3-6

CONCLUSION
Early diagnosis and timely therapeutic interventions appear to be the most effective means for improving the poor outcome of GI complications after CPB. Although GI complications (**intestinal, hepatic, splenic, pancreatic, biliary**) were associated with prolonged CPB time, the role of CPB in splanchnic injury remains controversial. Further research into the pathophysiology of GI hypoperfusion during cardiac surgery, either on-pump or off-pump, seems to be required.

Renal Complications

Acute renal failure following cardiac surgery.

Nephrol. Dial. Transplant. (1999) 14 (5): 1158-1162.

Of the CABG patients 7.9% developed ARF and 0.7% developed ARF-D. The mortality for patients who developed ARF was 14% (OR 15, P = 0.0001) compared with 1% among those who did not develop ARF.

The mortality for CABG patients who developed ARF-D was 28% (OR 20, P = 0.0001) compared with 1.8% among those who did not require dialysis.

Variables that were significantly associated with the development of ARF by multivariate analysis included: increased age,

elevated preoperative serum Cr,

duration of CPB, presence of a carotid artery bruit,

presence of diabetes,

reduced cardiac ejection fraction and

Increased body weight.