19-20 settembre 2019
BERGAMO

CONGRESSO NAZIONALE DELLA
SOCIETÀ ITALIANA DELL'ANCA

GIOVEDÌ 19 SETTEMBRE 2019

AUDITORIUM

16.15 – 18.30 TAVOLA ROTONDA 1: OBIETTIVO RISCHIO ZERO IN CHIRURGIA ELETTIVA MAGGIORE: ERAS (ENHANCED RECOVERY AFTER SURGERY) NEL PAZIENTE DIFFICILE

In collaborazione con SIAARTI (Società Italiana di Anestesia Analgesia Rianimazione e Terapia Intensiva)
Moderatori: **Francesco Falez** (Roma), **Paolo Angelo Grossi** (Milano)

16.15 Ottimizzazione preoperatoria delle condizioni cliniche e selezione del paziente
Luigi Tritapepe (Roma)

16.30 Può la tecnica anestesiologica cambiare i risultati?
Dario Bugada (Bergamo)

16.40 Quanto e quale monitoraggio
Alessandro Locatelli (Cuneo)

16.55 Chi ha realmente bisogno della terapia intensiva
Luca Lorini (Bergamo)

17.10 La chirurgia: il controllo del sanguinamento e la profilassi tromboembolica
Massimo Mariconda (Napoli)

17.20 Protocolli multimodali per il controllo del dolore
Paolo Angelo Grossi (Milano)

17.30 La dimissibilità e outcome funzionali
Andrea Baldini (Firenze)

Ottimizzazione preoperatoria delle condizioni cliniche e selezione dei pazienti

Luigi Tritapepe
Direttore UOC Anestesia e Rianimazione DEA
Azienda Ospedaliera San Camillo Forlanini-Roma
Referente Nazionale Area
Anestesia e Medicina Perioperatoria
SIAARTI

Collaboration with

Baxter
Orion
Abbvie
Fresenius
Edwards
Medtronic
Abbott
Getinge
MSD

No Financial Disclosures with this talk

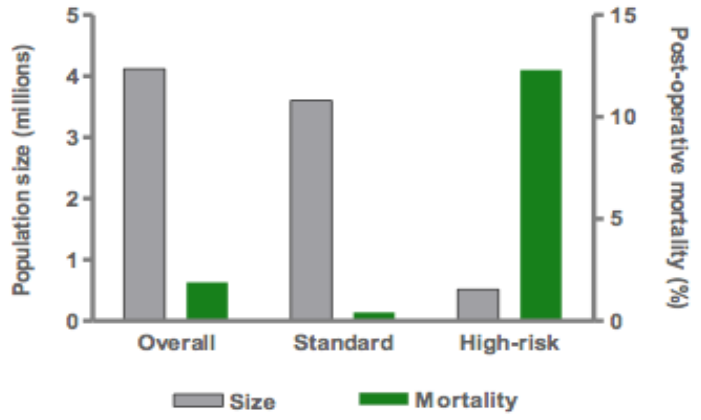
The high-risk surgical patient

1. Frailty
2. Elderly
3. Co-morbid disease
4. Major surgery
5. Emergency surgery

EuSOS

European Surgical Outcomes Study

International seven day study of standards of care and clinical outcomes for patients undergoing non-cardiac surgery



80% of surgical deaths are from the high-risk population

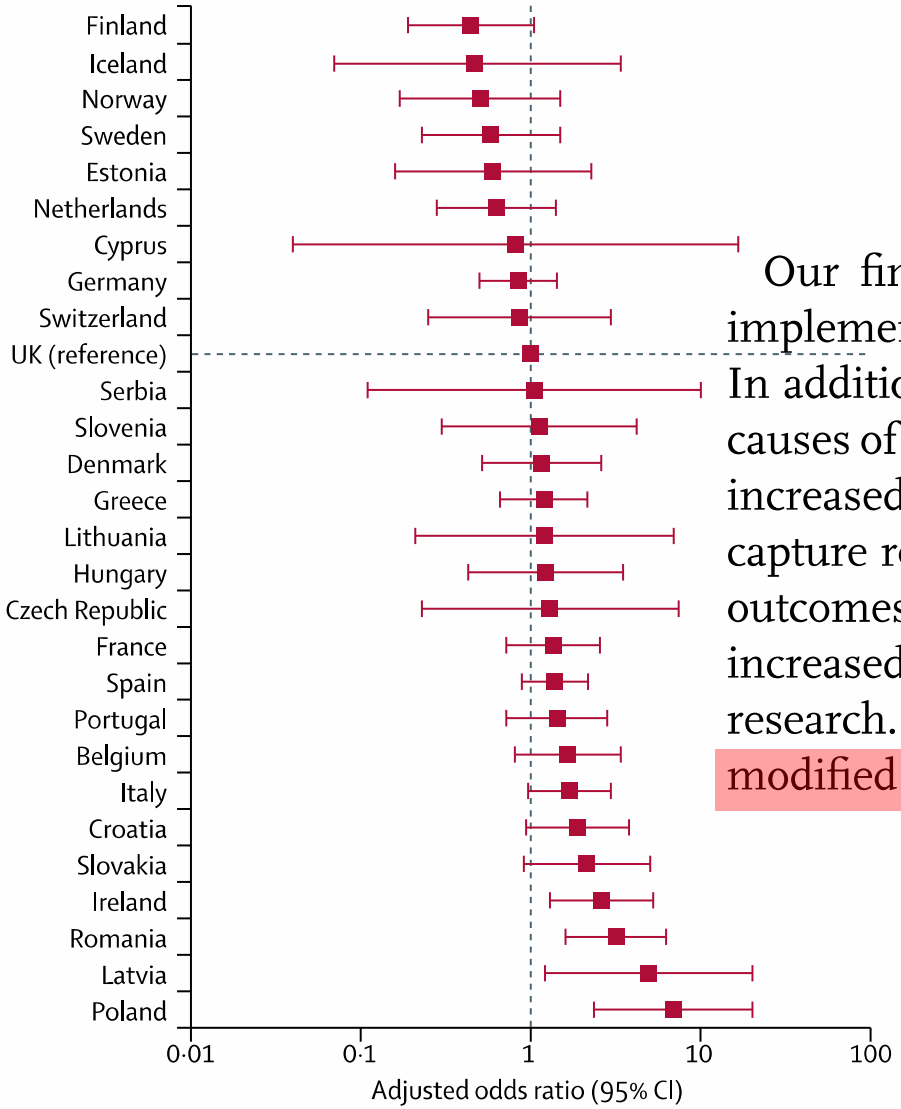
Pearse et al. *Crit Care* 2006; 10: R81.

EUROPEAN SOCIETY OF INTENSIVE CARE MEDICINE

ESA European Society of Anaesthesiology

Mortality after surgery in Europe: a 7 day cohort study

*Rupert M Pearse, Rui P Moreno, Peter Bauer, Paolo Pelosi, Philipp Metnitz, Claudia Spies, Benoit Vallet, Jean-Louis Vincent, Andreas Hoeft, Andrew Rhodes, for the European Surgical Outcomes Study (EuSOS) group for the Trials groups of the European Society of Intensive Care Medicine and the European Society of Anaesthesiology**



Our findings suggest both the need and potential to implement measures to improve postoperative outcomes. In addition to further research in this discipline, the root causes of this problem could be better understood through increased use of high-quality registries designed to capture robust data describing quality of care and clinical outcomes for surgical patients. This step would require increased funding for this specific area of health services research. The high mortality rate after surgery might be modified by changes in the organisation of care.[20]

Lancet 2012; 380: 1059–65

Journal of Clinical Anesthesia
Volume 49, September 2018, Pages 79-86

Original Contribution

Perioperative mortality related to anesthesia within 48h and up to 30days following surgery: A retrospective cohort study of 11,562 anesthetic procedures

Luciana C. Stefani MD, PhD [a, b], Patricia W. Gamermann MD [b], Amanda Backof MD [b], Fernanda Guollo MD [b], Rafael M.J. Borges [c], Adriana Martin MD [d], Wolnei Caumo MD, PhD [a, b, e], Elaine A. Felix MD, PhD [a, b]

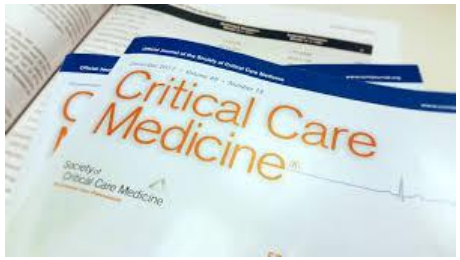
Highlights

- Perioperative mortality is associated with the patient's condition, the surgical procedure and the anesthetic act.
- The majority of perioperative deaths up to 30days were considered inevitable (50.7%), as they were related to advanced illnesses.
- Deaths with connection to the anesthesia were of early occurrence (less than 48 hours after surgery).
- Transoperative vasopressor, extremes of age and out-of-hour surgery were independent variables associated to early deaths.

JAMA®
The Journal of the American Medical Association

ANESTHESIOLOGY
Trusted Evidence: Discovery to Practice

The NEW ENGLAND JOURNAL of MEDICINE



HIGH RISK PATIENT

…VULNERABILE

APACHE Score

CHARLSON COMORBIDITY Score

ASA

POSSUM

Table 4. Comparison of risk prediction scoring systems

Risk prediction system	Description	Advantages	Disadvantages
American Society of Anesthetists	Numerical scale (1 to 5) based on severity of co-morbidities	Simple, easily applied, well known	Subjective, not individual or procedure specific, poor sensitivity and specificity
Charlson Comorbidity Score	Additive score based on weighting of preoperative diseases	Simple, better predictor than American Society of Anesthetists, good at estimating population risk	Subjective, does not look at procedure, mainly used as a research tool
Revised Cardiac Risk Index	Scoring system based on presence of one of six major co-morbidities and the severity of operation	Simple, well validated and good for predicting cardiac risk	Single-organ risk, broad categories, assessment of severity of operation is subjective
Acute Physiology and Chronic Health Evaluation	12 to 17 variables, measured over 24 hours	Individualised predictor of risk of mortality and morbidity, better predictor of outcome than American Society of Anesthetists, well known	Multiple variables over 24 hours of critical care, can be difficult to score before emergent surgery, not designed for use perioperatively
Simplified Acute Physiology Score	17 variables measured over 24 hours	Well validated for predictive mortality	Multiple variables over 24 hours of critical care, can be difficult to score before emergent surgery, not designed for use perioperatively
Physiological and Operative Severity Score for the Enumeration of Mortality and Morbidity	Scoring of 12 physiological and six operative variables, which are then entered into two mathematical equations to predict mortality and morbidity	Best validated and known/used scores for perioperative prediction various surgery-specific variations for specific areas	May overestimate or underestimate mortality and morbidity in specific populations due to use of logarithmic regression

REVISED CARDIAC RISK INDEX

SAPS

CLINICAL PRACTICE GUIDELINE

2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery

American College of Surgeons
Inspiring Quality: Highest Standards, Better Outcomes

ACS NSQIP®

Surgical Risk Calculator

Risk Calculator Homepage | About | FAQ | ACS Website | ACS NSQIP Website

Enter Patient and Surgical Information

Procedure 35286 - Repair blood vessel with graft other than vein; lower extremity — Clear

Begin by entering the procedure name or CPT code. One or more procedures will appear below the procedure box. You will need to click on the desired procedure to properly select it. You may also search using two words (or two partial words) by placing a '+' in between, for example: "cholecystectomy+cholangiography"

Reset All Selections

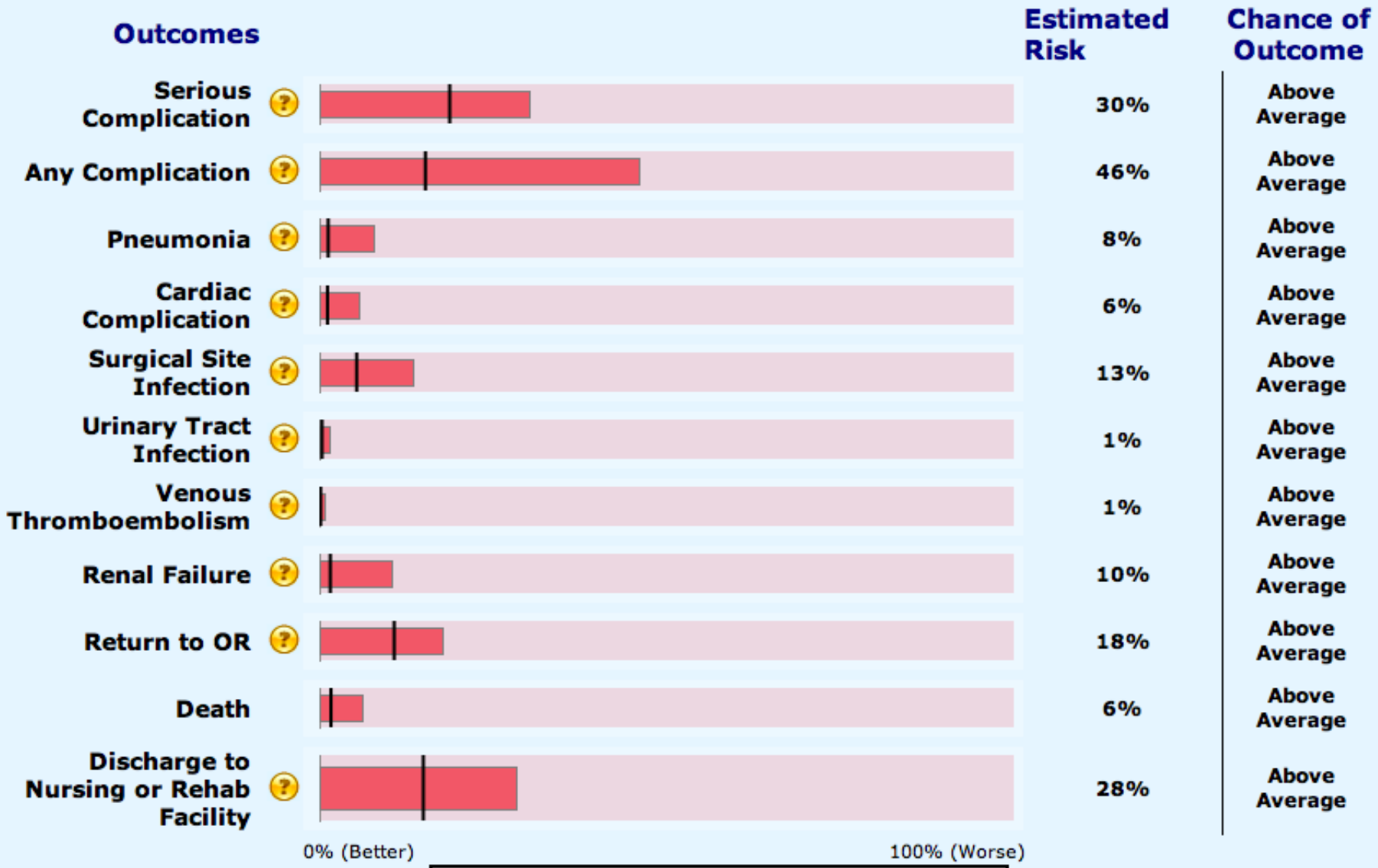
Are there other potential appropriate treatment options? ☐ Other Surgical Options ☐ Other Non-operative options ☐ None

Please enter as much of the following information as you can to receive the best risk estimates. A rough estimate will still be generated if you cannot provide all of the information below.

Age Group	75–84 years	**Diabetes**	Oral
Sex	Male	**Hypertension requiring medication**	Yes
Functional status	Partially Dependent	**Previous cardiac event**	Yes
Emergency case	No	**Congestive heart failure in 30 days prior to surgery**	No
ASA class	III – Severe systemic disease		
Wound class	Clean/Contaminated	**Dyspnea**	With Moderate exertion
Steroid use for chronic condition	No	**Current smoker within 1 year**	Yes
Ascites within 30 days prior to surgery	No	**History of severe COPD**	Yes
Systemic sepsis within 48 hours prior to surgery	None	**Dialysis**	No
		Acute Renal Failure	No
Ventilator dependent	No	**BMI Calculation: Height (in)**	6
Disseminated cancer	No	**Weight (lbs)**	165

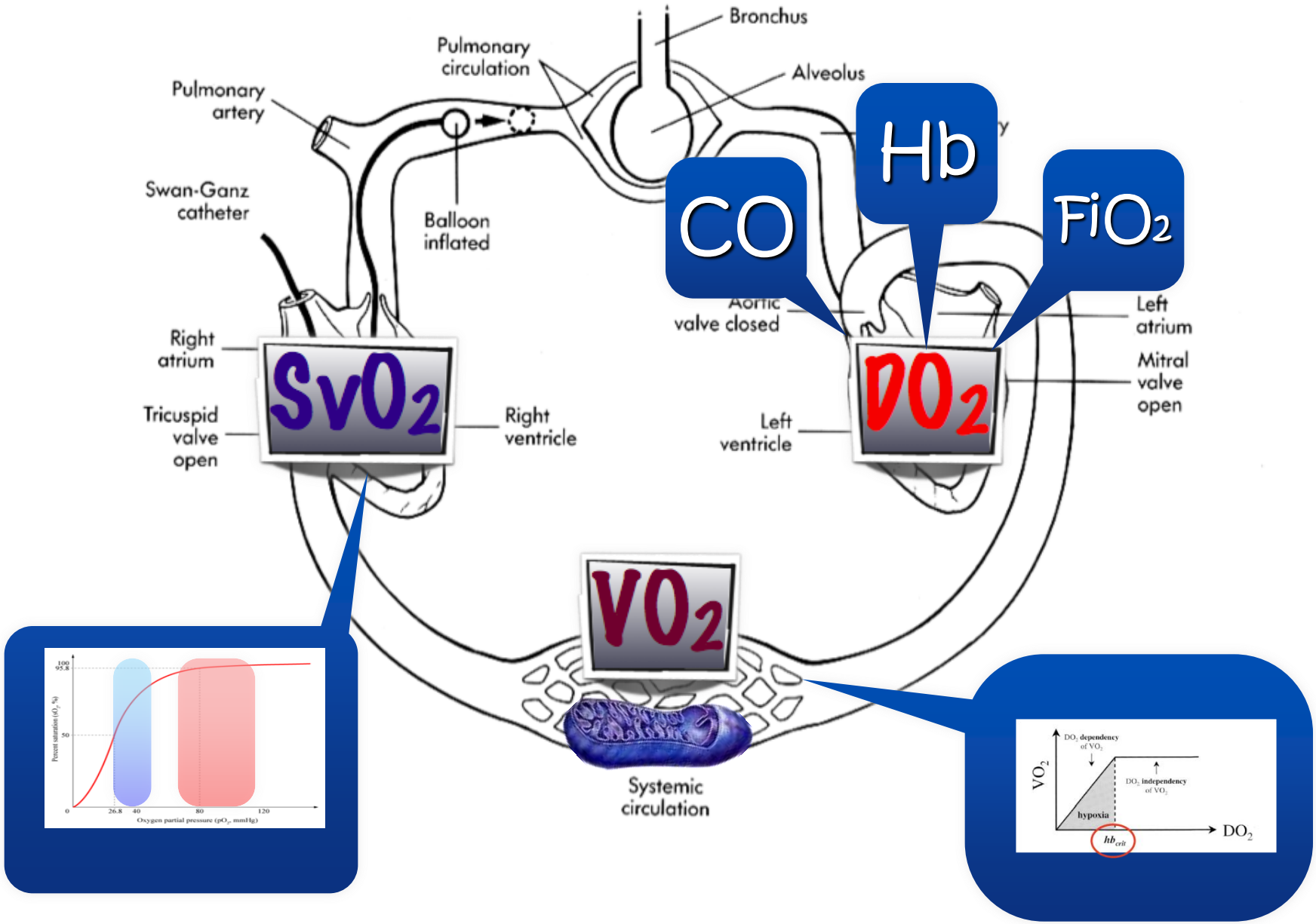
Procedure	35286 - Repair blood vessel with graft other than vein; lower extremity
Risk Factors	Age: 75-84, Male, Partially dependent functional status, ASA III, Clean/Contaminated wound, Diabetes (oral), HTN, Previous cardiac, Dyspnea with exertion, Smoker, COPD, Obese (Class3)

Change Patient Risk Factors



Predicted Length of Hospital Stay: 3.5 days

Avoid oxygen debt as soon as possible!



REVIEW ARTICLE

David S. Warner, M.D., Editor

Perioperative Organ Injury

Karsten Bartels, M.D.,* Jörn Karhausen, M.D.,† Eric T. Clambey, Ph.D.,‡ Almut Grenz, M.D., Ph.D.,§ Holger K. Eltzschig, M.D., Ph.D.‖

Despite the fact that a surgical procedure may have been performed for the appropriate indication and in a technically perfect manner, patients are threatened by perioperative organ injury.

For example:

stroke, myocardial infarction, acute respiratory distress syndrome, acute kidney injury, or acute gut injury…

are among the most common causes for morbidity and mortality in surgical patients

Anesthesiology 2013; 119:1474-89

Table 1. Incidence and mortality of major postoperative complication

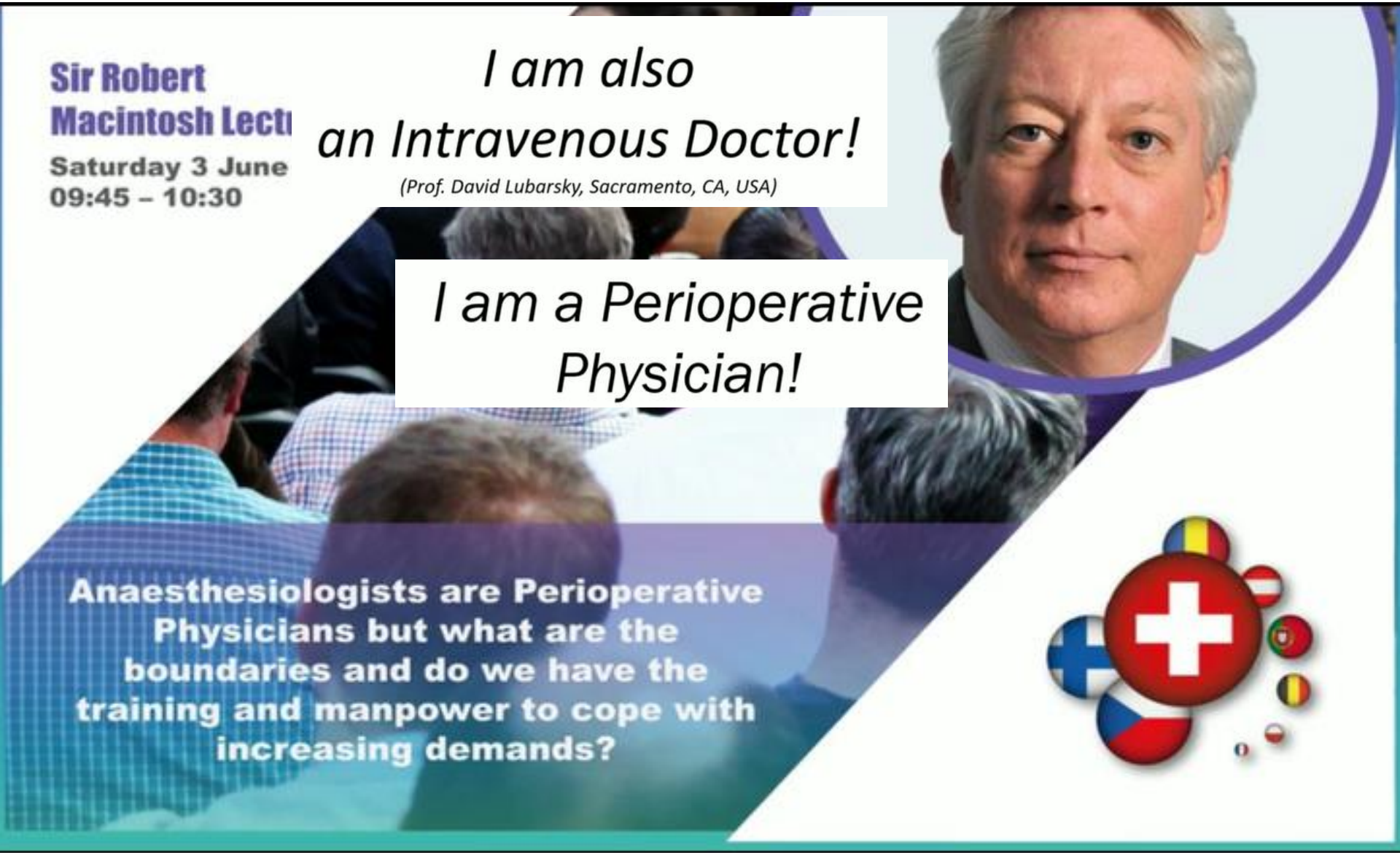
Major complications	Incidence (%)	Mortality of complication (%)	Mortality × incidence = contribution to total mortality (%)
Infection-associated:			
Pneumonia	2.1	19.1	0.40
Deep wound infection	1.9	4.5	0.09
Organ-space infection	3.3	6.7	0.22
Septic shock	2.1	36.3	0.76
Acute renal failure	1.5	43.7	0.66
Ischemia-associated:			
Stroke	0.2	35.1	0.07
Myocardial infarction	0.5	32.1	0.16
Coagulation-associated:			
Pulmonary embolism	0.7	7.7	0.05
Postoperative bleeding	1.4	29.9	0.42

Infectious complications are much more prevalent than ischemic postoperative complications and are the main cause of postoperative mortality (data modified from Ghaferi *et al.* [4]).

4. Ghaferi AA, Birkmeyer JD, Dimick JB. Variation in hospital mortality associated with inpatient surgery. N Engl J Med 2009; 361:1368–1375.

L'anestesista...

Forse non è sufficiente


Sir Robert
Macintosh Lecti
Saturday 3 June
09:45 – 10:30
I am also
an Intravenous Doctor!
(Prof. David Lubarsky, Sacramento, CA, USA)
I am a Perioperative
Physician!
Anaesthesiologists are Perioperative Physicians but what are the boundaries and do we have the training and manpower to cope with increasing demands?

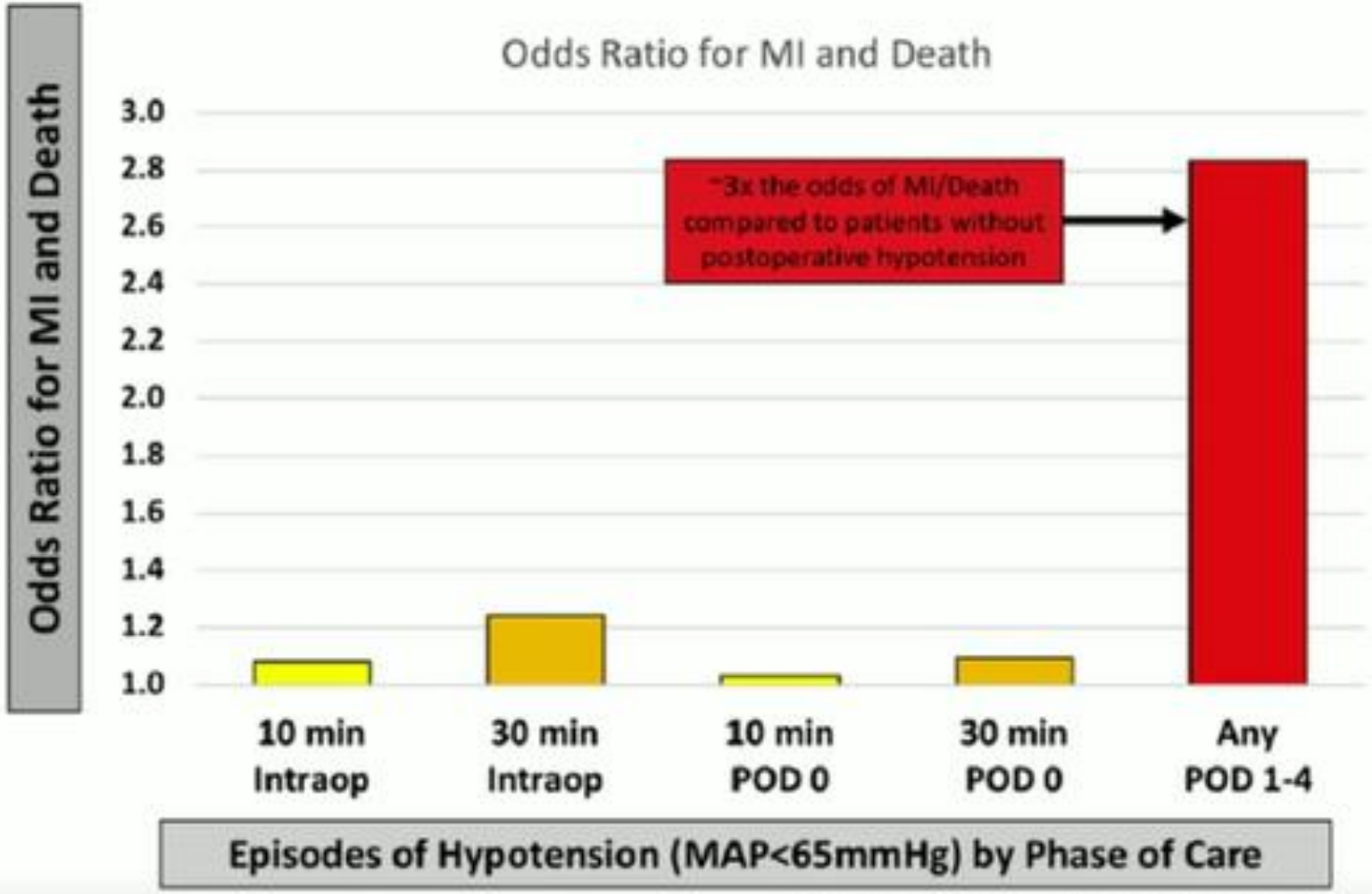
Hemodynamic stability

Normothermia

Periop fluid management

Postop pain control

Association Between Increase Risk of Harm and Hypotension by Phase of Care



Adapted from Sessler et al. *Anesthesiology*, 2018

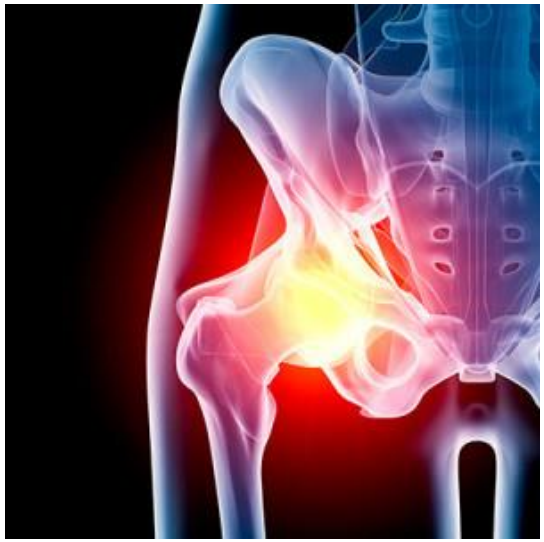
Consensus statement on postoperative blood pressure
doi: 10.1016/j.bja.2019.01.019

Patient Blood Management

(Multidisciplinary, multimodal perioperative programs)

- Perioperative optimization of haematopoiesis
- Minimization of blood loss and perioperative coagulopathy
- Tolerance to postoperative anaemia

Improved patient outcome



Hip fracture patient on oral anticoagulant
Excluding intracapsular fracture neck of femur in young adults

DOAC[57]
- Omit DOAC
- Delay surgery 24 hr
- No bridging therapy
- Multidisciplinary consultation

Aspirin alone[72]
- Continue aspirin
- No bridging therapy
- Proceed with surgery with no precautions

Clopidogrel +/- aspirin[68,69]
- No bridging therapy
- Proceed with surgery
- Avoid neuroaxial anaesthesia
- Be prepared for platelet transfusion for uncontrollable bleeding

VKA + INR ≥ 1.5

Indication of VKA (risk stratification)[45]

Low risk group
1. AF (no prior stroke or TIA)
2. DVT > 3 mths
3. Single PE > 3 mths

High risk group
1. VTE < 3 mths
2. Multiple/recurrent PEs
3. Mechanical heart valve
4. Thromboembolic disorders
5. AF (+previous stroke or TIA)

1. Stop VKA
2. IV 3 mg of Vit.K at admission
3. Prophylactic LMWH (omit the night before surgery)
4. Recheck INR at 6 hrs

1. Stop VKA
2. Multidisciplinary consultation
3. Bridging therapy required

Repeat

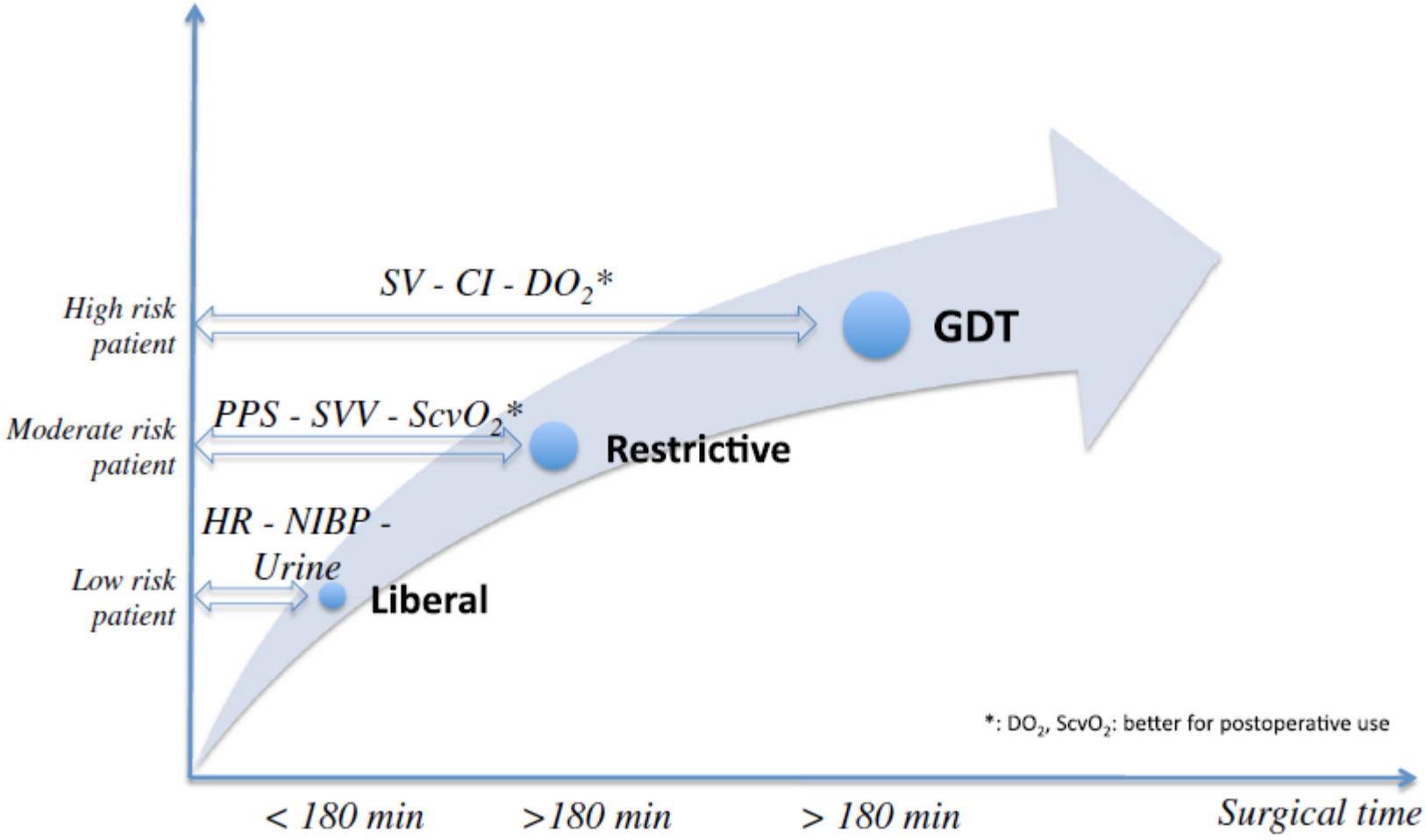
INR ≤ 1.5

Proceed with hip fracture surgery

INR >1.5

PCC is indicated for urgent reversal of VKA in:
1-Intracapsular neck of femur fracture in young adults.
2-DOAC reversal in selected cases.
3-Failure of reversal using other measures within 36 hrs
*FFP to be considered in the event that PCC is unavailable.

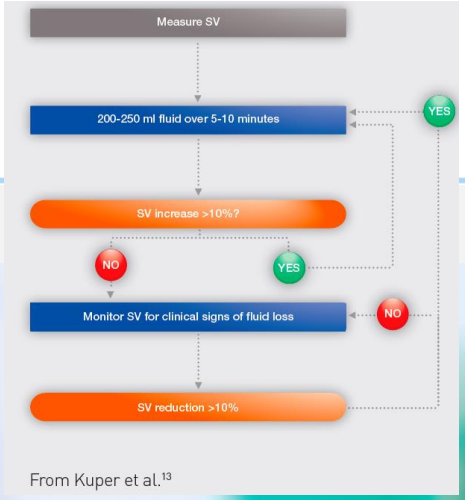
Patient risk, monitoring, fluid goal and surgical time



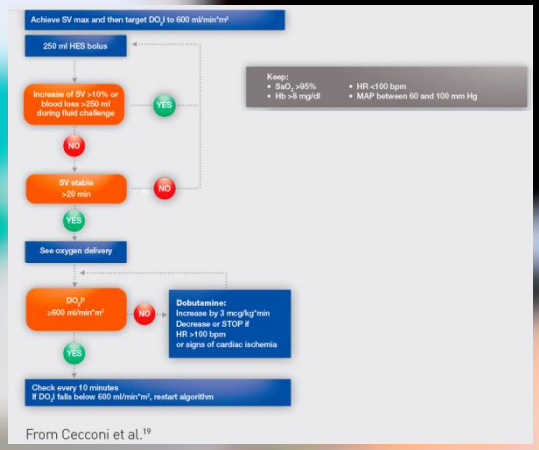
European Society of Anaesthesiology

ESA

U.E.M.S. Section European Board of Anaesthesiology

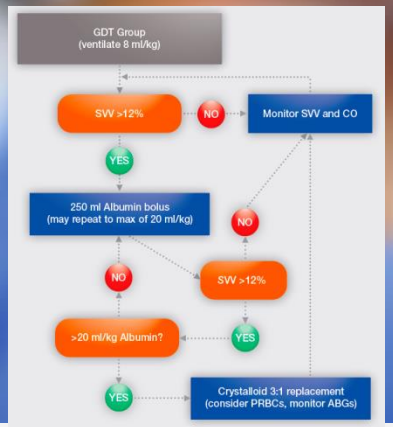


From Kuper et al.[13]



From Cecconi et al.[19]

PERIOPERATIVE GOAL-DIRECTED THERAPY PROTOCOL SUMMARY



From Ramsingh et al.[24]

Goal directed fluid technologies: Pulse contour analysis

requires high-fidelity arterial line

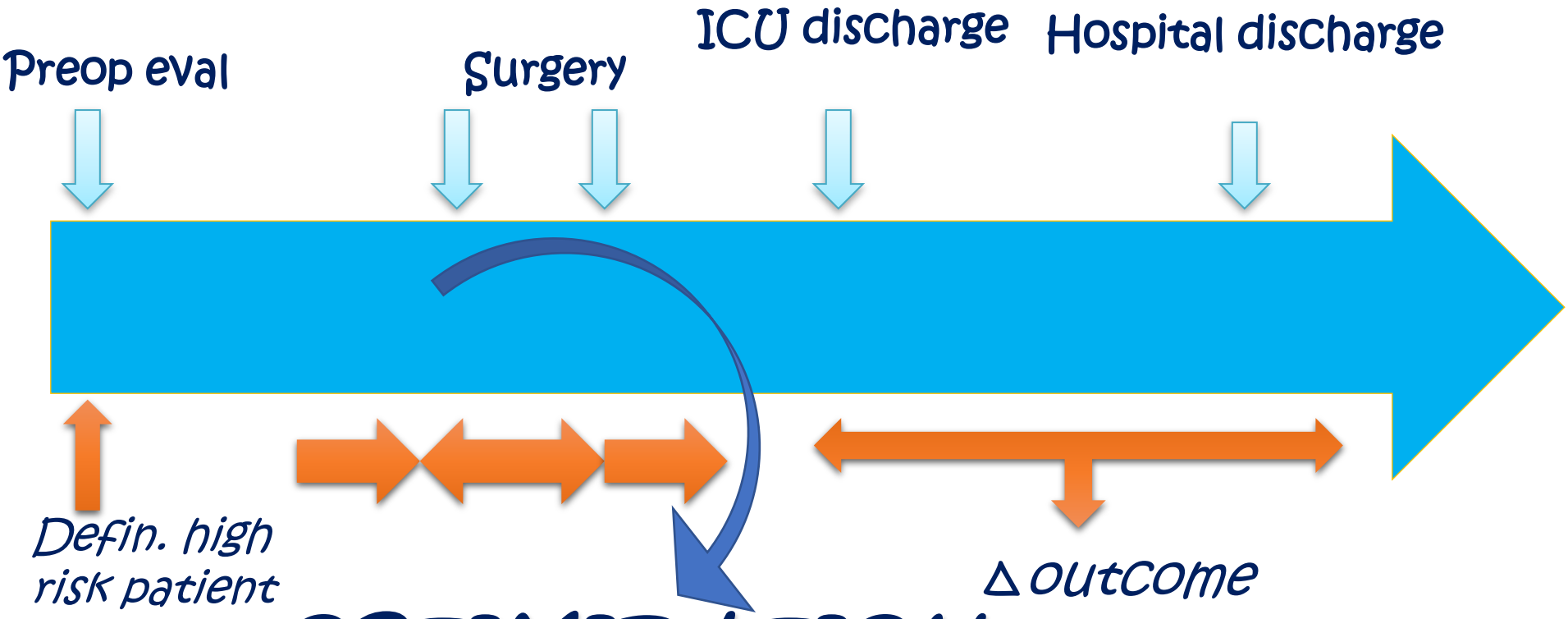
simple, no manual calibration

monitor SV, SVI, CO, CI, SVV

when used with CVP gives $ScvO_2$

updates every 20 sec: real time cardiac output

Perioperative hemodynamic optimization: a complex issue…in emergency



- ✓High RiskPatients
- ✓"Supposed" normal goals ≠ "supranormal" goals
- ✓Postop NIV

Quali pazienti ammetto in terapia intensiva?

Appropriatezza

Qualità

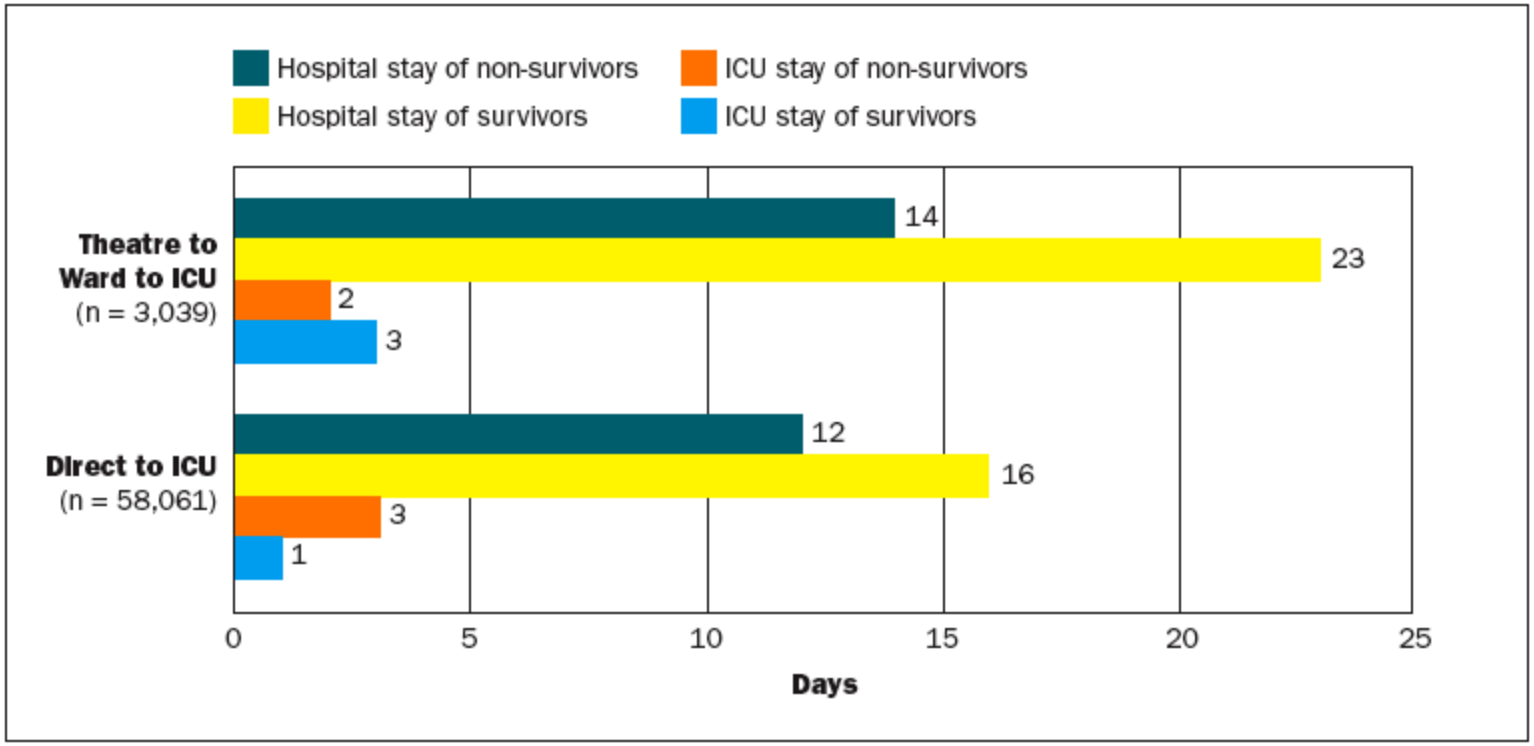
Risorse limitate

Rischi

Costi

Modernising Care for Patients Undergoing Major Surgery

The mortality rate is higher for patients transferred from the operating room to ward and then in intensive care, compared to those transferred directly to the ICU (42.5% vs. 19.9%)



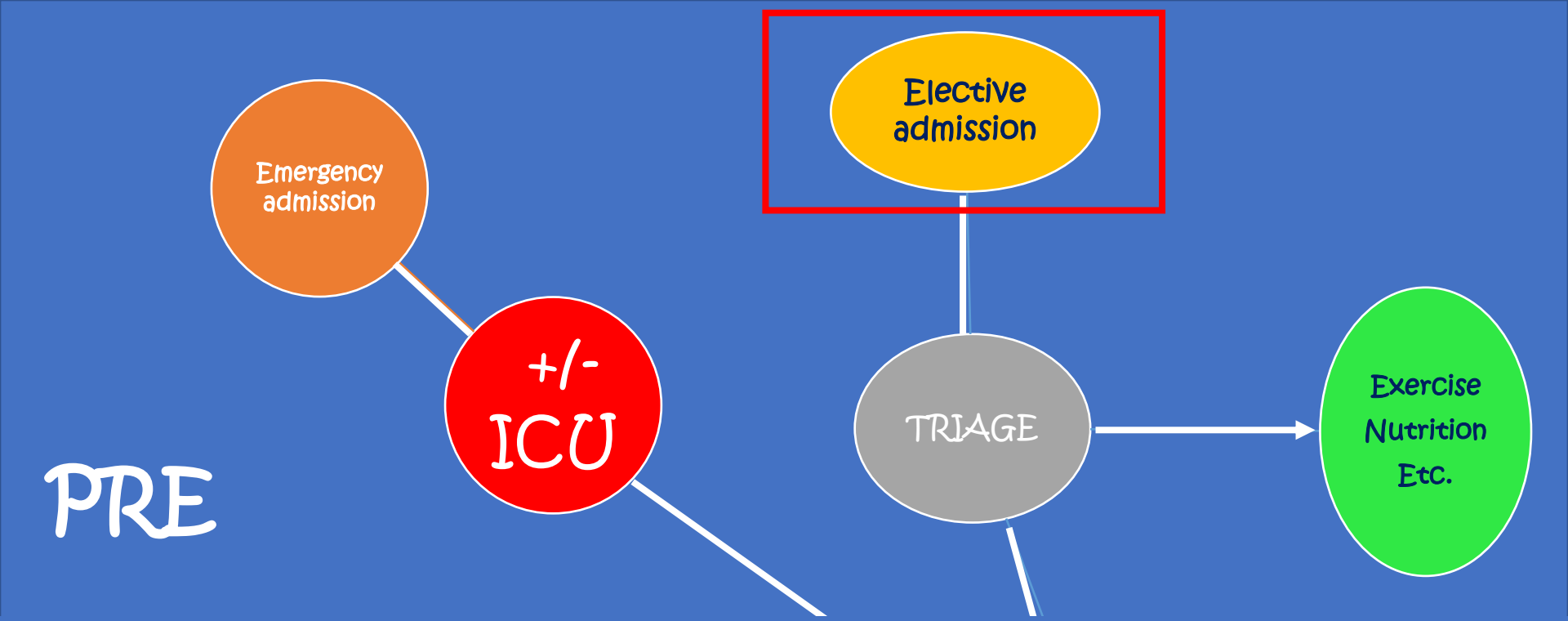
EJA

Eur J Anaesthesiol 2018; **35:**407–465

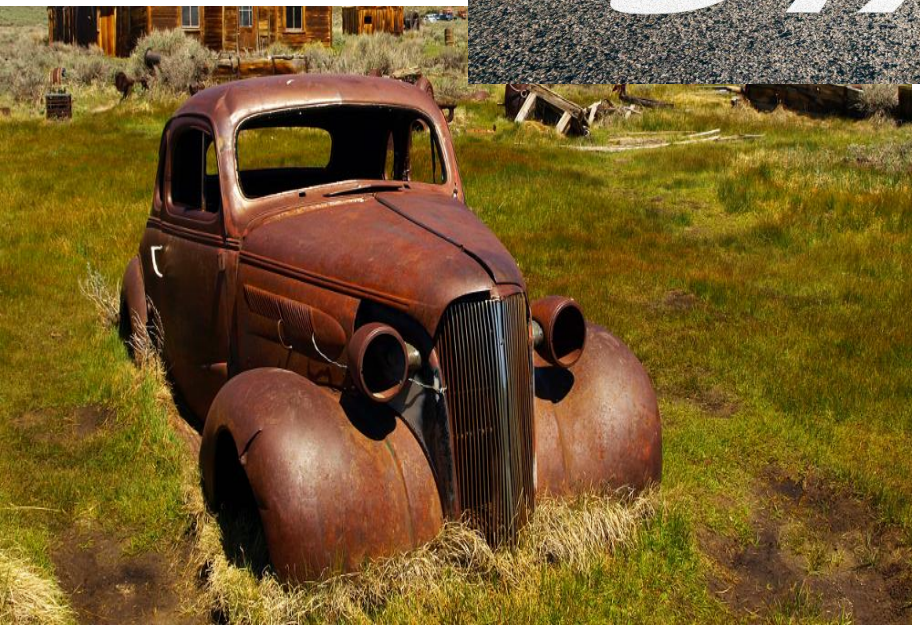
GUIDELINES

Pre-operative evaluation of adults undergoing elective noncardiac surgery

Updated guideline from the European Society of Anaesthesiology


Elective admission
Emergency admission
+/- ICU
TRIAGE
Exercise Nutrition Etc.
PRE


START



SIAARTI
PRO VITA CONTRA DOLOREM SEMPER

Buone pratiche cliniche SIAARTI

NORMOTERMIA PERIOPERATORIA

Il presente documento è disponibile per il download e la stampa all'indirizzo:
www.siaarti.it/standardclinici

LA FORMAZIONE PRIMA DI TUTTO

NORMOTERMIA PERIOPERATORIA

✓ **OBIETTIVO: CORE ≥ 36°C**

Per interventi superiori a 30 Min**

✓

1. MANTENERE / RIPRISTINARE LA NORMOTERMIA PRIMA DEL TRASFERIMENTO DEL PAZIENTE NEL BLOCCO OPERATORIO
2. INCORAGGIARE IL PAZIENTE A CAMMINARE PER RAGGIUNGERE IL BO (QUANDO OPPORTUNO E SE POSSIBILE)
3. RISCALDARE PAZIENTE E FLUIDI, APPENA POSSIBILE, DOPO L'INGRESSO NEL BLOCCO OPERATORIO *
4. CONSIDERARE IL PRERISCALDAMENTO (MIN. 10-30 MINUTI) PER EVITARE IPOTERMIA DA RIDISTRIBUZIONE
5. MONITORARE LA TC DURANTE L'INTERVENTO (OGNI 30 MINUTI) E PER TUTTA LA DURATA DELL'ANESTESIA E REGISTRARE SEMPRE IL DATO IN CARTELLA
6. REGISTRARE SEMPRE LA TC IN RR/PACU (OGNI 15 MIN) E ALLA DIMISSIONE DAL BLOCCO OPERATORIO, FORNENDO INDICAZIONI/ALERT AL PERSONALE IN CONSEGNA.

*CONSIDERARE SEMPRE:
- TEMPERATURA AMBIENTALE BLOCCO OPERATORIO (NEI LIMITI PREVISTI)
- RISCALDAMENTO ATTIVO DEL PAZIENTE
- RISCALDAMENTO DEI FLUIDI DA INFONDERE E DI QUELLI DI IRRIGAZIONE

⚠

**PAZIENTE PEDIATRICO:
1. RISCALDARE SEMPRE ANCHE PER INTERVENTI <30 MIN.
2. NON SVESTIRE IL PAZIENTE ALL'INGRESSO NEL BO
3. RISCALDARE IMMEDIATAMENTE, CON MEZZI DEDICATI

T° CORE IN ANESTESIA GENERALE

- Esofagea
- Sensore servo controllato riscaldato
- Timpanica a contatto
- Vescicale*
- PAC/Catetere art. PICCO o EV1000 o analoghi*

*se indicati

T° CORE IN ANESTESIA LOCO-REGIONALE

- Timpanica a contatto
- Sensore servo controllato riscaldato
- Vescicale*

*se indicati

SE T°C < 36:

1. VALUTARE IMPLEMENTAZIONE DEI MEZZI DI RISCALDAMENTO (AD ARIA CALDA FORZATA SE POSSIBILE, MATERASSINI E COPERTE TERMICHE IN BASE A VALUTAZIONE RISCHI/BENEFICI)
2. NON DIMETTERE IL PAZIENTE DAL BLOCCO OPERATORIO FINO AL RAGGIUNGIMENTO DEI 36°C (ESCLUSI I PAZIENTI DA TRASFERIRE IN TERAPIA INTENSIVA)

NECESSARIO | AUSPICABILE | WARNING

SIAARTI
PRO VITA CONTRA DOLOREM SEMPER

Buone pratiche cliniche SIAARTI

GESTIONE FLUIDI ED EMODINAMICA PERIOPERATORIA NEL PAZIENTE AD ALTO RISCHIO

Il presente documento è disponibile per il download e la stampa all'indirizzo:
www.siaarti.it/standardclinici

FLUIDI ED EMODINAMICA PERIOPERATORIA NEL PAZIENTE AD ALTO RISCHIO

1 mL/Kg/h DI CRISTALLOIDI + MONITORAGGIO DELLA CO

REATTIVA	PROATTIVA
PROBLEMI EMODINAMICI INTRAOPERATORI FC, PA, DIURESI	INDICE CARDIACO < 2,5 L/min/m² SVI < 35 mL/M²
SVV/PPV/PVI POSITIVI	SVV/PPV/PVI NEGATIVI
FLUID CHALLENGE 3 mL/Kg	INOTROPI O VASOPRESSORI
↑ SVI ≥ 10% DOPO FLUID CHALLENGE DO_2I > 600 mL/min/m² (se possibile)	RIVALUTARE OGNI 10 MIN

OTTIMIZZAZIONE POSTOPERATORIA:
DO_2I > 600 mL/min/m² (se possibile) E/O $ScvO_2$ - SvO_2 > 70%

IN CASO DI DUBBIO CONSIDERA SEMPRE TTE/TEE SE DISPONIBILE

NECESSARIO | AUSPICABILE | WARNING

MIORISOLUZIONE, MONITORAGGIO NEUROMUSCOLARE E ANTAGONISMO

Il presente documento è disponibile per il download e la stampa all'indirizzo:
www.siaarti.it/pages/formazione-e-risorse/linee-guida.aspx

BLOCCANTI NM, MONITORAGGIO ED ANTAGONISMO

MANTENIMENTO

MONITORAGGIO OBBLIGATORIO

NECESSITÀ CHIRURGICA DI BLOCCO PROFONDO E/O GRAVI PATOLOGIE:
- EPATICHE
- RENALI
- NEUROMUSCOLARI
- BMI>30

TOF OGNI 5 MIN (QUALITATIVO)

TOF IN CONTINUO (QUANTITATIVO) → TOF=0 PTC=1,2

MONITORAGGIO DISPONIBILE

NECESSITÀ ANESTESIOLOGICHE
- IOT
- SINGLE SHOT*

SOMMINISTRAZIONE BOLO O INF. CONT. A SECONDA DEL TARGET (DA RIPORTARE IN CARTELLA)

ESTUBAZIONE

BLOCCO PROFONDO TOF = 0 E PTC = 1,2	BLOCCO MODERATO T1-T3	RECUPERO SPONTANEO
• SUGAMMADEX (4 MG/KG) SOLO AMINOSTEROIDEI • NO NEOSTIGMINA	• NEOSTIGMINA (50-70 MCG/KG) MAX • SUGAMMADEX (2 MG/KG) AMINOSTEROIDEI	

TOF-R ≥ 0,9 → ESTUBAZIONE

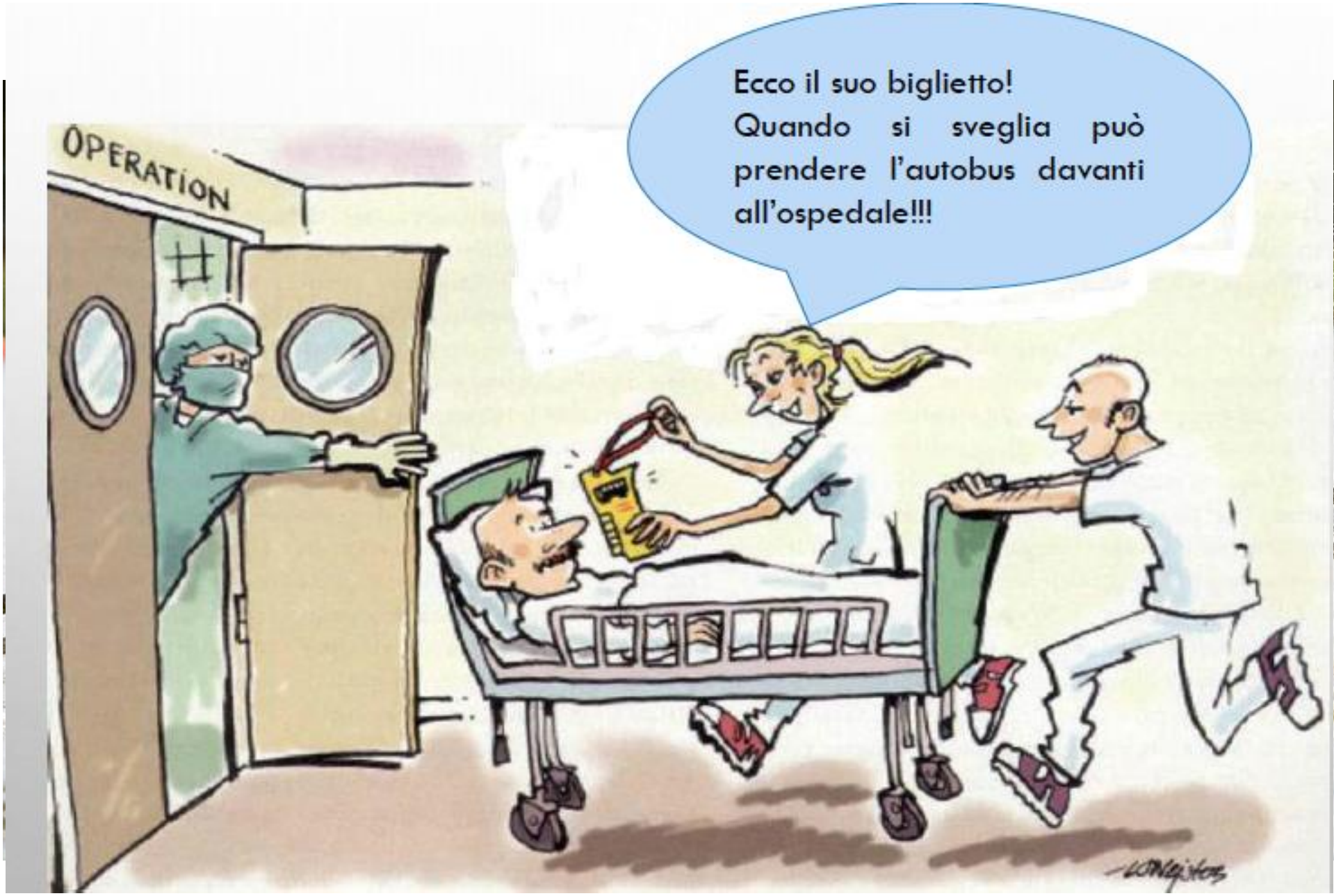
DIMISSIONE

DOCUMENTARE IN CARTELLA IL RECUPERO DELLA FUNZIONE NEUROMUSCOLARE

* VEDI AVVERTENZE

NECESSARIO | AUSPICABILE | WARNING

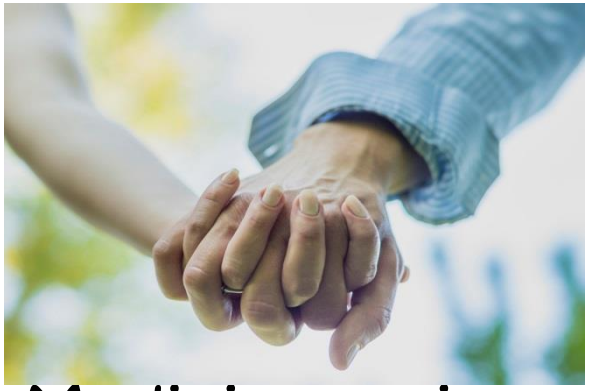

Guidelines


OPERATION
Ecco il suo biglietto!
Quando si sveglia può prendere l'autobus davanti all'ospedale!!!

Conoscere e valutare

specifici criteri

Paziente vulnerabile



Ottimizzare le risorse

Medicina perioperatoria nella emergenza

Anestesia e outcome in ERAS

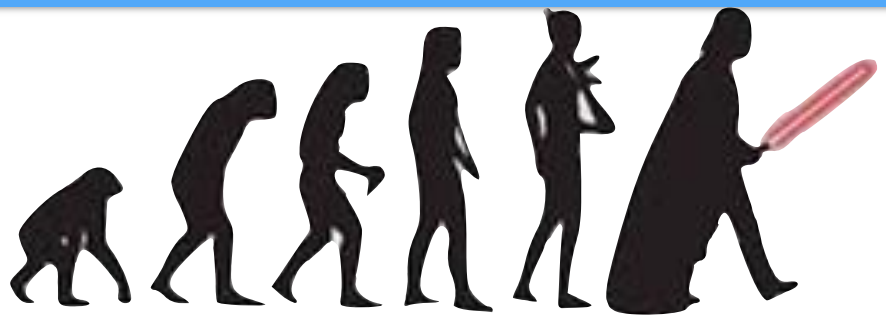


Tavola Rotonda "Obiettivo rischio zero" - ERAS nel paziente difficile

Congresso Nazionale SIDA, Bergamo - 19 settembre 2019

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Sistema Sanitario Regione Lombardia

Società Italiana dell'Anca

SIAARTI
PRO VITA CONTRA DOLOREM SEMPER

ESRA
State of the Art Safety Standards in RA
THE EUROPEAN SOCIETY OF REGIONAL ANAESTHESIA & PAIN THERAPY

Può la tecnica anestesiologica cambiare i risultati?

BMJ

Recent advances: Management of patients in fast track surgery

Douglas W Wilmore and Henrik Kehlet

BMJ 2001;322;473-476
doi:10.1136/bmj.322.7284.473

2001

Annals of Surgery • Volume 248, Number 2, August 2008

Evidence-Based Surgical Care and the Evolution of Fast-Track Surgery

Henrik Kehlet, MD, PhD, and Douglas W. Wilmore, MD†*

2008

2001 2017

Original article

OPEN ACCESS

Enhanced recovery after surgery for hip and knee arthroplasty: a systematic review and meta-analysis

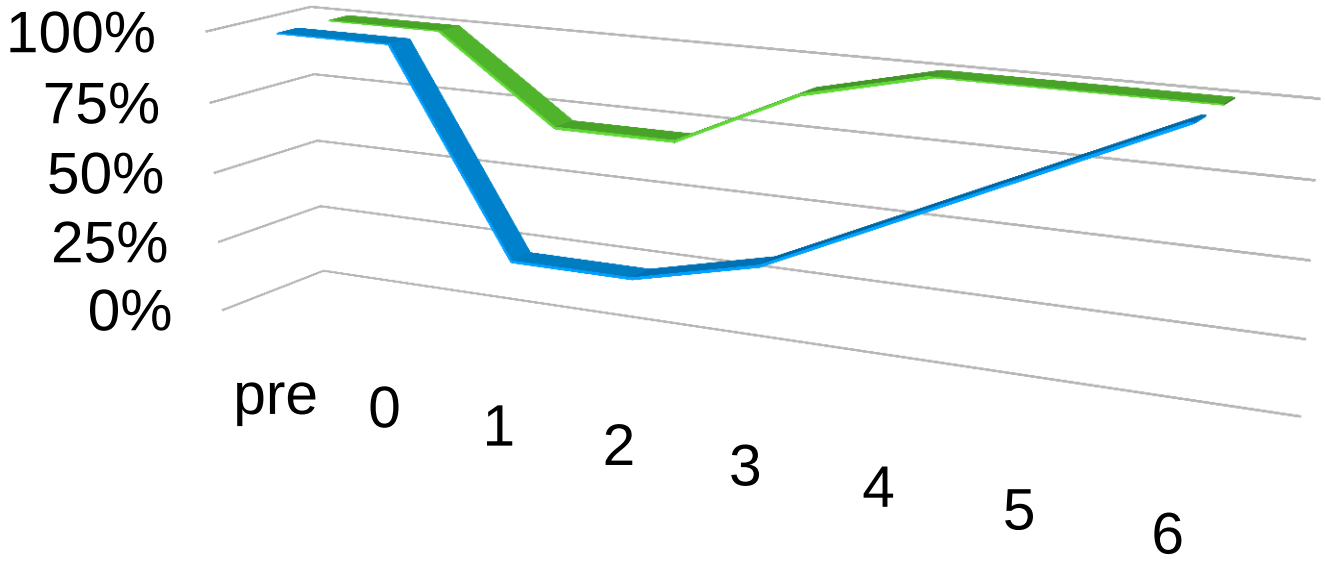
Shibai Zhu, Wenwei Qian, Chao Jiang, Canhua Ye, Xi Chen

Results A total of 10 published studies (9936 cases) met the inclusion criteria. The cumulative data included 4205 cases receiving enhanced recovery after surgery (ERAS), and 5731 cases receiving traditional recovery after surgery (non-ERAS). The meta-analysis showed that LOS was significantly lower in the ERAS group than in the control group (non-ERAS group) ($p<0.01$), and there were fewer incidences of complications in the ERAS group than in the control group ($p=0.03$). However, no significant difference was found in the 30-day readmission rate ($p=0.18$).

Zhu S, et al. Postgrad Med J 2017;93:736–742.

2 0 X X

capacità funzionale



Kehlet H. *Br J Anesth* 1997;78:606-17

in the meanwhile..

CME The Role of the Anesthesiologist in Fast-Track Surgery: From Multimodal Analgesia to Perioperative Medical Care

Paul F. White, PhD, MD*

Henrik Kehlet, MD, PhD†

Joseph M. Neal, MD‡

Thomas Schricker, MD, PhD§

Daniel B. Carr, MD‖¶

Franco Carli, MD, MPhil§ and the Fast-Track Surgery Study Group

BACKGROUND: Improving perioperative efficiency and throughput has become increasingly important in the modern practice of anesthesiology. Fast-track surgery represents a multidisciplinary approach to improving perioperative efficiency by facilitating recovery after both minor (i.e., outpatient) and major (inpatient) surgery procedures. In this article we focus on the expanding role of the anesthesiologist in fast-track surgery.

METHODS: A multidisciplinary group of clinical investigators met at McGill University in the Fall of 2005 to discuss current anesthetic and surgical practices directed at improving the postoperative recovery process. A subgroup of the attendees at this conference was assigned the task of reviewing the peer-reviewed literature on this topic as it related to the role of the anesthesiologist as a perioperative physician.

RESULTS: Anesthesiologists as perioperative physicians play a key role in fast-track surgery through their choice of preoperative medication, anesthetics and techniques, use of prophylactic drugs to minimize side effects (e.g., pain, nausea and vomiting, dizziness), as well as the administration of adjunctive drugs to maintain major organ system function during and after surgery.

CONCLUSION: The decisions of the anesthesiologist as a key perioperative physician are of critical importance to the surgical care team in developing a successful fast-track surgery program.

(Anesth Analg 2007;104:1380–96)

TABLE 1. Evidence-Based Elements of Fast-track Programs

Preoperative preparation
Patient information and explanation of fast-track modalities
Optimization of medical and physical conditions
Smoking cessation (4–6 wk before surgery)
Stop alcohol intake
Carbohydrate loading from the night before surgery
No mechanical bowel preparation
Intraoperative care
Antibiotic prophylaxis
Attenuation of stress response
Avoidance of fluid excess
Maintenance of normothermia
Use of short-acting opioids and muscle relaxants
Maintenance of tissue oxygenation
Deep vein thrombosis prophylaxis
Postoperative care
Optimize multimodal analgesia (opioid sparing)
Avoid fluid and sodium excess
Control of nausea and vomiting
Control of ileus
Early oral nutrition
Early ambulation
Early removal of catheters, drains, and tubes

Evidence Review Conducted for the Agency for Healthcare Research and Quality Safety Program for Improving Surgical Care and Recovery: Focus on Anesthesiology for Total Hip Arthroplasty

Ellen M. Soffin, MD, PhD,* Melinda M. Gibbons, MD, MSHS,†
Clifford Y. Ko, MD, MS, MSHS,†‡ Stephen L. Kates, MD,§ Elizabeth C. Wick, MD,‖
Maxime Cannesson, MD, PhD,¶ Michael J. Scott, MB ChB, FRCP, FRCA, FFICM,#**
and Christopher L. Wu, MD*‖

Anesth Analg
2019;128:454–65

Table 1. Improving Surgical Care and Recovery Total Hip Arthroplasty Protocol Components: Anesthesia

Immediate preoperative
Reduced fasting
Carbohydrate loading
Multimodal preanesthesia medication
Intraoperative
Standard intraoperative anesthesia pathway
Fluids/goal-directed fluid therapy
Normothermia
Tranexamic acid
Glycemic control
Postoperative
Standard postoperative multimodal analgesic regimen

outline..

- preparazione
- tecnica di anes
- adiuvanti
- strategie di sup

..preanesthetic medications may be administered as part of a multimodal approach to analgesia and PONV prophylaxis..

paracetamolo

FANS

profilassi PONV

REJECTED

Sofin et al. Anesth Analg 2019;128:45

preoperative FASTING

Anesth Analg
2019;128:454–65

2h 6h

Anesth Analg
2019;128:454–65

CARBOHYDRATE LOADING

3 Methods to Increase Your Chance of

MARATHON SUCCESS

Anesth Analg
2019;128:454–65

DM?

outline..

- preparazione
- **tecnica di anest**
- adiuvanti
- strategie di supporto

ANAESTHESIA BY NEW METHOD.

SPINAL CANAL PENETRATED BY SURGEON'S HOLLOW NEEDLE THROUGH WHICH COCAINE IS INJECTED

PATIENT DUMB TO SENSE OF PAIN BUT HIS SENSES ACTIVE AND HIS CONSCIOUSNESS UNIMPAIRED

J Bone Joint Surg Am. 1975 Mar;57(2):173-7.

The use of spinal anesthesia for total hip-replacement arthroplasty.

Sculco TP, Ranawat C.

Abstract

Two hundred and thirty-four total hip replacements in 199 patients performed by one surgeon were reviewed to compare the effects of spinal and general anesthesia. The amount of total blood loss was reduced an average of 600 milliliters in patients under spinal anesthesia. The amounts of operative blood loss, postoperative suction drainage, and blood replacement were also reduced very significantly (p smaller than 0.001). The patients in the two anesthesia groups were similar as to sex, age, body weight, pre-existing medical disease, preoperative medications administered, hip disease, type of prosthesis used, position during surgery, and anticoagulation regimen. The postoperative complications were fewer in the spinal anesthesia group. It is concluded from this study that spinal anesthesia is to be preferred over general anesthesia in patients undergoing total hip replacement.

Anestesia SpinalE

SPECIAL ARTICLE

Evidence Basis for Regional Anesthesia in Multidisciplinary Fast-Track Surgical Care Pathways

Francesco Carli, MD, MPhil, FRCA, FRCPC, Henrik Kehlet, MD, PhD,† Gabriele Baldini, MD,* Andrew Steel, MD, MBBS, MRCP, FRCA, EDIC,‡ Karen McRae, MD,‡ Peter Slinger, MD,‡ Thomas Hemmerling, MD, MSc, DEAA,* Francis Salinas, MD,§ and Joseph M. Neal, MD§*

perfusione coronarica

stress response

ponv + ileo

miglior ventilazione + tosse

minor insulino-R

meno dolore
meno oppioidi

Anestesia SpinalE

Anesthesia Technique and Mortality after Total Hip or Knee Arthroplasty

A Retrospective, Propensity Score–matched Cohort Study

Anahi Perlas, M.D., F.R.C.P.C., Vincent W. S. Chan, M.D., F.R.C.P.C., F.R.C.A.,
Scott Beattie, M.D., F.R.C.P.C.

Results: We identified 10,868 patients, of whom 8,553 had spinal anesthesia and 2,315 had general anesthesia. Ninety-two percent (n = 2,135) of the patients who had general anesthesia were matched to similar patients who did not have general anesthesia. In the matched cohort, the 30-day mortality rate was 0.19% (n = 4) in the spinal anesthesia group and 0.8% (n = 17) in the general anesthesia group (risk ratio, 0.42; 95% CI, 0.21 to 0.83; $P = 0.0045$). Spinal anesthesia was also associated with a shorter hospital length of stay (5.7 *vs.* 6.6 days; $P < 0.001$).

Conclusions: The results of this observational, propensity score–matched cohort study suggest a strong association between spinal anesthesia and lower 30-day mortality, as well as a shorter hospital length of stay, after elective joint replacement surgery.
(ANESTHESIOLOGY 2016; 125:724-31)

CLINICAL PRACTICE

Anaesthetic care of patients undergoing primary hip and knee arthroplasty: consensus recommendations from the International Consensus on Anaesthesia-Related Outcomes after Surgery group (ICAROS) based on a systematic review and meta-analysis

Editor's key points

- In this state-of-the-art systematic review and analysis of the literature, a multinational expert group reached a consensus on the optimal anaesthetic approach for patients undergoing lower-limb arthroplasty.
- Considering multiple perioperative outcomes, the consensus was that neuraxial anaesthesia is the preferred anaesthetic technique (when no contraindications exist), and that this reduces the risk of most (but not all) complications.
- Neuraxial anaesthesia, which remains underutilised in many countries, may be used to improve perioperative outcomes, although limitations of the current literature may mandate the revision of these recommendations when new data become available.

- ☑ mortalità
- ☑ complicanze polmonari
- ☑ Insufficienza renale acuta
- ☑ TVP (+TEP)
- ☑ infezioni
- ☑ trasfusioni
- ☑ NO ritenzione urinaria

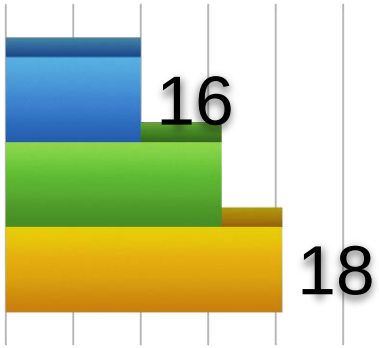
British Journal of Anaesthesia, 123 (3): 269e287 (2019)

☑ paziente a R (respiratorio)

Society of Anesthesia and Sleep Medicine Guideline on Intraoperative Management of Adult Patients With Obstructive Sleep Apnea

Stavros G. Memtsoudis, MD, PhD,*† Crispiana Cozowicz, MD,*† Mahesh Nagappa, MD,‡ Jean Wong, MD, FRCPC,§ Girish P. Joshi, MBBS, MD, FFARCSI,‖ David T. Wong, MD, FRCPC,§ Anthony G. Doufas, MD, PhD,¶ Meltem Yilmaz, MD,# Mark H. Stein, MD,** Megan L. Krajewski, MD,†† Mandeep Singh, MBBS, MD, MSc, FRCPC,‡‡§§¶¶## Lukas Pichler, MD,*† Satya Krishna Ramachandran, MD,*** and Frances Chung, MBBS, FRCPC§

%complications



compared to regional anesthesia. When feasible, regional anesthesia may confer advantages such as avoidance of upper airway effects and neuromuscular blockade, effective pain management, reduced opioid consumption, and efficient suppression of the systemic stress response. These features may be of benefit to patients with OSA. Given these findings and in the absence of evidence suggesting a disadvantage of regional anesthesia, the utilization of these techniques should be considered preferable over general anesthesia whenever feasible. A summary

it’ not about what..but ***how*** you do it!

- ☑ NO alte dosi AL
- ☑ evitare morfina IT
- ☑ controindicazioni spinale

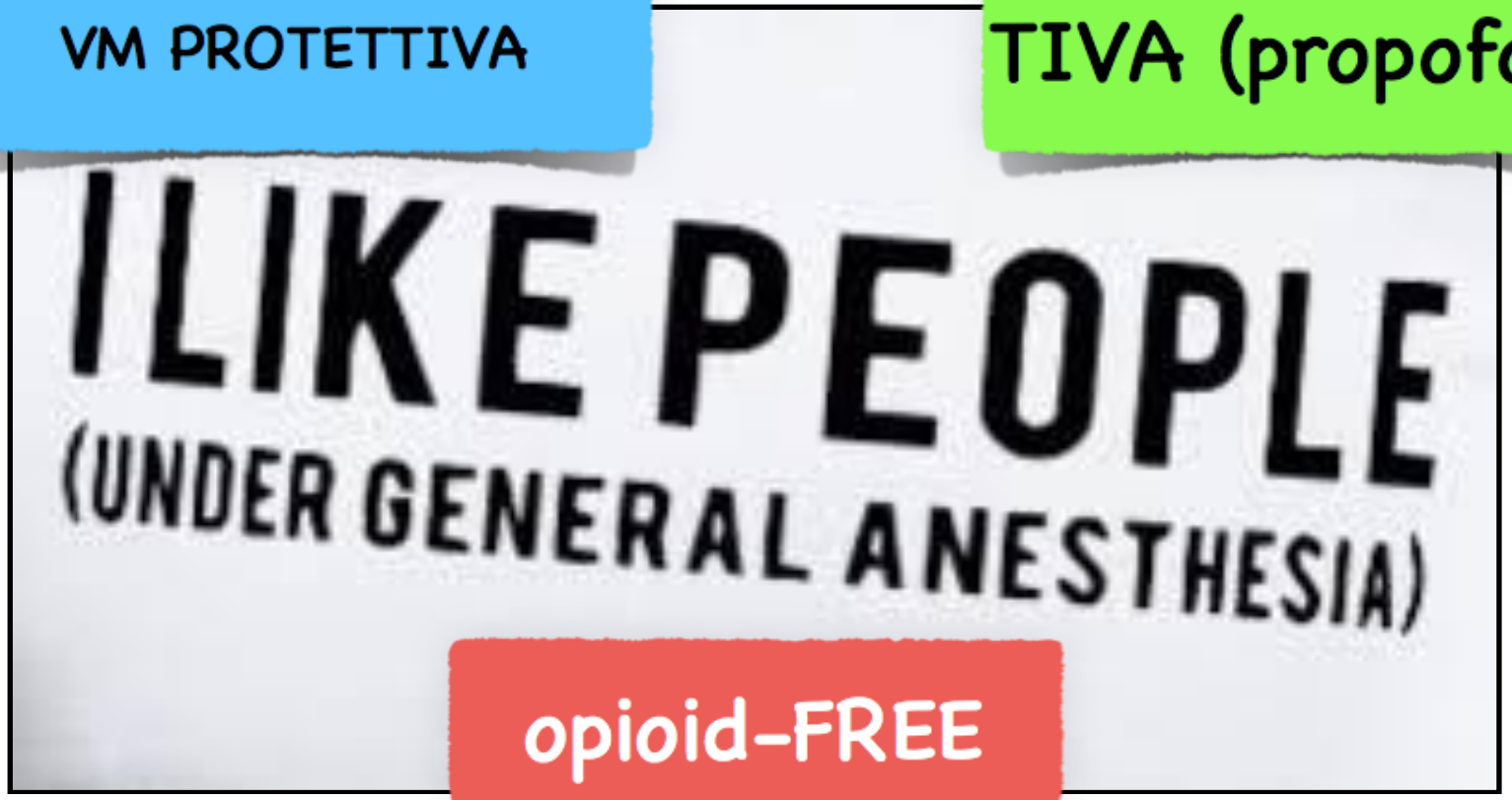
Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy

American Society of Regional Anesthesia and Pain Medicine Evidence-Based Guidelines (Fourth Edition)

Terese T. Horlocker, MD, Erik Vandermeuelen, MD,† Sandra L. Kopp, MD,* Wiebke Gogarten, MD,‡ Lisa R. Leffert, MD,§ and Honorio T. Benzon, MD||*

VM PROTETTIVA

TIVA (propofol)



opioid-FREE

Online version at http://www.minervamedica.it

Minerva Anestesiologica 2017 March;83(3):315-20
DOI: 10.23736/S0375-9393.16.11698-0

EXPERTS' OPINION

Opioid-less perioperative care

Juan P. CATA [1-3] *, Dario BUGADA [3-5], Jose DE ANDRÉS [3, 6]

outline..

- preparazione
- tecnica di anestesia
- adiuvanti
- strategie di sup

KeTaMiNe

Cochrane Library

Cochrane Database of Systematic Reviews

Perioperative intravenous ketamine for acute postoperative pain in adults (Review)

Brinck ECV, Tiippana E, Heesen M, Bell RF, Straube S, Moore RA, Kontinen V

nor dolore e consumo di analgesici..in ogni caso..

SPECIAL ARTICLE

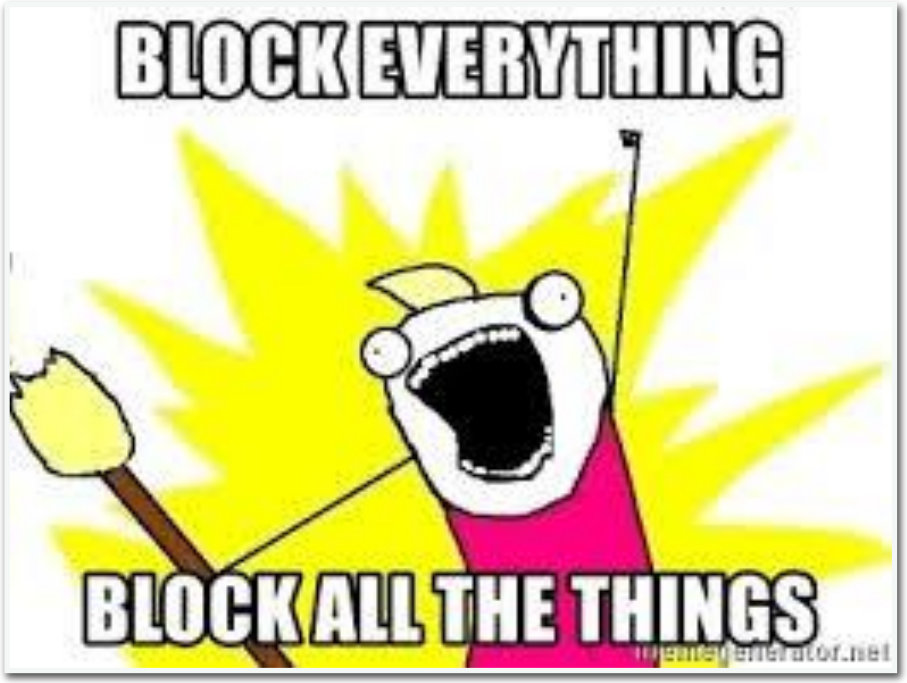
Evidence Review Conducted for the Agency for Healthcare Research and Quality Safety Program for Improving Surgical Care and Recovery: Focus on Anesthesiology for Total Hip Arthroplasty

Ellen M. Soffin, MD, PhD,* Melinda M. Gibbons, MD, MSHS,† Clifford Y. Ko, MD, MS, MSHS,†‡ Stephen L. Kates, MD,§ Elizabeth C. Wick, MD,‖ Maxime Cannesson, MD, PhD,¶ Michael J. Scott, MB ChB, FRCP, FRCA, FFICM,#** and Christopher L. Wu, MD*‖

part of a balanced intraoperative regimen for anesthesia/analgesia for THA. Ketamine may be particularly useful in opioid-tolerant patients and when attempting to minimize opioid administration.

..scelta sensata..in ogni caso..

ANaLGeSiA



Cochrane Library

Cochrane Database of Systematic Reviews

Nerve blocks or no nerve blocks for pain control after elective hip replacement (arthroplasty) surgery in adults (Review)

Guay J, Johnson RL, Kopp S

Update on Selective Regional Analgesia for Hip Surgery Patients

Dario Bugada, MD[a,*], Valentina Bellini, MD[b], Luca F. Lorini, MD[a], Edward R. Mariano, MD, MAS (Clinical Research)[c,d]

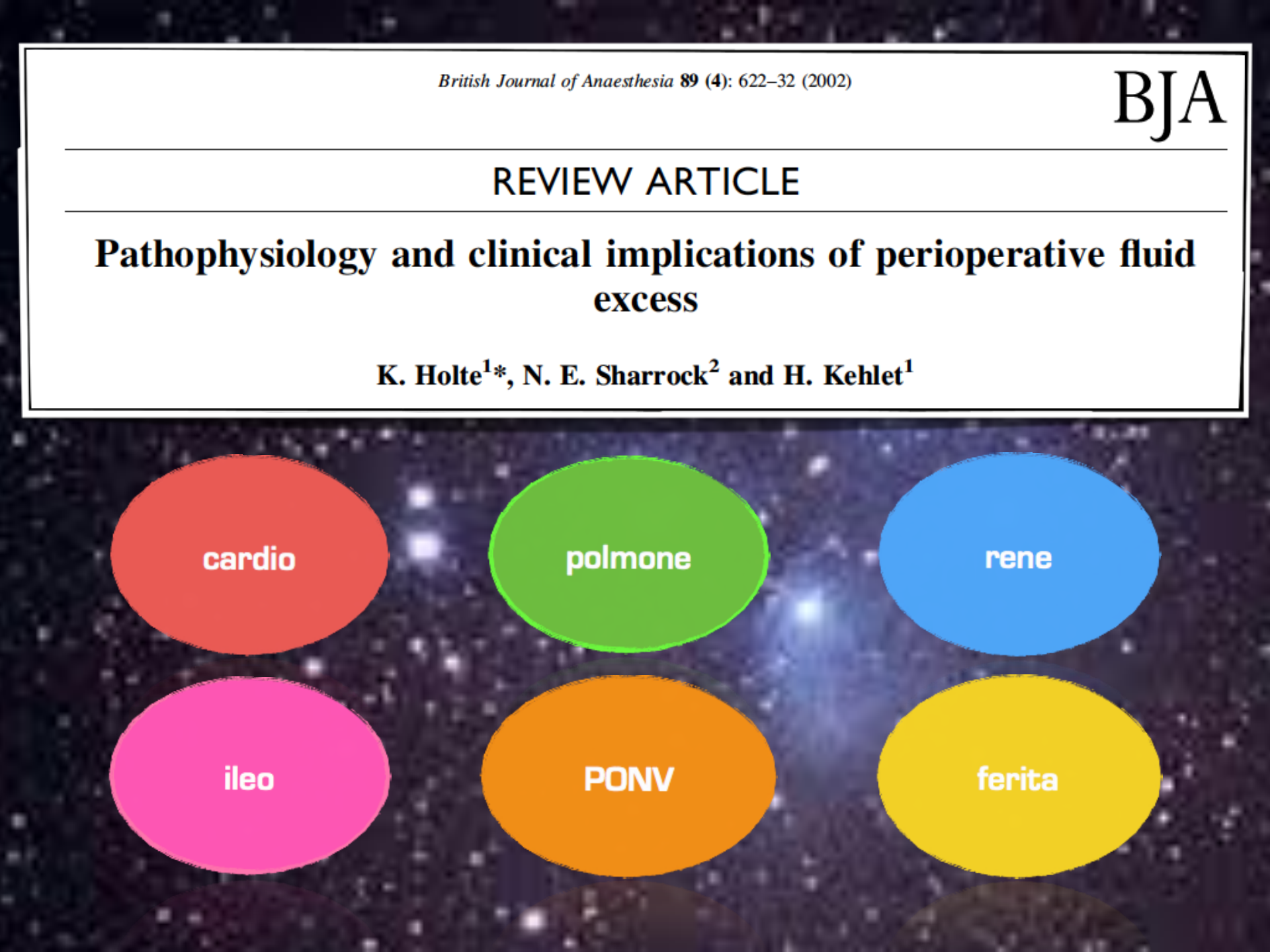
British Journal of Anaesthesia **89 (4)**: 622–32 (2002)

BJA

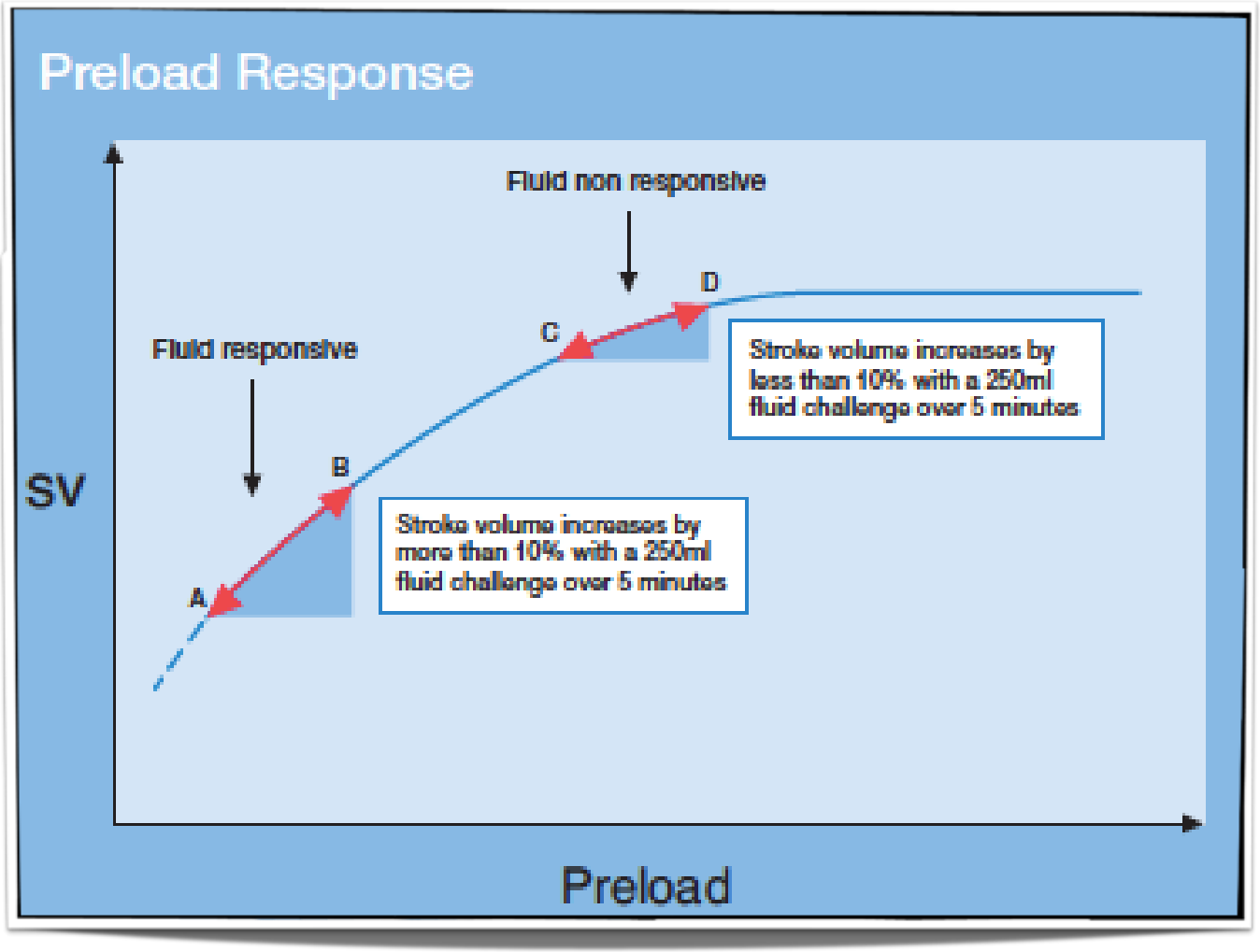
REVIEW ARTICLE

Pathophysiology and clinical implications of perioperative fluid excess

K. Holte[1]*, N. E. Sharrock[2] and H. Kehlet[1]



goal-directed and dynamic



e sicker, the better

The evidence basis to guide the optimal IV fluid regimen and associated volume-status monitoring in THA are limited; however, the available literature supports the judicious use of fluids to achieve euvolemia. That being said, patients with significant comorbidities or significant blood loss may benefit from more intense hemodynamic monitoring.[124]

< 200

In addition, the CDC recommends maintaining perioperative normothermia (category IA: strong recommendation) as high-quality evidence suggested a benefit of patient warming over no warming.[14]

Può la tecnica anestesiologica cambiare i risultati?

- ☑ digiuno “adegual
- ☑ pre-medicazione
- ☑ anestesia neuraxi
- ☑ strategie opioid-fr
- ☑ monitoraggio CV
- ☑ eutermia/glicemi

Grazie

Tavola Rotonda “Obiettivo rischio zero” - Congresso Nazionale SIDA, Bergamo - 19 settembre 2019

Dario Bugada; MD, PhD, EDRA
Department of Anesthesia and ICU
ASST Papa Giovanni XXIII°, Bergamo
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@Bubu84csa

TAVOLA ROTONDA 1:

OBIETTIVO RISCHIO ZERO IN CHIRURGIA ELETTIVA MAGGIORE: ERAS (ENHANCED RECOVERY AFTER SURGERY) NEL PAZIENTE DIFFICILE

Quanto e quale monitoraggio

ALESSANDRO LOCATELLI

Dipartimento Emergenza e Aree Critiche
ASO Santa Croce e Carle
CUNEO

Il Paziente Ortopedico “DIFFICILE”

1. • **Elderly**
2. • **Co-morbid disease**
3. • **Major surgery**
4. • **Emergency surgery**

Le variabili del paziente e del contesto

Età avanzata

Polivasculopatico

Comorbidità

Chirurgia:
- Maggiore
- Minore
- mininvasiva

Circostanze (urgenza-emergenza)

→ Frequenti complicanze

Abbiamo Identificato il pz difficile?

Seguendo quali criteri

- Linee guida
- Score di rischio
- valutazione della riserva funzionale

Quale e quanto monitoraggio peri-operatorio mettere in gioco per gestire approccio farmacologico/strumentale/ fluidico +/- aggressivo

CAUSE DI MORBILITA' E MORTALITA' nei pazienti sottoposti a chirurgia maggiore

- IMA
- BASSA PORTATA (< volemia/< funz. Card)
- INSUFFICIENZA RESPIRATORIA
- INSUFFICIENZA RENALE
  - prevenire bassa portata, ipotensione, ipovolemia
- STROKE
- MALDISTRIBUZIONE/IPOPERFUSIONE

Età avanzata: fattore di rischio indipendente di mortalità
→ valutazione attenta età biologica

2014 ESC/ESA Guidelines on non-cardiac surgery: cardiovascular assessment and management

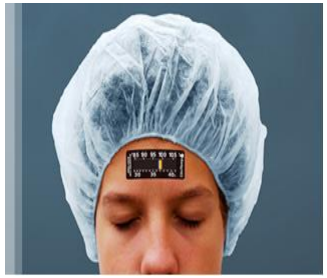
Table 3 Surgical risk estimate according to type of surgery or intervention[a,b]

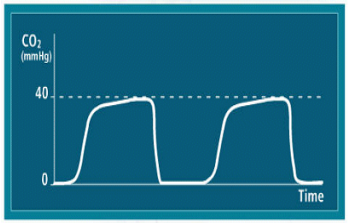
Low-risk: < 1%	Intermediate-risk: 1–5%	High-risk: > 5%
• Superficial surgery • Breast • Dental • Endocrine: thyroid • Eye • Reconstructive • Carotid asymptomatic (CEA or CAS) • Gynaecology: minor • Orthopaedic: minor (meniscectomy) • Urological: minor (transurethral resection of the prostate)	• Intraperitoneal: splenectomy, hiatal hernia repair, cholecystectomy • Carotid symptomatic (CEA or CAS) • Peripheral arterial angioplasty • Endovascular aneurysm repair • Head and neck surgery • Neurological or orthopaedic: major (hip and spine surgery) • Urological or gynaecological: major • Renal transplant • Intra-thoracic: non-major	• Aortic and major vascular surgery • Open lower limb revascularization or amputation or thromboembolectomy • Duodeno-pancreatic surgery • Liver resection, bile duct surgery • Oesophagectomy • Repair of perforated bowel • Adrenal resection • Total cystectomy • Pneumonectomy • Pulmonary or liver transplant

Rischio cardiaco atteso delle procedure chirurgiche


STANDARDS

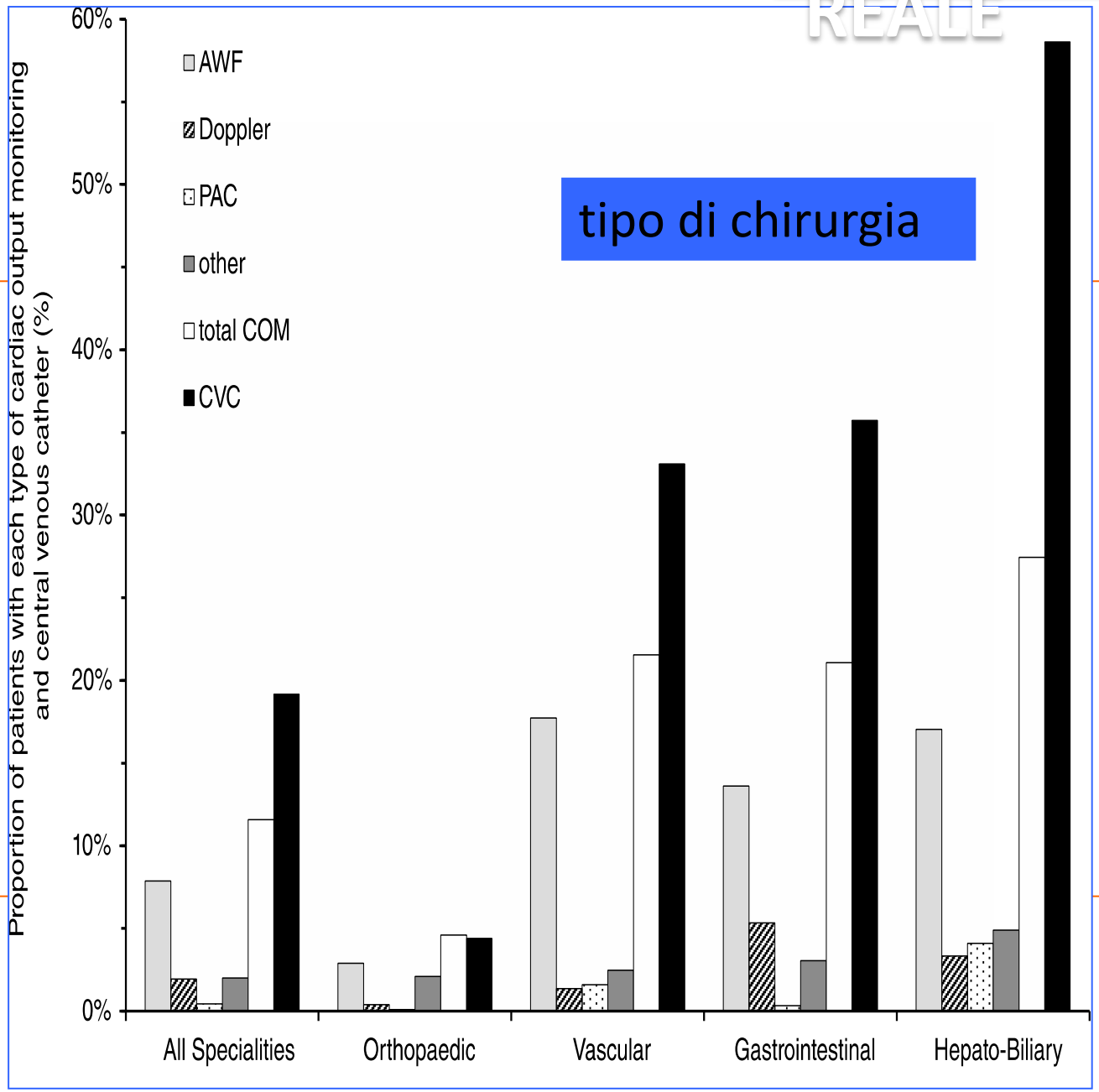

90
60




CO2
(mmHg)
40
0
Time


TOF
100

IL MONDO REALE



la maggior parte degli anestesisti dichiara come il DO2 e l'ottimizzazione siano importanti nel paziente chirurgico ad alto rischio

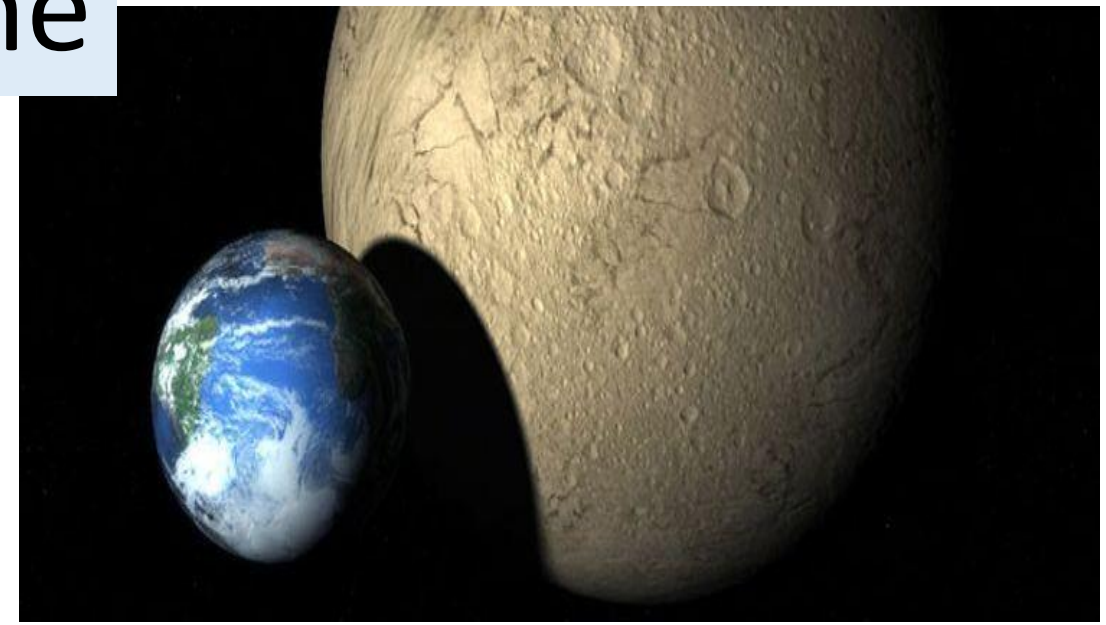
A web-based Italian survey of current trends, habits and beliefs in hemodynamic monitoring and management J Clin Monit Comput (2015) 29:635–642

during anesthesia

avoid hypotension
maintain normovolemia
avoid occult hypoperfusion
Avoid anemia

Ipotensione

5-99%



L’ipotensione non dovrebbe di per se essere un trigger di infusione volemica poiché non tutti gli eventi ipotensivi sono dovuti ad ipovolemia.

Anesthesiology 2009; 111:1217–26

Intraoperative Hypotension and 1-Year Mortality after Noncardiac Surgery

Jilles B. Bijker, M.D., Wilton A. van Klei, M.D., Ph.D.,† Yvonne Vergouwe, Ph.D.,‡ Douglas J. Eleveld, Ph.D.,§ Leo van Wolfswinkel, M.D., Ph.D.,† Karel G. M. Moons, Ph.D.,‡ Cor J. Kalkman, M.D., Ph.D.#*

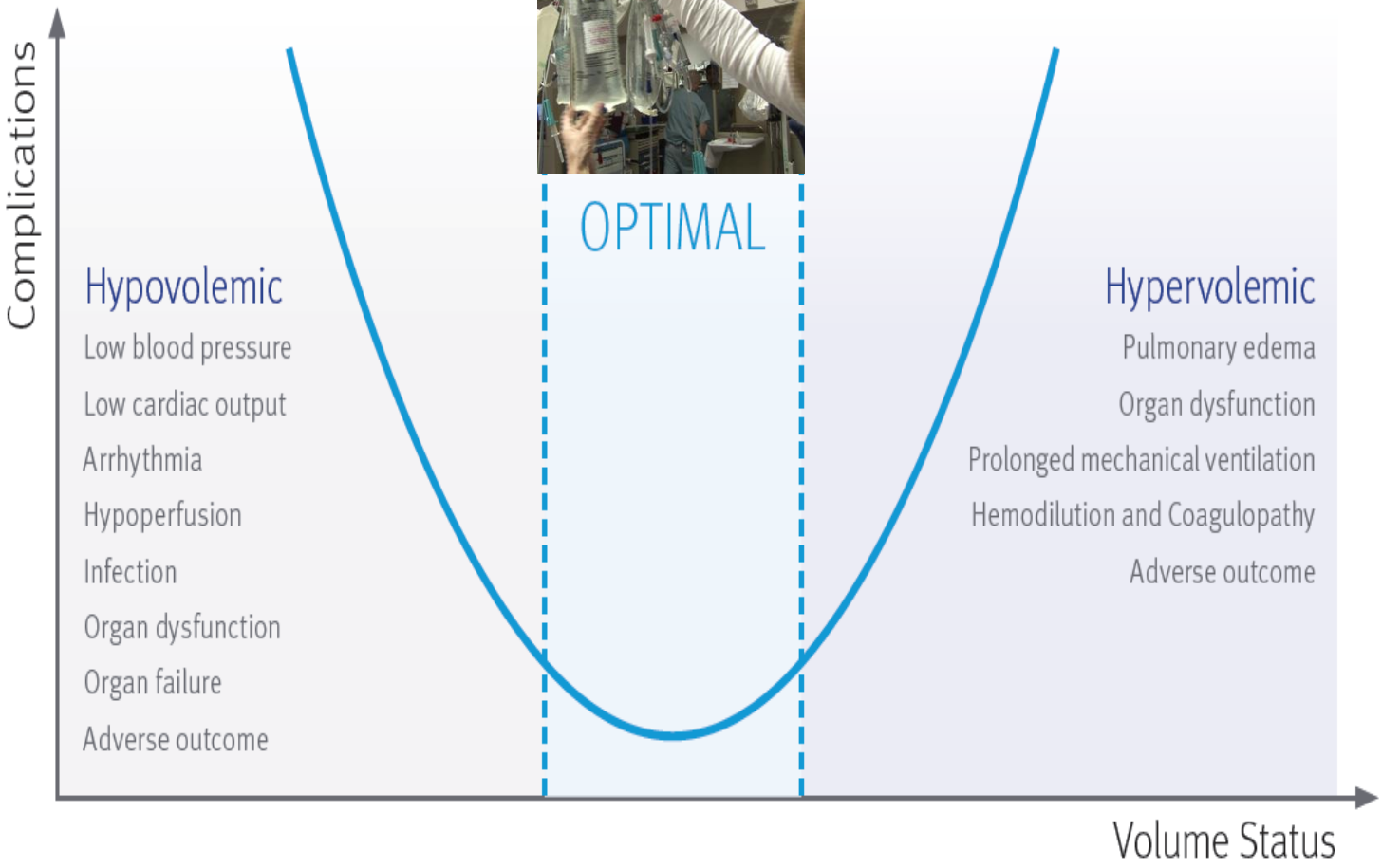
 # pts=1705
mortality=5,16%
hypotensive=8,12%
normotensive=3,32%

Table 1. Characteristics of the Cohort (n = 1,705)

		Intraoperative Hypotension*		
	Total Cohort (n = 1,705)	Present (n = 652)	Absent (n = 1,053)	*P* Value
Mean age (SD), yr	52 (15.8)	57 (14.2)	49 (15.9)	< 0.05‡
Male sex	880 (51.6)	324 (49.7)	556 (52.8)	0.21§
Mean BMI (SD), kg/m^2	25 (4.8)	25 (4.9)	25 (4.8)	0.60‡
Smoking	509 (29.9)	195 (29.9)	314 (29.8)	0.97§
ASA physical status				
I	647 (37.9)	186 (28.5)	461 (43.8)	< 0.05§
II	872 (51.1)	374 (57.4)	498 (47.3)	
III or IV	186 (10.9)	92 (14.1)	94 (8.9)	
History of				
Cardiac disease	258 (15.1)	115 (17.6)	143 (13.6)	< 0.05§
Hypertension	380 (22.3)	177 (27.1)	203 (19.3)	< 0.05§
Diabetes mellitus	143 (8.4)	67 (10.3)	76 (7.2)	< 0.05§
Stroke	118 (6.9)	45 (6.9)	73 (6.9)	0.94§
Type of surgery				
Minor general	1,200 (70.4)	366 (56.1)	835 (79.3)	< 0.05§
Major general	303 (17.8)	187 (28.7)	116 (11.0)	
Vascular	199 (11.7)	99 (15.2)	100 (9.5)	
Median surgery duration (25th–75th percentile), min	112 (73–163)	151 (100–217)	91 (65–134)	< 0.05‖
Type of anesthesia				
General	1,226 (71.9)	457 (70.1)	769 (73.0)	< 0.05§
Regional	201 (11.8)	17 (2.6)	184 (17.5)	
Combined	278 (16.3)	178 (27.3)	100 (9.5)	
Cumulative exposure to anesthetics,† (25th–75th percentile)				
Median AUC for sevoflurane	111 (61–201)	151 (74–274)	95 (55–160)	< 0.05‖
Median AUC for isoflurane	96 (44–167)	141 (73–197)	66 (27–125)	< 0.05‖
Median AUC for propofol	310 (179–454)	321 (190–510)	305 (175–441)	0.18‖
1-yr mortality (KM estimate)	88 (353.7)	53 (346.2)	35 (358.4)	< 0.05#

VOLUME : Troppo, troppo poco, giusto?

FIGURE 1. COMPLICATIONS ASSOCIATED WITH SUBOPTIMAL PERIOPERATIVE FLUID MANAGEMENT[13]

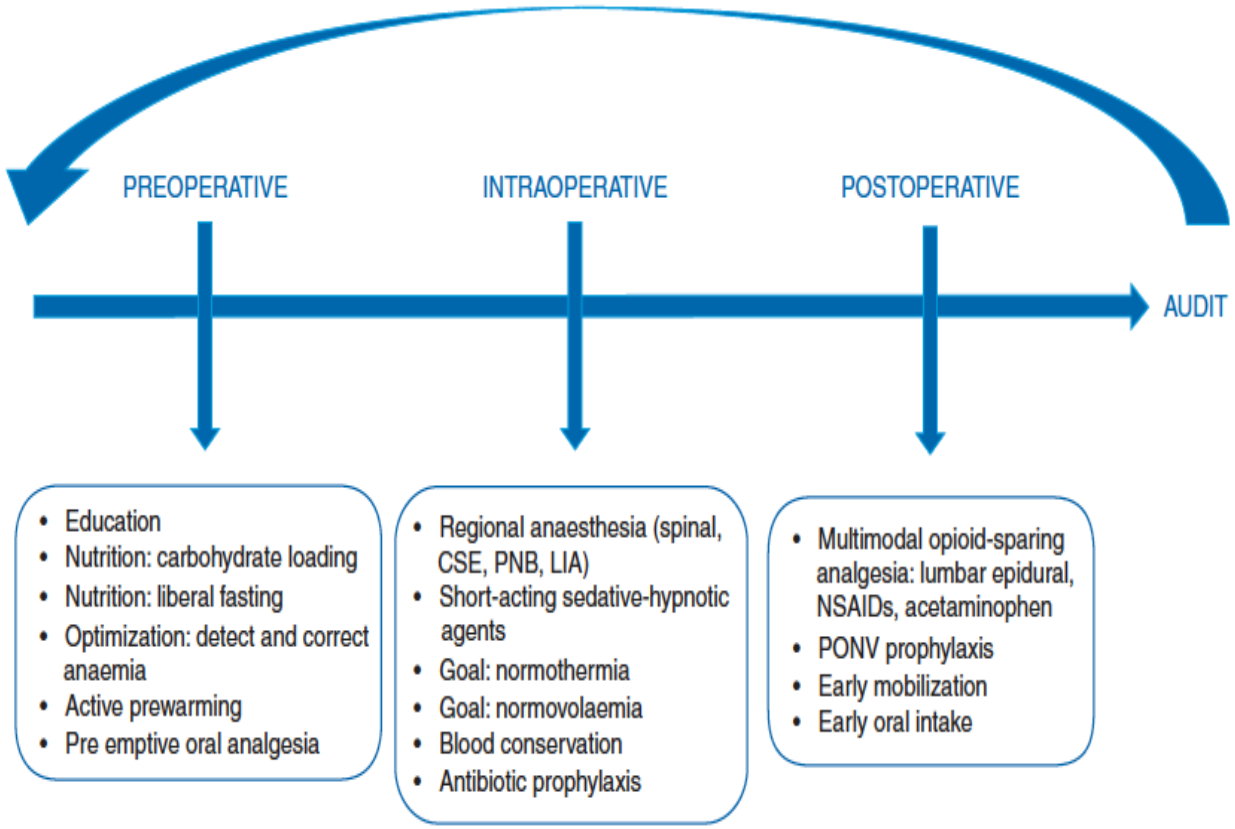


Enhanced recovery after surgery for primary hip and knee arthroplasty: a review of the evidence

E. M. Soffin* and J. T. YaDeau

British Journal of Anaesthesia, 117 (S3): iii62–iii72 (2016)

ERAS



Habicher *et al. Perioperative Medicine* (2016) 5:31
DOI 10.1186/s13741-016-0056-x

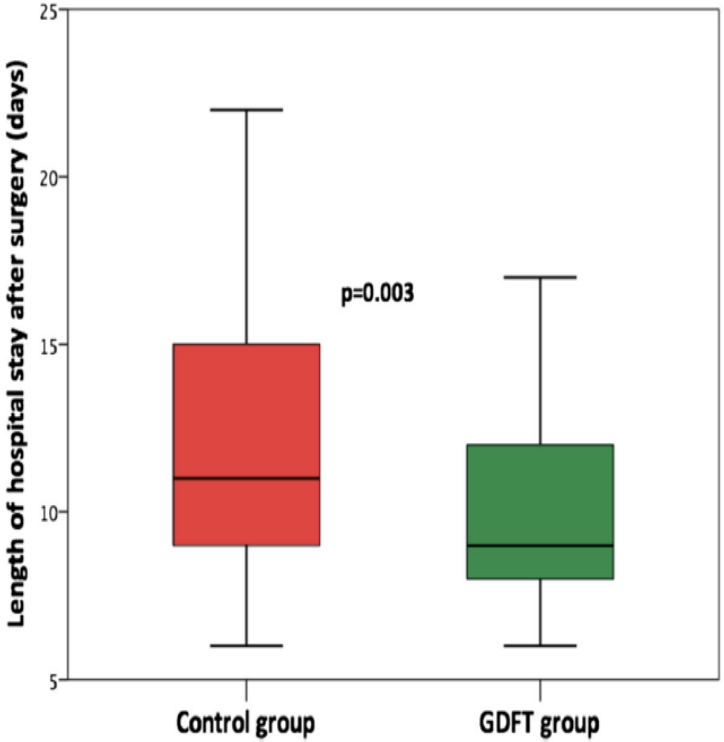
Perioperative Medicine

OUTCOMES PRIMARI: sanguinamento, complicanze infettive, cardiache, neurologiche, renali
OUTCOMES SECONDARI:
Tempi degenza in Ospedale e in ICU

RESEARCH

Implementation of goal-directed fluid therapy during hip revision arthroplasty: a matched cohort study

Marit Habicher[1*], Felix Balzer[1], Viktor Mezger[1], Jennifer Niclas[1], Michael Müller[2], Carsten Perka[2], Mic[illegible]



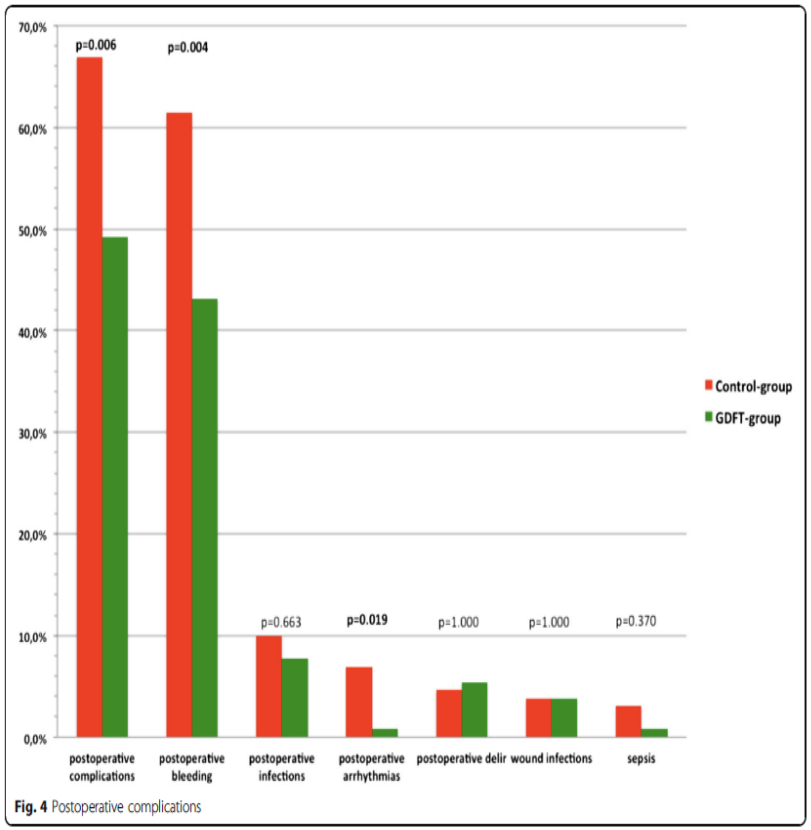
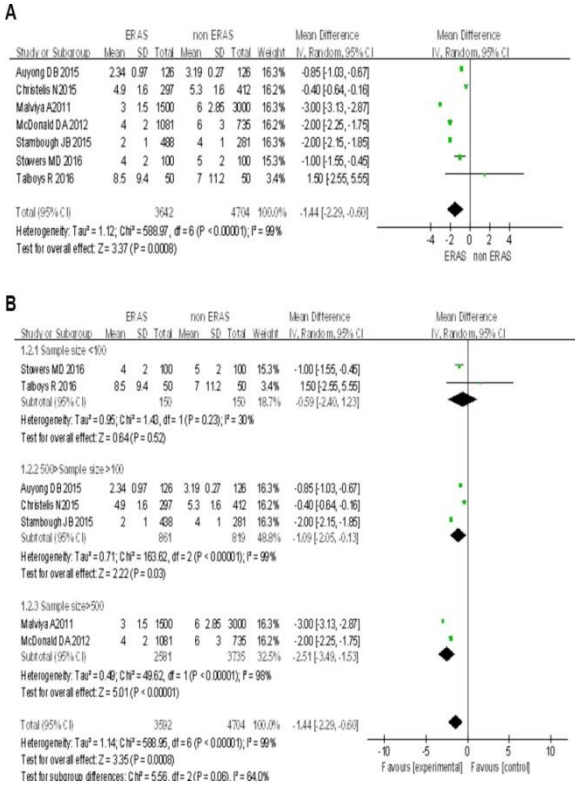


Fig. 4 Postoperative complications

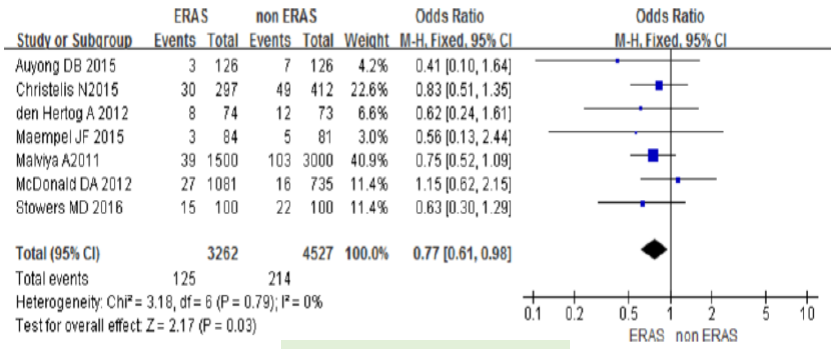
Enhanced recovery after surgery for hip and knee arthroplasty: a systematic review and meta-analysis

Shibai Zhu, Wenwei Qian, Chao Jiang, Canhua Ye, Xi Chen

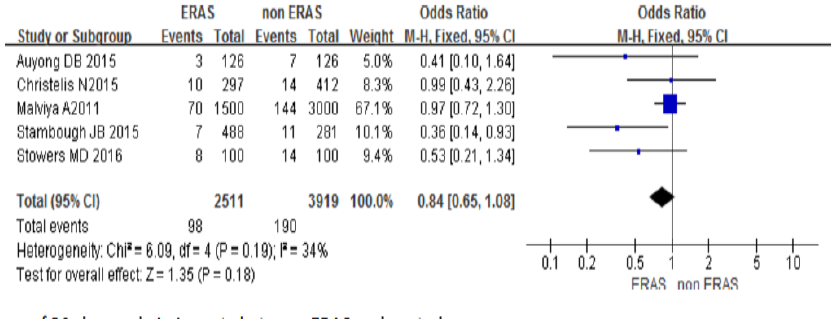
Postgrad Med J 2017;**93**:736–742.



Durata degenza

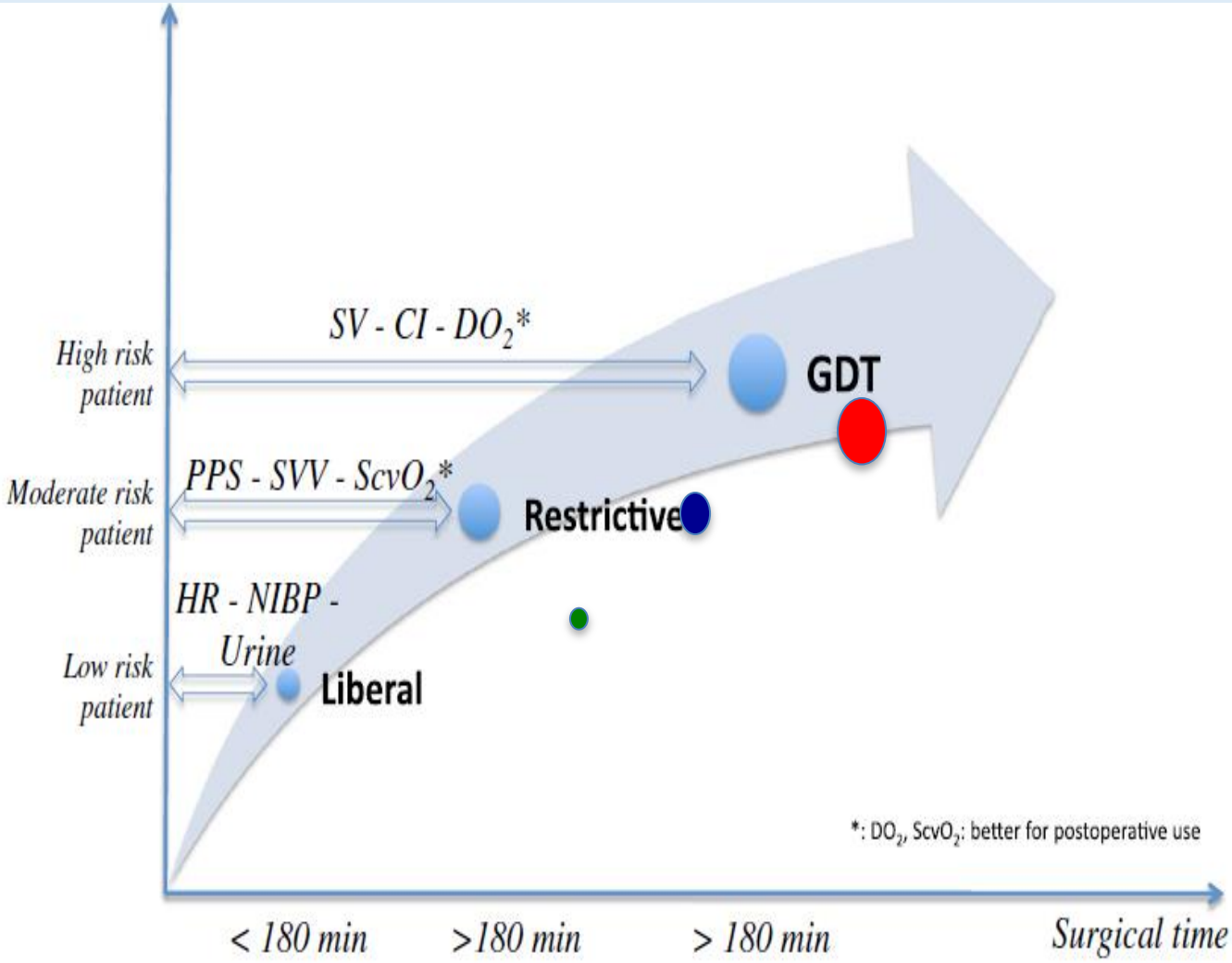


Complicanze



Rericoveri

TIRIAMO LE SOMME……..
Rischio-tempo chirurgico-monitoraggio-gestion



Scelta del sistema di monitoraggio: variabili

Il dispositivo

- Disponibilità
- Setting
- Costo/efficacia

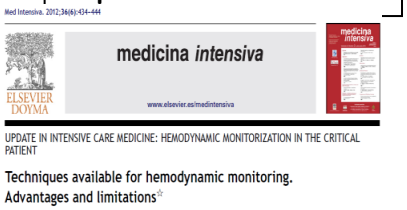
Il paziente

- Condizioni/gravità

Pz + grave → sistema + preciso → sistema + invasivo

Il medico

- Conoscenza
- Esperienza
- Interpretazione dei dati
- Operatore-dipendenza



Scelta del sistema di monitoraggio

PAC (wedge)

Shock cardiogeno
Ipertensione polmonare

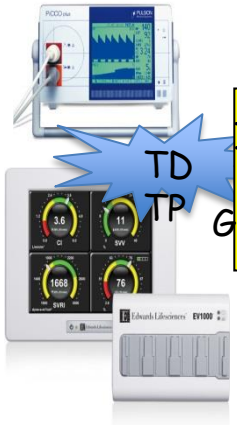
Il paziente/il contesto

Pulse contour

e

Diagnosi
Evoluzione
Controindicazioni a PAC

Sala Operatoria
- Ottimizzazione
Terapia Intensiva
UTIC



TD
TP

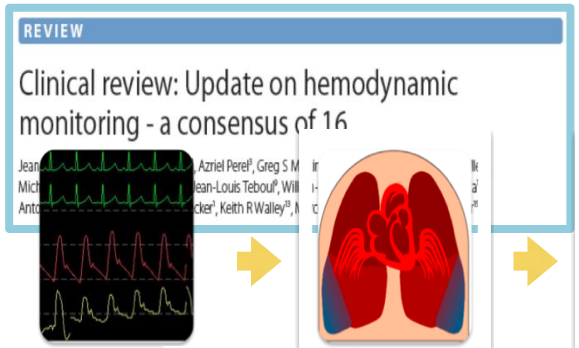
Insufficienza respiratoria
Gestione volemia

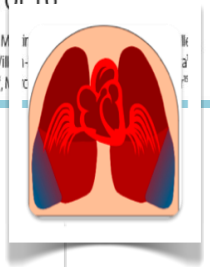
Migliorare la perfusione tissutale → DO2/VO2

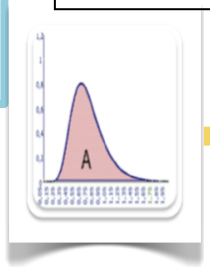
UPDATE IN INTENSIVE CARE MEDICINE: HEMODYNAMIC MONITORIZATION IN THE CRITICAL PATIENT

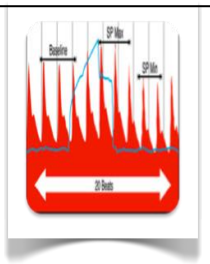
Techniques available for hemodynamic monitoring. Advantages and limitations☆

Monitoraggio emodinamico









pressioni

volumi

flussi

dinamico - funzionale

ALL

MONITORAGGIO STANDARD?

INTEGRAZIONE

INTERAZIONE

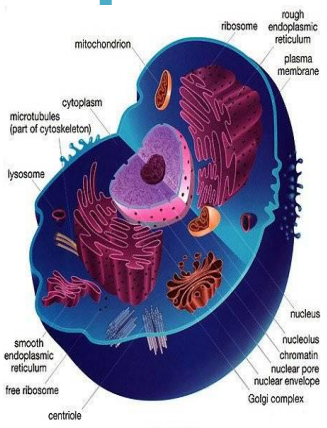
FLOW-DIRECTED PROTOCOLS

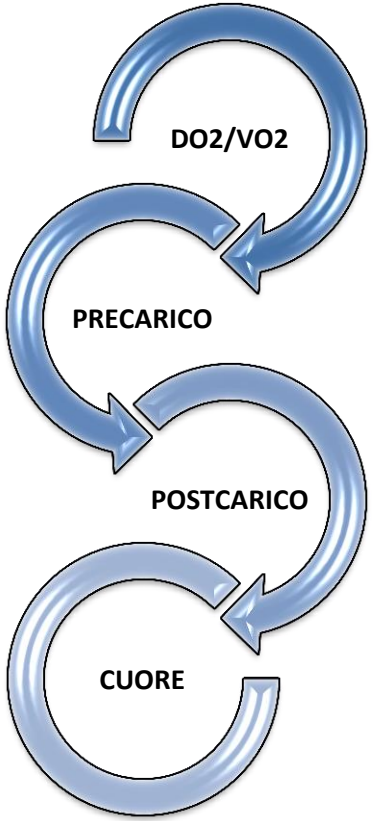
Best Practice & Research Clinical Anaesthesiology 30 (2016) 127–129

CARATTERISTICHE DEL MONITORAGGIO IDEALE

Table 2. The key properties of an 'ideal' hemodynamic monitoring system

Provides measurement of relevant variables
Provides accurate and reproducible measurements
Provides interpretable data
Is easy to use
Is readily available
Is operator-independent
Has a rapid response-time
Causes no harm
Is cost-effective
Should provide information that is able to guide therapy






Bio Z
Cardio Q
PIC CO
Vigil eo
NIC O
Masi mo
COsta us
NIR S
Swan-Ganz
USC om
MostC are
LiD O
CRITICAL CARE

Pulse Contour Methods (PCM)

PiCCO$_{plus}$

External and internal calibration is needed

Calibrated

EV-1000

Indicator dilution + patient's anthropometric and demographic characteristics

LiDCO

Pulse Contour Methods (PCM)

Vigileo

Internal calibration is needed

Uncalibrated

PulsioFlex

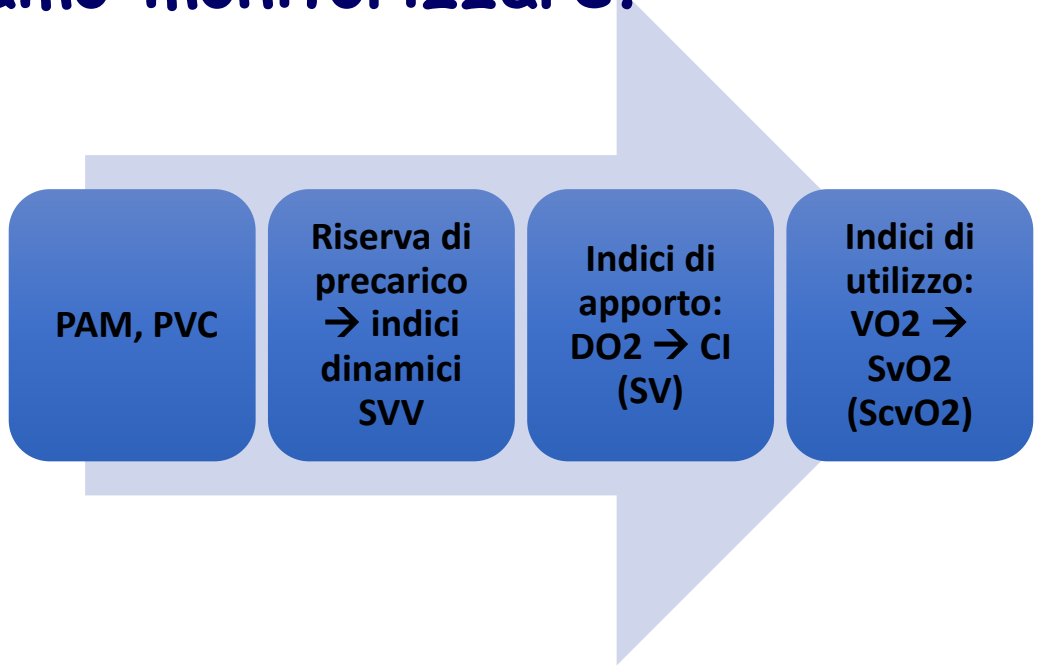
patient's anthropometric and demographic characteristics

LiDCO rapid

No calibration is needed

MostCare^{Up} (PRAM)

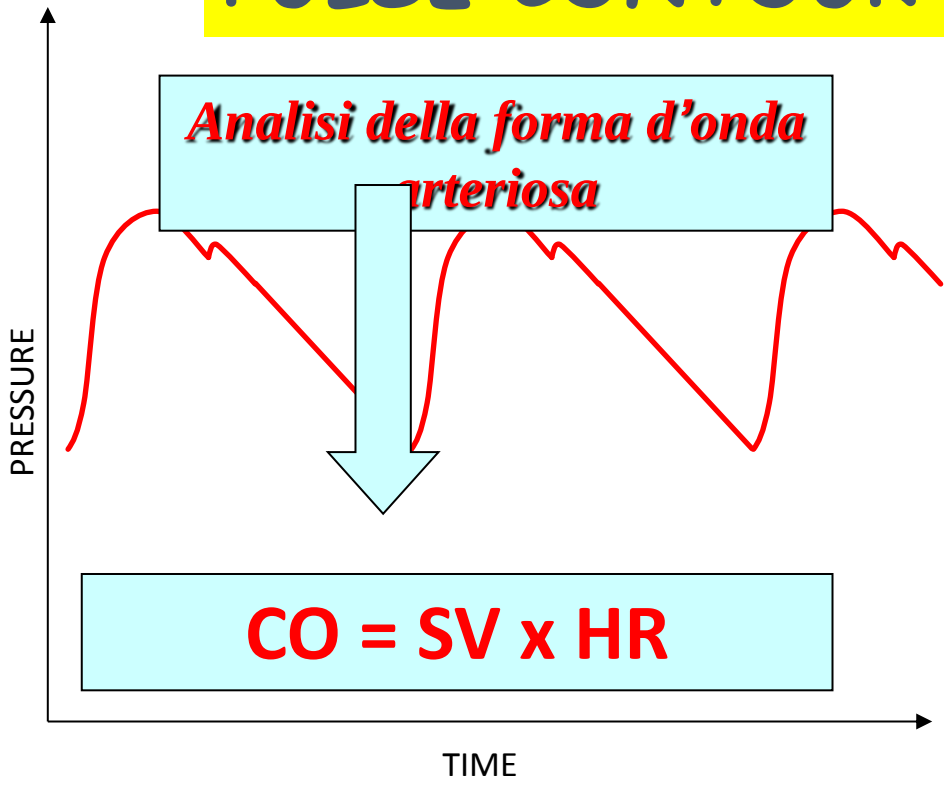
IN SALA OPERATORIA:cosa vogliamo monitorizzare?



OBIETTIVO:

STIMA PERFUSIONE D'ORGANO

PULSE CONTOUR



Basata sul concetto che la forma d'onda arteriosa è proporzionale al volume sistolico

SELF CALIBRATION: FloTrac VIGILEO

CO = HR x SV

FloTrac System Cardiac Output = Pulse Rate x [std(BP)*χ]

Deviazione standard pressione arteriosa

Fattore di compenso per le differenti compliance vascolari e resistenze: stimati su dati biometrici e su cambiament

FloTrac

Sensore di analisi della forma d'onda arteriosa per CO in continuo – SV e SVV – SVR
linea arteriosa periferica

Self-calibration ogni minuto

PULSIOFLEX:

piattaforma di monitoraggio *perioperatorio*

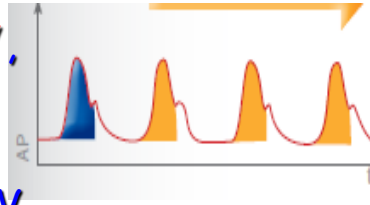
Sensore

ProAQT:

CI *Trend*,

CI *Cal*

SVI - SVV



CeVOX: ScVO2

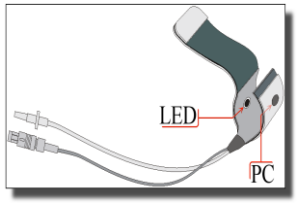
- Stroke volume (SV)
- Stroke volume variation (SVV)
- Cardiac output (CO)

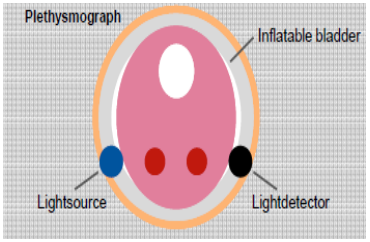
- Systemic vascular resistance (SVR)
- Continuous blood pressure (cBP)
- Valuable hemodynamic insight in moderate to high-risk surgery

Volume Clamp Technology

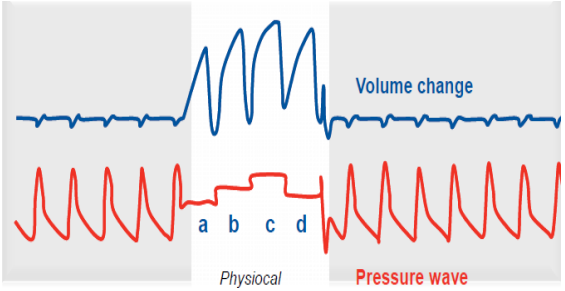
Autocalibrazione di qualità

PA arteriosa continua non invasiva





CO/SV
SVV
PA



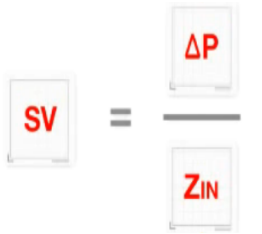
Clearsight

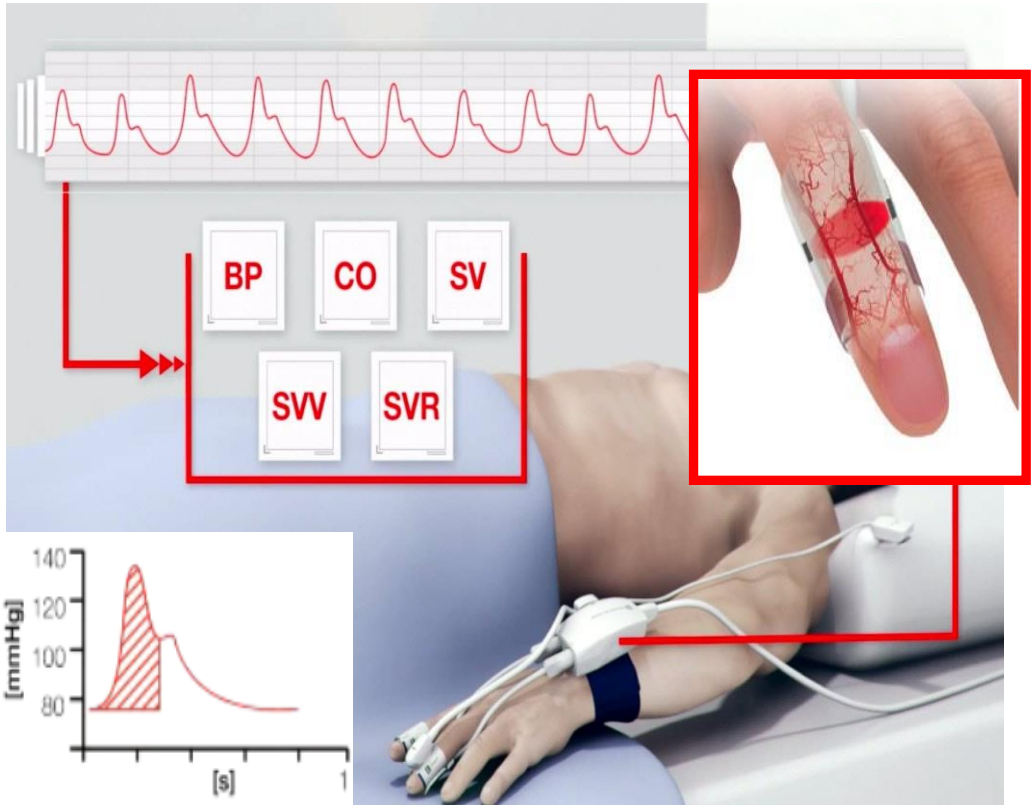
Perioperative goal-directed therapy

Volume management for the OR

MONITORAGGIO EMODINAMICO NON INVASIVO IN CHIRURGIA ORTOPEDICA

LA NOSTRA ESPERIENZA-EV1000 ClearSight™





- PULSE CONTOUR ANALYSIS
- VOLUME CLAMP TECHNOLOGY

ECOCARDIOGRAFIA

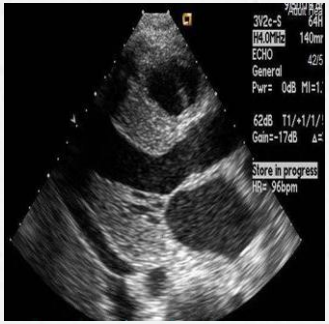
VALUTAZIONE ANCHE SOLO ISPETTIVA di:

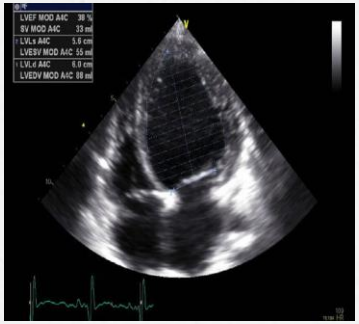
- CONTRATTILITÀ CARDIACA
- FUNZIONE VALVOLARE
- RIEMPIMENTO VENTRICOLARE – CAVALE➔DEFINIZIONE DELLO STATO VOLEMICO

Recommendations	Class[a]	Level[b]
Rest echocardiography may be considered in patients undergoing high-risk surgery.	IIb	C
Routine echocardiography is not recommended in patients undergoing intermediate- or low-risk surgery.	III ???	C

ECO si se:
. Storia di IMA
. ECG +
. BBS
. soffio

INFORMAZIONI ECO e DECISION MAKING

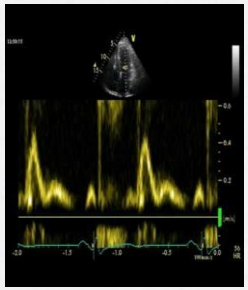


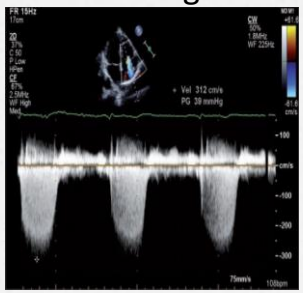


VENTRICOLO IPERTROFICO
-> disfunzione diastolica
ATRIO SX DILATATO
-> rischio di FA

VENTRICOLO DILATATO, EF <
-> disfunzione sistolica
-> monitoraggio emodinamico
-> farmaci

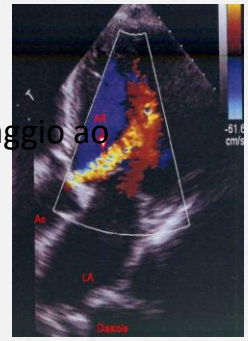
ECODINAMICA -> gestione dei liquidi, diuretici, ventilazione



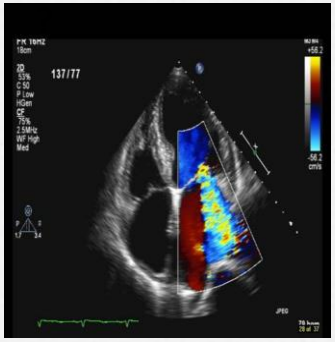


STENOSI AORTICA
Anziani, cad
-> > rischio
-> TAVI preventiva

IAO
Dilatazione ao asc
Attenzione al clampaggio ao
-> vasodilatatori



INFORMAZIONI ECO e DECISION MAKING

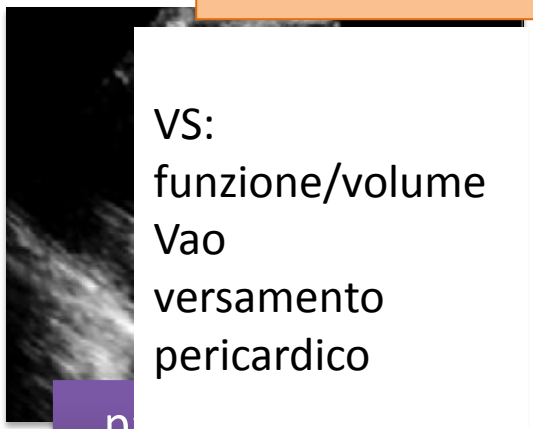


IM FUNZIONALE
Bassa ef, rimodellamento VS
-> monitoraggio emodinamico
-> vasodilatatori, diuretici

Perioperative Anesthesiology UltraSonographic Evaluation (PAUSE): A Guided Approach to Perioperative Bedside Ultrasound

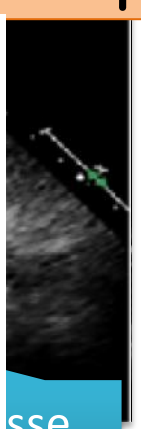
Journal of Cardiothoracic and Vascular Anesthesia, Vol 30, No 2 (April), 2016: pp 521–529

PAUSE: valutazione preop

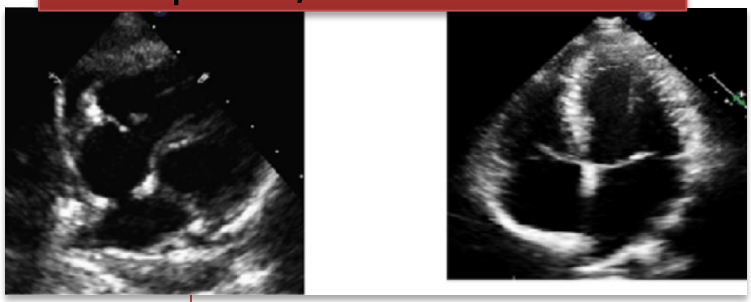


VS:
funzione/volume
Vao
versamento pericardico

contrattilità segmentaria
VS fx sistolica
stato volemico:
obliterazione cavità VS

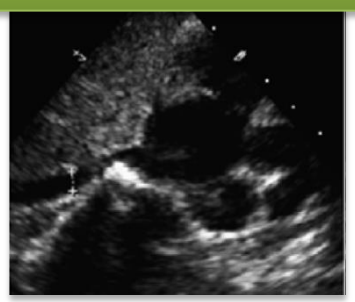


4 camere apicale/sottocostale



anomalia Vmi-Vtri?

collassabilità VCI



ipovolemia?

Perioperative Anesthesiology UltraSonographic Evaluation (PAUSE): A Guided Approach to Perioperative Bedside Ultrasound

Journal of Cardiothoracic and Vascular Anesthesia, Vol 30, No 2 (April), 2016: pp 521–529

PAUSE: instabilità emodinamica intra-postop

VS: funzione/volu
Vao
versamento perica
ostruzione LVOT
VD: forma e dimer
VMi

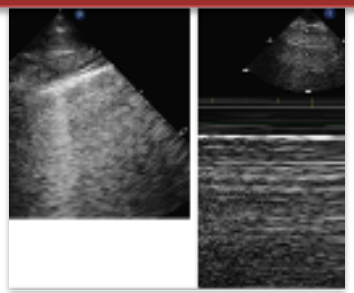
contrattilità
segmentaria
VS fx sistolica
stato volemico
VD dilatazione

Vmi-Vtri
atri
contrattilità segmentaria
versamento pericardico
setto IA-IV

lungo

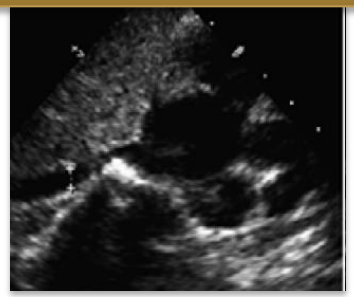
apicale/sottocostale

eco polmone



versamento pleurico/PNX/OLV

collassabilità VCI



riempimento-contrattilità

parasternale (biforcazione PA)

PE/ostruzione RVOT

CHIRURGIA ORTOPEDICA MAGGIORE
INTERVENTI DI ARTROPROTESI TOTALE ANCA E GINOCCHIO

Perdite ematiche

+

Perdite ematiche

SQUILIBRIO SISTEMI COAGULAZIONE/FIBRINOLISI

Anemizzazione

Rischio trasfusionale

Minimize blood loss & bleeding

ottimizzazione della coagulazione

minimizzazione delle perdite ematiche

preoperatorio

rischi emorragici legati a terapie, a patologie e al tipo d'intervento

RISCHIO BASSO	RISCHIO INTERMEDIO	RISCHIO ALTO
• > 6 mesi dopo PCI con BMS • >12 mesi dopo PCI con DES.	• >1 mese < 6 mesi dopo PCI con BMS; • > 6 <12 mesi dopo DES; • >12 mesi dopo DES a rischio elevato (stent lunghi, multipli, in overlapping, piccoli vasi, biforcazioni, tronco comune, last remaining vessel).	• <1 mese dopo PCI con BMS • <6 mesi dopo DES • <12 mesi dopo DES a rischio elevato (stent lunghi, multipli, in overlapping, piccoli vasi, biforcazioni, tronco comune, last remaining vessel).
>6 mesi dopo new DES	>3 <6 mesi dopo new DES	< 3 mesi dopo new DES

protocolli di sospensione delle terapie anticoagulanti e antiaggreganti

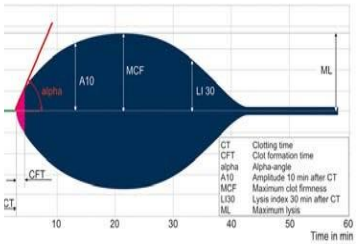
Minimize blood loss & bleeding

ottimizzazione della coagulazione

minimizzazione delle perdite ematiche

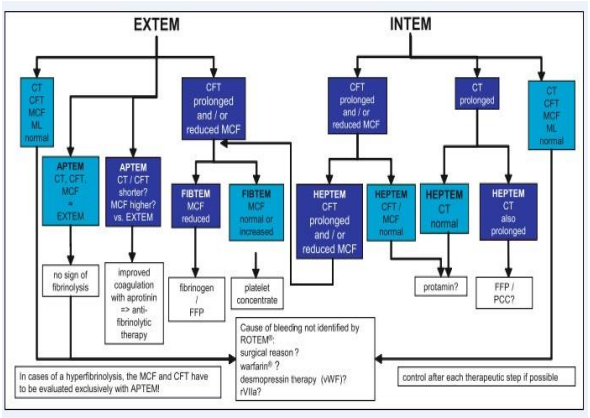
intraoperatorio

postoperatorio

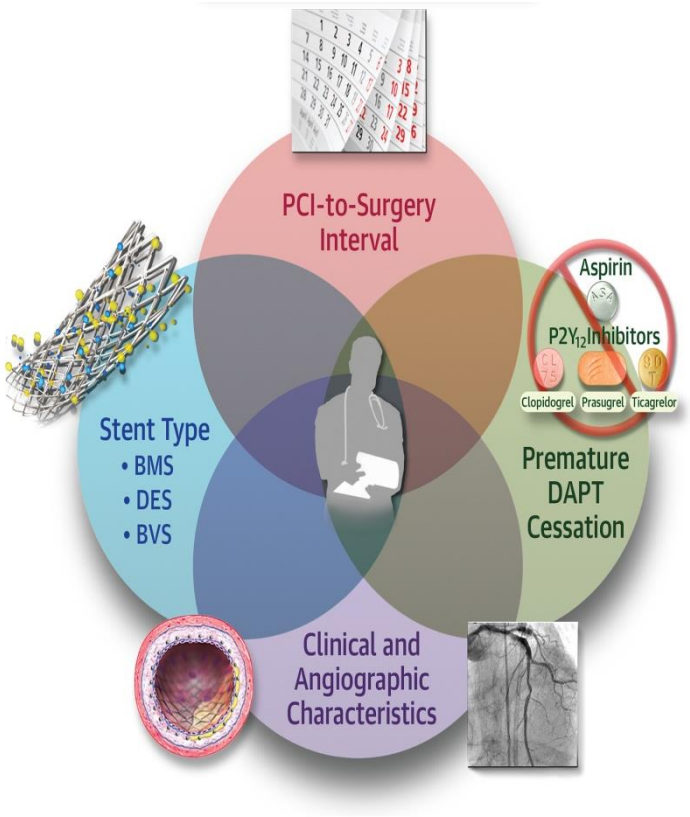


gestione dell'emostasi

gestione della coagulazione antifibrinolitici



The “Combined ischemic risk”

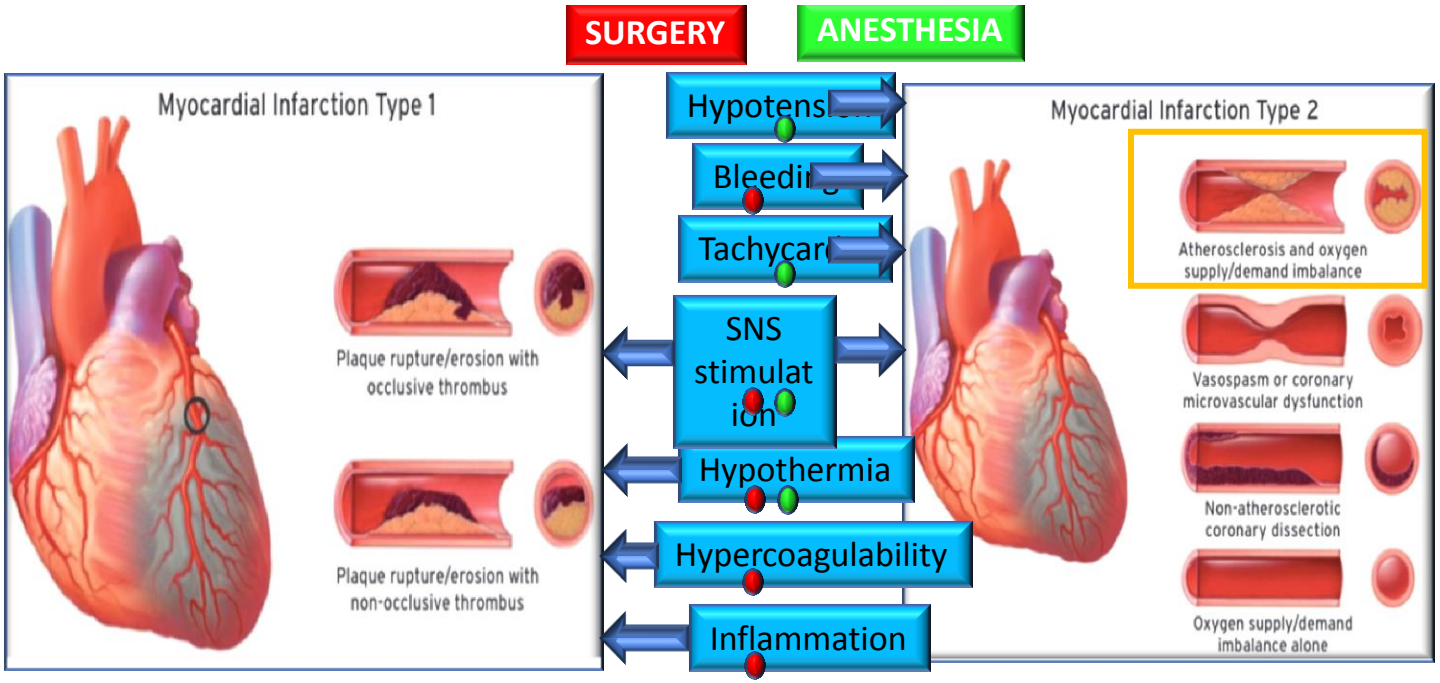


The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

Dan L. Longo, M.D., *Editor*

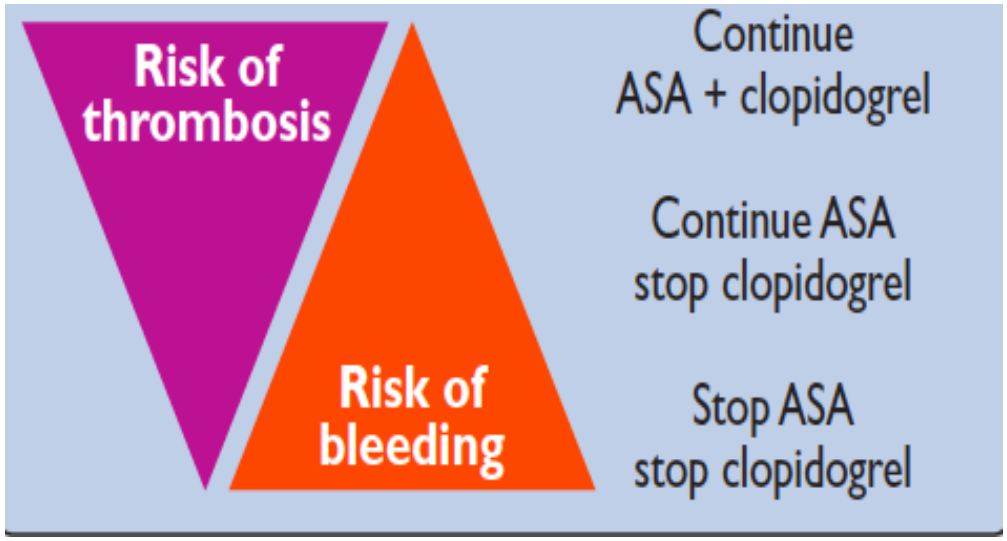
Cardiac Complications in Patients Undergoing Major Noncardiac Surgery



N Engl J Med 2015;373:2258-69.

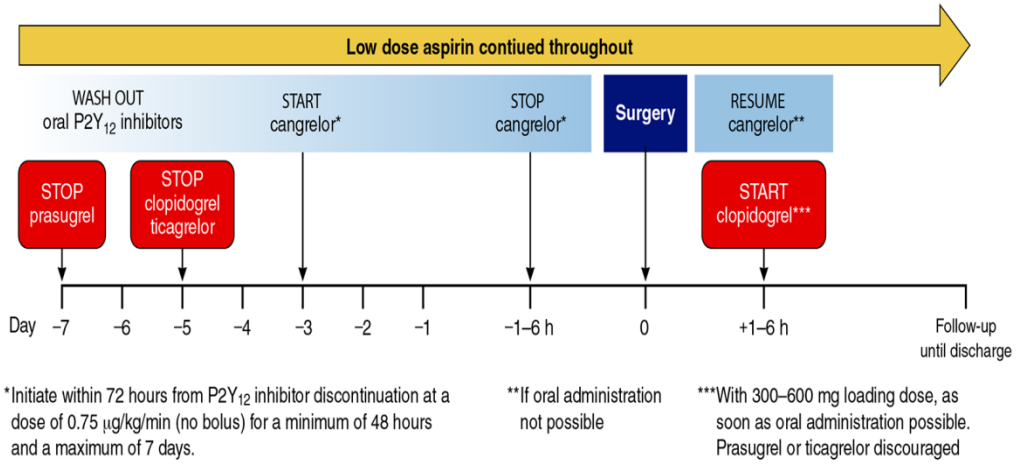
MANAGEMENT OF ANTIPLATELET THERAPY IN PATIENTS UNDERGOING NON CARDIAC SURGERY

Guidelines on myocardial revascularization



Eur Heart J. 2010;31:2501–2555

Bridge therapy: CANGRELOR



Alternatively, small-molecule GPIs (eptifibatide or tirofiban) may be considered for bridging therapy

JAMA Cardiol. 2017 February 01; 2(2): 181–187

Trends in Perioperative Major Adverse Cardiovascular and Cerebrovascular Events associated with Non-Cardiac Surgery

Results—Among 10,581,621 hospitalizations for major non-cardiac surgery, perioperative MACCE occurred in 317,479 (3.0%), corresponding to an annual incidence of ≈150,000 after applying sample weights. Major adverse cardiovascular and cerebrovascular events occurred most frequently in patients undergoing vascular (7.7%), thoracic (6.5%), and transplant surgery (6.3%).

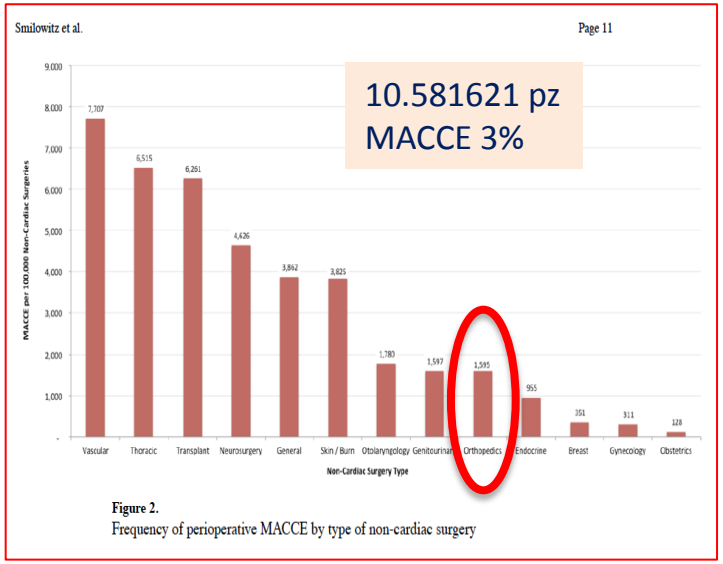


Figure 2.
Frequency of perioperative MACCE by type of non-cardiac surgery

- I pazienti che si devono sottoporre a chirurgia ortopedica sono a rischio di sviluppare eventi avversi cardiaci nel 1,6% dei casi.
- Quando si verifica l'IMA si riduce la sopravvivenza a 5aa del 26 - 55%.

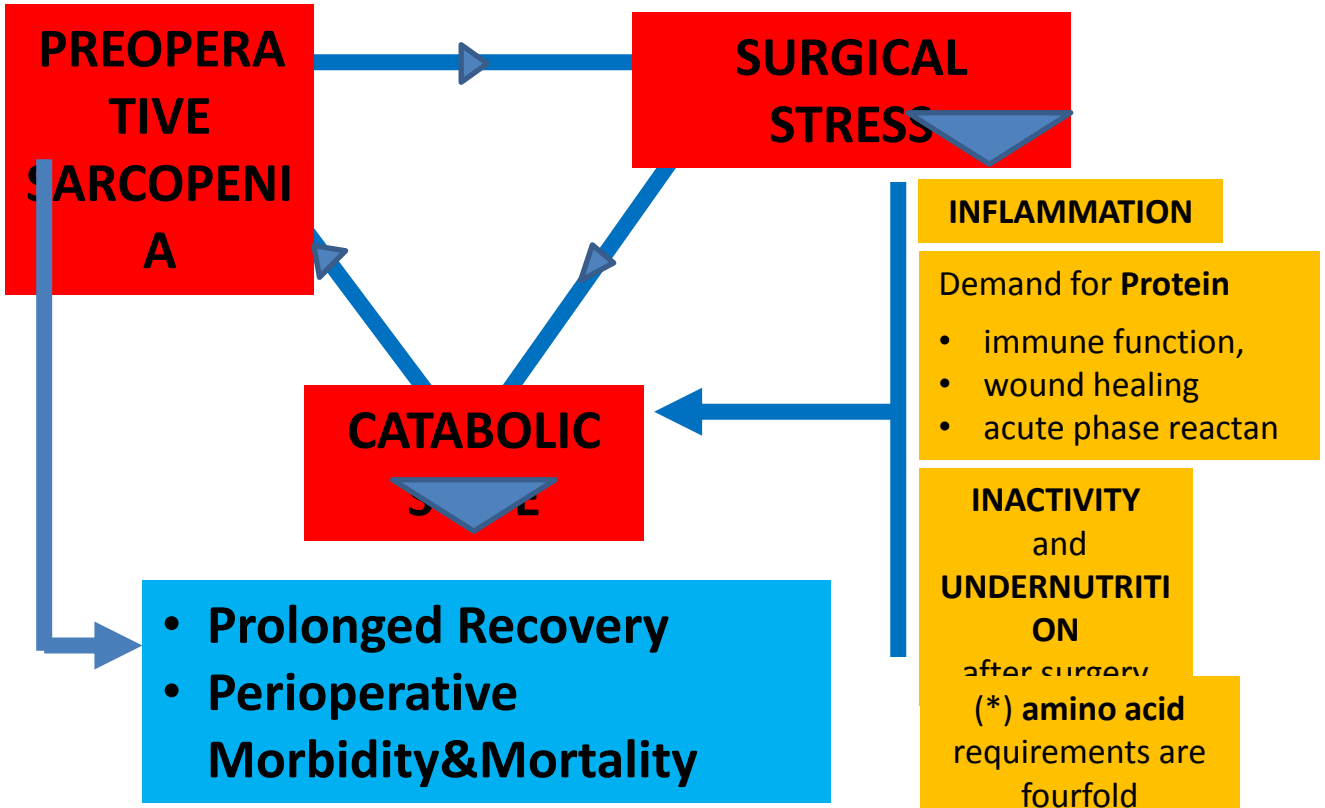
Update in preoperative risk assessment in vascular surgery patients

Arya Zarinsefat, MD, and Peter Henke, MD, *Ann Arbor, Mich*

J Vasc Surg 2015;62:499-509

Main Outcomes—Perioperative MACCE (primary outcome), defined as in-hospital, all-cause death, acute myocardial infarction (AMI), or acute ischemic stroke, were evaluated over time.

Frailty and Surgery



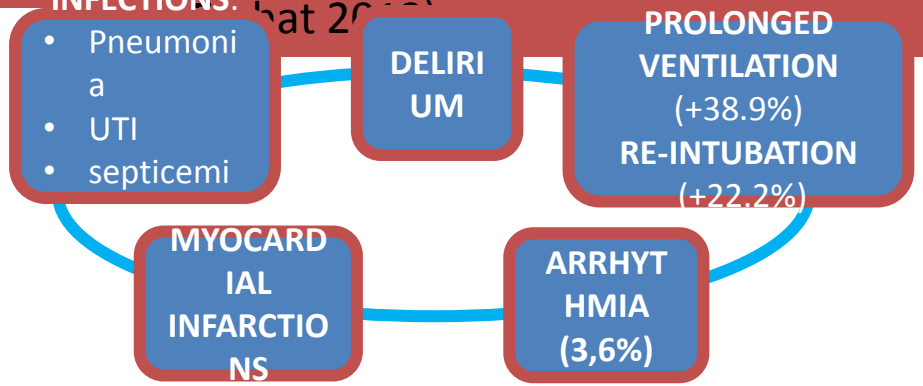
Ferrucci L et al J Am Coll Surg 2006;203:134-5

Can J Anesth/J Can Anesth (2015) 62:143–157
DOI 10.1007/s12630-014-0273-z

REVIEW ARTICLE/BRIEF REVIEW

Frailty and perioperative outcomes: a narrative review

COMPLICATI((OR 11.70 in emergency general surgery - [illegible]hat 20[illegible])



LO (Increases in all types of surgical procedures – Makary 2010)

M [illegible] A. 2013)

DISCHARGE TO AN INSTITUTION (OR up to 20,5 – Makary 2010)

Choosing patient-tailored hemodynamic monitoring

CRITICAL CARE

Slagt *et al. Critical Care* 2010, **14**:208

QUALE MONITORAGGIO PER IL NOSTRO PAZIENTE? QUALE CASELLA?

Patient`s individual risk**

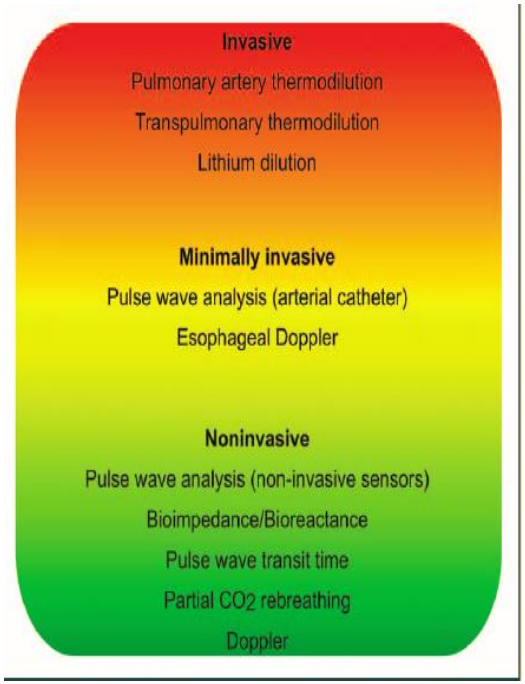
	low	intermediate	high
high	Basic monitoring minimal-invasive, cont. AP, SV/CO + PPV/SVV, PAC as individual-case decision	Basic monitoring minimal-invasive, cont. AP, SV/CO + PPV/SVV, PAC/TEE as individual-case decision	Basic monitoring CVC, minimal-invasive, cont. AP, SV/CO + PPV/SVV, PAC/TEE as individual-case decision
intermediate	Basic monitoring non-invasive, cont. AP, SV/CO + PPV/SVV	Basic monitoring minimal-invasive, cont. AP, SV/CO + PPV/SVV,	Basic monitoring CVC, minimal-invasive, cont. AP, SV/CO + PPV/SVV,
low	Basic monitoring non-invasive, intermittent, arterial pressure (AP)	Basic monitoring non-invasive, cont. AP, SV/CO + PPV/SVV	Basic monitoring CVC, minimal-invasive, cont. AP, SV/CO + PPV/SVV,

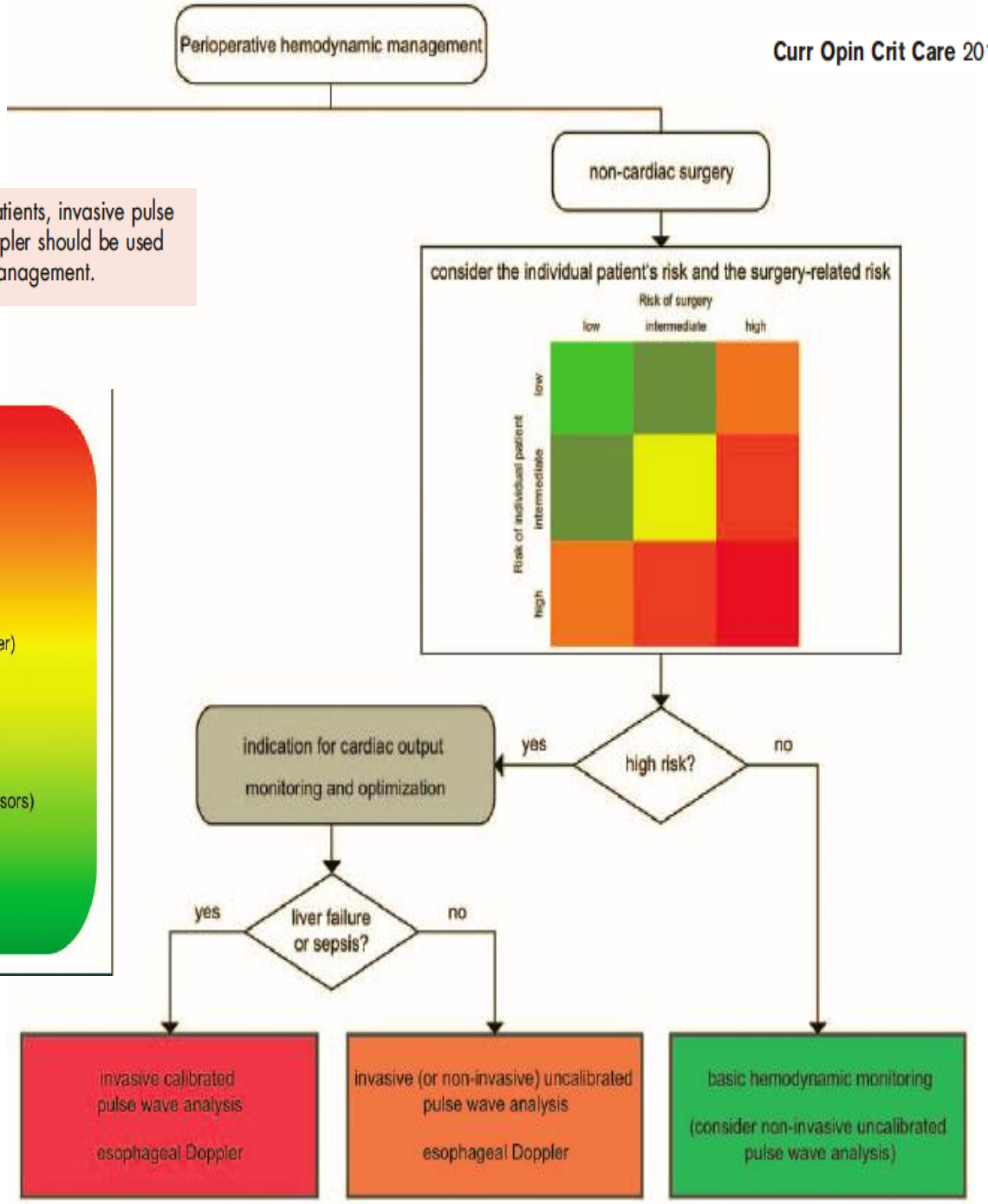
Surgical risk estimate*

J. Renner et al. / Best Practice & Research Clinical Anaesthesiology 30 (2016) 201–216

Curr Opin Crit Care 2018, 24:000–000

- In high-risk noncardiac surgical patients, invasive pulse wave analysis or esophageal Doppler should be used for perioperative hemodynamic management.

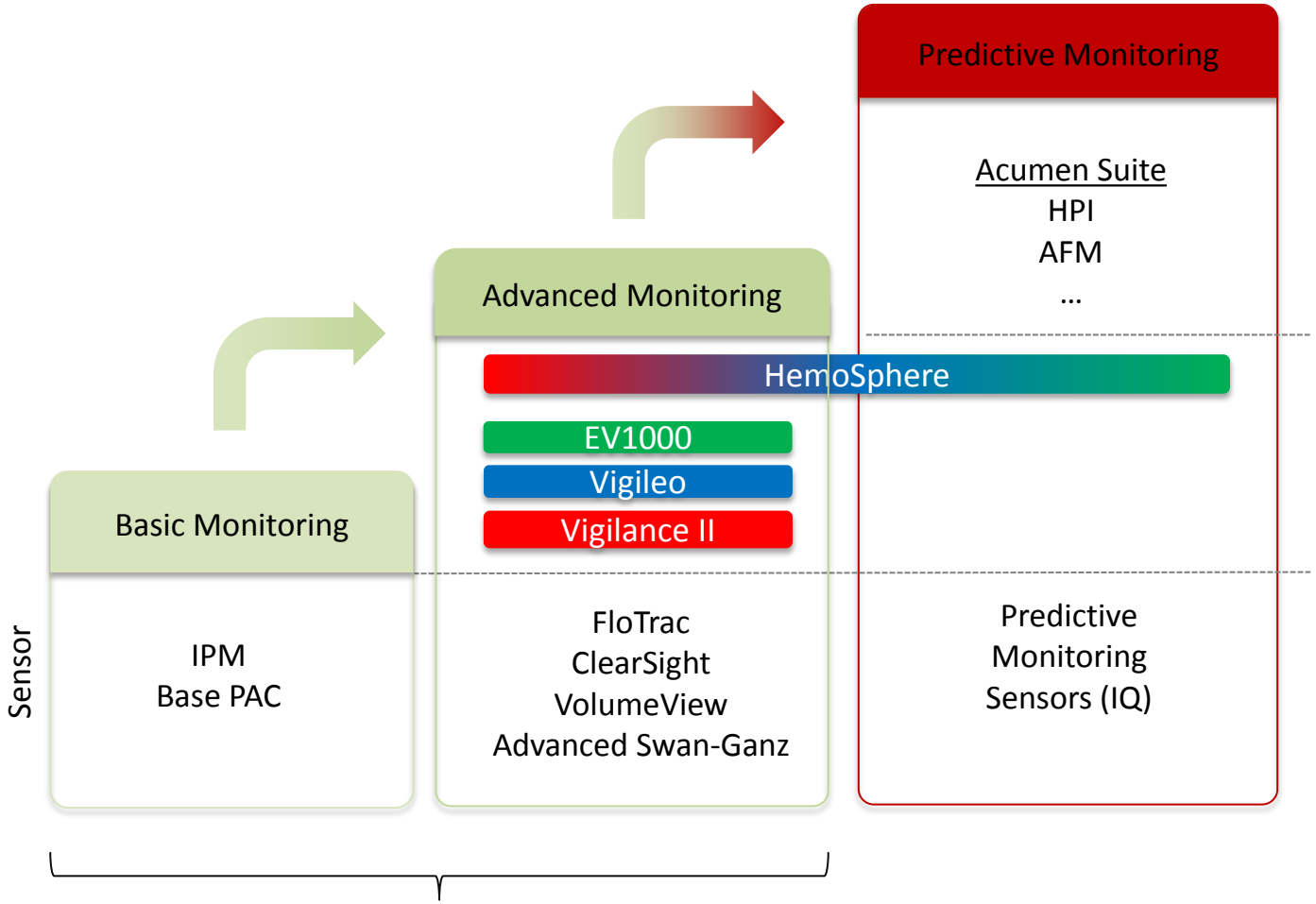




HEMOSPHERE

Una sola piattaform

Evolution


Predictive Monitoring
Acumen Suite
HPI
AFM
…
Advanced Monitoring
HemoSphere
EV1000
Vigileo
Vigilance II
Basic Monitoring
Sensor
IPM
Base PAC
FloTrac
ClearSight
VolumeView
Advanced Swan-Ganz
Predictive
Monitoring
Sensors (IQ)
Descriptive
Predictive

protocolli di trattamento perioperatori

CONDIZIONANO INSORGENZA DI COMPLICANZE

CODIFICARE I PROTOCOLLI DI TRATTAMENTO

STRATEGIE CORRETTIVE:

- misurazioni corrette
- interpretazioni codificate
- strategie e protocolli terapeutici validati

IL SISTEMA DI MONITORAGGIO NON E' UN FARMACO

strumento

- Osservare
- Aiutare a fare Diagnosi
- Ir izzare u trategia te peutica

goal-directed

Qualità dato emodinamico

Linee guida di trattamento condivise e applicate

Target emodinamici corretti


Grazie per
l’attenzione

Criteri di ammissione in Area Critica

Dr. F.L. Lorini

Chi ammettere in TI?

- ***Guidelines for intensive care unit admission, discharge, and triage*.** Task Force of the American College of Critical Care Medicine, Society of Critical Care Medicine

  Crit Care Med. 1999 Mar; 27(3):633-8

- ***Guidelines on admission and discharge for adult intermediate care units.*** American College of Critical Care Medicine of the Society of Critical Care Medicine. Crit

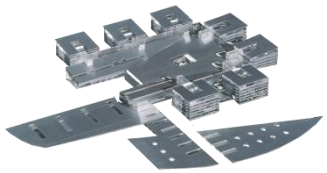
  Care Med. 1998 Mar;26(3):607-10. PubMed PMID: 9504593.

- ***Expanding a performance improvement initiative in critical care from hospital to system.*** Dlugacz YD, Stier L, Lustbader D, Jacobs MC, Hussain E, Greenwood A.

  Jt Comm J Qual Improv. 2002 Aug;28(8):419-34.

Tipologie di criteri proposte in letteratura

- ✓ Per parametri oggettivi
- ✓ Per priorità
  1. Pazienti instabili che necessitano e beneficiano di cure e monitoraggio non applicabili fuori dalla TI.
  2. Richiedono monitoraggio e possono avere bisogno di interventi immediati Pazienti instabili ma per la loro patologia hanno ridotte capacità di recupero
  3. L'ammissione non è abitualmente appropriata, ma possono in alcune circostanze particolari essere giudicati ammissibili
- ✓ Per diagnosi o quadro clinico



Il nuovo ospedale per acuti organizzato per aree di intensità di cura

“….cure differenziate in funzione della gravità dei malati e dei conseguenti bisogni di assistenza.”

Intensità di cura Complessità assistenziale

Intensità di cura
(Briani S., Cortesi E., 2007)

"Assegnare al malato il posto letto collocato nel settore più appropriato rispetto ai suoi bisogni assistenziali , legati non solo alla tipologia di ricovero ma anche alla sua condizione clinica e di dipendenza"

Complessità assistenziale
(Moiset C., Vanzetta M., 2009)

"Un' insieme di prestazioni infermieristiche che si riferiscono alle diverse dimensioni dell' assistenza infermieristica espresse in termini di intensità d' impegno e quantità lavoro dell' infermiere"

terapie intensive

terapie sub-intensive

Cure ad alta intensità

Criteri di ammissione e dimissione cure alta intensità

cure ad intensità medio-alta

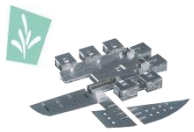
Cure a media intensità

cure ad intensità medio-bassa

Criteri di ammissione e dimissione cure bassa intensità

accompagnamento alla dimissione

Cure a bassa intensità

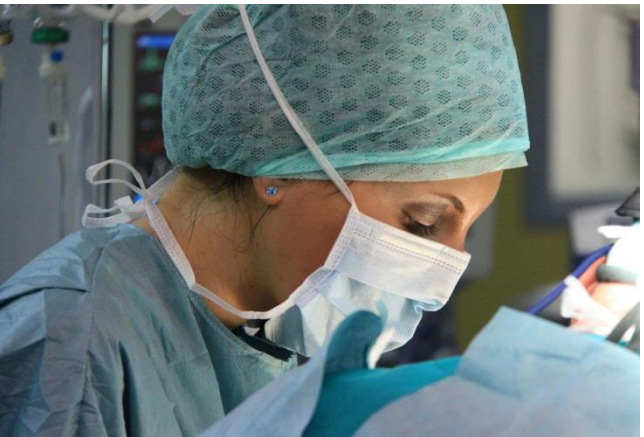


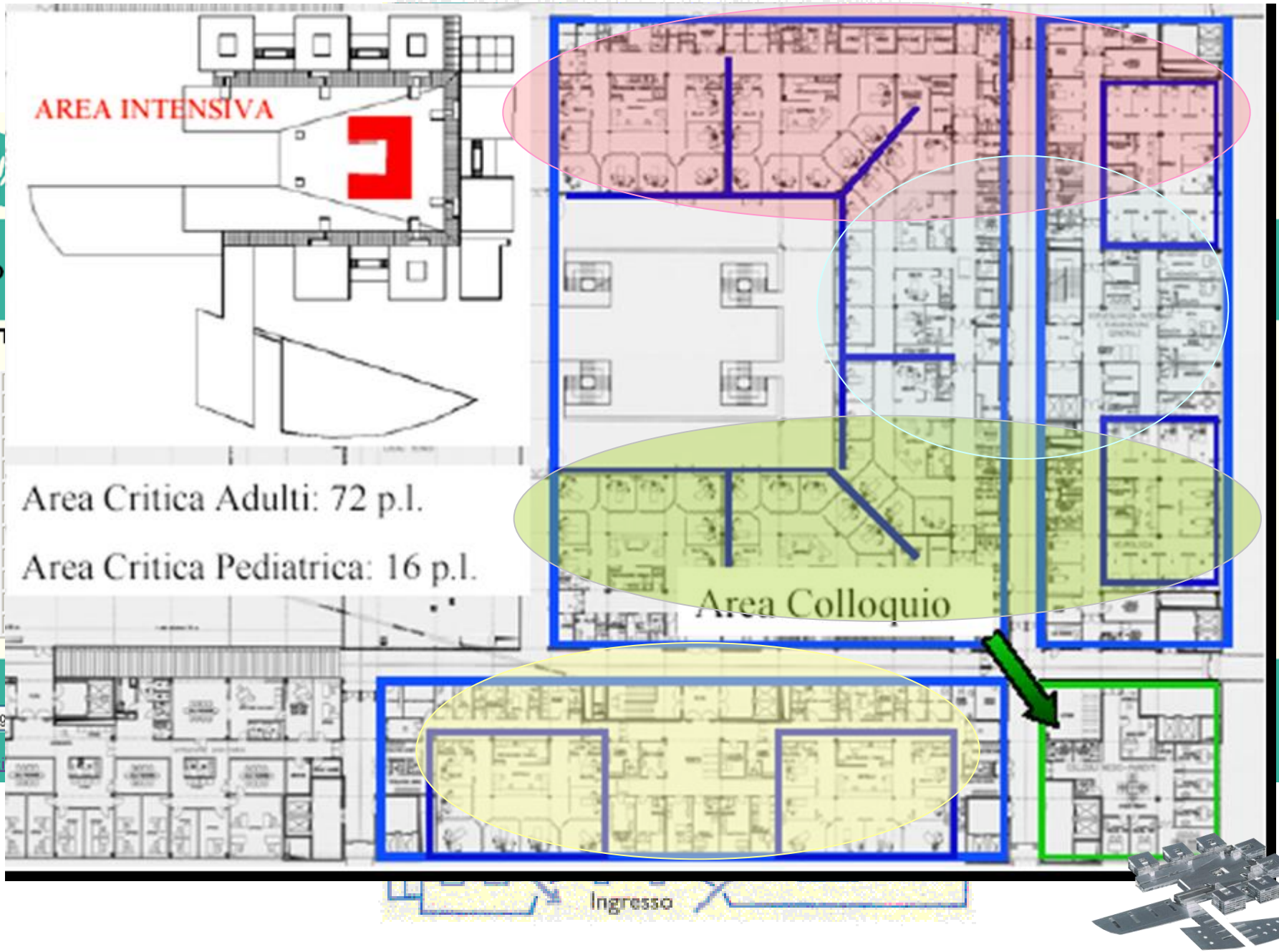
Area Intensiva

Ampliamento significativo degli spazi e accorpamento delle varie specialità

88 posti letto,
una delle più grandi aree critiche d'Europa

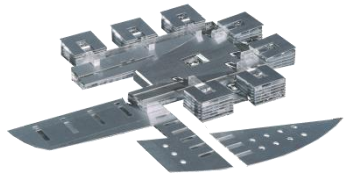
Poli specialistici di riferimento




AREA INTENSIVA
Area Critica Adulti: 72 p.l.
Area Critica Pediatrica: 16 p.l.
Area Colloquio
Ingresso

Documento condiviso 2006

- Gruppo di lavoro che coinvolge intensivisti e specialisti che lavorano nelle TI e SI
- Criteri della letteratura adeguati per la nostra realtà
- Condivisi con le UO dell'Ospedale
- Identificano situazioni cliniche che hanno bisogno di un livello di cura ad "alta intensità", sia in Terapia Intensiva che in Sub Intensiva



Da dove siamo partiti

Pazienti chirurgici in cui il rischio di morte e di complicanze maggiori postoperatorie eccede il 10%.

Rappresenta solo il 7.5% della popolazione

Rappresenta l'80% di tutte le morti chirurgiche

Copeland GP, Jones MW. POSSUM: a scoring system for surgical audit. *Br J Surg* 1991; 78: 35560.

Quale Score adottare ?

- ASA (American Society of Anesthesiologists)
- CEPOD (Confidential Enquiry into PeriOperative Deaths)
- NCEPOD (National Confidential Enquiry into Patient Outcome and Death)
- BUPA (British United Provident Association).
- SRS (Surgical Risk Score)
- ……

POSSUM

(Physiological and Operative Severity Score for the enUmeration of Mortalità and morbidity)

E' la più sensibile e specifica per stimare il rischio di mortalità e la morbilità dei pazienti chirurgici a 30 giorni

E' facile e rapida da usare

Ha un'ampia applicazione nelle procedure chirurgiche elettive o di urgenza-emergenza

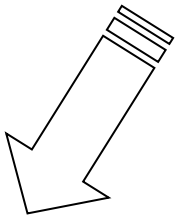
Permette il confronto tra le performances di differenti chirurghi

Permette il confronto tra differenti unità operative ed ospedali

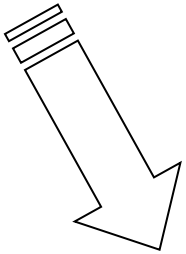
POSSUM

(Physiological and Operative Severity Score for the Enumeration of Mortalità and Morbidity)

E' un sistema a punteggio in 2 parti



Stato fisiologico



Misura della severità dell'intervento chirurgico

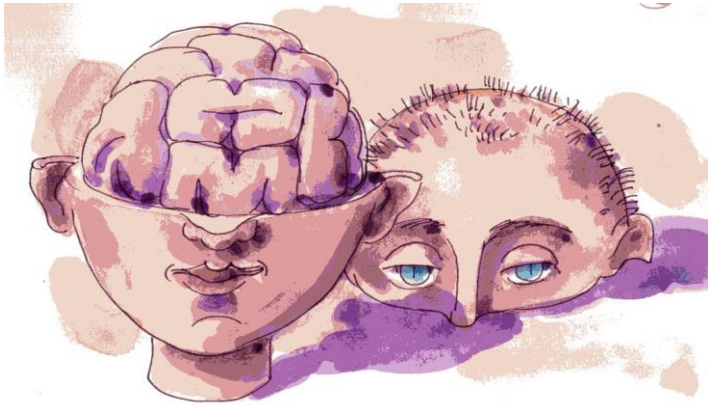
Neary WD, Heather BP, Earnshaw JJ. The Physiological and Operative Severity Score for the enUmeration of Mortality and Morbility (POSSUM). *Br J Surg* 2003, 90: 157-65.

Scala POSSUM e P-POSSUM: Punteggio fisiologico.

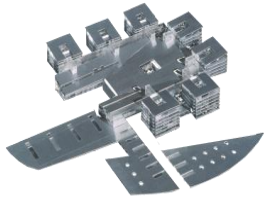
PUNTI	1	2	4	8
Età (anni)	<60	61-70	>71	
Segni cardiaci (RX torace)	Normali	Farmaci cardiaci o steroidi	Edemi Coumadin Cardiomegalia borderline	Giugulari turgide Cardiomegalia
Segni respiratori (RX torace)	Normali	Dispnea all'esercizio Lieve BPCO	Dispnea dopo una scala BPCO moderata	Dispnea a riposo Ogni altra alterazione
Presione arteriosa sistolica (mmHg)	110 - 130	131-170 100-109	> 171 90-99	< 89
Frequenza cardiaca (battiti/min)	50 - 80	81 – 100 40 - 49	101 – 120	> 121 < 39
Glasgow Coma Score	15	12-14	9-11	<8
Azotemia (mg/dl)	< 48	48,6-64	64,6-96	> 96
Sodiemia (mEq/l)	> 136	131-135	126-130	<125
Potassiemia (mEq/l)	3.5 – 5	3.2-3.4 5.1-5.3	2.9-3.1 5.4-5.9	<2.8 >6
Emoglobina (g/dl)	13 - 16	11.5-12.9 16.1-17	10-11.4 17.1-18	<9.9 >18.1
Globuli bianchi (1x1000/mm3)	4 -10	10.1-20 3.1-3.9	>20 <3	
ECG	Normale	Fibril. Atriale (60-90 bpm)		Ogni altra alterazione

Scala POSSUM e P-POSSUM: punteggio gravità chirurgica

PUNTI	1	2	4	8
Tipo di operazione	Minore	Media	grossa	Molto grossa
N° di operazioni	1		2	> 2
Perdita ematica per operazione (ml)	< 100	101-500	501-999	> 1000
Contaminazione peritoneale	No	Siero	Pus localizzato	Contenuto enterico, pus o sangue
Presenza di malignità	No	Cancro	Metastasi linfonodali	Metastasi a distanza
Timing dell'operazione	Elettivo		Urgenza: possibile rianimazione per 24h	Emergenza: immediata operazione entro 2h



Un P-POSSUM score > 36
inquadra il paziente ad alto rischio



METODI E STRUMENTI

Disegno di studio: Osservazionale

Campione

Criteri di inclusione

-Tutti i pazienti adulti (età superiore a 16 aa) degenti nelle 3 Terapie Intensive e 3 Sub Intensive attuali

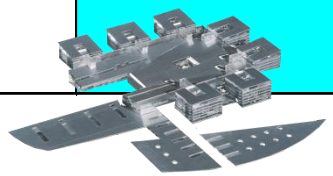
Criteri di esclusione

-Pazienti pediatrici (età inferiore a 16 aa)

- da metà febbraio a metà aprile 2011 con lo scopo di raccogliere i dati di almeno 500 pazienti

Prevista la formazione di tutti i medici e infermieri nella prima metà di febbraio

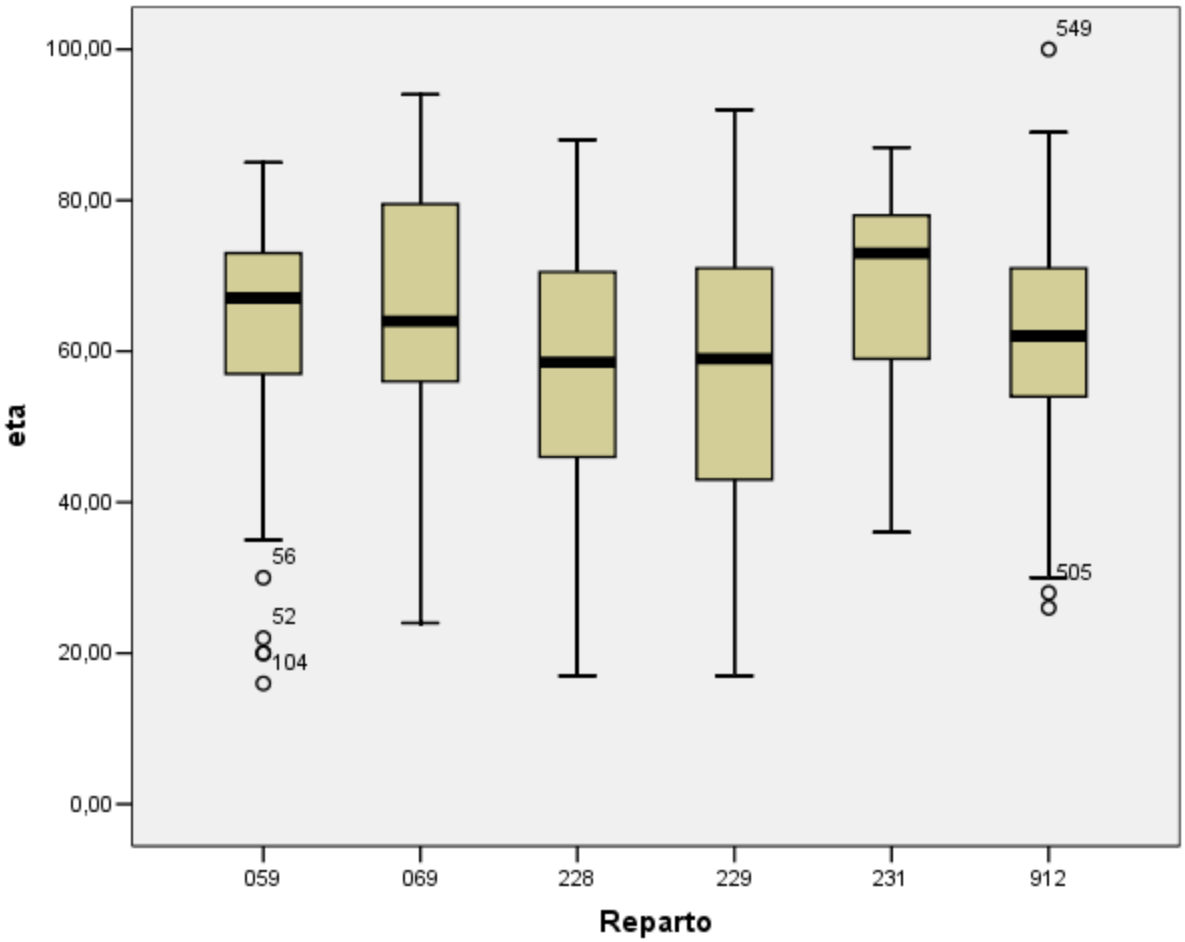
strumenti	Disponibilità	tempi di rilevazione	rilevatori
Documento Criteri ammissione e dimissione cure alta intensità	Reso disponibile attraverso un database in MS Access accessibile dal PC di ciascuna USC	Tutti i giorni	**Medici**
Scheda N.E.M.S.	Resa disponibile attraverso il sistema intranet ospedaliero: Oracolo, nella sezione Dirsan/DDS/DPS/NAS-NEMS.	Tutti i giorni	**Infermieri**
Scheda N.A.S.	Resa disponibile attraverso il sistema intranet ospedaliero: Oracolo, nella sezione Dirsan/DDS/DPS/NAS-NEMS.	Tutti i giorni	**Infermieri**
Indice M.E.W.S.	Reso disponibile attraverso il sistema intranent ospedaliero: Oracolo, nella sezione Dirsan/DDS/DPS/MEWS.	Dimissione	**Infermieri**

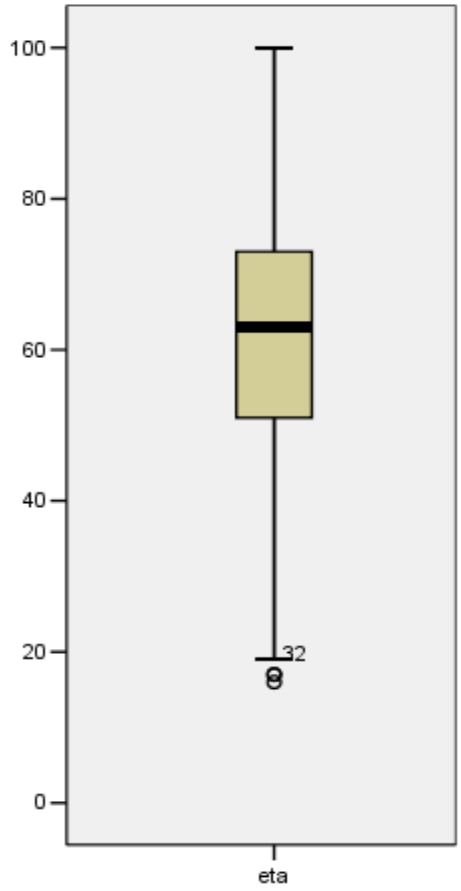


CAMPIONE - Numerosità

	Reparto	Pazienti (CF)	Pazienti (CF)	Ricoveri (RI)	Ricoveri (RI)	Episodi di ricovero in area critica	Episodi di ricovero in area critica	Giornate	Giornate
059	**TI Cardiochirurgia**	113	113	113	113	118	118	475	475
069	**Unità Coronarica**	94	92	96	94	102	99	677	667
228	**TSI Neurochirurgia**	126	105	126	105	139	116	682	611
229	**TI Neurochirurgia**	97	97	97	97	99	99	621	621
231	**Stroke Unit**	47	46	47	46	48	47	397	392
912	**TI Adulti**	90	90	90	90	103	103	683	683
911	**TI pediadrica**	8	-	8	-	8	-	72	-
	TOTALE	**575**	**543**	**577**	**545**	**617**	**582**	**3607**	**3449**

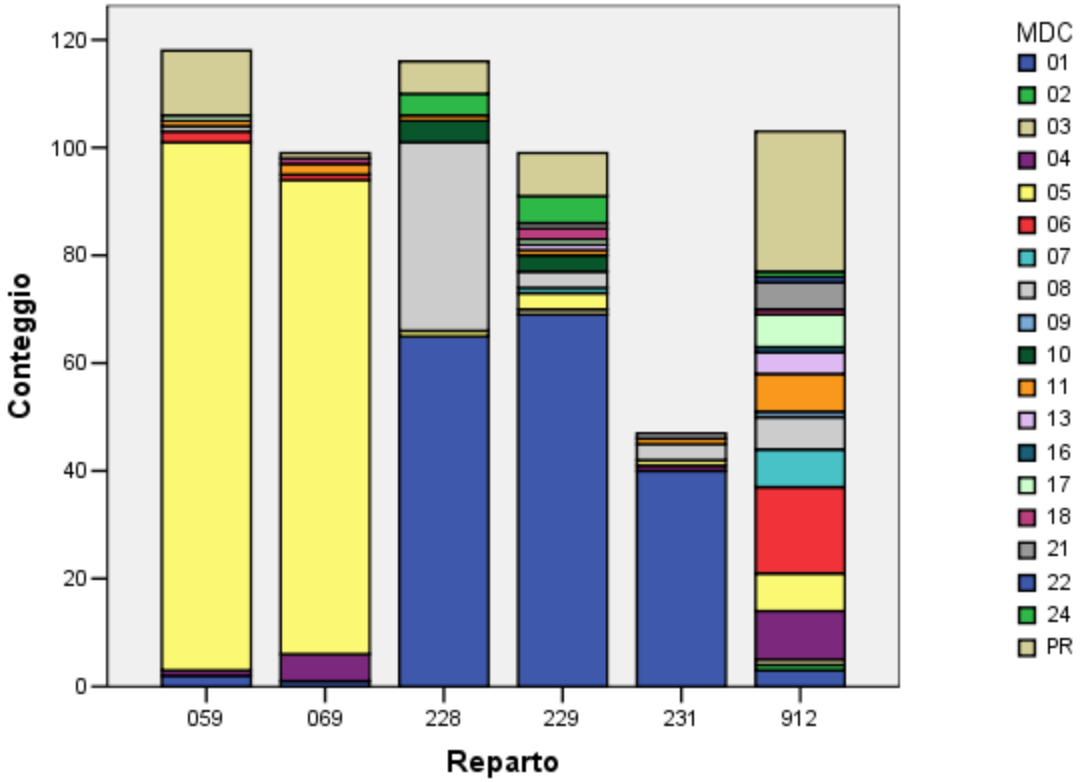
CAMPIONE - Età





TI Cardiochirurgia	Unità Coronarica	TSI Neurochirurgia	TI Neurochirurgia	Stroke Unit	TI Adulti
118	99	116	99	47	103

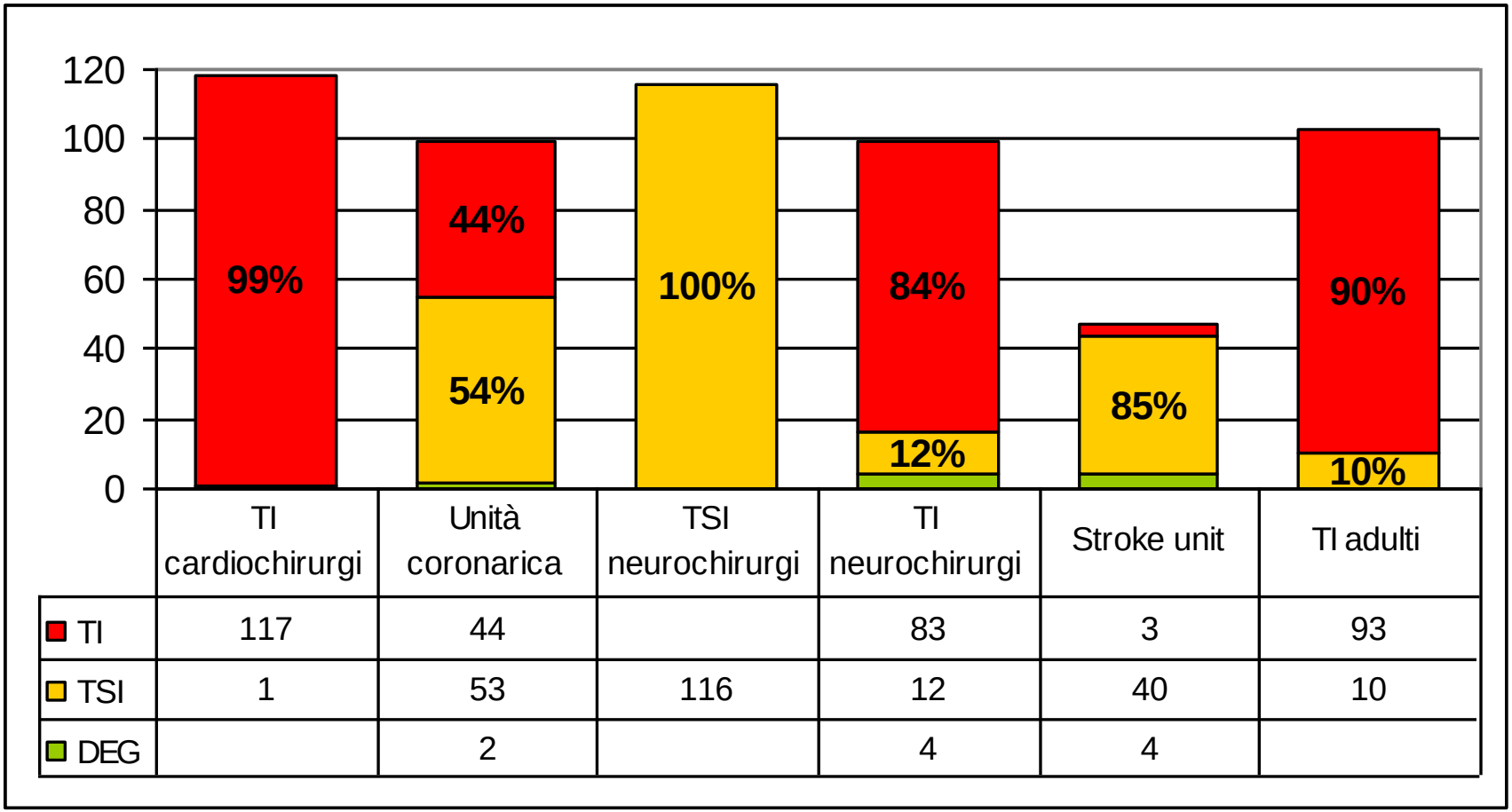
CAMPIONE - MDC



CDC		N
059	**TI Cardiochirurgia**	118
069	**Unità Coronarica**	99
228	**TSI Neurochirurgia**	116
229	**TI Neurochirurgia**	99
231	**Stroke Unit**	47
912	**TI Adulti**	103

1. **Malattie e disturbi del sistema nervoso**
2. Malattie e disturbi dell'occhio
3. Malattie e disturbi dell'orecchio, del naso e della gola
4. Malattie e disturbi dell'apparato respiratorio
5. **Malattie e disturbi dell'apparato cardiocircolatorio**
6. **Malattie e disturbi dell'apparato digerente**
7. Malattie e disturbi epatobiliari e del pancreas
8. **Malattie e disturbi dell'apparato muscoloscheletrico e connettivo**
9. Malattie e disturbi della pelle, del sottocutaneo e della mammella
10. Malattie e disturbi endocrini, metabolici e nutrizion
11. Malattie e disturbi del rene e delle vie urinarie
12. Malattie e disturbi dell'apparato riproduttivo maschile
13. Malattie e disturbi dell'apparato riproduttivo femminile
14. Gravidanza, parto e puerperio
15. Malattie e disturbi del periodo neonatale
16. Malattie e disturbi del sangue e degli organi ematopoietici e del sistema immunitari
17. Malattie e disturbi mieloproliferativi e tumori poco differenziati
18. Malattie infettive e parassitarie (sistematiche)
19. Malattie e disturbi mentali
20. Uso di alcool o farmaci e disturbi mentali organici indotti da alcool o farmaci
21. Traumatismi, avvelenamenti ed effetti tossici dei farmaci
22. Ustioni
23. Fattori influenzanti lo stato di salute ed il ricorso a servizi sanitari
24. Traumi multipli significativi
25. Infezioni da HIV.

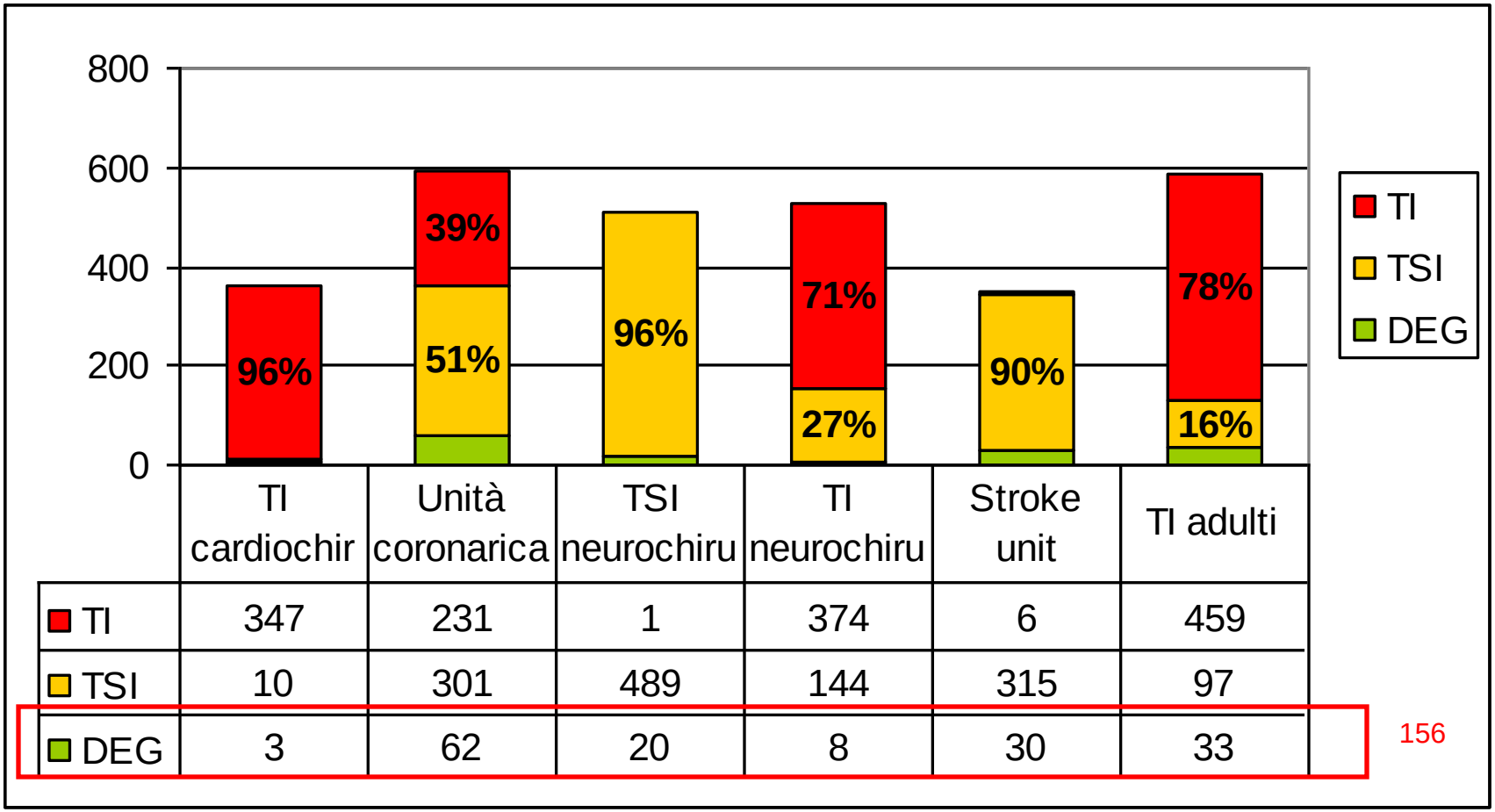
Attribuzione all’ammissione



TI Cardiochirurgia	Unità Coronarica	TSI Neurochirurgia	TI Neurochirurgia	Stroke Unit	TI Adulti
118	99	116	99	47	103

Giornate per attribuzione

(esclusa la giornata di dimissione)



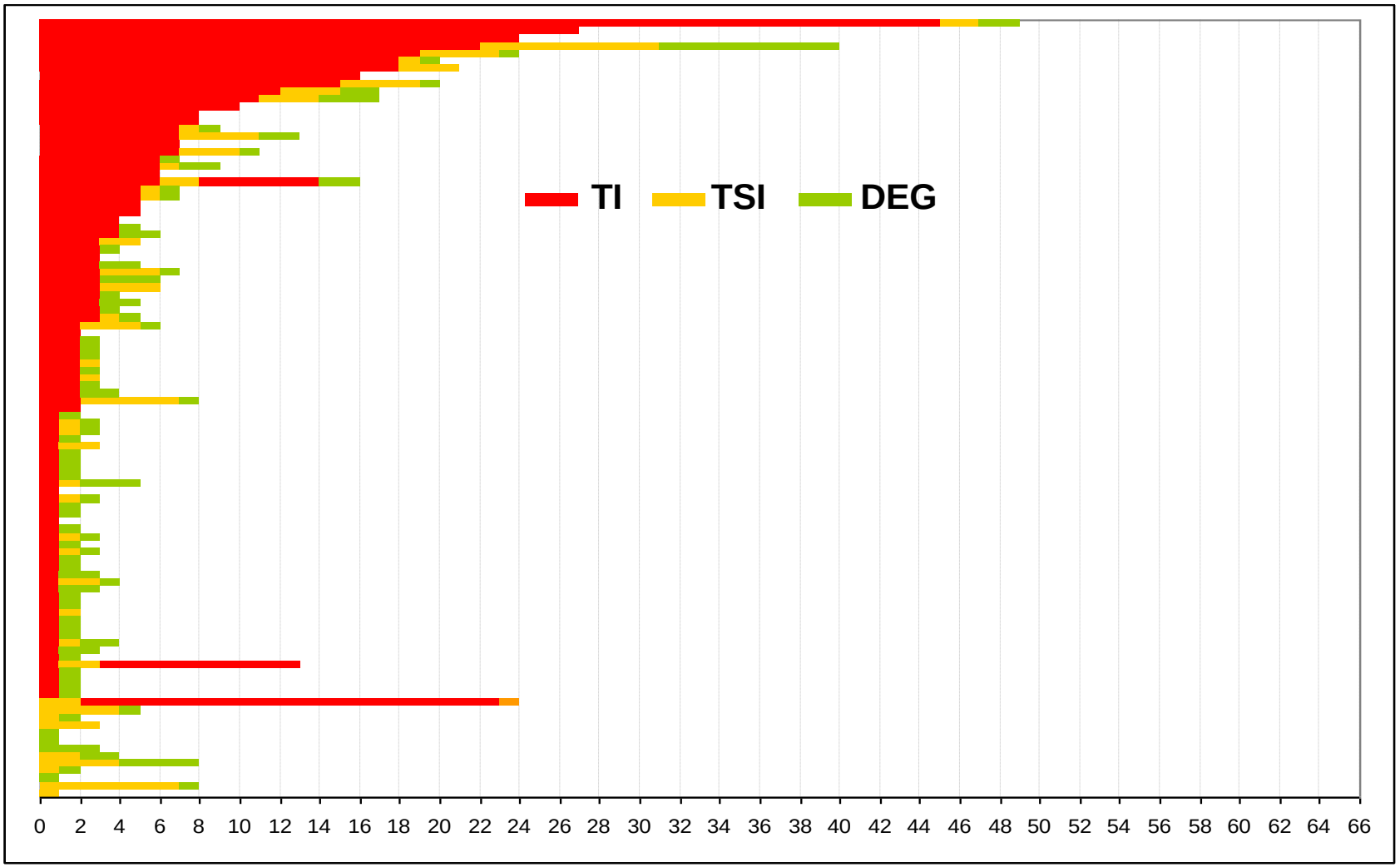
	TI cardiochir	Unità coronarica	TSI neurochiru	TI neurochiru	Stroke unit	TI adulti
TI	347	231	1	374	6	459
TSI	10	301	489	144	315	97
DEG	3	62	20	8	30	33

156

TI Cardiochirurgia	Unità Coronarica	TSI Neurochirurgia	TI Neurochirurgia	Stroke Unit	TI Adulti
360	594	510	526	351	589

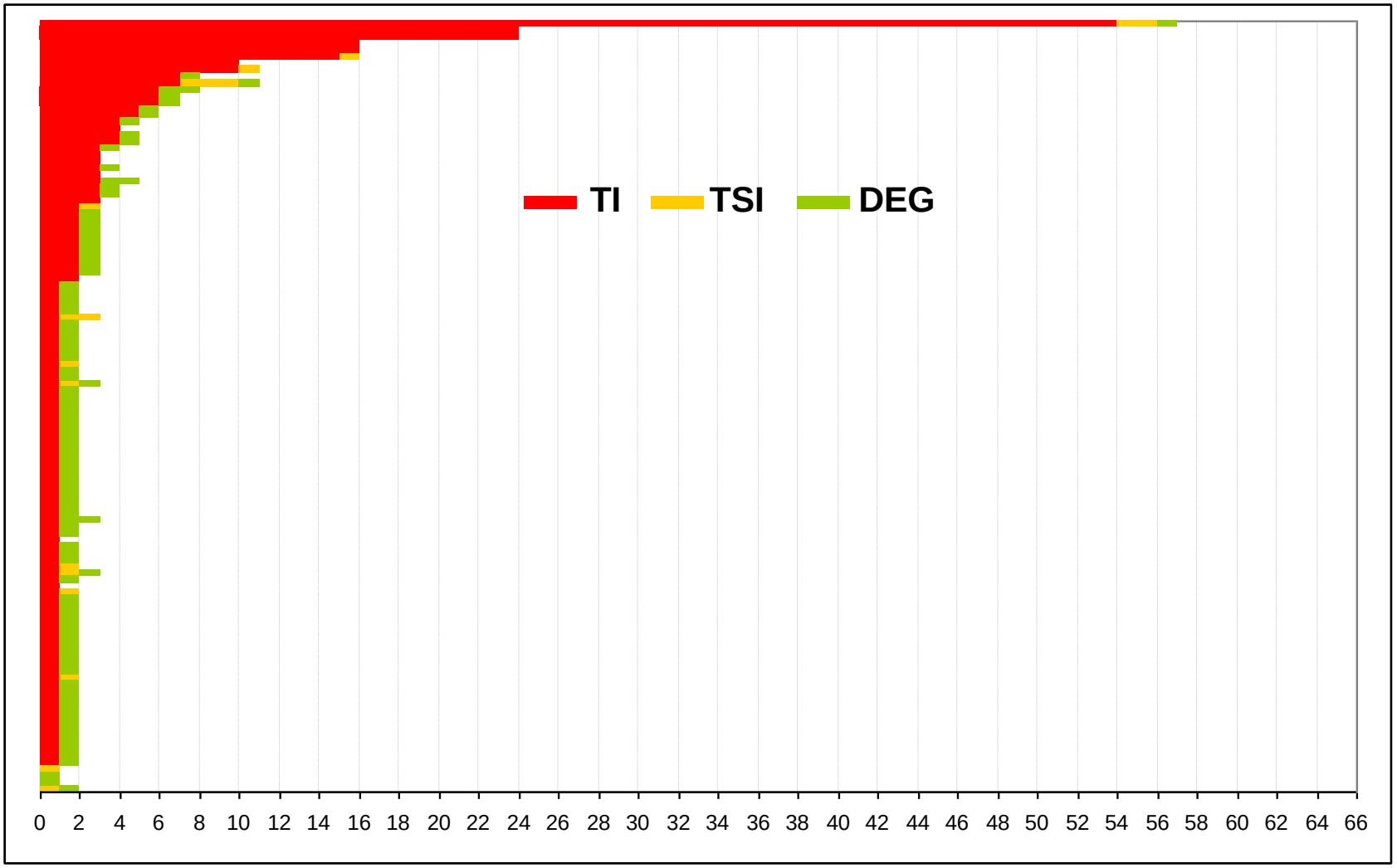
TI Adulti

ATTRIBUZIONE CRITERI CLINICI DIE/PZ (con giornata di dimissione)



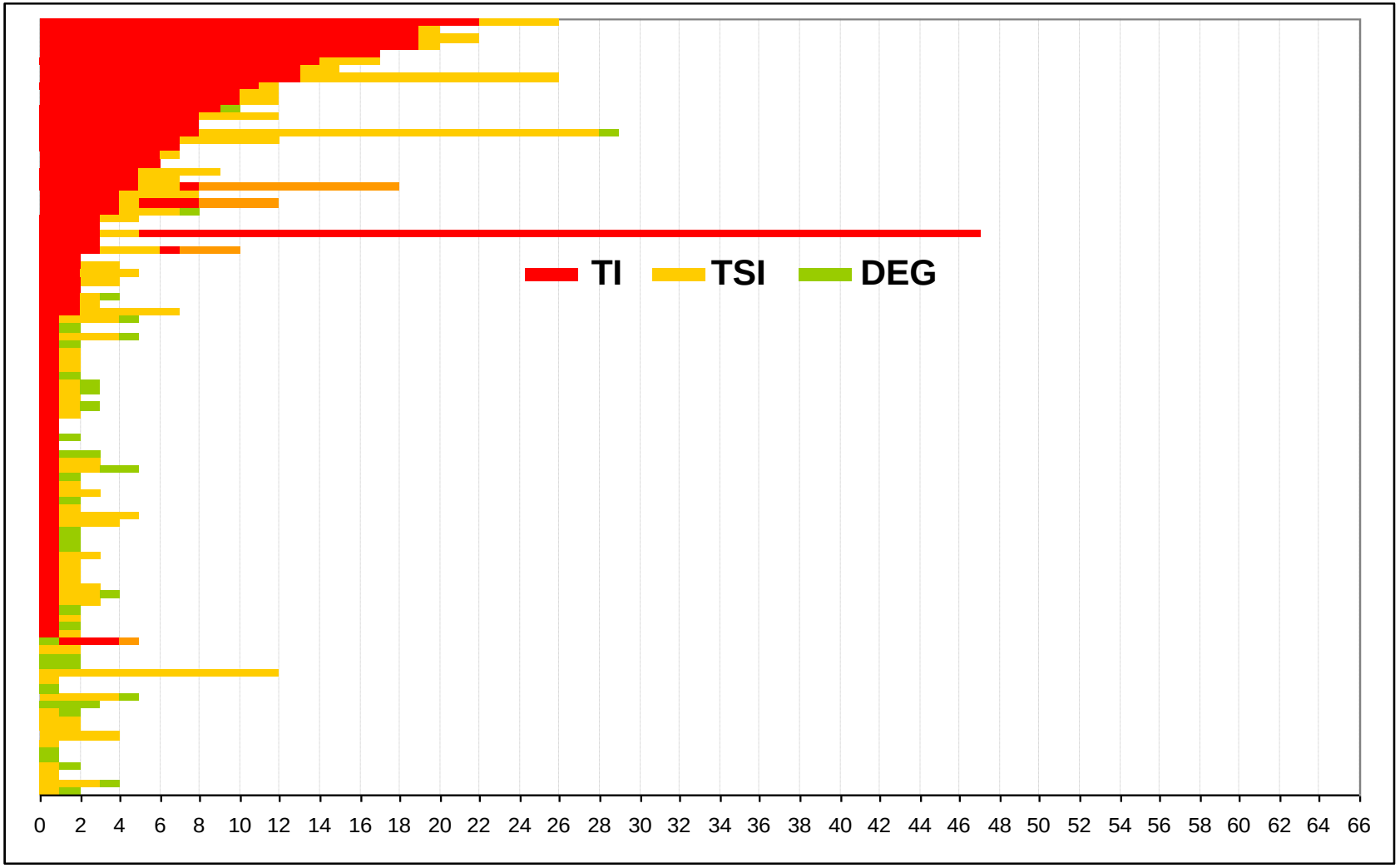
TI Cardiochirurgia

ATTRIBUZIONE CRITERI CLINICI DIE/PZ (con giornata di dimissione)

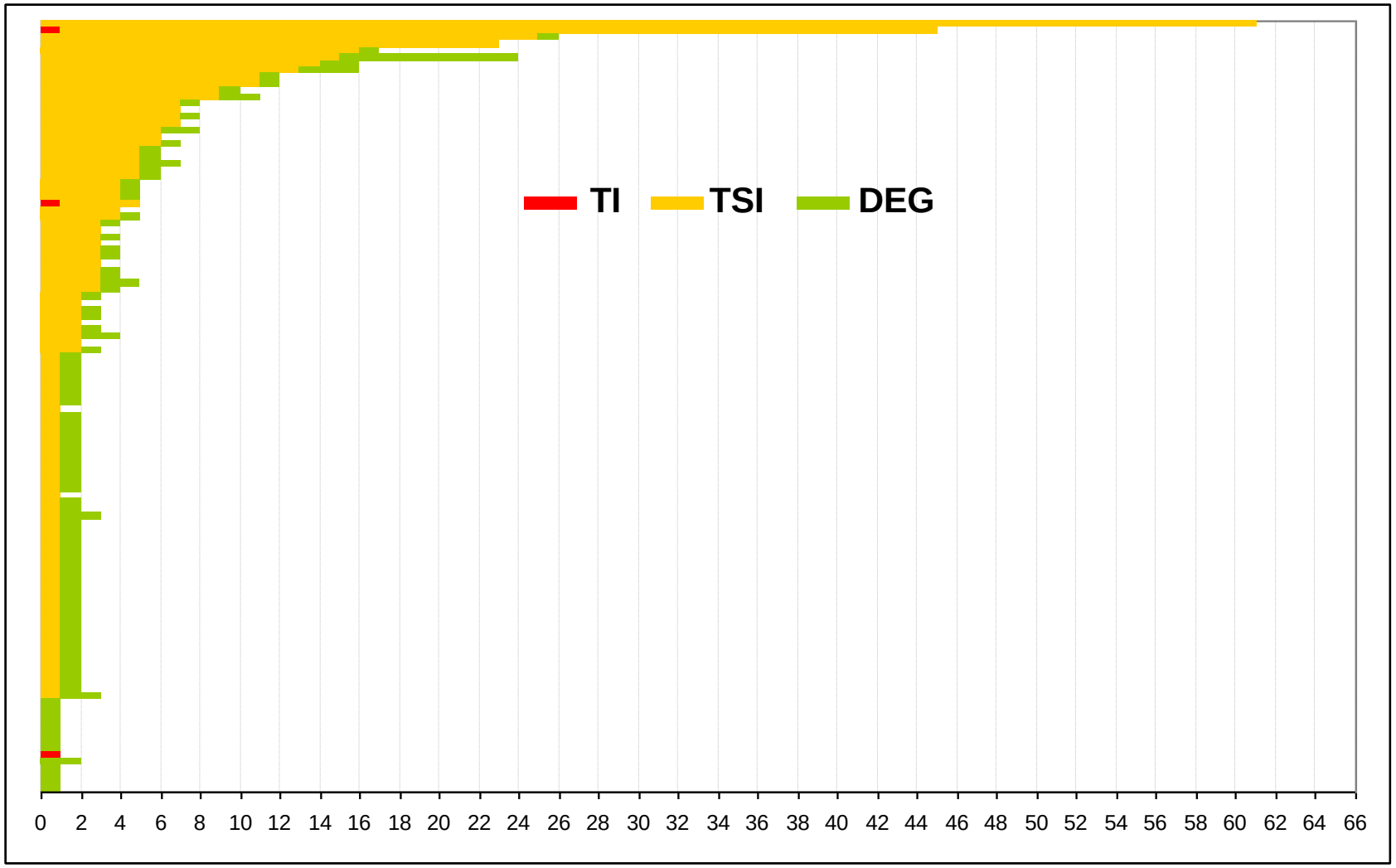


TI Neurochirurgia

ATTRIBUZIONE CRITERI CLINICI DIE/PZ (con giornata di dimissione)

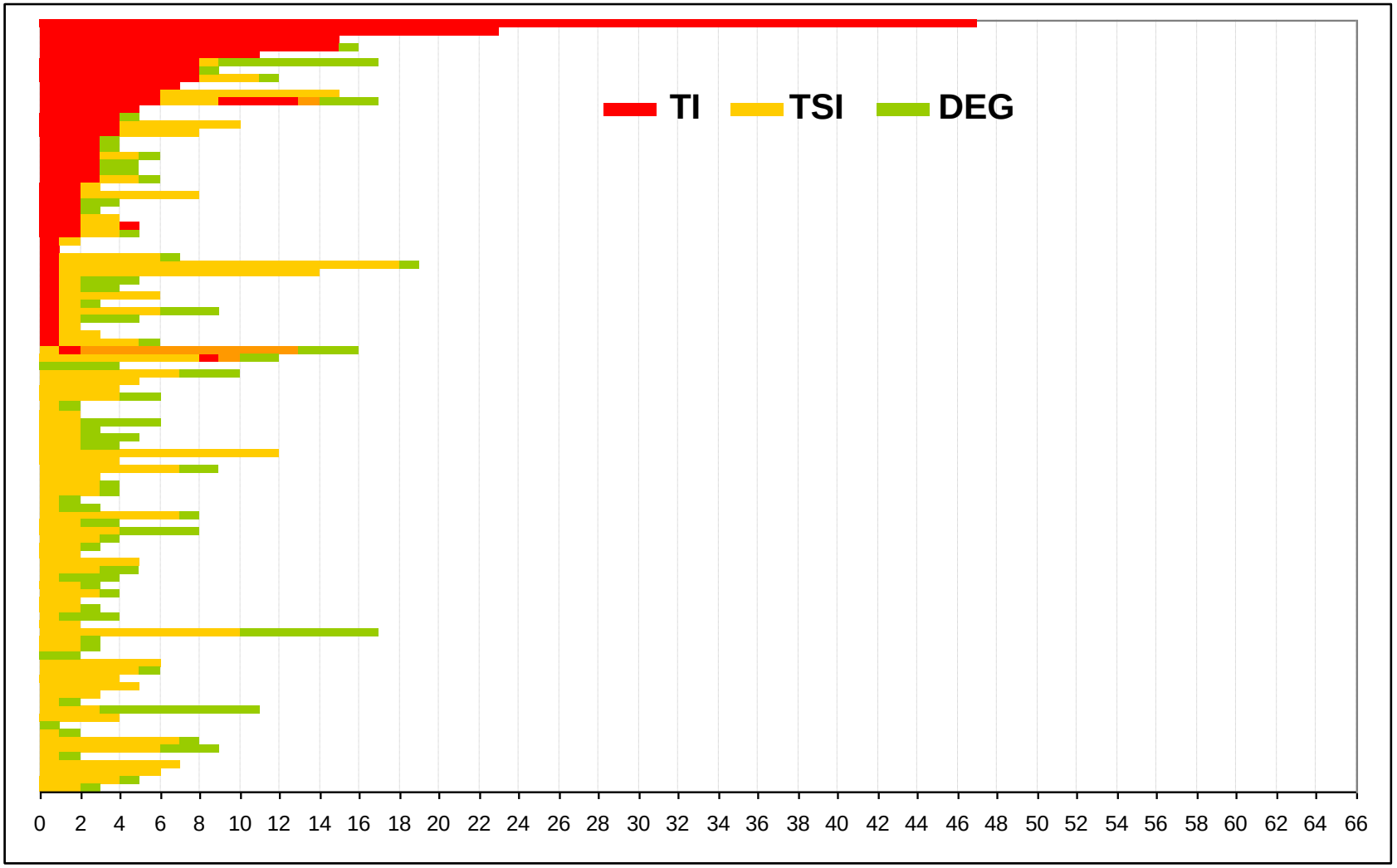


TSI Neurochirurgia ATTRIBUZIONE CRITERI CLINICI DIE/PZ (con giornata di dimissione)



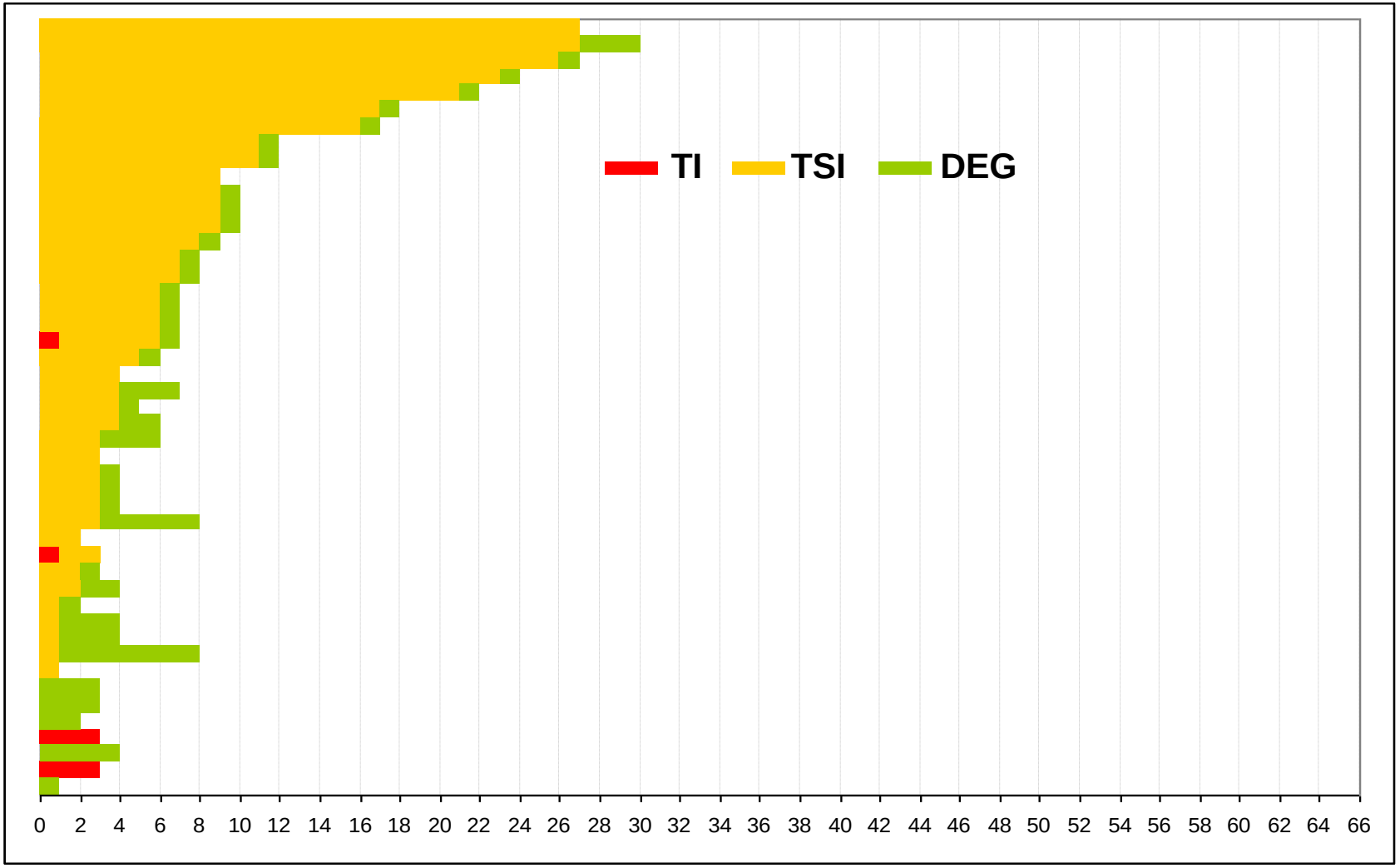
Unità coronarica

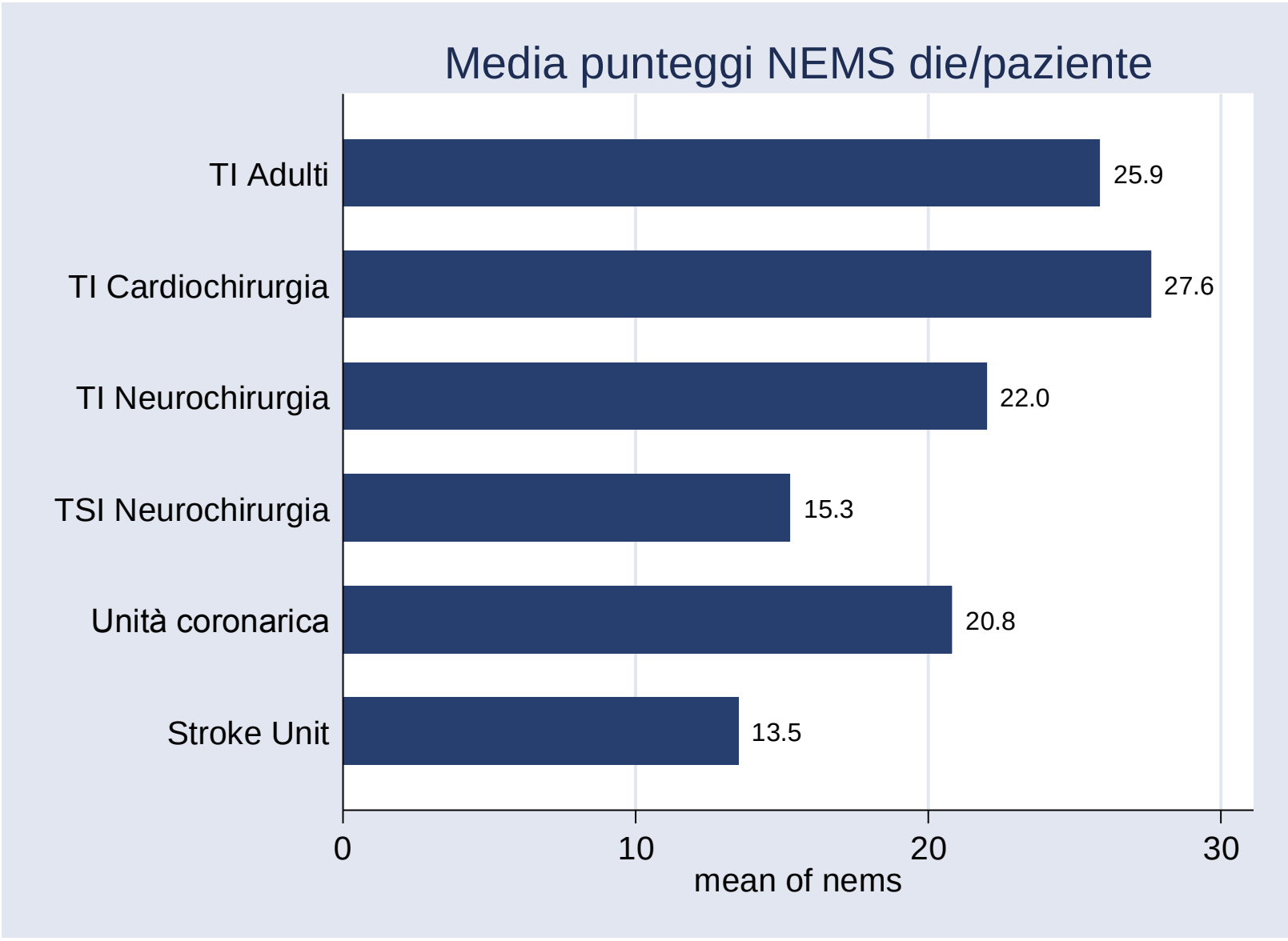
ATTRIBUZIONE CRITERI CLINICI DIE/PZ (con giornata di dimissione)

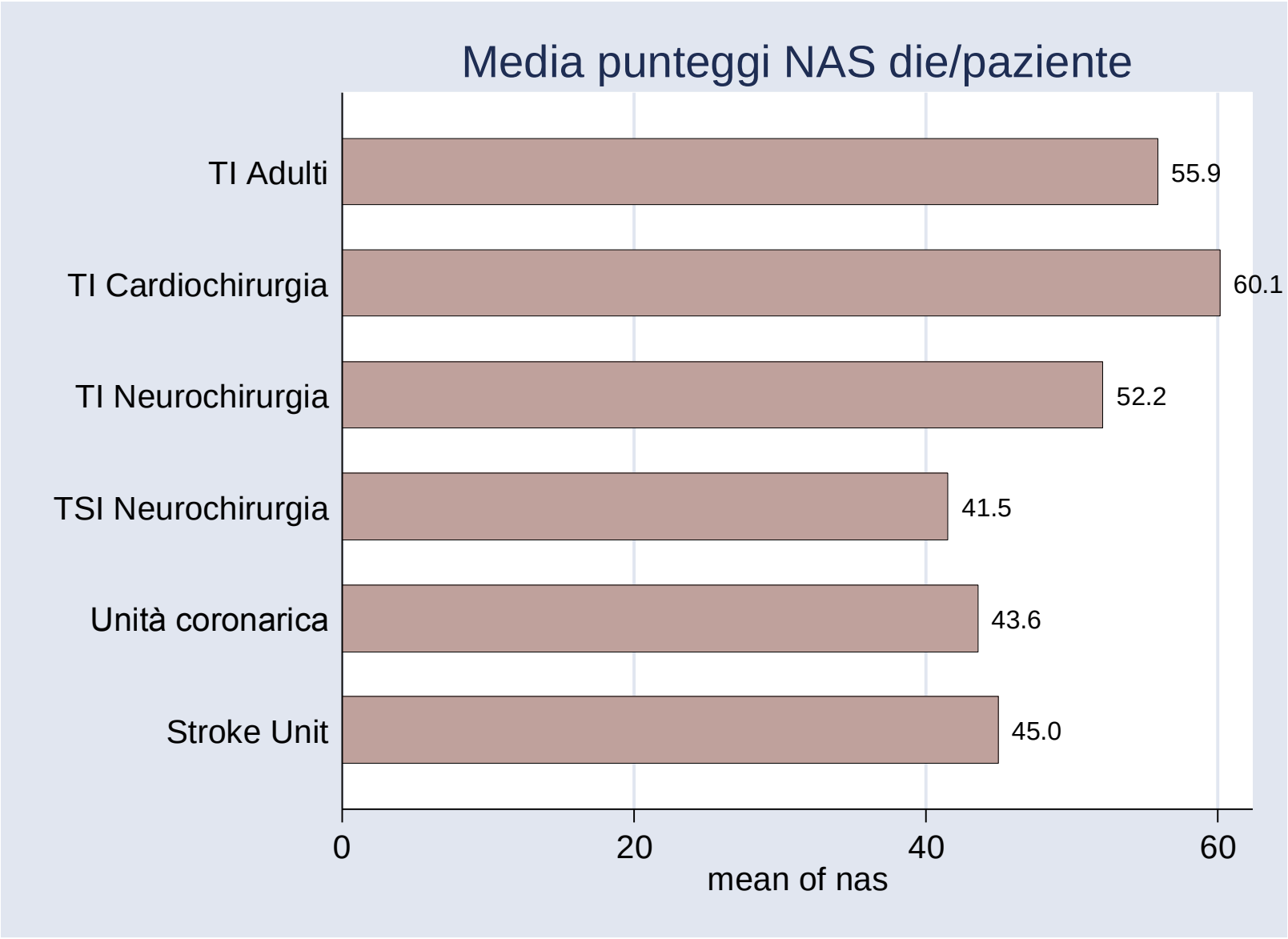


Stroke Unit

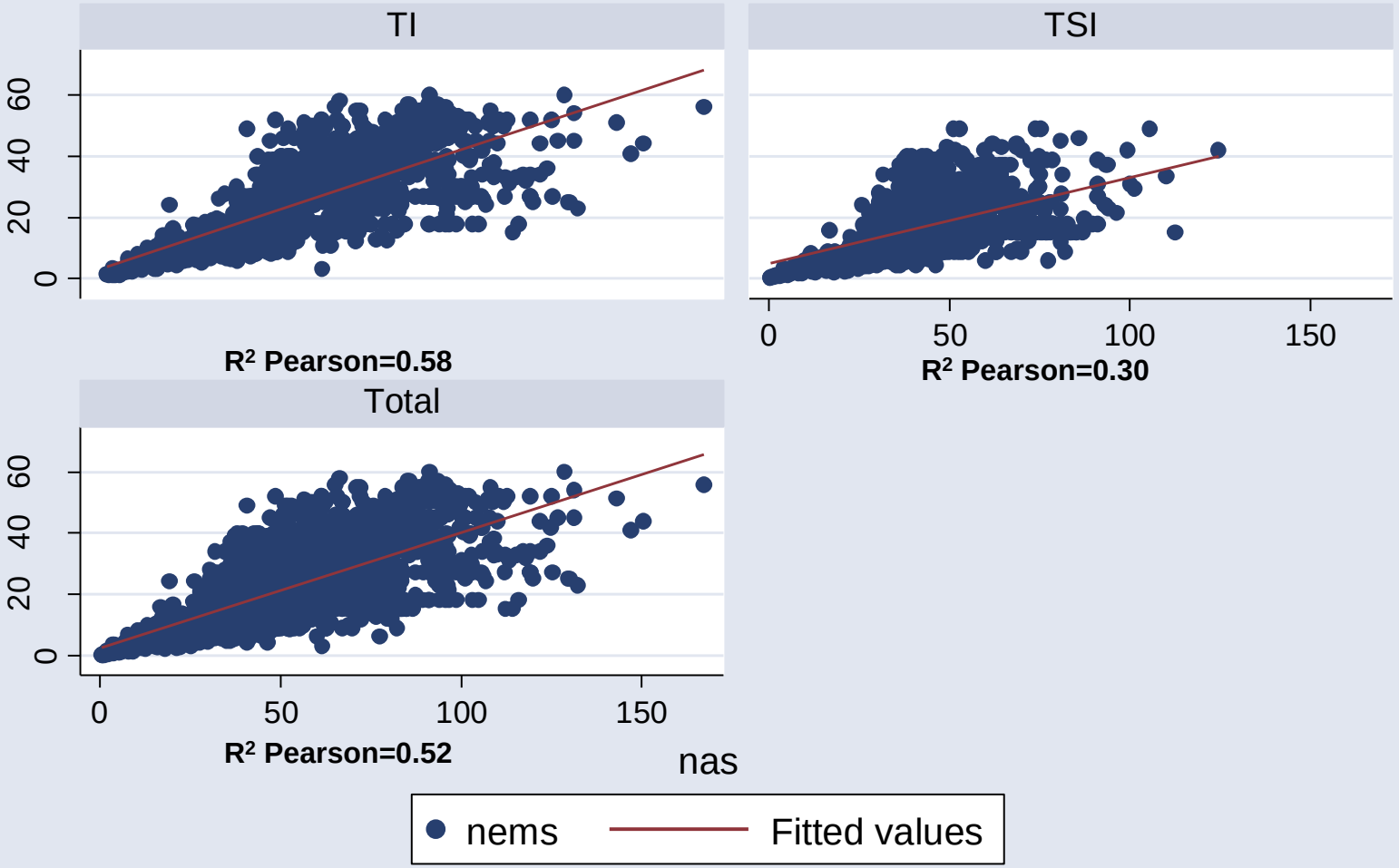
ATTRIBUZIONE CRITERI CLINICI DIE/PZ (con giornata di dimissione)

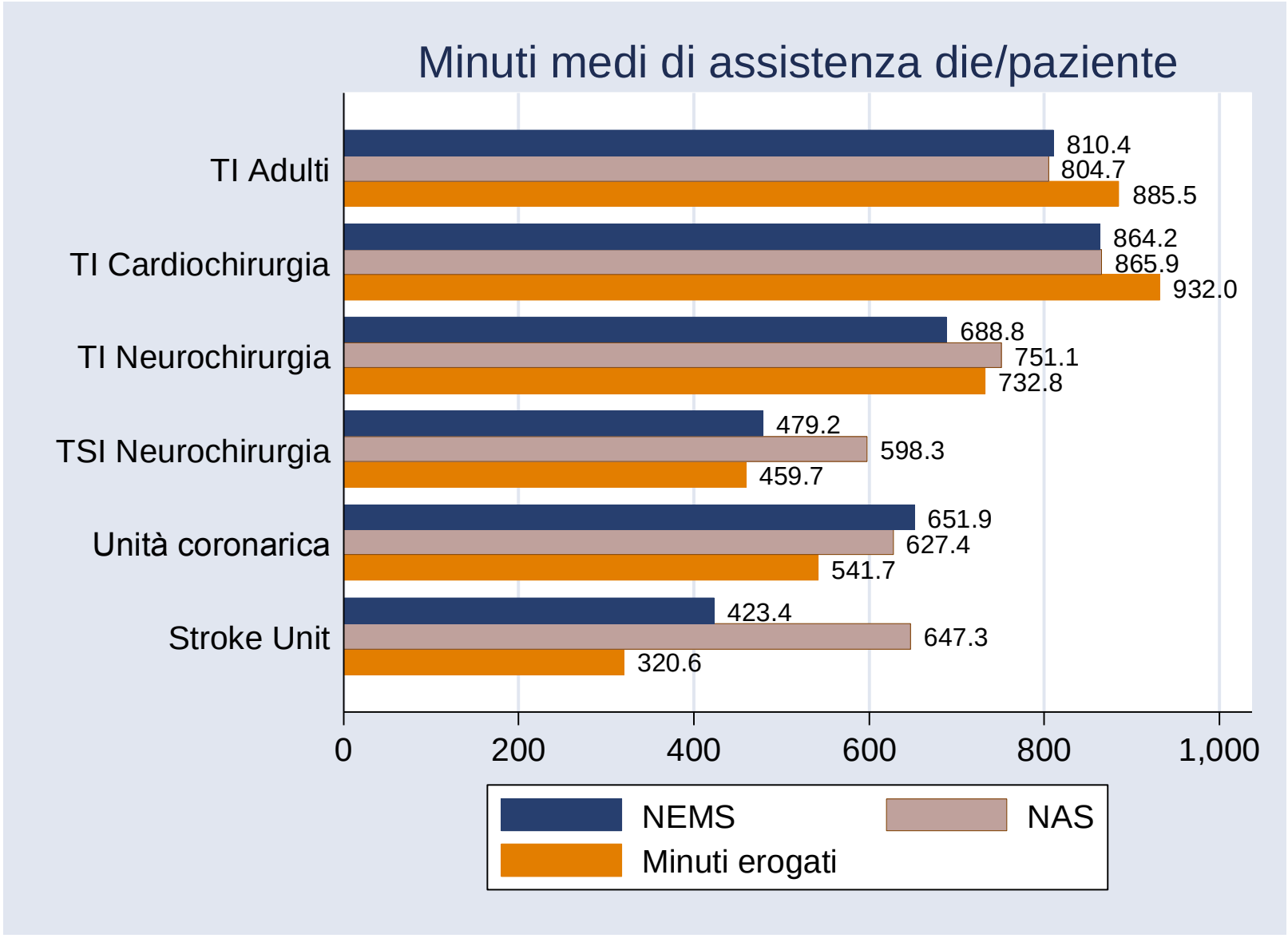


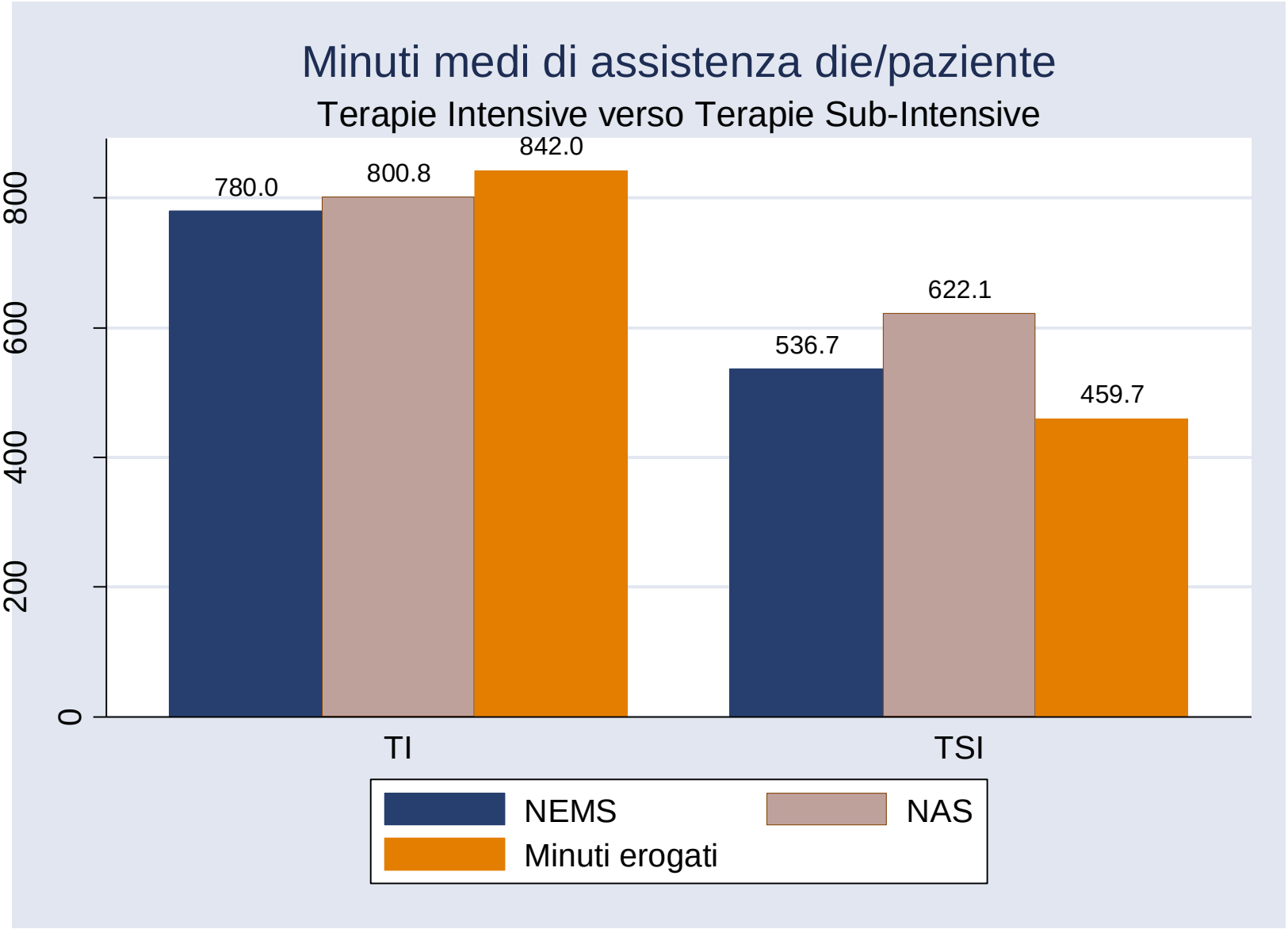

Media punteggi NEMS die/paziente
TI Adulti
TI Cardiochirurgia
TI Neurochirurgia
TSI Neurochirurgia
Unità coronarica
Stroke Unit
25.9
27.6
22.0
15.3
20.8
13.5
0
10
20
30
mean of nems


Media punteggi NAS die/paziente
TI Adulti
TI Cardiochirurgia
TI Neurochirurgia
TSI Neurochirurgia
Unità coronarica
Stroke Unit
55.9
60.1
52.2
41.5
43.6
45.0
0
20
40
60
mean of nas

Correlazione tra i punteggi NEMS e NAS



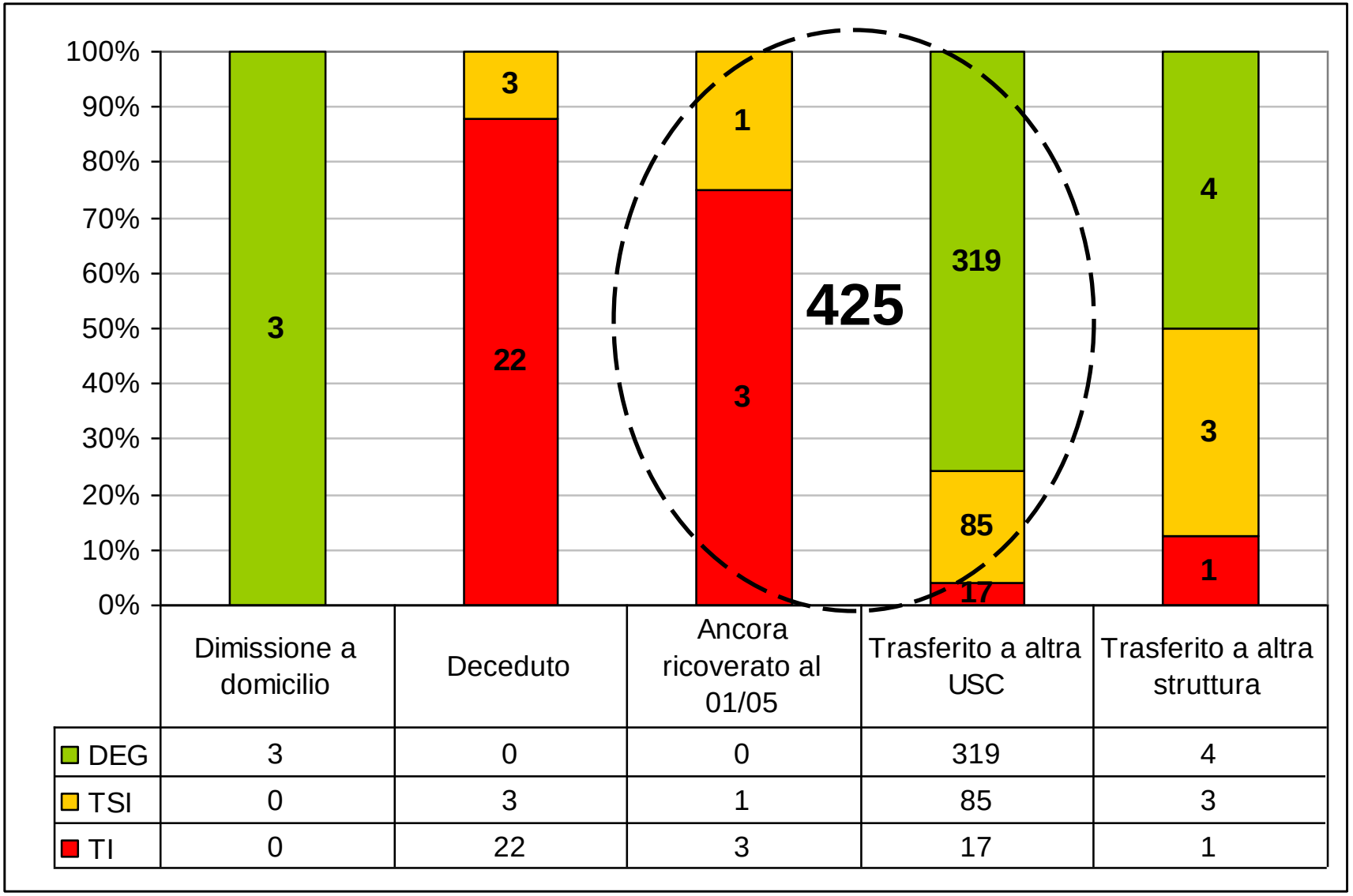

Minuti medi di assistenza die/paziente
TI Adulti
TI Cardiochirurgia
TI Neurochirurgia
TSI Neurochirurgia
Unità coronarica
Stroke Unit
810.4
804.7
885.5
864.2
865.9
932.0
688.8
751.1
732.8
479.2
598.3
459.7
651.9
627.4
541.7
423.4
647.3
320.6
0
200
400
600
800
1,000
NEMS
NAS
Minuti erogati


Minuti medi di assistenza die/paziente
Terapie Intensive verso Terapie Sub-Intensive
0
200
400
600
800
780.0
800.8
842.0
536.7
622.1
459.7
TI
TSI
NEMS
NAS
Minuti erogati

Situazione alla dimissione

N=461 pazienti al primo episodio di ricovero

Criteri alla dimissione e tipo di dimissione



	Dimissione a domicilio	Deceduto	Ancora ricoverato al 01/05	Trasferito a altra USC	Trasferito a altra struttura
DEG	3	0	0	319	4
TSI	0	3	1	85	3
TI	0	22	3	17	1

Situazione alla dimissione

N=425 pazienti dimessi al primo episodio di ricovero

Criteri alla dimissione e reale attribuzione in USC

Criteri \ USC	DEG	TSI	TI
DEG	313	6	0
TSI	32	50	4
TI	5	3	12

"A" "B"

Agreement	Expected Agreement	Kappa	Std. Err.	Z	Prob>Z
88.24%	64.80%	0.6658	0.0402	16.56	0.0000

Situazione alla dimissione

N=50 pazienti dimessi al primo episodio di ricovero con criteri non concordanti

40 in luogo inappropriato gruppo A
10 troppo protetti gruppo B

GRUPPO A : Indice di rientro in area Crit. 10 volte lo std
Indice di mortalità 6 volte lo std

Conclusioni

- Condivisione ed applicazione dei criteri
- Corretto utilizzo delle risorse
- Riduzione di un approccio soggettivo al ricovero e alla dimissione
- Programmazzione della attività chirurgica
- Outcome?
- Costi?

Facoltà di Medicina e Chirurgia
Dipartimento di Sanità Pubblica
Cattedra e Scuola di Specializzazione
in Ortopedia e Traumatologia
Direttore Prof. Massimo Mariconda

La chirurgia: il controllo del sanguinamento e la profilassi tromboembolica

Massimo Mariconda

INTRODUZIONE

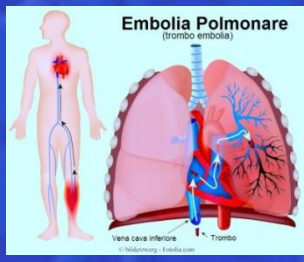
Rischio emorragico in chirurgia protesica

8-10% delle trasfusioni sono dovute a interventi di artroprotesi totale di anca e ginocchio

(Kotze et al, Br J Anaesth, 2012)

RISCHI DELLE TRASFUSIONI

- Allungamento dell' ospedalizzazione e ritardata mobilizzazione e riabilitazione
  (Carson et al, JAMA,1998; Lemaire et al, JBJS, 2008)
- Rischio di trasmissione virale, emolisi e in rari casi exitus
  (Madjpour et al, Br J Anaesth, 2005)
- Incremento del rischio trombo-embolico
  (Orpen et al, Knee,2006)
- Incremento del rischio di infezione del sito chirurgico
  (Kim et al, J Arthroplasty, 2017)



INTRODUZIONE

Rischio emorragico in chirurgia protesica

Alto numero di pubblicazioni

BLOOD MANAGEMENT AND PATIENT SPECIFIC TRANSFUSION OPTIONS IN TOTAL JOINT REPLACEMENT SURGERY

John J. Callaghan, M.D.*
Andrew I. Spitzer, M.D.**

Iowa Orthop J 2000

PERIOPERATIVE BLOOD MANAGEMENT PRACTICES IN ELECTIVE ORTHOPAEDIC SURGERY.

Keating EM, Meding JB

J Am Acad Orthop Surg. 2002

Orthopedic Surgery Transfusion Hemoglobin European Overview (OSTHEO) study: blood management in elective knee and hip arthroplasty in Europe.

Rosencher N, Kerkkamp HE, Macheras G, Munuera LM, Menichella G, Barton DM, Cremers S, Abraham IL

Transfusion. 2003

Raccomandazioni empiriche, spesso non basate su dati ottenuti da trials clinici

STRATEGIE PERIOPERATORIE DI RISPARMIO DEL SANGUE

Perioperative blood conservation
David Cardone and Andrew A. Klein
Eur J Anaesthesiol, 2009

1) FARMACI
- antifibrinolitici (acido tranexamico, acido aminocaproico); desmopressina acetato; fattore ricombinante VIIa (rFVIIa); eritropoietina (EPO); agenti emostatici topici

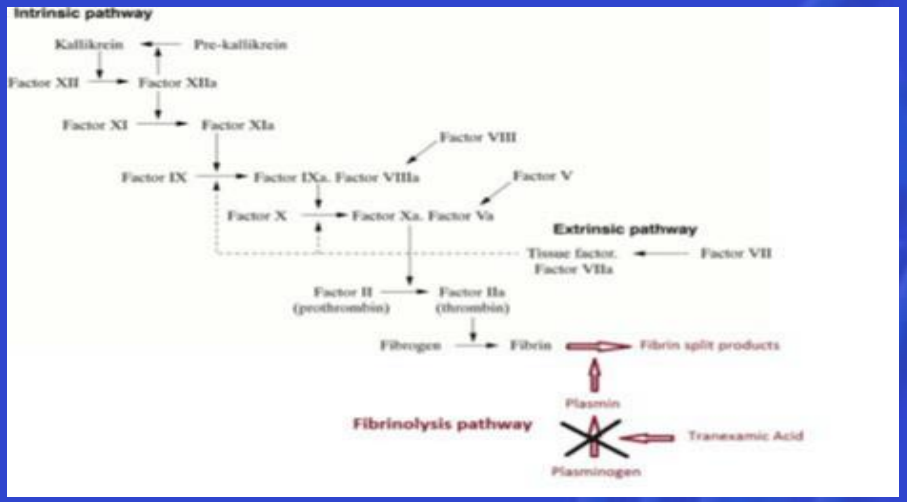
2) AUTOTRASFUSIONE
- predeposito; emodiluizione normovolemica; emorecupero (intra e post-operatorio)

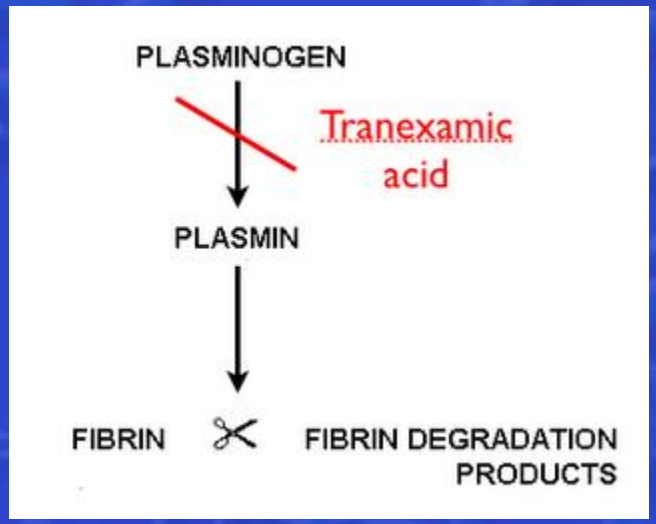
3) TECNICHE ANESTESIOLOGICHE
- ipotensione controllata ; anestesia spinale o epidurale; gestione pressione venosa centrale

4) IMPLEMENTAZIONE GESTIONE CHIRURGICA
- elettrocoagulazione, MIS

5) BUON USO DEL SANGUE
- linee guida, clinic audit

Antifibrinolitici:
Acido Tranexamico





- Antagonista sintetico della lisina;
- Blocca il legame della lisina sul plasminogeno inibendo la conversione in plasmina.

Attività antifibrinolitica

Acido Tranexamico

75 pazienti sottoposti a PTA primaria non cementata presso l'Azienda Ospedaliera Universitaria "Federico II" di Napoli.

Criteri di inclusione

- Coxartrosi primaria
- Singolo operatore
- Accesso postero-laterale
- Anestesia spinale
- Protesi non cementate a stelo corto.

Criteri di esclusione

- Patologie cardiovascolari
- Profilassi o terapia con anticoagulanti o antiaggreganti
- Nefropatie severe

Gruppi sperimentali

- **25 pazienti** : utilizzo di TXA locale 3 grammi diluiti in 50 ml di soluzione salina (= 80 ml) iniettati nell'acetabolo e nel canale midollare preparati per l'impianto e dopo la ricostruzione della capsula articolare .
- **25 pazienti**: somministrazione endovenosa di 1 grammo di TXA in 100 ml di fisiologica all'induzione dell'anestesia ed a fine intervento, unitamente al protocollo locale.
- **25 pazienti**: controlli, nessuna somministrazione di TXA.

CALO DEL TASSO DI EMOGLOBINA

Il gruppo trattato con TXA sistemico presenta minor calo postoperatorio dell'Hb al nadir rispetto ai controlli ($p < 0.001$).

TRASFUSIONI POSTOPERATORIE

Significativamente meno frequenti nei pazienti trattati con TXA sistemico rispetto agli altri due gruppi ($p = 0.009$).

PREDITTORI DELLA NECESSITA' TRASFUSIONALE

All' analisi multivariata, la necessità di trasfusione postoperatoria è inversamente associata al livello preoperatorio di emoglobina ($p = 0.002$) e all' utilizzo di TXA per via sistemica ($p < 0.001$). L'impiego di TXA locale non riduce l'esigenza di trasfusione.

Acido Tranexamico

INTRAVENOUS VS TOPICAL TRANEXAMIC ACID IN PRIMARY TOTAL HIP REPLACEMENT: A META-ANALYSIS

(Pei Zhang et al., Medicine, 2016)

I pazienti trattati con TXA sistemico presentano un calo di emoglobina postoperatoria più basso *(p=0.0006*).

Non vi sono differenze significative nel *trasfusion rate (p=0.39).*

Non vi sono significative differenze per l'incidenza di TVP ed EP *(p=0.71).*

Agenti Emostatici Topici:
Evicel
Fibrinogeno + Fibronectina + Trombina

Quixil® HUMAN SURGICAL SEALANT

EFFECTIVENESS OF FIBRIN SEALANT AFTER CEMENTLESS TOTAL HIP REPLACEMENT: A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL

F. RANDELLI, L. BANCI, V. RAGONE, M. PAVESI and G. RANDELLI

International Journal Of Immunopathologyand Pharmacology,2013

Fibrin sealant reduces perioperative blood loss in total hip replacement.
Wang GJ, Goldthwaite CA Jr, Burks S, Crawford R, Spotnitz WD;

Orthopaedic Investigators Group, 2003

Bleeding was reduced by 221 mL or 27.1% (p = 0.0098)

An Aprotinin Containing Fibrin Sealant Does Not Reduce Blood Loss in Total Hip Arthroplasty.

Kearns SM, Kuhar HN, Bohl DD, Levine BR

J Arthroplasty, 2017

L'utilizzo topico di sigillante con fibrina è meno efficace del TXA IV nel ridurre il sanguinamento in chirurgia protesica dell'anca

Comparative efficacy and safety of different hemostatic methods in total hip arthroplasty: a network meta-analysis

Zhihu Zhao[1], Jianxiong Ma[2] and Xinlong Ma[2*]

Zhao et al. Journal of Orthopaedic Surgery and Research (2019) 1

L'utilizzo di Sigillante di Fibrina e TXA può ridurre il sanguinamento e la necessità di trasfusioni rispetto ai controlli

Trombo Embolismo Venoso

Negli USA la TVP è responsabile di circa 600.000 ospedalizzazioni/anno ed è causa di circa 50.000 decessi (10% dei decessi ospedalieri)

Falck-Ytter,2012

Frequenza di TEV dopo chirurgia protesica di anca e ginocchio

Andréa Senay[1,2]
Milanne Trottier[3]
Josée Delisle[2,4]
Andreea Banica[2,4]
Benoit Benoit[2,4]
G Yves Laflamme[2,4]
Michel Malo[2,4]
Hai Nguyen[4]
Pierre Ranger[2,4]
Julio C Fernandes[2–4]

Incidence of symptomatic venous thromboembolism in 2372 knee and hip replacement patients after discharge: data from a thromboprophylaxis registry in Montreal, Canada

Vascular Health and Risk Management 2018

Outcomes	Total, n(%) (N=2372)	Dabigatran, n(%) (n=904)	Enoxaparin, n(%) (n=1468)	Absolute risk difference[a] (per 100 patients, 95% confidence intervals)	p-value[b]
Efficacy outcomes					
After discharge					
Total symptomatic VTE	16 (0.7)	7 (0.8)	9 (0.6)	–0.16 (–0.87; 0.54)	0.641
Proximal DVT	13 (0.6)	6 (0.7)	7 (0.5)	–0.19 (–0.83; 0.45)	0.559
Distal DVT	3 (0.1)	1 (0.1)	2 (0.1)	*	0.672
Symptomatic PE	7 (0.3)	3 (0.3)	4 (0.3)	*	0.543

TEV dopo chirurgia protesica di revisione

Venous Thromboembolism Rates Did Not Decrease in Lower Extremity Revision Total Joint Arthroplasty From 2008 to 2016

Jared A. Warren, DO, ATC, CSCS [a], Kavin Sundaram, MD, Msc [a], Atul F. Kamath, MD [a], Robert M. Molloy, MD [a], Viktor E. Krebs, MD [a], Michael A. Mont, MD [b], Nicolas S. Piuzzi, MD [a, *]

J Arthroplasty, 2019

Procedure	Complication	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	*P* Value
rTKA	VTE	5 (2.3%)	3 (0.7%)	7 (1.2%)	19 (1.7%)	13 (0.8%)	34 (1.6%)	36 (1.3%)	38 (1.1%)	40 (1.0%)	195 (1.2%)	.137
(n = 16,245)	DVT	4 (1.8%)	2 (0.5%)	7 (1.2%)	13 (1.2%)	10 (0.6%)	20 (0.9%)	27 (1.0%)	28 (0.8%)	28 (0.7%)	139 (0.9%)	.448
	PE	2 (0.9%)	1 (0.2%)	1 (0.2%)	7 (0.6%)	3 (0.2%)	16 (0.7%)	11 (0.4%)	11 (0.3%)	14 (0.4%)	66 (0.4%)	.121 (.112-.129)[a]
	Mortality	0 (0.0%)	3 (0.7%)	3 (0.5%)	6 (0.5%)	3 (0.2%)	6 (0.3%)	8 (0.3%)	15 (0.4%)	11 (0.3%)	55 (0.3%)	.463[b]
rTHA	VTE	3 (1.5%)	2 (0.5%)	5 (0.9%)	10 (0.8%)	12 (0.7%)	19 (0.8%)	25 (1.0%)	30 (1.2%)	40 (1.4%)	146 (1.0%)	.393
(n = 14,136)	DVT	3 (1.5%)	2 (0.5%)	4 (0.7%)	9 (0.7%)	7 (0.4%)	16 (0.7%)	13 (0.5%)	19 (0.7%)	29 (1.0%)	102 (0.7%)	.376
	PE	0 (0.0%)	0 (0.0%)	1 (0.2%)	2 (0.2%)	6 (0.4%)	6 (0.3%)	13 (0.5%)	13 (0.5%)	13 (0.5%)	54 (0.4%)	.602[b]
	Mortality	4 (2.1%)	4 (1.0%)	4 (0.7%)	6 (0.5%)	17 (1.0%)	12 (0.5%)	5 (0.2%)	17 (0.7%)	25 (0.9%)	94 (0.7%)	**.010**

Fattori di rischio per lo sviluppo di TEV

Fattori di rischio	
Storia di TEV personale o familiare (in familiari di primo grado)	XX
Trombofilia congenita o acquisita nota (Tab. 2)	XX
Neoplasia in fase attiva	XX
Obesità (BMI >30)	XX
Allettamento prolungato (>3 giorni)	XX
Impedimento a una normale deambulazione	X
Età (>60-70 anni)	X
Terapia estro-progestinica o ormonale sostitutiva (in corso o entro 1 mese da sospensione)	X
Gravidanza o puerperio (6 settimane dopo il parto)	X
Recente IMA o ictus	X
Scompenso cardiaco cronico	X
Insufficienza respiratoria cronica	X
Malattie infiammatorie croniche intestinali	X
Sepsi o infezioni gravi	X
Varici importanti	X
Sindrome nefrosica	X

*Fattori associati a un rischio elevato (XX) o moderato (X)

Razionale della tromboprofilassi

- Elevata prevalenza del TEV

  (Spesso multipli fattori di rischio, soprattutto in pazienti ospedalizzati, effetto “cumulativo”)

- Dimostrata efficacia della tromboprofilassi

  (prevenzione della TVP previene anche embolia polmonare, rapporto rischio/beneficio ben dimostrato)

Geerts WH, et al. ACCP GUIDELINES. CHEST 2008; 133:381S-453S.

TIPI DI PROFILASSI

FARMACOLOGICA

- Eparina a Basso Peso Molecolare (EBPM)
- Eparina Non Frazionata (ENF)
- Anticoagulanti orali (inibitori della vitamina K)
- Inibitori diretti della trombina e nuovi anticoagulanti orali

NON FARMACOLOGICA

- Calze elastiche
- Compressione pneumatica intermittente
- Pompa plantare
- Deambulazione precoce

Chapman HH et al. Aust Fam Physician 2009;38(1-2):36-40
DeitelZweig SB et al. Cleve Clin J Med 2008;75(3suppl):527-536
Geerts WH et al. Chest 2008;133(6suppl):381S-453S
Hirsh J et al. Chest 2008;133(6suppl):141S-159S

PROFILASSI NON FARMACOLOGICA

- **CALZE ELASTICHE A COMPRESSIONE GRADUATA**

  Scarsa efficacia nella prevenzione TVP prossimali ed EP

- **COMPRESSIONE PNEUMATICA INTERMITTENTE (CPI)**
  - Difficoltà per la compliance del paziente e disponibilità
  - Studi di limitate dimensioni
- **FILTRI CAVALI**
  - Indicazioni ristrette
  - Mancano dati da studi randomizzati (± profilassi farmacologica)

Raccomandazioni: Geerts WH, et al. The Seventh ACCP Conference on Antithrombotic and Thrombolytic therapy. CHEST 2004; 126: 338S-400S:

- Pz. Ad alto rischio emorragico (Grado 1C+).
- Aggiunta alla profilassi farmacologica (Grado 2A).
- Necessario uso corretto dei mezzi meccanici di profilassi e necessità di compliance del paziente (Grado 1C+).

RACCOMANDAZIONI 8°ACCP
CHIRURGIA ANCA

Strategia di profilassi	Grado
• EBPM	1A
• Fondaparinux (2.5 mg/die)	1A
• Warfarin a dosi aggiustate (INR 2–3)	1A

Eparina basse dosi, ASA, destrano, o calze e CPI come unico metodo di profilassi: sconsigliati (grado 1A)!

The 8th ACCP Consensus Conference on Antithrombotic and Thrombolytic Therapy, Geerts WH, et al. CHEST 2008; 133:381S-453S.

EBPM: dosi in chirurgia ortopedica maggiore

- EBPM: molecole eterogenee, con caratteristiche farmacocinetiche specifiche → Non intercambiabili.

- Evidenze cliniche per i seguenti schemi di trattamento:

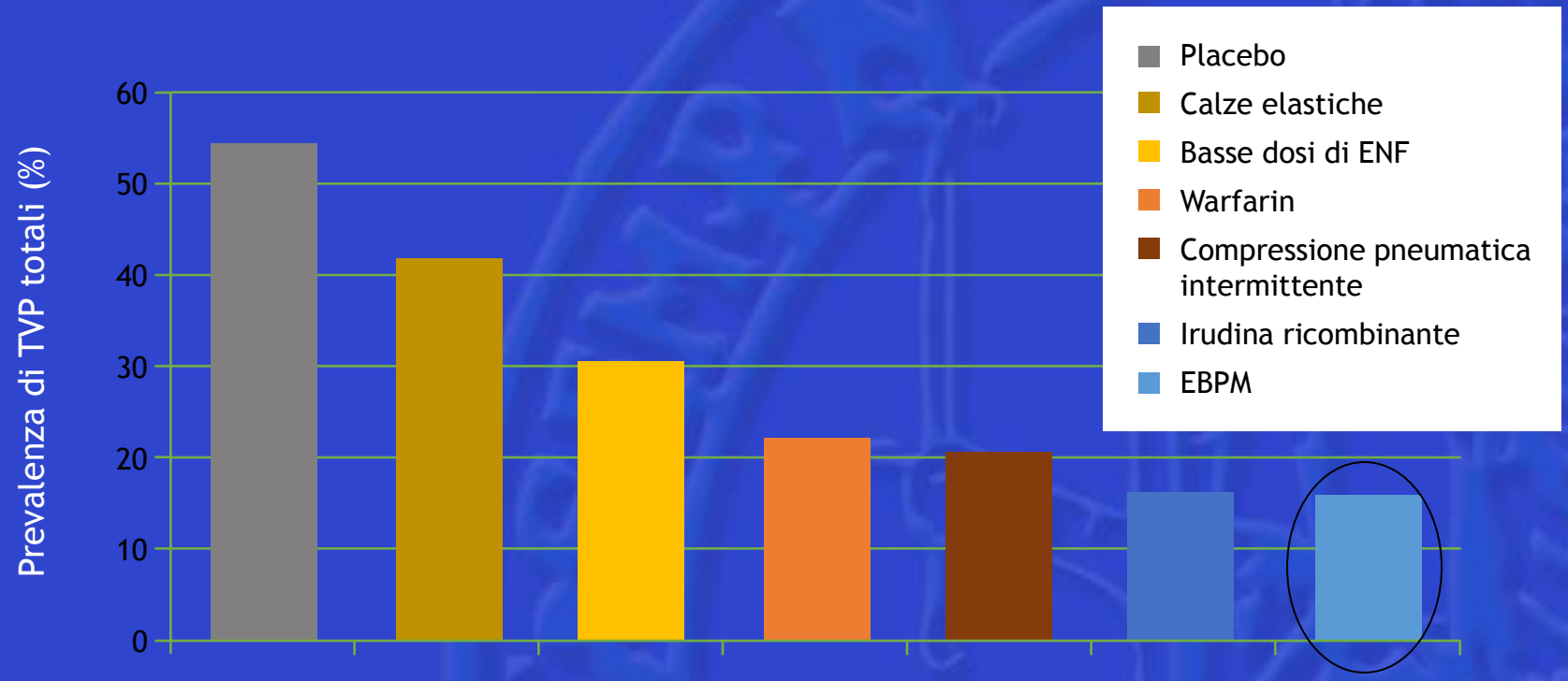
  - Enoxaparina (Clexane): 4000 U/24 h iniziando 12 h prima dell'intervento o entro 24 h dall'intervento.

    3000 U/12 h a partire da 12-24 h dopo l'intervento.

  - Nadroparina (Seleparina): 38 UI/Kg 12 h prima dell'intervento, poi ogni 24 h nei primi 3 gg dopo l'intervento, quindi 57 UI/Kg.

  - Dalteparina (Fragmin): 5000 U 8-12 h prima dell'intervento, poi ogni 24 h a partire da 12-24 h dopo l'intervento;

EFFICACIA DEI DIVERSI TRATTAMENTI IN CHIRURGIA ORTOPEDICA MAGGIORE: CHIRURGIA PROTESICA D'ANCA



Pazienti (n)	626	290	1.016	1.828	423	1.172	6.216
RRR	-	23	45	59	63	70	70

RRR = **R**iduzione **R**ischio **R**elativo

Geerts W et al. Chest 2001;119(suppl):132S-175S

Timing di inizio della profilassi con EBPM
Chirurgia d'anca
Review sistematica della letteratura
Strebel N., et al Arch Intern Med. 2002; 162 (13): 1451-1456

Per le EBPM non esiste un'evidenza univoca circa il fatto che l'inizio pre-operatorio della profilassi (12 h prima dell'intervento) possa essere associato ad un minor rischio di trombosi venosa rispetto all'inizio nel post-operatorio (12-24 h dopo la procedura).

Clin Orthop Relat Res (2017) 475:2245–2252
DOI 10.1007/s11999-017-5419-1

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

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CLINICAL RESEARCH

Similar Clinical Outcomes with Preoperative and Postoperative Start of Thromboprophylaxis in THA: A Register-based Study

Pål O. Borgen MD, Are H. Pripp PhD, Eva Dybvik PhD, Lilian Leistad PhD, Ola E. Dahl MD, PhD, Olav Reikerås MD, PhD

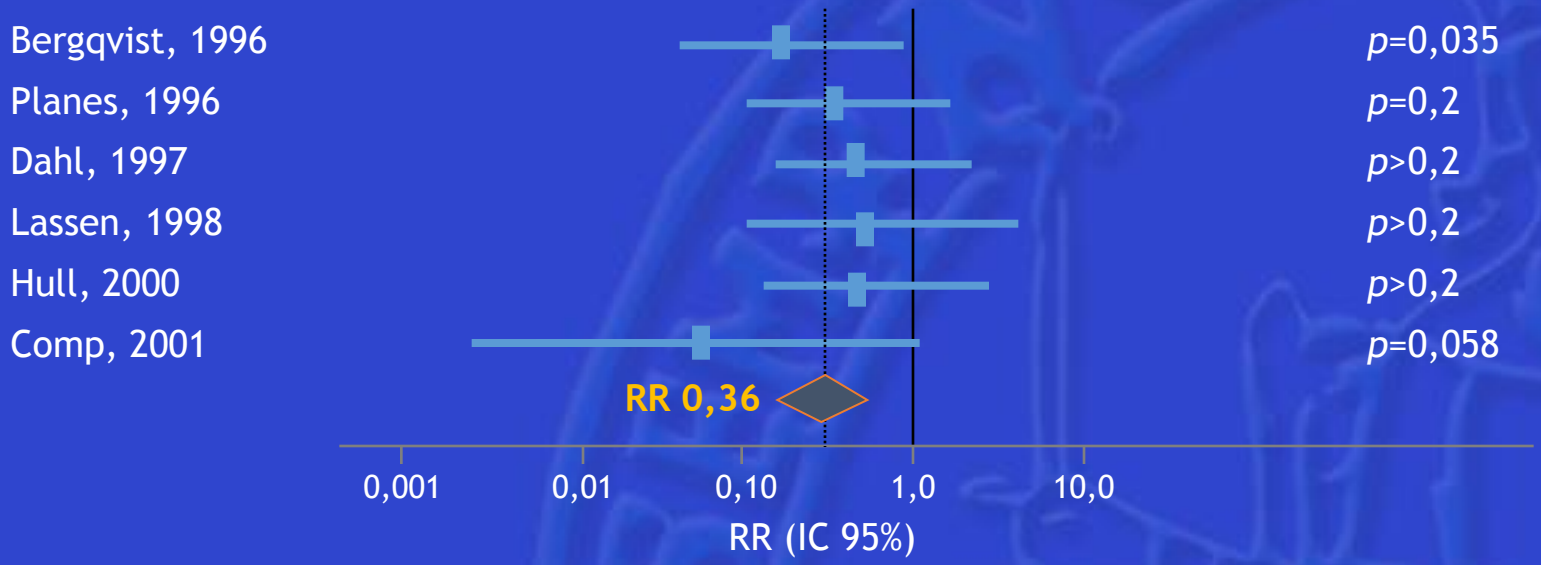
Results After adjustment for age, sex, operation time, year of surgery, and American Society of Anesthesiologists class, we could not show major differences in bleeding events; (odds ratio [OR], 1.04; 95% CI, 0.88–1.22; p = 0.660), thromboembolic episodes; (OR, 1.03; 95% CI, 0.84–1.27; p = 0.786), or other postoperative clinical complications; (OR, 0.86; 95% CI, 0.76–0.99; p = 0.034), with the two regimens. Six-month mortality was similar, (OR, 0.76; 95% CI, 0.56–1.05; p = 0.093), and the readmission rate was higher in the preoperative group; (OR, 0.92; 95% CI, 0.85–0.97; p = 0.016).

RACCOMANDAZIONI 8°ACCP
DURATA DELLA PROFILASSI IN CHIRURGIA ORTOPEDICA

Nella protesi d'anca si raccomanda di estendere la profilassi fino al giorno 35 post-intervento con EBPM **(Grado 1A)**, o VKA **(Grado 1B)** o fondaparinux **(Grado 1C).**

Hirsh J et al. Chest 2008;133:71S-109S

TROMBOPROFILASSI PROTRATTA CON EBPM DOPO CHIRURGIA PROTESICA D'ANCA: TEV SINTOMATICO



Risultati a favore di EBPM 4-5 settimane

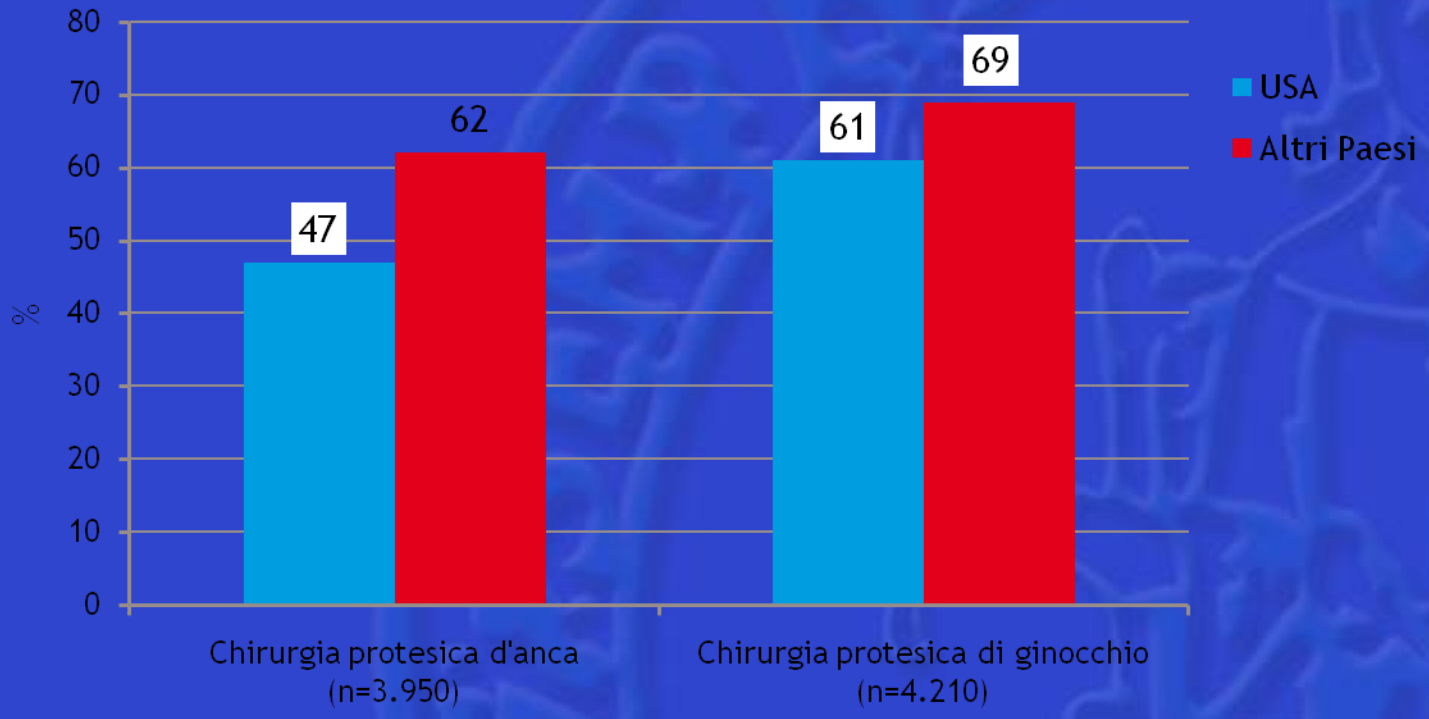
Totale	EBPM 4-5 settimane 1,4% TVP	$p<0,001$	EBPM 1-2 settimane 4,2% TVP

RR = **R**ischio **R**elativo

Hull RD et al. Ann Intern Med 2001;135:858-869

GLORY: COMPLIANCE ALLA PROFILASSI SECONDO LE LINEE GUIDA ACCP

Profilassi secondo il 6°ACCP in accordo al regime raccomandato



Rappresentazione grafica di dati numerici

Quasi tutti i pazienti hanno ricevuto una qualche forma di profilassi, ma solo il 47% (US) e il 62% (non US) nella protesi d'anca e solo il 61% (US) e il 69% (non US) nella protesi di ginocchio è stato trattato secondo le Linee Guida per tipo di profilassi, inizio, dose e durata

Friedman RJ et al. Glory. Curr Med Res Opin 2008;24(1):87-97

Profilassi del TEV nel paziente in terapia antiaggregante

L'EBPM va aggiunta alla terapia antiaggregante o la sostituisce?

- **Le LG sconsigliano l'uso dell'ASA per la profilassi del TEV**

  (ACCP 8th -2008; SIOT 2011; ACCP 9° - 2012)

- **Come trattare i pz che fanno profilassi primaria con antiaggreganti?**

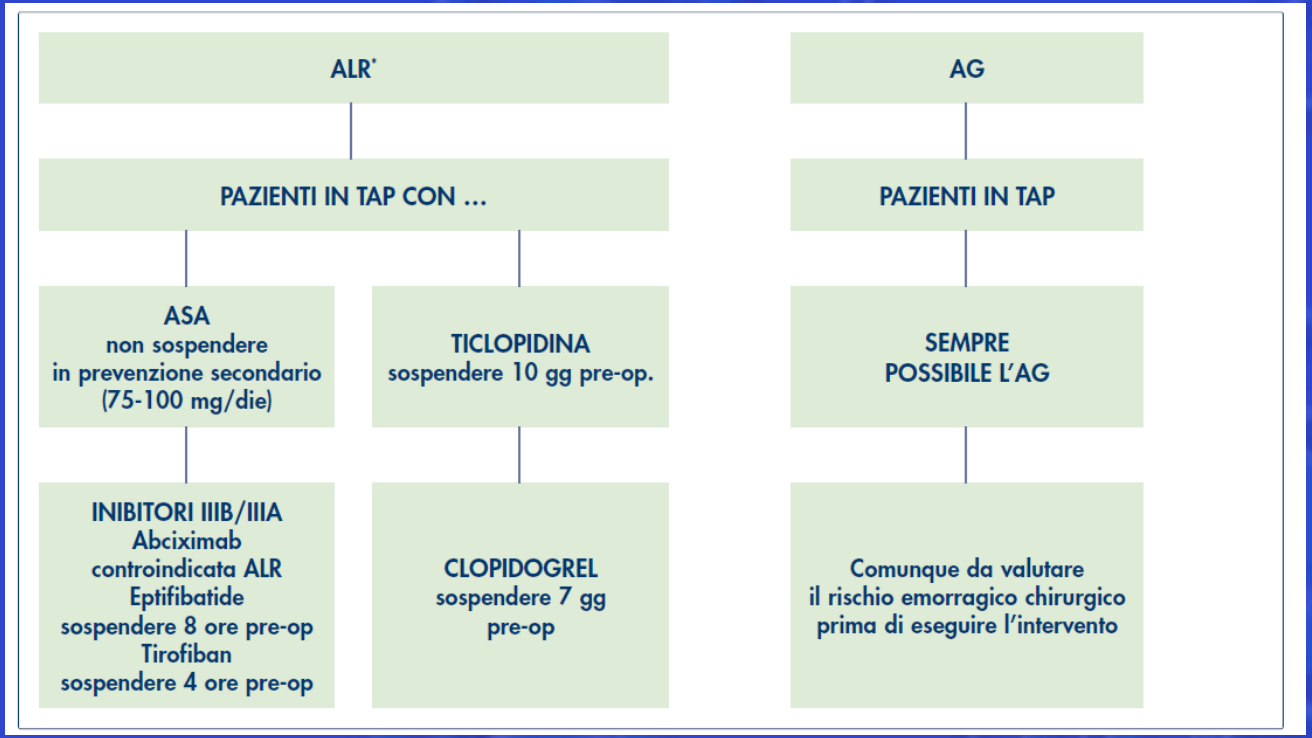
EBPM in aggiunta? Sostituire ASA con EBPM?

STRATIFICARE IL RISCHIO

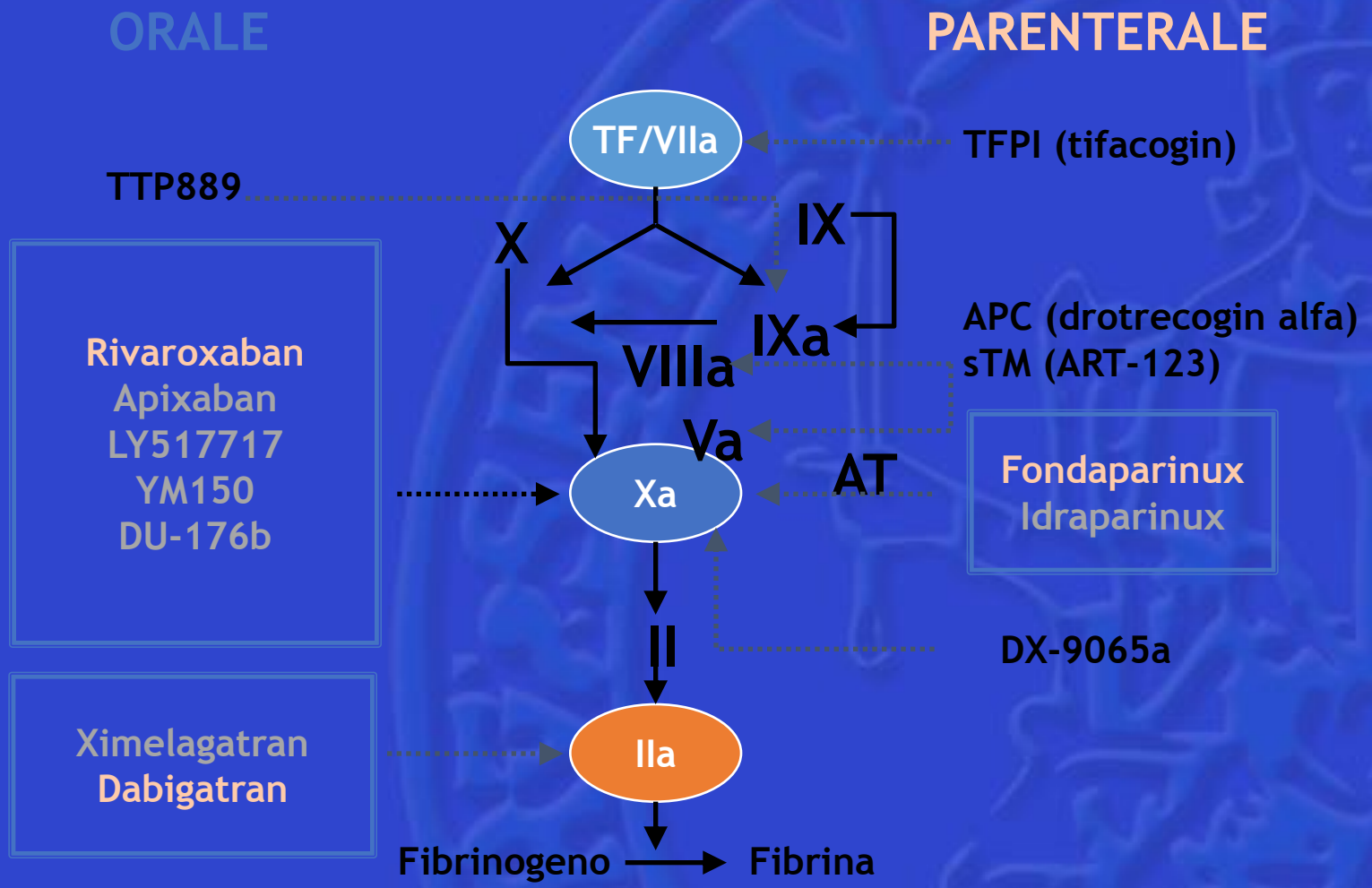
Linee Guida SIOT

(GIOT 2011;37:162-82)

…l'aspirina, se assunta in prevenzione primaria, va sospesa 7 giorni prima dagli interventi in elezione, in relazione al tipo di anestesia



I NUOVI ANTITROMBOTICI



Adattato da Weitz JI, Bates SM J Thromb Haemost 2005;3:1843-1853; Bates SM, Weitz JI BJH 2006;134:3-19

Nuovi anticoagulanti

Inibitori Fattore Xa

- Indiretti: Fondaparinux (Arixtra®) (legano ATIII)
  - Diretti : Rivaroxaban (Xarelto®) 10 mg/die os. Dose iniziale 6 – 10 ore dopo l'intervento.
    Apixaban (Eliquis®) 2,5 mg/bid os.
    Dose iniziale 12-24 ore dopo l'intervento.

Inibitori trombina

- Dabigatran (Pradaxa®). 110 mg 1-4 ore dopo l'intervento, poi 110 mg/bid/os

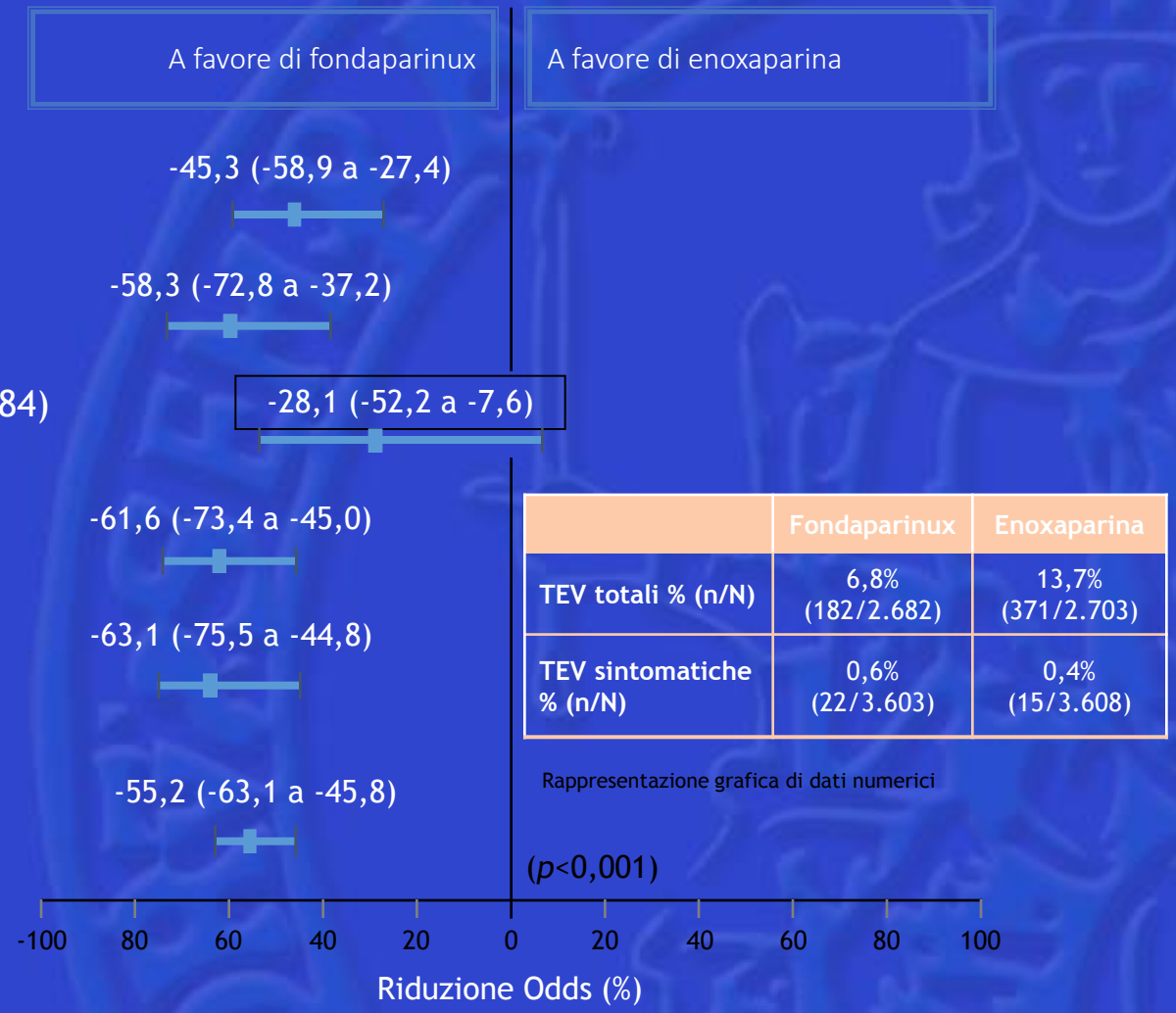
Nuovi anticoagulanti orali: potenziali vantaggi

Inibitori orali diretti del FXa/inibitori della trombina:

- Compliance del paziente
- No interazioni con il cibo né variazioni su base genetica del metabolismo farmacologico
- Minima interazione farmacologica
- No monitoraggio

FONDAPARINUX VS ENOXAPARINA NELLA PREVENZIONE DEL TEV IN CHIRURGIA ORTOPEDICA MAGGIORE

Efficacia



	Fondaparinux	Enoxaparina
TEV totali % (n/N)	6,8% (182/2.682)	13,7% (371/2.703)
TEV sintomatiche % (n/N)	0,6% (22/3.603)	0,4% (15/3.608)

Rappresentazione grafica di dati numerici

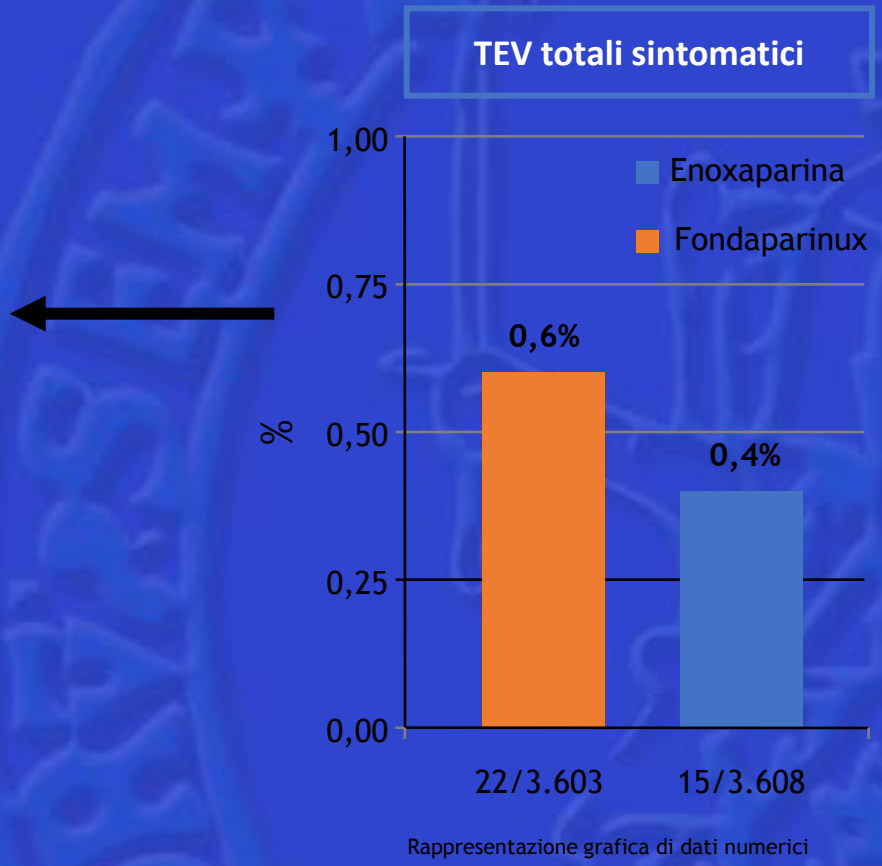
Turpie AG et al. Arch Intern Med 2002;162:1833-1840

"FONDAPARINUX È PIÙ EFFICACE DI ENOXAPARINA?"

- **Confronto tra enoxaparina e fondaparinux: endpoint clinici**

Riduzione del rischio: 47%

Piuttosto che occuparsi di trombosi flebografiche, "sarebbe meglio… focalizzarsi su ciò che è rilevante per i pazienti e per i medici che li hanno in cura"



Rappresentazione grafica di dati numerici

Vormfelde SV Lancet 2002;360(9346):1701

FONDAPARINUX VS ENOXAPARINA NELLA PREVENZIONE DEL TEV IN CHIRURGIA ORTOPEDICA MAGGIORE

Complicanze emorragiche

	Fondaparinux	Enoxaparina
Chirurgia maggiore d'anca (EPHESUS)	47/1.140 (4,1%)	32/1.133 (2,8%)
Chirurgia maggiore d'anca (PENTATHLON)	20/1.128 (1,8%)	11/1.129 (1,0%)
Fratture d'anca	18/831 (2,2%)	19/842 (2,3%)
Chirurgia maggiore di ginocchio	11/517 (2,1%)	1/517 (0,2%)
Dati raggruppati	96/3.616 (2,7%)	83/3.621 (1,7%)

I sanguinamenti maggiori sono circa 1% più frequenti con fondaparinux che con enoxaparina

*Rappresentazione grafica di dati numerici

Bounameaux H, Perneger T Lancet 2002;359:1710-1711

RIVAROXABAN NELLA PREVENZIONE DEL TEV DOPO PROTESI TOTALE D'ANCA

- Rivaroxaban per os 10 mg /d vs enoxaparina sc in >7000 pazienti

Studio	Durata del trattamento con rivaroxaban (10 mg od)*	Durata del trattamento con enoxaparina (40 mg od o 30 mg bid)**
RECORD1 n=4.541	35 giorni	35 giorni
RECORD2 n=2.509	31-39 giorni	10-14 giorni

* La prima dose di rivaroxaban è stata somministrata 6-8 ore dopo l'intervento chirurgico (chiusura della ferita)
**La prima dose di enoxaparina 40 mg od è stata somministrata la sera prima dell'intervento chirurgico

Studio	Enoxaparina (40 mg o 30 mg bid)	Rivaroxaban (10 mg)
Endpoint primario: TVP, EP e morte per tutte le cause (%): $p<0,05$		
RECORD1	3,7	1,1
RECORD2	9,3	2,0

- Endpoint primario "TEV totale" (= qualsiasi TVP, EP non fatale o decesso): rivaroxaban ha dimostrato superiore efficacia rispetto a enoxaparina
- Endpoint secondario "TEV maggiori" (= qualsiasi TVP prossimale, EP non fatale o morte correlata a TEV): è stata dimostrata superiorità rispetto a enoxaparina
- In ciascun singolo studio non si osserva differenza tra i due gruppi per il TEV sintomatico

Eriksson BI et al. NEJM 2008;358:2765-2775; Kakkar AK et al. Lancet 2008;372:31-39

SANGUINAMENTI RIVAROXABAN VS. ENOXAPARINA DOPO P.T.A.

In una metanalisi cumulativa si osserva una tendenza crescente di sanguinamenti con rivaroxaban. L'endpoint "sanguinamenti maggiori più sanguinamenti non maggiori ma clinicamente rilevanti" è significativamente più elevato con rivaroxaban.

Eriksson BI et al. NEJM 2008;358:2765-2775; Kakkar AK et al. Lancet 2008;372:31-39; Lassen MR et al. NEJM 2008;358:2776-2786

The Journal of Arthroplasty 34 (2019) 789–800

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journal homepage: www.arthroplastyjournal.org

Review

Factor Xa Inhibitors and Direct Thrombin Inhibitors Versus Low-Molecular-Weight Heparin for Thromboprophylaxis After Total Hip or Total Knee Arthroplasty: A Systematic Review and Meta-Analysis

Guangwei Sun, PhD [a, b], Jingjing Wu, MS [c], Qian Wang, MS [d], Qiang Liang, PhD [a], Jian Jia, BS [b], Kai Cheng, MS [b], Guoliang Sun, MS [e], Zili Wang, BS [f, *]

ABSTRACT

Background: The purpose of this study is to perform a meta-analysis to compare outcomes of venous thromboembolism (VTE) prophylaxis with low-molecular-weight heparin (LMWH) vs other anticoagulants in patients who received total knee (TKA) or total hip arthroplasty (THA).

Methods: MEDLINE, Cochrane, EMBASE, and Google Scholar databases were searched until June 30, 2017 for eligible randomized controlled studies.

Results: Thirty-two randomized controlled studies were included. LMWH provided better protection against VTE than placebo. In both TKA and THA patients, the rates of VTE were lower with factor Xa inhibitors than LMWH. In THA patients, the rate of deep vein thrombosis (DVT) was lower with factor Xa inhibitors than LMWH. In TKA patients, the rates of VTE and DVT were similar between LMWH and direct thrombin inhibitors. In THA patients, the rate of VTE was lower with direct thrombin inhibitors than with LMWH, while the DVT rates were similar. The pulmonary embolism rates were similar between all 3 classes of drugs in TKA and THR patients, as were the major bleeding rates. Nonmajor and minor bleeding rates were also similar between the 3 drug classes.

Conclusion: LMWH is associated with a higher rate of VTE than factor Xa inhibitors in TKA and THA patients. Direct thrombin inhibitors are associated with a lower rate of VTE in THA patients, but their effectiveness with respect to DVT and pulmonary embolism prophylaxis is similar to that of LMWH in TKA and THA patients.

162 GIOT AGOSTO 2011;37:162-182

LA PREVENZIONE DEL TROMBOEMBOLISMO VENOSO IN CHIRURGIA ORTOPEDICA SOSTITUTIVA DELL'ANCA E DEL GINOCCHIO

Banca dati comparativa tra Linee Guida e raccomandazioni per la pratica clinica

- La profilassi farmacologica si basa sulle eparine a basso peso molecolare, sul fondaparinux e sui nuovi anticoagulanti orali.
- L'aspirina non deve essere utilizzata come profilassi anti-TEV.
- I dicumarolici non dovrebbero essere utilizzati in quanto difficili da gestire.

2012

CHEST 2012;141(2):e278s-325s Supplement

ANTITHROMBOTIC THERAPY AND PREVENTION OF THROMBOSIS, 9TH ED: ACCP GUIDELINES

Prevention of VTE in Orthopedic Surgery Patients

Table 17—*[Section 2.3.5] Summary of Findings: Rivaroxaban vs LMWH for Major Orthopedic Surgery (Both Initial and Extended Prophylaxis)*[15-20,22,104]

Outcomes	No. of Participants (Studies)	Quality of the Evidence (GRADE)	Relative Effect (95% CI)	Anticipated Absolute Effects: Risk with LMWH	Anticipated Absolute Effects: Risk Difference With Rivaroxaban (95% CI)
Nonfatal PE	10,869 (7 studies)	High	RR 1.34 (0.39-4.6)	Study population	
				2 per 1,000	
				Contemporary population (initial prophylaxis)[a]	
				4 per 1,000	1 more per 1,000 (from 2 fewer to 13 more)
				Contemporary population (full 35-d prophylaxis)[a]	
				6 per 1,000	2 more per 1,000 (from 3 fewer to 20 more)
Symptomatic DVT	10,869 (7 studies)	Moderate[b] due to imprecision	RR 0.41 (0.2-0.83)	Study population	
				8 per 1,000	
				Contemporary population (initial prophylaxis)[a]	
				8 per 1,000	5 fewer per 1,000 (from 1 fewer to 6 fewer)
				Contemporary population (full 35-d prophylaxis)[a]	
				12 per 1,000	7 fewer per 1,000 (from 2 fewer to 10 fewer)
Bleeding requiring re-operation	10,941 (7 studies)	Moderate[c] due to imprecision	RR 2.03 (0.86-4.83)	1 per 1,000	1 more per 1,000 (from 0 fewer to 5 more)
Major nonfatal bleeding	10,941 (7 studies)	Moderate[c] due to imprecision	RR 1.58 (0.84-2.97)	Study population	
				3 per 1,000	
				Contemporary population (initial prophylaxis)[a]	
				15 per 1,000	9 more per 1,000 (from 2 fewer to 30 more)
Total mortality[d]	10,869 (7 studies)	High	RR 0.84 (0.31-2.27)	2 per 1,000	0 fewer per 1,000 (from 1 fewer to 2 more)

Table 19—*[Section 2.3.6] Summary of Findings: Dabigatran 220 mg vs LMWH for Major Orthopedic Surgery (Both Initial and Extended Prophylaxis)*[23-26]

Outcomes	No. of Participants (Studies)	Quality of the evidence (GRADE)	Relative Effect (95% CI)	Anticipated Absolute Effects: Risk With LMWH[a]	Anticipated Absolute Effects: Risk Difference With Dabigatran 220 mg (95% CI)
Nonfatal PE	7,377 (4 studies)	High	RR 1.22 (0.52-2.85)	Study population	
				3 per 1,000	
				Contemporary population (initial prophylaxis)[b]	
				4 per 1,000	1 more per 1,000 (from 2 fewer to 6 more)
				Contemporary population (full 35-d prophylaxis)[b]	
				6 per 1,000	1 more per 1,000 (from 3 fewer to 10 more)
Symptomatic DVT	7,377 (4 studies)	High[c]	RR 0.70 (0.12-3.91)	Study population	
				5 per 1,000	
				Contemporary population (initial prophylaxis)[b]	
				8 per 1,000	2 fewer per 1,000 (from 7 fewer to 23 more)
				Contemporary population (full 35-d prophylaxis)[b]	
				12 per 1,000	4 fewer per 1,000 (from 11 fewer to 36 more)
Bleeding requiring reoperation	7,411 (4 studies)	High	RR 0.98 (0.27-3.54)	1 per 1,000	0 fewer per 1,000 (from 1 fewer to 3 more)
Major nonfatal bleeding[d]	7,411 (4 studies)	High	RR 1.06 (0.66-1.72)	Study population	
				12 per 1,000	
				Contemporary population (initial prophylaxis)[b]	
				15 per 1,000	1 more per 1,000 (from 5 fewer to 11 more)
Total mortality[e]	7,377 (4 studies)	High	RR 1.67 (0.37-7.53)	1 per 1,000	0 more per 1,000 (from 0 fewer to 4 more)

RACCOMANDAZIONI ACCP 9th ed., 2012

2.3.1. In pazienti che devono sottoporsi ad intervento di protesi d'anca, **l'uso delle eparine a basso peso molecolare va preferito rispetto agli altri agenti raccomandati come alternative**: fondaparinux, apixaban, dabigatran, rivaroxaban (raccomandazioni grado 2B) o aspirina (grado 2C).

…… limitazioni all'uso di farmaci alternativi sono la possibilità di maggior sanguinamento e la mancanza di dati a lungo termine sulla sicurezza di impiego

Chest 2012;141(2):e278s-325s

TAKE HOME MESSAGES

….in chirurgia protesica dell'anca

- **L'uso di acido tranexamico per via sistemica consente di ridurre il sanguinamento e le necessità trasfusionali**

- **Gli anticoagulanti orali di recente introduzione hanno un profilo di efficacia sovrapponibile all'eparina a basso peso molecolare, con il vantaggio di una migliore compliance del paziente ma lo svantaggio di maggiori costi e minor disponibilità di dati sulla sicurezza a lungo termine.**


Grazie

Sistema Socio Sanitario

Centro Specialistico Ortopedico Traumatologico
Gaetano Pini-CTO

Regione Lombardia

ASST Gaetano Pini

ERAS AND HIP SURGERY
Ruolo delle combinazioni dei farmaci

PAOLO GROSSI, M.D.

DIRECTOR OF **ANESTHESIA INTENSIVE CARE** & PAIN TREATMENT DEPARTMENT

ASST CENTRO ORTOPEDICO TRAUMATOLOGICO GAETANO PINI – CTO,

Possibili complicanze da inadeguato trattamento del Dolore Post-Operatorio

Criticita' :

-Scarso controllo del dolore post-operatorio

- Aumento mortalità e morbilità

- Ritardata dimissione

- Aumento della spesa del ricovero

Recommendations

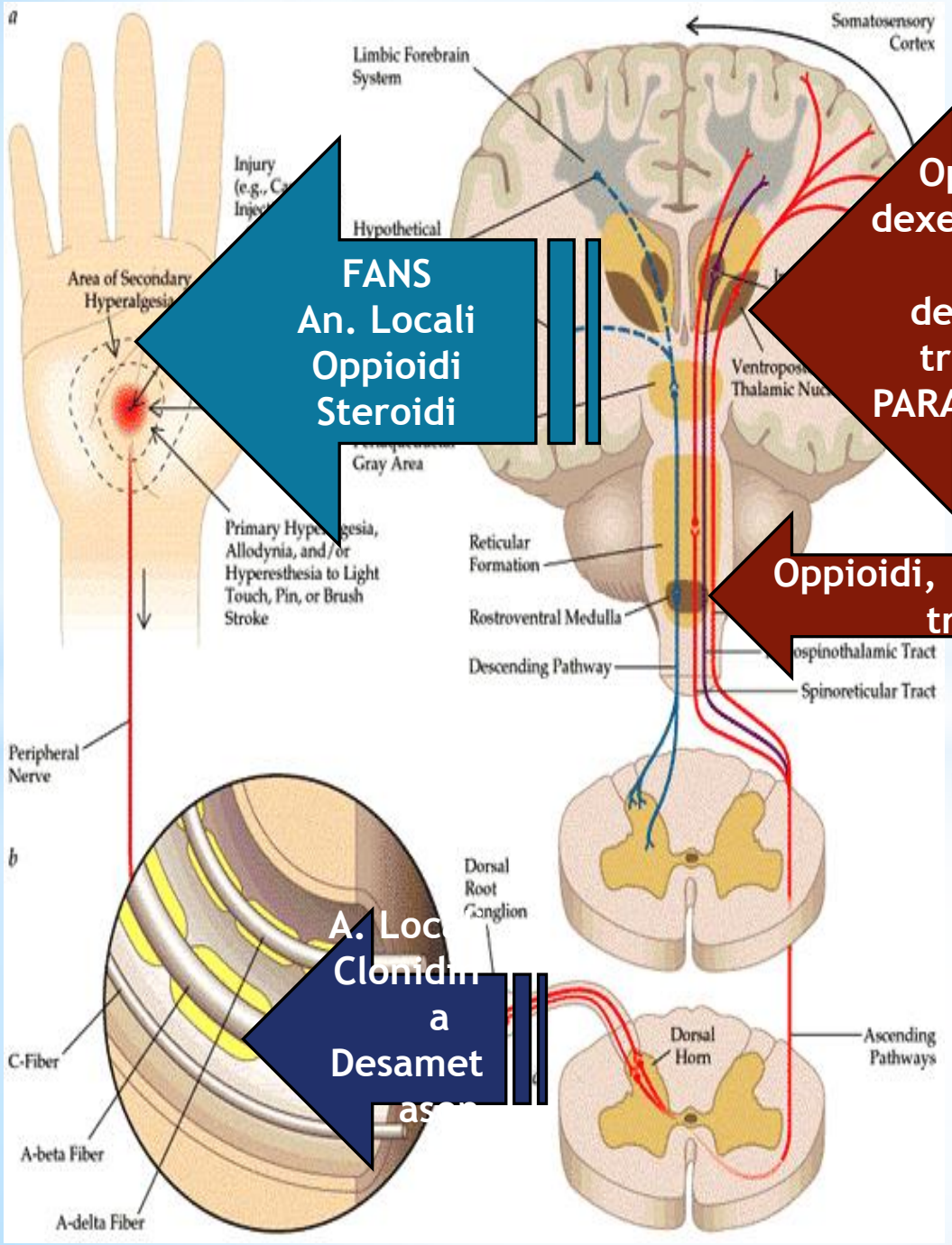
Preoperative Education and Perioperative Pain Management Planning

Recommendation 1

- The panel recommends that clinicians provide patient and family-centered, individually tailored education to the patient (and/or responsible caregiver), including information on treatment options for management of postoperative pain, and document the plan and goals for postoperative pain management (strong recommendation, low-quality evidence).

Farmaci impiegati per il trattamento del DPO

FANS	• Ketorolac, Ketoprofene, Ibuprofene, Indometacina,Coxib, (Paracetamolo)
Oppioidi	• Morfina, Fentanyl, Sufentamil, Ossicodone, Metadone, Tramadolo, Codeina, Buprenorfina
A. locali	• Bupivacaina, Ropivacaina, Levobupivacaina
Adiuvanti	• Clonidina, Ketamina, Gabapentin, pregabalin, amiltriptilina, Magnesium



Fibre C: stimoli termici, meccanici, chimici

Fibre A-delta: stimoli meccanici e termici

Technique	Examples	Advantages	Disadvantages
Central Regional Analgesia	Intrathecal or epidural opioid[a]	• Improved pain relief	• Increased frequency of pruritus
	Epidural opioid[a] + local anesthetic[b]	• Improved pain scores	• Increased motor weakness
	Epidural opioid[a] + clonidine	• None noted	• None noted

a Examples of opioids include morphine, fentanyl, sufentanil
b Examples of local anesthetics include bupivacaine, ropivacaine

American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology*. 2012;116(2):248-273.

Technique	Examples	Advantages	Disadvantages
Systemic opioids[a]	Staff-administered intramuscular (IM) injections	• None noted	• Pain on injection • Tissue damage
	Staff-administered intravenous injections	• Similar pain control to PCA	• Peak / trough opioid adverse drug reactions (ADRs)
	PCA without background infusion	• Improved pain scores vs IM	• None noted
	PCA with background infusion	• Improved pain scores vs IM	• Increased analgesic use vs no

a Examples of opioids include morphine, fentanyl, hydromorphone

American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology*. 2012;116(2):248-273.

Technique	Examples	Advantages	Disadvantages
Peripheral Regional Analgesia	Peripheral nerve blocks[b]	• Generally, improved pain relief and lower analgesic consumption compared with saline	• None noted
	Intra-articular blocks[b] or opioids[a]	• None noted compared with saline	• None noted
	Infiltration of incisions[b]	• Generally, improved pain relief and lower analgesic consumption	• None noted

[a] Examples of opioids include morphine, fentanyl, sufentanil

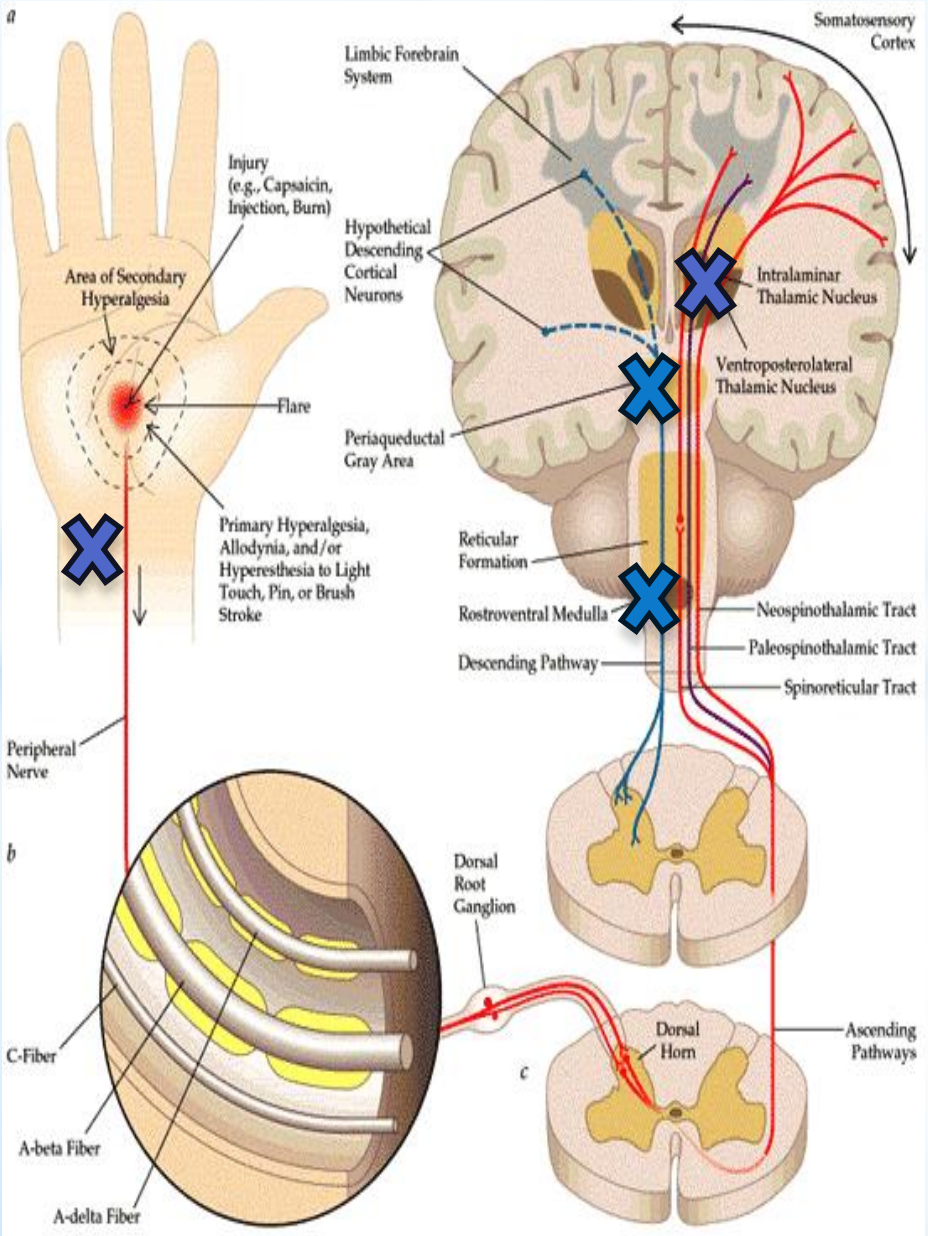
[b] Examples of local anesthetics include bupivacaine, ropivacaine

American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology*. 2012;116(2):248-273.

Technique	Examples	Advantages	Disadvantages
Nonopioid systemic analgesics	Acetaminophen (oral, rectal, injectable)	• Similar benefit to intravenous (IV) PCA opioid • Fewer ADRs	• None noted
	Injectable NSAIDs	• Improved pain scores • Reduced analgesic use	• NSAID risks / ADRs
	Oral NSAIDs (both non- and selective	• None noted	• NSAID risks / ADRs
	Gabapentinoids (both	When combined w/ opioids • Improved pain	• None noted

American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology*. 2012;116(2):248-273.

Oppioidi: tanti siti d'azione!



Vie ascendenti

Vie discendenti

Gli oppioidi agiscono ubiquitariamente perché sono analoghi di quelli endogeni (endorfine, encefaline, dinorfine)

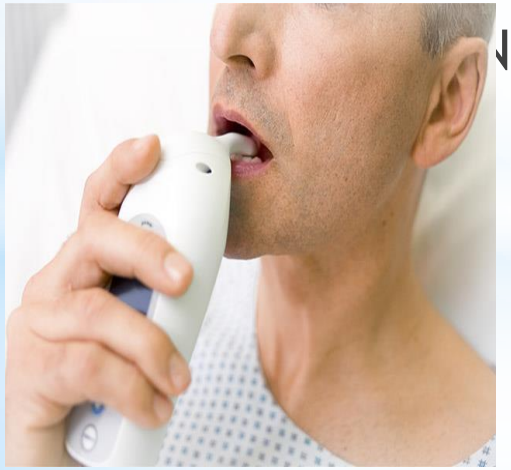
Multimodal Approaches: Evidence-based Summary

- Parenteral Opioids – Patient-controlled Analgesia
  - Cochrane review
    - 55 studies with 2023 patients receiving PCA and 1838 patients assigned to a control group (nurse-administered opioid)
      - PCA provided better pain control and greater patient satisfaction than conventional parenteral 'as-needed' analgesia
      - Patients using PCA:
        - Consumed higher amounts of opioids than the controls
        - Had higher incidence of pruritus (itching), but similar incidence of other adverse effects
        - There was no difference in the length of hospital stay

Hudcova et al. *Cochrane Database Syst Rev.* 2006;(4):CD003348.

Multimodal Approaches: Evidence-based Summary

* Other Patient-controlled Analgesia Routes - Sublingual
  * PCA with Sufentanil 30 mcg tablets is safe and effective
  * Adverse Events can account up to 44% of patients, compared to 33 in placebo.
  * Most adverse events were mild to moderate
    * Nausea



Pain Manag. 2019 Jan 7. doi: 10.2217/pmt-2018-0090.

* Acetaminophen (APAP) – oral, single d
  * Cochrane review[1]
    * 51 studies, 5762 patients, 3277 active, placebo
      * 50% ↓ in pain with 50% APAP group, placebo group for 4 hours
      * Number needed to treat (NNT) based on dose:
        * APAP 500 mg: 3.5
        * APAP 650 mg: 4.6
        * APAP 1000 mg: 3.6
      * 50% of APAP and 70% of placebo needed additional analgesia
  * A systematic review[2] identified 21 studies comparing APAP alone or in combination with NSAIDs and reported increased efficacy with the combination of 2 agents than with either alone

1Toms L et al. *Cochrane Database Syst Rev*. 2008;(4):CD004602.
2Ong CK et al. *Anesth Analg*. 2010;110(4):1170-1179.

* Acetaminophen – Parenteral
  * Studied single dose, multiple dose over 24 hours compared with placebo
  * Orthopedic surgery, laminectomy, abdominal, gynecological, cardiac, and thyroidectomy
    * Dosing: 1 gram IV, either single dose or every 6 hours
  * Summary APAP patients:
    * Statistically significant shortened time to meaningful pain relief and in total relief compared with placebo
    * Improved patient satisfaction with pain control, lower morphine consumption (up to 61%) and decreased incidence of vomiting
    * No statistical significant difference in the rates of adverse events including liver function abnormalities compared with placebo

Wininger SJ et al. *Clin Ther.* 2010;32(14):2348-2369.
Cakan T et al. *J Neurosurg Anesthesiol.* 2008;20(3):169-173.
Memis D et al. *J Crit Care.* 2010;25(3):458-462.
Macario A, Royal MA. *Pain Pract.* 2011;11(3):290-296.

* Nonselective NSAIDs
  * Single dose oral ibuprofen[1] – Summary 72 randomized clinical trials (RCTs), 9168 patients
    * ≥ 50% pain relief in approximately half of patients with moderate to severe postoperative pain, and adverse events were similar to placebo
  * Single dose oral aspirin[2] – Summary
    * ≥ 50% or greater reduction in pain in 39% of those with moderate to severe pain, compared with 15% of those in the placebo group
    * The efficacy of aspirin was considered equivalent to that of acetaminophen
    * Adverse events were statistically similar for those taking a lower aspirin dose, 600 mg to 650 mg, compared with placebo. However, patients who took 900 mg to 1000 mg experienced adverse events at more than twice the rate of patients receiving placebo (26% vs 12%). The most common events in the aspirin group were drowsiness, dizziness, nausea, vomiting, and gastric irritation

1Derry C et al. *Cochrane Database Syst Rev*. 2009;(1):CD004234.
2Derry C et al. *Cochrane Database Syst Rev*. Published Online Jan 2012

* Selective NSAIDs – Single dose Celecoxib
  * Cochrane review - 10 studies, 1785 patients
    * NNT for ≥ 50% decrease in pain over 4 to 6 hours:
      * Celecoxib 200 mg: 4.8
      * Celecoxib 400 mg: 3.5
    * Median time for rescue medication use:
      * Celecoxib 200 mg: 6.6 hours
      * Celecoxib 400 mg: 8.4 hours
      * Placebo: 2.3 hours
    * Proportion of patients requiring rescue medications:
      * Celecoxib 200 mg: 74%
      * Celecoxib 400 mg: 63%
      * Placebo: 91%
    * Adverse events mild to moderate in all groups with no difference in frequency

Derry S et al. *Cochrane Database Syst Rev*. Published Online: 22 OCT 2013

* Injectable NSAIDs
  * Ketorolac and ibuprofen studied in United States
  * Indicated for short-term moderate to severe acute pain that requires analgesia at the opioid level
    * Studies (variety of surgery types) with ketorolac[1,2] compared with placebo suggest patients who received ketorolac:
      * Significant reduction in pain
      * Reduction in opioid consumption (~30%)
      * Facilitation of quicker recovery and rehabilitation
    * Studies with ibuprofen in orthopedic and abdominal surgery[3]
      * At 800-mg dose, reduced morphine use by 22% in first 24 hours
      * Significant reductions in pain at rest and with movement

1. Cassinelli EH et al. *Spine (Phila Pa 1976)*. 2008;33(12):1313-1317.
2. Wong HY et al. *Anesthesiology*. 1993;78(1):6-14.
3. Southworth S et al. *Clin Ther*. 2009;31(9):1922-1935.

U.S. FOOD & DRUG ADMINISTRATION

NSAIDs

Information for Healthcare Professionals: Non-Selective Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)*

Update: The information described in this communication have been addressed in product labeling (see Drugs@FDA).

FDA Alert [4/7/2005]:

Based on a review of available data from long-term placebo- and active-controlled clinical trials of non-steroidal anti-inflammatory drugs (NSAIDs), FDA has concluded that an increased risk of serious adverse cardiovascular (CV) events may be a class effect for NSAIDs (excluding aspirin). FDA has requested that the package insert for all NSAIDs be revised to include a boxed warning to highlight the potential increased risk of CV events and the well described risk of serious, and potentially life-threatening, GI bleeding. FDA has also requested that the package insert for all NSAIDs include a contraindication for use in patients immediately post-operative from coronary artery bypass graft (CABG) surgery.

Nel 2005

The NEW ENGLAND JOURNAL of MEDICINE

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Complications of the COX-2 Inhibitors Parecoxib and Valdecoxib after Cardiac Surgery

Nancy A. Nussmeier, M.D., Andrew A. Whelton, M.D., Mark T. Brown, M.D., Richard M. Langford, F.R.C.A., Andreas Hoeft, M.D., Joel L. Parlow, M.D., Steven W. Boyce, M.D., and Kenneth M. Verburg, Ph.D.

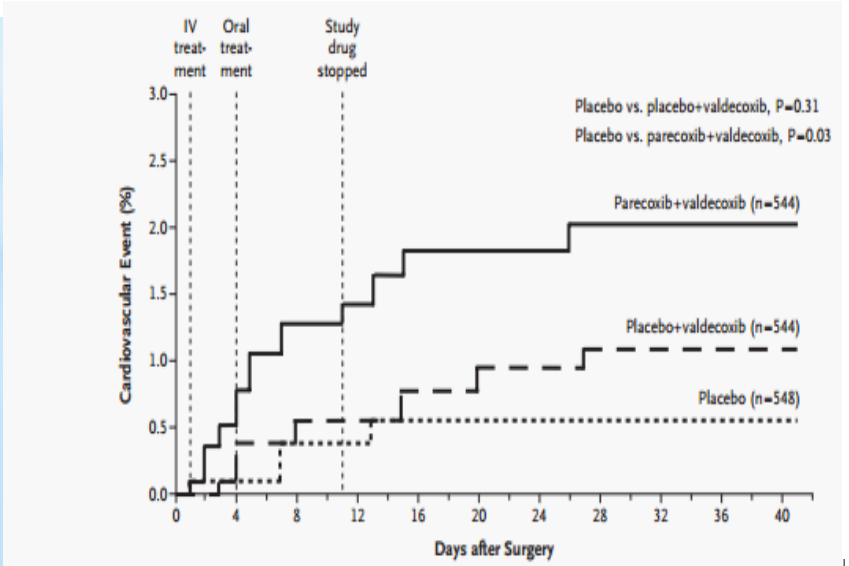
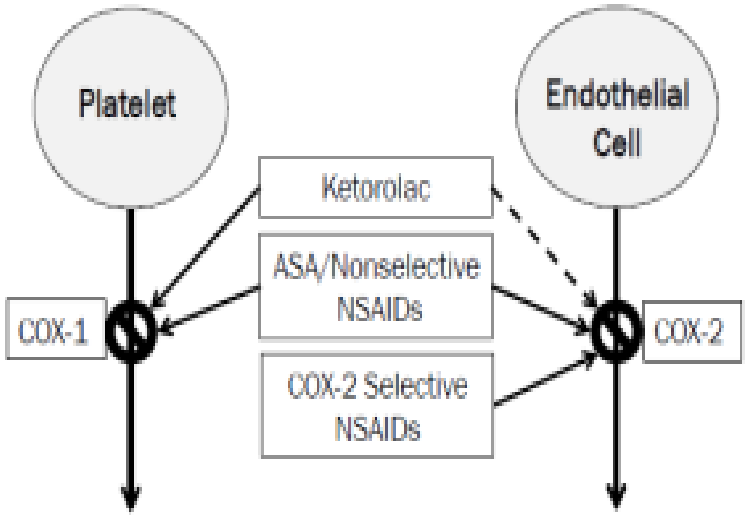


Figure 2. **Kaplan–Meier Estimates of the Time to a Cardiovascular Event.**

Cardiovascular events occurred throughout and after the 10-day period of drug administration in all groups. IV denotes intravenous.



Thromboxane A2
-platelet activation
-GI mucosal integrity

Prostacyclin
-pain
-inflammation
-antiplatelet effects

PAIN Practice

Review Article

Efficacy of Additional Corticosteroid in a Multimodal Cocktail for Postoperative Analgesia Following Total Knee Arthroplasty: A Meta-Analysis of Randomized Controlled Trials

Xiping Chai MD, Haiping Liu MD, Congxin You MD, Changde Wang MD

First published: 24 October 2018 | https://doi.org/10.1111/papr.12740 | Cited by: 1

* **Conclusions**: Additional corticosteroid added to a multimodal cocktail improved the postoperative pain, enhance knee functional recovery, and shorten the hospital stays following TKA, but local injection of corticosteroids had no effect on reducing nausea and vomiting based on our outcomes

Ketamine Intravenous – Systematic Review

- 70 studies, 4701 patients (2652 ketamine, 2049 placebo)
  - Despite using less opioid, 25 out of 32 treatment groups (78%) experienced less pain than the placebo groups
  - Hallucinations and nightmares were more common with patients receiving ketamine, but there was no association with increased sedation
  - The analgesic effect of ketamine was independent of the type of intraoperative opioid administered, the timing of ketamine administration, and the ketamine dose administered

Laskowski K et al. *Can J Anaesth.* 2011;58(10):911-23.

Alfa 2-agonisti

Systemic α_2 Agonist – Meta-analysis of RCTs

Summary

- Moderate analgesic benefit—probably better than paracetamol,
  but less than that of ketamine and NSAIDs as inferred from
  nonsystematic indirect comparison
- Adverse reactions may be significant (hypotension and bradycardia)
- Provides extra analgesic benefits such as sedation, anxiolysis, analgesia, postoperative shivering, decreased PONV, agitation, mitigation of stress response to surgery and tracheal intubation, anaesthetic-sparing effect, and as supplement to neuraxial and peripheral nerve blocks
- Decreased perioperative mortality and myocardial infarction, especially in high-risk vascular surgeries

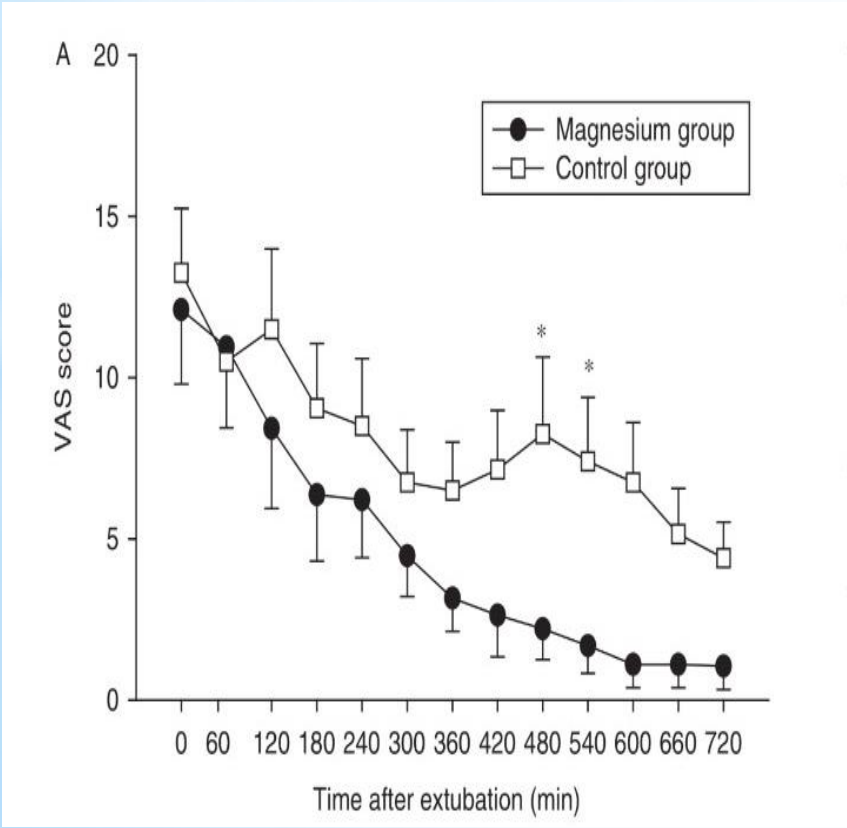
Blaudszun G et al. *Anesthesiology.* 2012;116(6):1312-1322.

British Journal of Anaesthesia **96** (**4**): 444–9 (2006)
doi:10.1093/bja/ael037 Advance Access publication February 20, 2006

BJA

Magnesium moderately decreases remifentanil dosage required for pain management after cardiac surgery†

B. Steinlechner[1]*, M. Dworschak[1], B. Birkenberg[1], G. Grubhofer[1], M. Weigl[2], A. Schiferer[1], T. Lang[1] and A. Rajek[1]



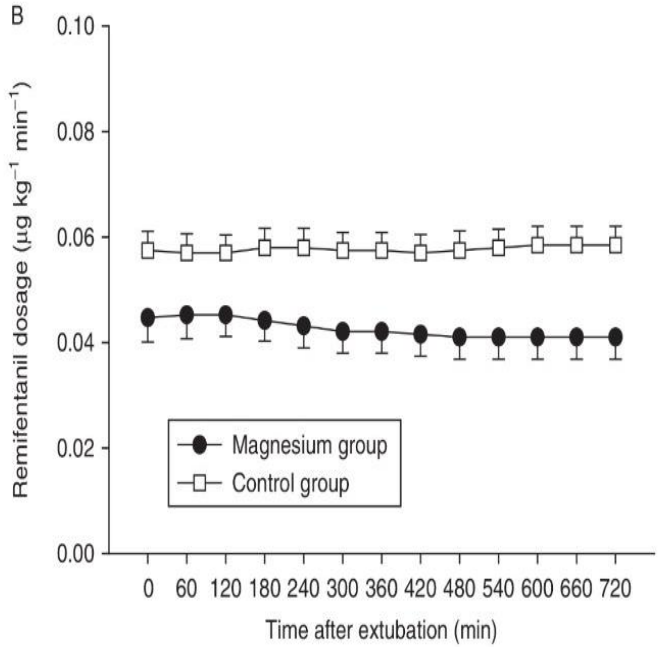


Fig 2 (A) VAS rating up to 12 h after extubation [mean (SEM); **P*<0.05 magnesium *vs* control group, two-way repeated measures ANOVA]. (B) Mean remifentanil dosage required in both groups to control pain after extubation [mean (SEM), *P*<0.05 magnesium *vs* control group, two-way repeated measures ANOVA].

Gabapentin

Multimodal Approaches:
Evidence-based Summary

Gabapentinoids - Systematic Review of RCTs

- Gabapentin: 22 trials, 1640 patients
- Pregabalin: 8 trials, 707 patients
- Summary:
  - Gabapentin provided better postoperative analgesia and in sparing rescue analgesics than placebo in the 6/10 RCTs that administered gabapentin as preemptive analgesia only
  - 14 RCTs suggested that gabapentin did not reduce PONV when compared with placebo
  - Pregabalin provided better postoperative analgesia and in sparing rescue analgesics than placebo in 2/3 RCTs that evaluated the effects of pregabalin alone vs placebo
  - 4 studies reported no pregabalin effects on preventing PONV
  - Both agents reduced opioid consumption by ~30%

Dauri M et al. *Curr Drug Targets*. 2009;10(8):71633.26

Gabapentin

Knee Surgery, Sports Traumatology, Arthroscopy
https://doi.org/10.1007/s00167-019-05385-7

KNEE

Perioperative pregabalin does not reduce opioid requirements in total knee arthroplasty

Jing Hui Yik[1] · Wei Yang Wilson Tham[1] · Kwang Hui Tay[2] · Liang Shen[3] · Lingaraj Krishna[1]

Received: 3 August 2018 / Accepted: 28 January 2019

Results Pregabalin did not reduce the cumulative or effective morphine consumption at 48 h and 72 h post-operation. There were also no significant differences noted in pain scores at 48 h and 72 h after surgery, functional range of motion of the operated knee at 72 h post-op, or outcomes recorded on the Knee Society Score (KSS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and 36-Item Short Form Survey (SF-36) questionnaires at 3 and 6 months post-op. None of the patients demonstrated common adverse reactions to pregabalin.

Conclusion This study showed no reduction in postoperative opioid requirements, or improvement in early postoperative pain scores or functional outcomes at 6 months, with perioperative use of pregabalin. Orthopaedic surgeons may consider this when selecting an analgesic regimen for their patients.

Level of evidence II.

Perioperative Pain – Analgesic Adjuvants

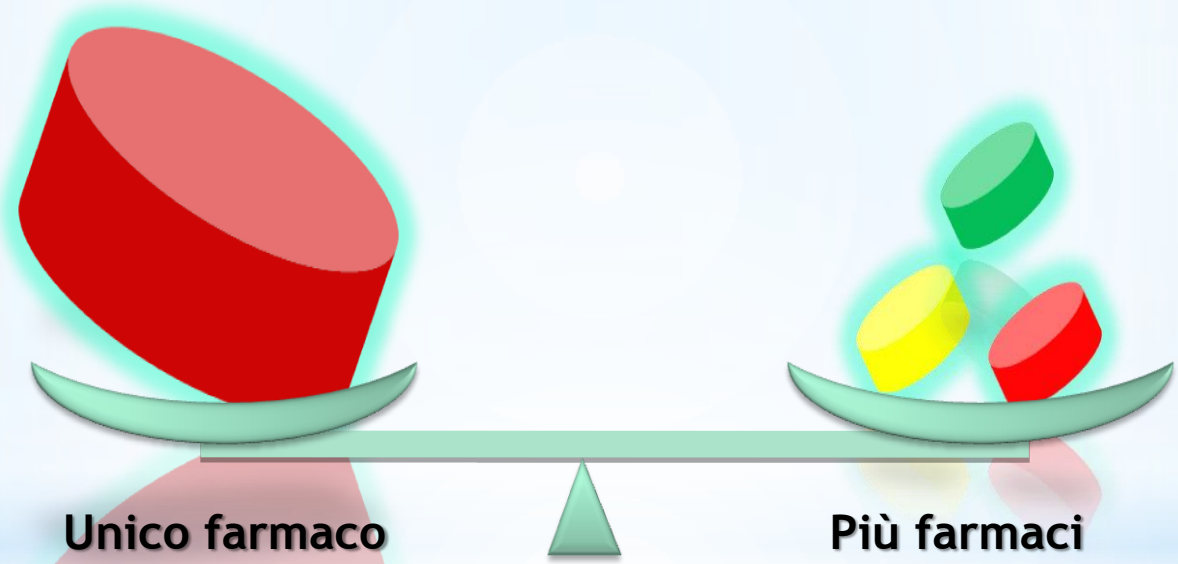
Drug	Pain Intensity	Analgesic Opioid Consumption	Opioid-related Side Effects	Prevention of Chronic Postsurgical Pain	Side Effects
Ketamine	↓	↓	↓	Inconsistent	Psychomimetic (hallucinations, dreams)
Pregabalin	↓	↓	↓	Yes	Sedation, dizziness
Gabapentin	↓	↓	↓	Yes	Sedation, dizziness
IV Lidocaine	↓	↓	↓	Possible	None noted, but monitor
Systemic α2 agonist	↓	↓	↓	No data	Hypotension, bradycardia

Shankar R et al. *Anaesth Crit Care Pain*. 2013;13(5):152-157

Class	Examples	ADR Risks	Comments
Opioids	Morphine Hydromorphone Fentanyl	• Sedation • Constipation • Nausea / Vomiting • Dizziness	• Sedation may impair postoperative rehabilitation • Constipation may affect time to discharge
NSAIDs (injectable)	Ketorolac Ibuprofen	• GI bleeds • Nephrotoxicity	• May affect wound / bone healing
NSAIDs (oral, nonselective)	Ibuprofen Naproxen Diclofenac	• GI bleeds • Nephrotoxicity • Nausea / Vomiting	• May affect wound / bone healing
NSAIDs (oral, selective)	Celecoxib	• Nephrotoxicity • Nausea / Vomiting	• May affect wound / bone healing
Acetaminophen	Acetaminophen (oral and injectable)	• Hepatotoxicity at high doses	• No effect on bleeding times • Well tolerated

Shankar R et al. *Anaesth Crit Care Pain*. 2013;13(5):152-

Strategie analgesiche

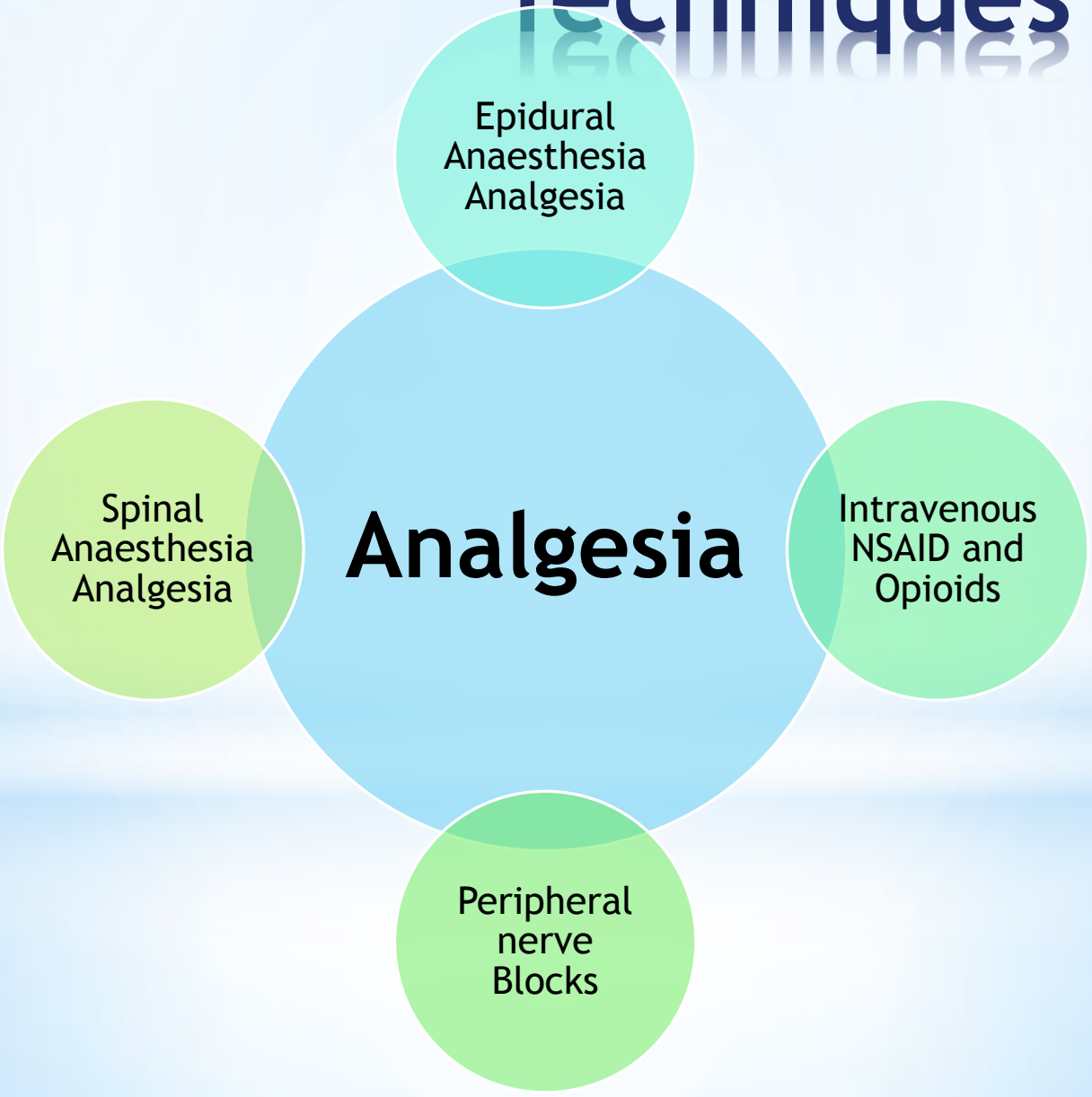


Unico farmaco
(Es: morfina)

Più farmaci
(Es: morfina + Ibuprofene + paracetamolo)

E' corretto privilegiare l'approccio <u>POLIFARMACOLOGICO</u> sfruttando l'effetto sinergico di più farmaci a dosaggio ridotto per ridurre l'insorgenza di effetti collaterali.

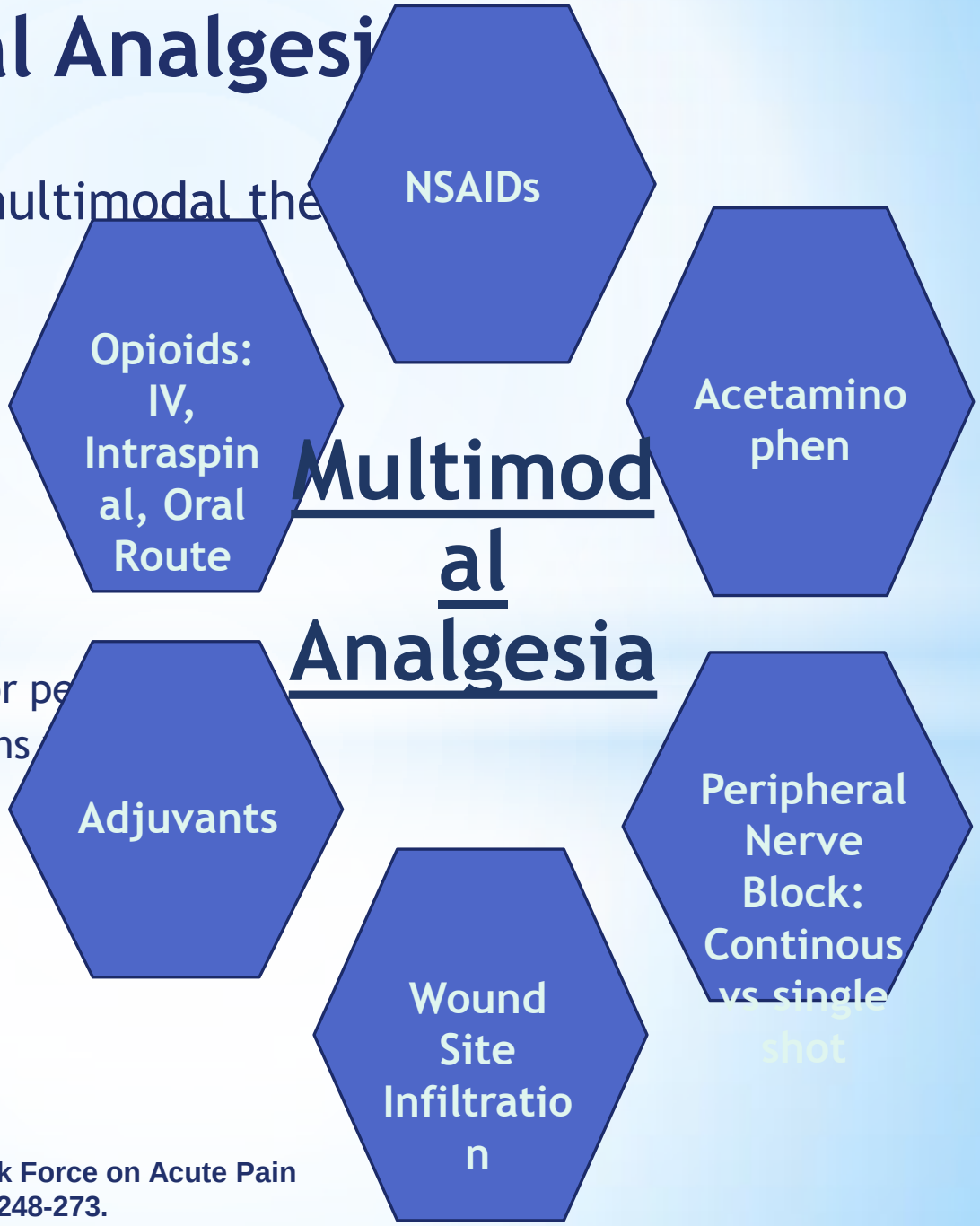
Anesthesia Techniques



Multimodal Analgesi

The state-of-the-art is multimodal the

- Opioids
  - IV
  - Intraspinal (IS)
  - Oral route
- NSAIDs
- APAP
- Local anesthetics
  - Wound site infiltration or pe
  - Peripheral nerve infusions
  - Epidural
  - IV
  - Preperitoneal catheters



American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology.* 2012;116(2):248-273.

Grazie!