

Derrame cerebral perioperatorio ¿Quién sabía que era tan común? Perioperative Stroke Who knew it was so common?

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¿DE QUÉ SE TRATA ESTA CONFERENCIA? WHAT THIS TALK IS ABOUT?

¿Es un problema el stroke perioperatorio?
Is perioperative stroke a problema?
¿Quién está en riesgo?
Who is at risk?
¿Cómo podemos reducir el riesgo?
How can we reduce risk?

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A focal neurological deficit of sudden onset that resolves rapidly after a period lasting more than a few seconds but less than 24 hours

¿CUÁL ES EL PERÍODO PERIOPERATORIO? WHAT IS THE PERIOPERATIVE PERIOD?

Un stroke que ocurre durante el período intraoperatorio y dentro de los primeros 30 días después de cirugía

A stroke that occurs in the perioperative period, usually defined as intraoperative and within the first 30 days following surgery

DERRAME CEREBRAL STROKE

«Alteración, de origen vascular, de la función cerebral de 24 horas o más de duración que puede llevar a la muerte»

«Rapidly developing signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin»

ATAQUE ISQUÉMICO TRANSITORIO TRANSIENT ISCHEMIC ATTACK (TIA)

Un déficit neurológico focal de comienzo repentino que se resuelve rápidamente después de un período que dura más de unos segundos, pero menos de 24 horas

¿EXISTE UN PROBLEMA? IS THERE A PROBLEM?

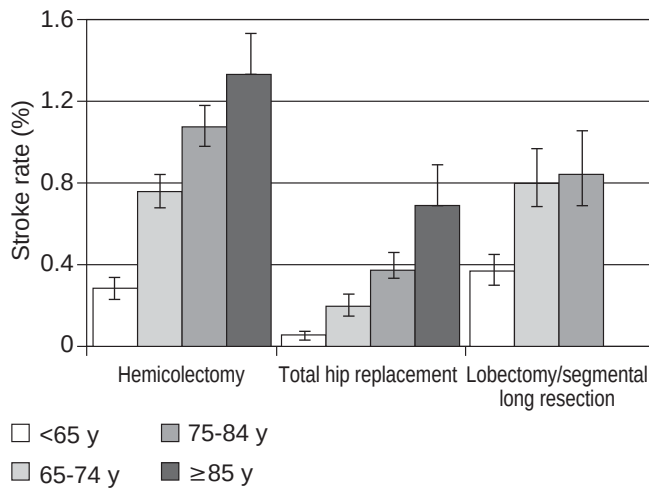
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¡10-15% de los strokes ocurre en pacientes hospitalizados!
10-15% of strokes are in hospitalized patients!

> 60% de Cirugía y Cardiología
Cirugía general 19%
General surgery 19%
Cirugía Torácica 12%
Thoracic Surgery 12%

Este artículo puede ser consultado en versión completa en <http://www.medigraphic.com/rma>

INCIDENCIA DEL DERRAME CEREBRAL PERIOPERATORIO PERIOPERATIVE STROKE INCIDENCE



Bateman BT Anesthesiology 2009; 110: 232
Nationwide Inpatient Sample; 2000-4

STOP

Todos los estudios publicados son análisis retrospectivos de notas de alta hospitalaria

All published studies are retrospective analyses of hospital discharge notes

¿POR QUÉ ES IMPORTANTE EL STROKE PERIOPERATORIO? WHY IS PERIOPERATIVE STROKE IMPORTANT?

STROKE PERIOPERATORIO MORTALIDAD PERIOPERATIVE STROKE MORTALITY

Stephen	1984	33%
Parikh	1993	26%
Landercasper	1990*	60%

* Todos pacientes con CVA previo

*All patients with previous CVA

Kim J, Gelb AW. J Neurosurg Anesth 1995; 7: 211.

«LA INCIDENCIA DE STROKE CEREBROVASCULAR PERIOPERATORIO EN LA COHORTE FUE DE 0.1%» «THE INCIDENCE OF PERIOPERATIVE STROKE IN THE COHORT WAS 0.1%»

Table I. Common procedures in the derivation cohort and the associated stroke incidence.

	Stroke all age, % (n)	Stroke age ≥ 65 yr, % (n)
Procedures in ACS NSQIP studied in Bateman et al.		
Hip arthroplasty (N = 1,566)	0.4 (6)	0.5 (5)
Lung resection (N = 1,484)	0.3 (5)	0.7 (5)
Colectomy (N = 33,426)	0.4 (130)	0.7 (100)
Most common procedures		
Hepatobiliary: biliary tree (N = 43,289)	0.1 (36)	0.2 (23)
Excisional breast (N = 36,793)	0.0 (16)	0.1 (11)
Hernia: ventral/umbilical/incisional/other (N = 32,638)	0.1 (28)	0.3 (21)
Hernia: inguinal/femoral/incisional mesh (N = 26,448)	0.1 (17)	0.1 (10)
Colorectal: appendectomy (N = 26,046)	0.0 (6)	0.2 (4)
Esophagogastric: bariatric (N = 23,766)	0.05 (0)	0 (0)
Head and neck: tumor (N = 20,057)	0.0 (7)	0.1 (3)
Minor vascular: chest/extremity (N = 5,883)	0.0 (2)	0.1 (1)
Small intestine: resection/ostomy (N = 5,860)	0.5 (27)	0.6 (14)
Small intestine: lysis of adhesions, other (N = 5,683)	0.3 (17)	0.7 (14)
Abdominal: exploration (N = 5,760)	0.5 (26)	0.9 (18)
Hepatobiliary: pancreas (N = 4,832)	0.3 (15)	0.5 (10)
Musculoskeletal: amputation (N = 4,800)	0.8 (37)	1.1 (29)
Esophagogastric: gastric (N = 4,749)	0.3 (16)	0.7 (12)
Esophagogastric: esophagus/gastric (N = 4,635)	0.0 (1)	0.1 (1)
Hysterectomy (N = 4,454)	0.1 (3)	0.2 (1)

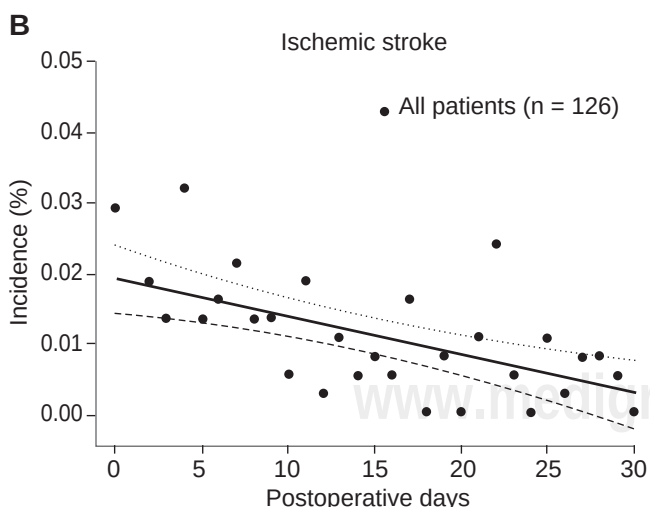
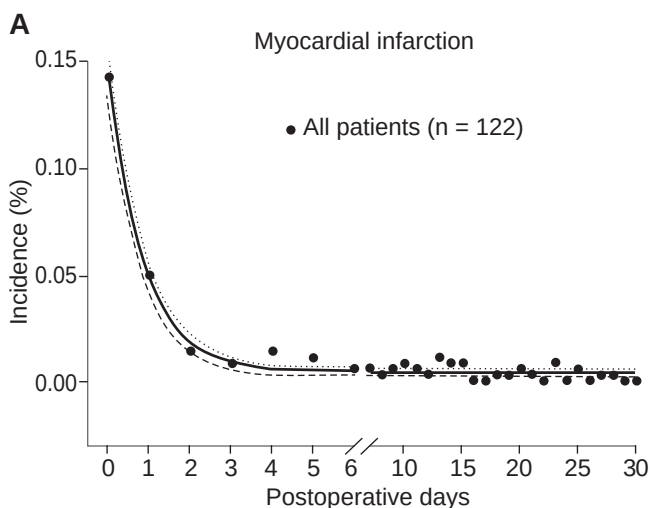
Mashour G. Anesthesiology 2011; 114: 1289. DOI:10.1097/ALN.0b013e318216e7f4

Incidencia de complicaciones mayores & mortalidad después de complicaciones según el Hospital Quintile of Mortality
Incidence of major complications & mortality after complications According to Hospital Quintile of Mortality

Variable	Very low mortality	Low mortality	Medium mortality	High mortality	Very high mortality
Incidencia de complicaciones %Incidence of complication %					
Myocardial infarction	0.5	0.4	0.5	0.4	0.5
Stroke	0.2	0.3	0.2	0.3	0.2
Mortalidad después de complicaciones Mortality after complication					
Myocardial infarction	29	28	27	36	40
Stroke	23	30	35	41	46

National Surgical Quality Improvement Program; 189 hospitals; 84,730 patients
Ghaferi AA. NEJM 2009; 361: 1368.

¿POR QUÉ NO TENEMOS CONOCIMIENTO
SOBRE ESTO?
WHY DO WE NOT KNOW ABOUT IT?



Distribución por días de postoperatorio de MI & Ictus
Daily distribution of MI & Stroke
1991-2006
Kikura M. J Thrombosis & Haemostasis 2008; 6: 742.

TIEMPO DE RECONOCIMIENTO DEL STROKE
TIME OF STROKE RECOGNITION 2003-2009

- 8% al despertar de la anestesia
on emergence from anesthesia
- 62% durante 48 horas within 48 hours
- 27% 3 a 30 días 3 to 30 days

Mashour, Gelb Unpublished data

¿POR QUÉ LA MORTALIDAD ES TAN ALTA?
WHY IS THE MORTALITY SO HIGH?

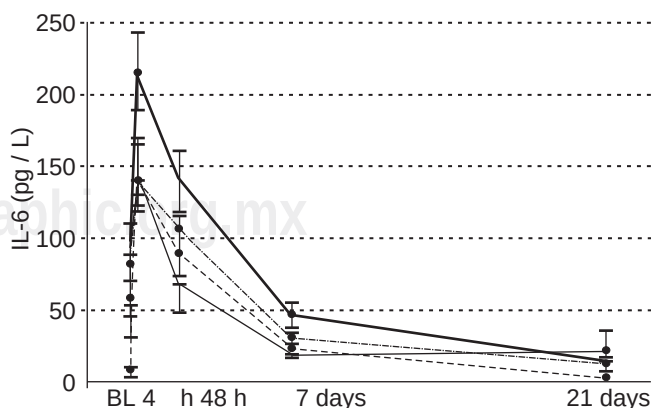
- Diagnóstico tardío Delayed diagnosis
- Tratamiento tardío Delayed treatment

Stroke perioperatorio es inicialmente un diagnóstico de enfermería
Pero

La atención de rutina no incluye neurodetección
Perioperative Stroke is initially a nursing diagnosis
But

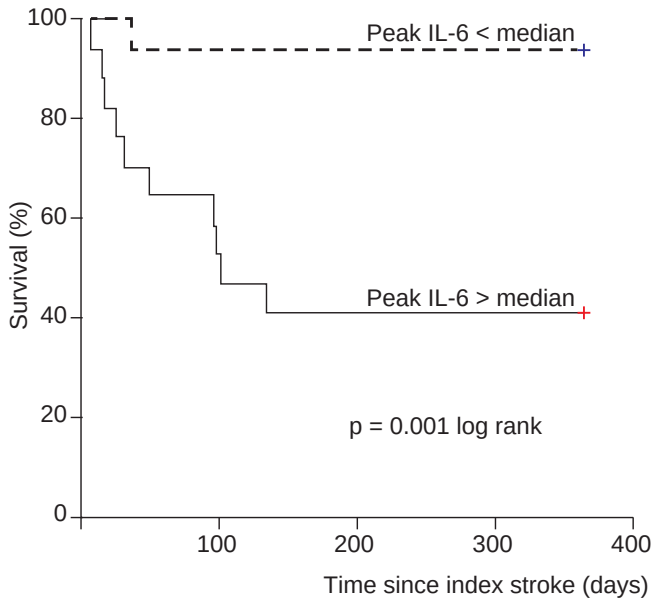
Routine post op care does not include neuro screening

IL-6 DESPUÉS DE CIRUGÍA DE CADERA
AFTER HIP SURGERY

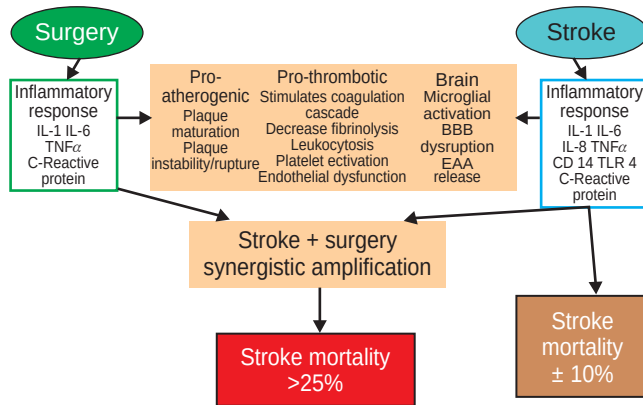


Sedlář M. Archives of Gerontology and Geriatrics 2010; 51: 3.

IL-6, STROKE & RESULTADO STROKE & OUTCOME



Twelve-month Kaplan-Meier survival curve for patients with peak plasma IL-6 concentration less than, or greater than, the sample median (30.5 pg/mL, n = 34)
Smith RF. BMC Neurology 2004; 4: 6.



Ng J, Chan M, Gelb AW. Anesthesiology 2011; 115:879

¿QUIÉN ESTÁ EN RIESGO? WHO IS AT RISK?

Edad del paciente y Stroke perioperatorio
Patient age and perioperative Stroke

Edad del paciente Patient Age (yr)	Stroke (%)
> 50	0.38
> 65	0.22
> 70	0.50
> 80	3.40
> 90	3.20

Kim J, Gelb AW. J Neurosurg Anesth 1995; 7: 211.

Risk factors for Stroke

Factor de riesgo	OR
Previous stroke	1.6-14
Peripheral vasa dis	8
Renal failure	3
Hyperincemia	3.5
Cancer esp. head & neck radiation	1.6
Atrial fibrillation	2
Hip fracture	3.8
Valvular heart disease	1.5

Ng J, Chan M, Gelb AW. Anesthesiology 2011; 115: 879.

¿Qué podemos hacer al respecto?
What can we do about it?

Stroke postoperatorio
Postoperative Stroke

Etiología	Etiology
• Hipotensión	Hypotensive
• Embólico	Embolic
• Trombótico	Thrombotic

¿QUÉ ES HIPOTENSIÓN? WHAT IS HYPOTENSION?

Table II. Thresholds of intraoperative hypotension as found with the literature search.

Definition	Articles (%)
Absolute systolic blood pressure thresholds	
SBP < 100 mmHg	2 (1.4)
SBP < 90 mmHg	5 (3.6)
SBP < 85 mmHg	1 (0.7)
SBP < 80 mmHg	10 (7.1)
Moderate: SBP < 100 mmHg, severe:	
SBP < 80 mmHg	2 (1.4)
Moderate: SBP < 85 mmHg, severe:	
SBP < 65 mmHg	1 (0.7)
SBP < 70 mmHg, later during surgery SBP < 100 mmHg	1 (0.7)
Relative systolic blood pressure thresholds	
Decrease in SBP > 10% from baseline	3 (2.1)
Decrease in SBP > 20% from baseline	18 (12.9)
Decrease in SBP > 25% from baseline	3 (2.1)
Decrease in SBP > 30% from baseline	7 (5.0)
Decrease in SBP > 40% from baseline	1 (0.7)
Decrease in SBP > 10 mmHg from baseline, moderate: < 90 mmHg	1 (0.7)
Decrease in SBP > 30 mmHg from baseline	1 (0.7)
Mild: decrease > 20%, moderate: 20-30%, severe: < 30% from baseline	1 (0.7)

Factores de riesgo para sufrir un Stroke

Combinations of absolute and relative systolic blood pressure thresholds

SBP < 100 mmHg or > 30% decrease from baseline	11 (7.9)
SBP < 100 mmHg or > 25% decrease from baseline	3 (2.1)
SBP < 100 mmHg or > 20% decrease from baseline	8 (5.7)
SBP < 100 mmHg and > 10% decrease from baseline	1 (0.7)
SBP < 95 mmHg or > 25% decrease from baseline	1 (0.7)
SBP < 90 mmHg or > 30% decrease from baseline	8 (5.7)
SBP < 90 mmHg or > 20% decrease from baseline	3 (2.1)
SBP < 80 mmHg or > 30% decrease from baseline	4 (2.9)
SBP < 80 mmHg or > 20% decrease from baseline	1 (0.7)
SBP < 75 mmHg or > 40% decrease from baseline	1 (0.7)
SBP < 100 mmHg, severe: decrease	
SBP > 30 mmHg from baseline	1 (0.7)
SBP < 90 mmHg or decrease > 30 mmHg from baseline	1 (0.7)
SBP < 90 mmHg or decrease > 20 mmHg from baseline	1 (0.7)
Absolute mean blood pressure thresholds	
MBP < 70 mmHg	1 (0.7)
MBP < 60 mmHg	2 (1.4)
MBP < 55 mmHg	2 (1.4)
MBP < 50 mmHg	1 (0.7)
Relative mean blood pressure thresholds	
Decrease in MBP > 10% from baseline, severe: 15% decrease	1 (0.7)
Decrease in MBP > 15% from baseline	1 (0.7)
Decrease in MBP > 20% from baseline	7 (5.0)
Decrease in MBP > 25% from baseline	5 (3.6)
Decrease in MBP > 30% from baseline	5 (3.6)
Combinations of absolute and relative mean blood pressure thresholds	
MBP < 60 mmHg or decrease > 30% from baseline	1 (0.7)
MBP < 65 mmHg or decrease > 30% from baseline	1 (0.7)
MBP < 70 mmHg and decrease > 40% from baseline or MBP < 60 mmHg	1 (0.7)
Combinations of systolic and mean blood pressure measurements	
SBP < 100 mmHg or decrease in MBP > 30% from baseline	1 (0.7)
SBP < 100 mmHg or decrease in SBP or MBP > 20% from baseline	1 (0.7)
SBP < 90 mmHg or decrease in MBP > 25% from baseline	2 (1.4)
SBP < 80 mmHg or MBP < 55% mmHg	1 (0.7)

No blood pressure measurement specification

Decrease in BP > 30% from baseline	1 (0.7)
Decrease in BP > 25% from baseline	1 (0.7)
Decrease in BP > 20% from baseline	3 (2.1)
Decrease in BP > 20 mmHg from baseline	1 (0.7)

Total number of articles is greater than 130 because several articles contained more than one definition
BP = blood pressure; MBP = mean blood pressure; SBP = systolic blood pressure

Bijker JB. *Anesthesiology* 2007; 107: 213.

Sorprendentemente, *ninguno de los factores* esperados intuitivamente asociados con un Stroke postoperatorio se pueden demostrar:

- Caída de tensión arterial durante el procedimiento
- Hematócrito elevado

Surprisingly, *none of the expected factors* intuitively associated with postoperative stroke could be demonstrated:

- BP drop during the procedure
- High hematocrit

Limburg M. *Neurology* 1998; 50: 895.

HIPOTENSIÓN RARAS VECES REPRESENTA STROKE POSTOPERATORIO HYPOTENSION RARELY ACCOUNTS FOR POSTOPERATIVE STROKES

Limburg M. *Neurology* 1998; 50: 895.

HIPOTENSIÓN CON ESTENOSIS CARÓTIDA HYPOTENSION WITH CAROTID STENOSIS

The observation that even *hypotensive events* in patients with severe carotid lesions during major vascular surgery *does not account for perioperative stroke* is consistent with findings in previous series confirming that the neurological event is *rarely* secondary to hemodynamic factors even in the presence of severe stenosis

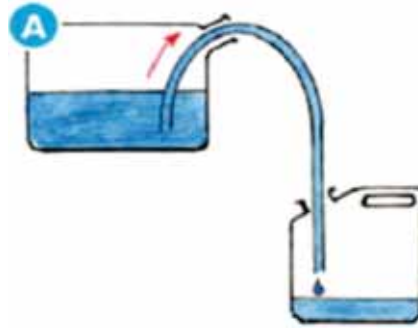
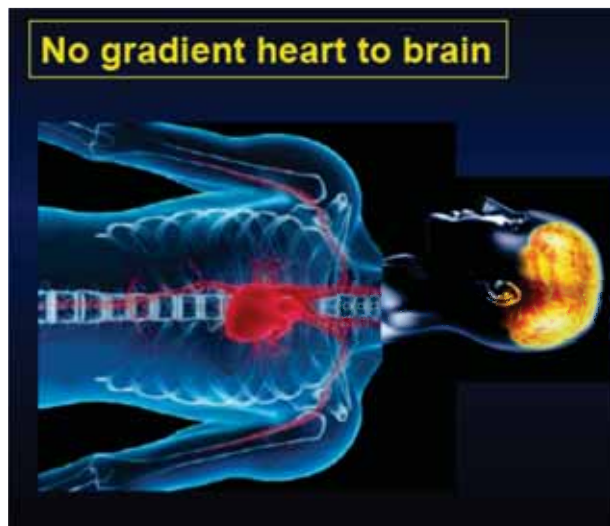
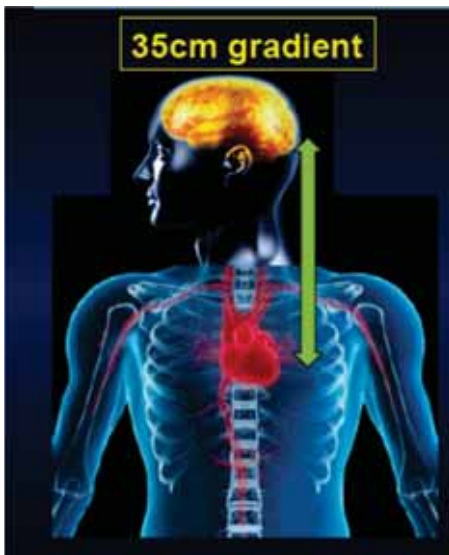
Asymptomatic severe carotid disease undergoing other vascular surgery procedures n = 39

Ballotta E. *Ann Vasc Surg* 2005; 19: 876.

POSICIÓN DEL PACIENTE: SENTADO O EN «SILLA DE PLAYA»

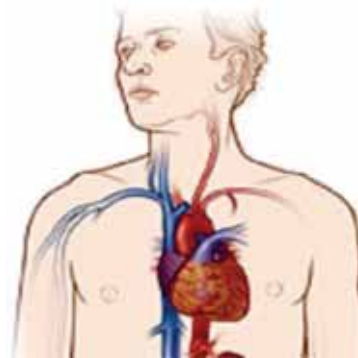


¿Cómo debe ser manejada la presión arterial?
How should blood pressure be managed?



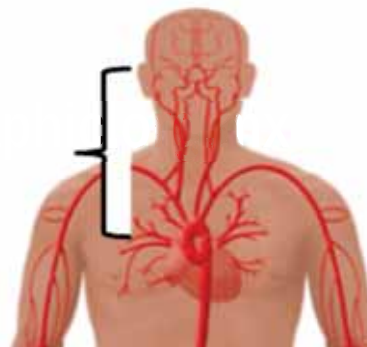
UN SIFÓN

Healthy vessels
No co-morbidities



UNA CASCADA

Vasc disease
Intracranial disease
Decr O₂ delivery



ESTUDIO EVALUATIVO DE ISQUEMIA PERIOPERATORIA PERIOPERATIVE ISCHEMIA EVALUATION STUDY



RESULTADOS SECUNDARIOS SECONDARY OUTCOMES

Resultados Outcome	Metoprolol (N = 4,174)	Placebo (N = 4,177)	HR (95% CI)	p
Stroke	41 (1.0%)	19 (0.5%)	2.17 (1.26-3.73)	0.005

PREDICTORES DEL STROKE PREDICTORS OF STROKE

60 strokes - 49 ischemic, 3 hemorrhagic, 8 uncertain

Table III. Independent predictors of death and stroke and their associated population attributable risks.

	Adjusted odds ratio (95% CI)	Frequency of risk factor n (%)	PAR* (95% CI)
Stroke			
Preoperative independent predictors			
History of stroke or transient ischaemic attack	2.80 (1.66-4.73)	1,759 (21.1%)	30.5% (17.1-48.2)
Use of clopidogrel or ticlopidine in 24 h before surgery	3.12 (1.43-6.77)	330 (4.0%)	9.1% (3.2-23.2)
Intraoperative and postoperative predictors			
Clinically significant hypotension	2.14 (1.15-3.96)	1,029 (12.3%)	14.7% (5.2-35.4)
Significant bleeding	2.18 (1.06-4.49)	553 (6.6%)	10.1% (3.0-28.5)
New clinically significant atrial fibrillation	3.51 (1.45-8.52)	200 (2.4%)	6.9% (2.1-20.4)
Total explained	—	—	51.8% (37.1-66.2)

PAR = population attributable risk. *Proportion of all outcomes attributable to the relevant risk factor if causality were proven. We calculated PAR from a multivariate logistic regression analysis and PAR estimates were calculated with IRAP (US National Cancer Institute, 2002). Lancet 2008; 371: 1839

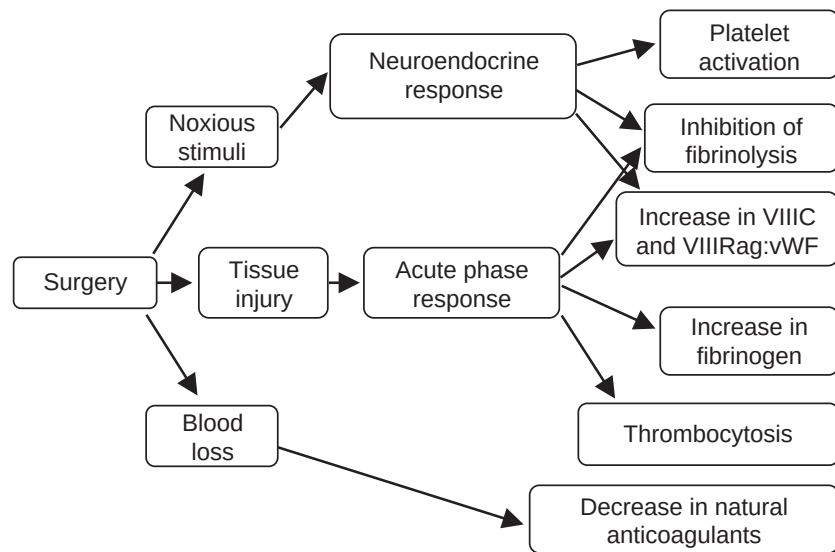
Stroke perioperatorio
Perioperative Stroke

- Intraoperative hypotension does not seem to be a frequent risk factor for stroke
- Postoperative hypotension is probably a much bigger risk factor
- Hypotension will worsen an embolic Stroke

Stroke postoperatorio
Postoperative Stroke

Etiología	Etiology
• Embólico	Embolic
• Trombótico	Thrombotic

ESTIMULACIÓN DE LA COAGULACIÓN DESPUÉS DE CIRUGÍA
COAGULATION STIMULATED AFTER SURGERY



Gibbs NM.
Australasian
Anaesthesia.
1994

¿DANDO ALGO DE ASPIRINA?
WHAT ABOUT GIVING SOME ASPIRIN?

30 Días de análisis eficaces
30 Day efficacy analysis
Aspirin CEA trial (ACE)

	Event rate ASA		RR	P
	Low dose 81/325 mg	High dose 650/1,300 mg		
Stroke, MI Death	3.7%	8.2%	2.21	0.002
Ipsilateral Stroke	3.0%	6.5%	2.18	0.005

Taylor DW et al. Lancet 1999; 353: 2179-84.

POISE-2

Primary objective

- Determine impact of low-dose clonidine and low dose ASA on death and nonfatal MI at 30 days

Design – blinded factorial RCT

- ASA/clonidine
- ASA/clonidine placebo
- ASA placebo/clonidine
- ASA placebo/clonidine placebo

Sample size – 10,000 patients

Gestión cerebrovascular perioperatorio
Perioperative Stroke management

- Diagnóstico de enfermería temprana
Early nursing diagnosis
 - Consulta temprana de Neurología
Early Neurology consult
 - Análisis de radiografía temprana
Early CT scan
 - Administrar aspirina
Give aspirin
 - Mover a la Unidad de Cuidados Intensivos o Unidad de Derrames
Move to ICU or Stroke Unit
 - Tratar las arritmias
Tx arrhythmias
 - Considerar la posibilidad de trombólisis
Consider thrombolysis
-

Conclusiones de Stroke perioperatorio

- Aceptación de que es un problema
Acceptance that it is a problem
 - Mejor recolección de información prospectiva
Better prospective data collection
 - Tratamiento y diagnóstico temprano
Earlier diagnosis & treatment
 - Mejor entendimiento de la fisiopatología
Better understanding of the pathophysiology
-

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