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Servicio de Anestesia,
Reanimación y Tratamiento del Dolor
HOSPITAL GENERAL UNIVERSITARIO VALENCIA

Gestión del riesgo pre y postoperatorio: el papel de las puntuaciones y los biomarcadores.

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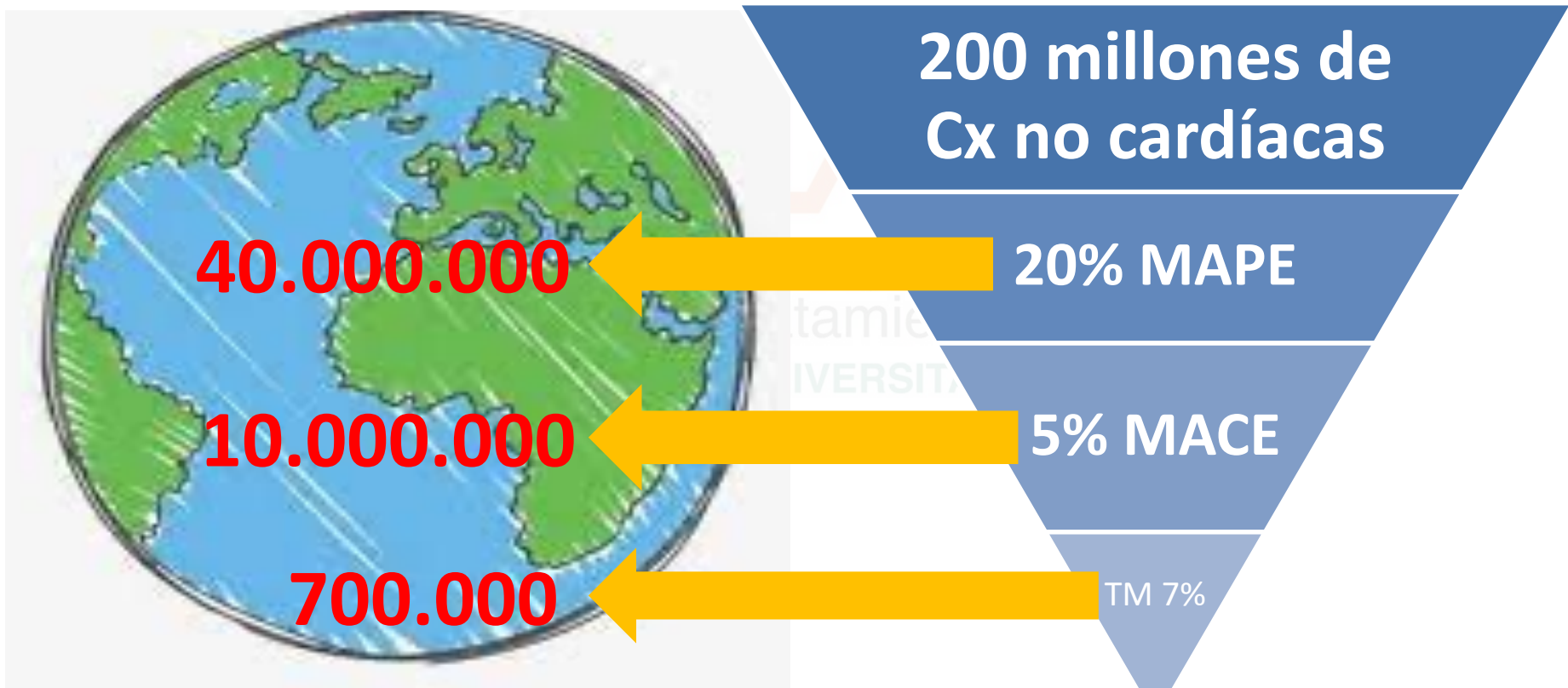
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2. Recomendaciones Guías Clínicas (ESAIC 2018)
3. Herramientas de estratificación del riesgo
4. Biomarcadores
5. Nuevas herramientas de estratificación
6. Limitaciones de los estudios
7. Conclusiones

1. INTRODUCCIÓN

Para contextualizar la problemática...

Anualmente en todo el mundo:



SARTD-CHGUV Sesión de Formación Continuada
Valencia 14 de Septiembre de 2021

MAPE

Major Adverse Postoperative Events

- Ingreso no planificado en UCI
- VM prolongada
- Infección de la herida
- TEP
- ACV

MACE

Major Adverse Cardiac Events

- Infarto de miocardio (IM)
- Parada cardiaca ↑
- Revascularización +/- de TnT.

Medicina preoperatoria



Objetivo: Disminuir la morbimortalidad perioperatoria.

- Identificando el riesgo potencial de complicaciones perioperatorias
- asesorar sobre estos riesgos
- implementar estrategias de reducción riesgos.

2. RECOMENDACIONES/ GUIAS CLÍNICAS

Lurati Buse G. Pre-operative evaluation of the adult patient undergoing elective noncardiac surgery: updated guideline from the European Society of Anaesthesiology. Direction and not directives. Eur J Anaesthesiol 2018; 35:405–406

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

Stefan De Hert*, Sven Staender, Gerhard Fritsch, Jochen Hinkelbein, Arash Afshari, Gabriella Bettelli, Matthias Bock, Michelle S. Chew, Mark Coburn, Edoardo De Robertis, Hendrik Drinhaus, Aarne Feldheiser, Götz Geldner, Daniel Lahner, Andrius Macas, Christopher Neuhaus, Simon Rauch, Maria Angeles Santos-Ampuero, Maurizio Solca, Nima Tanha, Vilma Traskaite, Gernot Wagner and Frank Wappler

2. EJA 2018

1.- ¿Quién y cuándo deben hacer la valoración preoperatoria?

2.- ¿Cómo debe ser ?

- Condiciones clínicas específicas: E. CVC, E. renal, obesidad, ancianos, etc.
- Gestión de medicación habitual: fitoterapia, psicotrópicos, ACO...
- Valoración vía aérea
- Test preoperatorios a realizar

3.- El papel de las escalas y los biomarcadores

4.- Náuseas y vómitos postoperatorios (escalas)

5.- Otros puntos

GRADE

TABLE 2

Quality of evidence

Quality	Description
High-A	Consistent evidence from well-performed randomized, controlled trials or overwhelming evidence of some other form; further research is unlikely to change our confidence in estimate of benefit and risks
Moderate-B	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodological flaws, indirect or imprecise), or very strong evidence of some other research design; further research (if performed) is likely to have impact on our confidence in estimate of benefit and risks and may change estimate
Low-C	Evidence from observational studies, unsystematic clinical experience, or randomized, controlled trials with serious flaws; any estimate of effect is uncertain

SMFM. SMFM adopts GRADE. Am J Obstet Gynecol 2013.

TABLE 3

Strength of recommendation

Strength	Description
1. Strong	Benefits clearly outweigh risks and burdens, or vice versa
2. Weak	Benefits closely balanced with risks and burdens

SMFM. SMFM adopts GRADE. Am J Obstet Gynecol 2013.

Tipo de estudio	Nivel de calidad a priori	Desciende si	Sube si	Nivel de calidad posteriori
Estudios aleatorizados	Alta	<i>Riesgo de sesgo</i>	<i>Efecto</i>	Alta
		-1 importante	+1 grande	
		-2 muy importante	+2 muy grande	
		<i>Inconsistencia</i>	<i>Dosis-respuesta</i>	Moderada
Estudios observacionales	Baja	-1 importante	+1 gradiente evidente	
		-2 muy importante		
		<i>No evidencia directa</i>	<i>Todos los factores de confusión:</i>	Baja
		-1 importante	+1 reducirían el efecto observado	
		-2 muy importante		
		<i>Imprecisión</i>	+1 sugerirían un efecto espurio si no hay efecto observado	Muy baja
		-1 importante		
		-2 muy importante		
	<i>Sesgo de publicación</i>			
	-1 probable			
	-2 muy probable			

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RECOMENDACIONES 1A

2.4. How should the airway be evaluated?

- We recommend that screening for DMV and difficult intubation should be conducted, whenever feasible, in all patients potentially requiring airway management for anaesthesia and in the ICU. This screening includes a medical history, a surgical history, history of difficult airway management and, if available, examination of previous anaesthetic records.
- Details of this should be documented in the patient chart. 1A
- We recommend that no single predictive sign for difficult airway management is sufficient by itself and the pre-anaesthesia assessment needs the combination of different validated evaluation criteria. 1A

- **EXPLORACIÓN DE VAD EN TODOS LOS PACIENTES PARA MANEJO ANESTÉSICO O EN UCI.**
- **DEBE QUEDAR POR ESCRITO EN LA HC**
- **NO HAY SIGNO ÚNICO PREDICTIVO DE VAD**

2. EJA 2018

1.- ¿Quién y cuándo deben hacer la valoración preoperatoria?

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- **Gestión de medicación habitual: fitoterapia, psicotrópicos, ACO...**
- **Valoración vía aérea**
- **Test preoperatorios a realizar**

3.- El papel de las escalas y los biomarcadores

4.- Náuseas y vómitos postoperatorios (escalas)

5.- Otros puntos

2.1. ¿CÓMO DEBE SER LA EVALUACIÓN?

- Condiciones clínicas específicas:

Se recomienda:

- Uso de **NSQIP** o el **RCRI** para la estratificación del riesgo perioperatorio cardíaco
- **Continuación** perioperatoria de **betabloqueantes** en pacientes que ya lo reciben.
- Uso de **cuestionarios para el SAOS** cuando la polisomnografía no está disponible → **STOP-BANG** (+ SE, +ES)

2.1. ¿CÓMO DEBE SER LA EVALUACIÓN?

- Condiciones clínicas específicas:

Se recomienda:

- En fx de cadera urgente --> no interrupción **clopidogrel***
- Tratar la **anemia ferropénica** con **Fe iv** antes de los qx electivos.

No se recomienda:

- Rx Tx preoperatorias de rutina

*Collyer T, Reynolds H, Truyens E, et al. Perioperative management of clopidogrel therapy: the effects on in-hospital cardiac morbidity in Older patients with hip fractures. Br J Anaesth 2011; 107:911–915.

*Soo CG, Della Torre PK, Yolland TJ, Shatwell MA. Clopidogrel and hip fractures, is it safe? A systematic review and meta-analysis. BMC Musculoskelet Disord 2016; 17:136.

2.1. ¿CÓMO DEBE SER LA EVALUACIÓN?

- Gestión de medicación habitual

Se sugiere:

- Suspender **medicamentos a base de hierbas 2 sem** antes de la cirugía (hierba de San Juan 5 días antes)
- Suspender **litio 72 h antes** de la cirugía.
- En procedimientos **QX menores** (cataratas o QX menor) → **continuación de AVK** en lugar de terapia "puente"/retirada.

2.1. ¿CÓMO DEBE SER LA EVALUACIÓN?

- Test preoperatorios a realizar:
 - ✓ Se realizan pruebas estándar por defecto a todos los pacientes (RxTx, ECG, BQ)
 - ✓ A menudo, **no cambian el manejo perioperatorio** y pueden dar lugar retrasos quirúrgicos innecesarios

NICE National Institute for Health and Care Excellence



NICE Pathways

NICE guidance

Life sciences

Standards and indicators

Evidence search

BNF

BNFC

CKS

Journals and e

Read about [our approach to COVID-19](#)

Home > NICE Guidance > Health and social care delivery > Patient and service user care

Routine preoperative tests for elective surgery

NICE guideline [NG45] Published: 05 April 2016

3. El papel de las escalas & biomarcadores

ESCALAS DE RIESGO/BIOMARCADORES

- ASA
- RCRI
- NSQIP
- MICA
- STOP BANG
- TNTUS
- NTPROBNP
- COPEPTINA

ASA- PS

I

• Paciente SANO



No incluye Fumadores ni Bebedores sociales

II

• Enfermedad sistémica leve



Cáncer en remisión, Obesidad, Embarazadas

III

• Enfermedad sistémica grave



Lactantes a término <6 semanas de edad,
Cáncer activo, Abuso de alcohol

IV

• Enfermedad sistémica grave amenaza para la vida.

V

• Paciente moribundo que no sobrevivirá sin la operación.

VI

• Muerte cerebral

RCRI

- ❖ El RCRI se utiliza para predecir el **riesgo cvv perioperatorio** (*precisión moderada*)
- ❖ Valor imitado en Qx vascular.

EJA

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Se recomienda:

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Elevated-risk surgery Intraperitoneal; intrathoracic; suprainguinal vascular (see 2014 ACC/AHA Guideline)	No 0	Yes +1
History of ischemic heart disease History of myocardial infarction (MI); history of positive exercise test; current chest pain considered due to myocardial ischemia; use of nitrate therapy or ECG with pathological Q waves	No 0	Yes +1
History of congestive heart failure Pulmonary edema, bilateral rales or S3 gallop; paroxysmal nocturnal dyspnea; chest x-ray (CXR) showing pulmonary vascular redistribution	No 0	Yes +1
History of cerebrovascular disease Prior transient ischemic attack (TIA) or stroke	No 0	Yes +1
Pre-operative treatment with insulin	No 0	Yes +1
Pre-operative creatinine >2 mg/dL / 176.8 µmol/L	No 0	Yes +1

0 points

Class I Risk

3.9 %

30-day risk of death, MI, or cardiac arrest

From Duceppe 2017, based on pooled data from 5 high quality external validations (4 prospective). These numbers are higher than those often quoted from the now-outdated original study (Lee 1999). See Evidence for details.

RCRI

Pacientes ≥ 65 años
(ó 45-64 a con enf
cv significativa) +
QX electiva no
cardiaca

<https://www.mdcalc.com/updated-cardiac-risk-index-pre-operative-risk#use-cases>

Elevated-risk surgery Intraperitoneal; intrathoracic; suprainguinal vascular (see 2014 ACC/AHA Guideline)	No 0	Yes +1
History of ischemic heart disease History of myocardial infarction (MI); history of positive exercise test; current chest pain considered due to myocardial ischemia; use of nitrate therapy or ECG with pathological Q waves	No 0	Yes +1
History of congestive heart failure Pulmonary edema, bilateral rales or S3 gallop; paroxysmal nocturnal dyspnea; chest x-ray (CXR) showing pulmonary vascular redistribution	No 0	Yes +1
History of cerebrovascular disease Prior transient ischemic attack (TIA) or stroke	No 0	Yes +1
Pre-operative treatment with insulin	No 0	Yes +1
Pre-operative creatinine >2 mg/dL / 176.8 μ mol/L	No 0	Yes +1

2 points

Class III Risk

10.1 %

30-day risk of death, MI, or cardiac arrest

From Duceppe 2017, based on pooled data from 5 high quality external validations (4 prospective). These numbers are higher than those often quoted from the now-outdated original study (Lee 1999). See Evidence for details.

RCRI

1. Riesgo qx
2. AP de enf isquémica
3. AP de ICC
4. AP de ACV
5. Insl^a preop
6. Cr >2mg/dl preop

<https://www.mdcalc.com/revision-cardiac-risk-index-pre-operative-risk#use-cases>

Elevated-risk surgery Intraperitoneal; intrathoracic; suprainguinal vascular (see 2014 ACC/AHA Guideline)	No 0	Yes +1
History of ischemic heart disease History of myocardial infarction (MI); history of positive exercise test; current chest pain considered due to myocardial ischemia; use of nitrate therapy or ECG with pathological Q waves	No 0	Yes +1
History of congestive heart failure Pulmonary edema, bilateral rales or S3 gallop; paroxysmal nocturnal dyspnea; chest x-ray (CXR) showing pulmonary vascular redistribution	No 0	Yes +1
History of cerebrovascular disease Prior transient ischemic attack (TIA) or stroke	No 0	Yes +1
Pre-operative treatment with insulin	No 0	Yes +1
Pre-operative creatinine >2 mg/dL / 176.8 μmol/L	No 0	Yes +1

2 points Class III Risk	10.1 % 30-day risk of death, MI, or cardiac arrest
From Duceppe 2017, based on pooled data from 5 high quality external validations (4 prospective). These numbers are higher than those often quoted from the now-outdated original study (Lee 1999). See Evidence for details.	

Table 2. Total RCRI score and corresponding risk of myocardial infarction, cardiac arrest, or death at 30 days after noncardiac surgery*

Total RCRI points	Risk estimate, %	95% CI for the risk estimate
0	3.9	2.8%-5.4%
1	6.0	4.9%-7.4%
2	10.1	8.1%-12.6%
≥3	15.0	11.1%-20.0%

CI, confidence interval; RCRI, Revised Cardiac Risk Index.

*On the basis of high-quality external validation studies.

Enter Patient and Surgical Information

The screenshot shows the 'Procedure' field with the text 'cholecystectomy' entered. A dropdown menu is open, listing several procedure codes and descriptions:

- 47562 - Laparoscopy, surgical; cholecystectomy
- 47563 - Laparoscopy, surgical; cholecystectomy with cholangiography
- 47564 - Laparoscopy, surgical; cholecystectomy with exploration of common duct
- 47600 - Cholecystectomy;
- 47605 - Cholecystectomy; with cholangiography
- 47610 - Cholecystectomy with exploration of common duct;
- 47612 - Cholecystectomy with exploration of common duct; with choledochenterostomy
- 47620 - Cholecystectomy with exploration of common duct; with transduodenal sphincterotomy or sphincteroplasty, with or without cholangiography

A yellow lightning bolt icon points to the dropdown menu. A 'Clear' button is visible to the right of the input field. Below the dropdown, there is a note: 'A rough estimate will still be generated if you cannot provide all of the information below.'

Se recomienda:

- Uso de **NSQIP** o el **RCRI** para la estratificación del riesgo perioperatorio cardíaco

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<https://riskcalculator.facs.org/RiskCalculator/PatientInfo.jsp>

NSQIP



Surgical Risk Calculator



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Inspiring Quality: Highest Standards, Better Outcomes

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FAQ

ACS Website

ACS NSQIP Website

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

65-74 years

Sex

Male

Functional Status

Independent

Emergency Case

No

ASA Class

Healthy patient

Steroid use for chronic condition

No

Ascites within 30 days prior to surgery

No

Systemic Sepsis within 48 hours prior to surgery

None

Ventilator Dependent

No

Disseminated Cancer

No

Diabetes

No

Hypertension requiring medication

Yes

Congestive Heart Failure in 30 days prior to surgery

No

Dyspnea

No

Current Smoker within 1 Year

Yes

History of Severe COPD

No

Dialysis

No

Acute Renal Failure

No

BMI Calculation:

Height: 69 in / 175 cm

Weight: 176 lb / 80 kg

Back

Continue

Step 2 of 4

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

Age Group

65-74 years

Sex

Male

Functional Status

Independent

Emergency Case

No

ASA Class

Healthy patient

Steroid use for chronic

No

Ascites within 30 days

No

Systemic Sepsis within

None

Ventilator Dependent

No

Disseminated Cancer

No

Disseminated Cancer

The patient has a primary cancer that has metastasized to a major organ AND meets at least one of the following:

- active treatment for the cancer within one year of the surgery date. If the surgical procedure is the treatment for the metastatic cancer, answer "Yes".
- the patient has elected not to receive treatment for the metastatic disease
- the patient's metastatic cancer has been deemed untreatable

Report the following cancers as Disseminated Cancer: Acute Lymphocytic Leukemia (ALL), Acute Myelogenous Leukemia (AML), and Stage IV Lymphoma.

Do not report the following as Disseminated Cancer: Chronic Lymphocytic Leukemia (CLL), Chronic Myelogenous Leukemia (CML), Stages I through III Lymphomas or Multiple Myeloma.

Weight: 176 lb / 80 kg

Back

Continue

Step 2 of 4

Enter Geriatric Patient Information

Would you like to add Geriatric Outcomes? If so, please answer the following questions. Yes No

*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.*

Mobility Aid Use

No ▾

History of Dementia or Cognitive Impairment

No ▾

Origin Status on Admission

Not from home ▾

Hospice or Palliative Care on Admission

No ▾

Fall History

No ▾

Surrogate-Signed Consent

No, Patient signed his/her own consent ▾

Back

Continue

NSQIP



Surgical Risk Calculator



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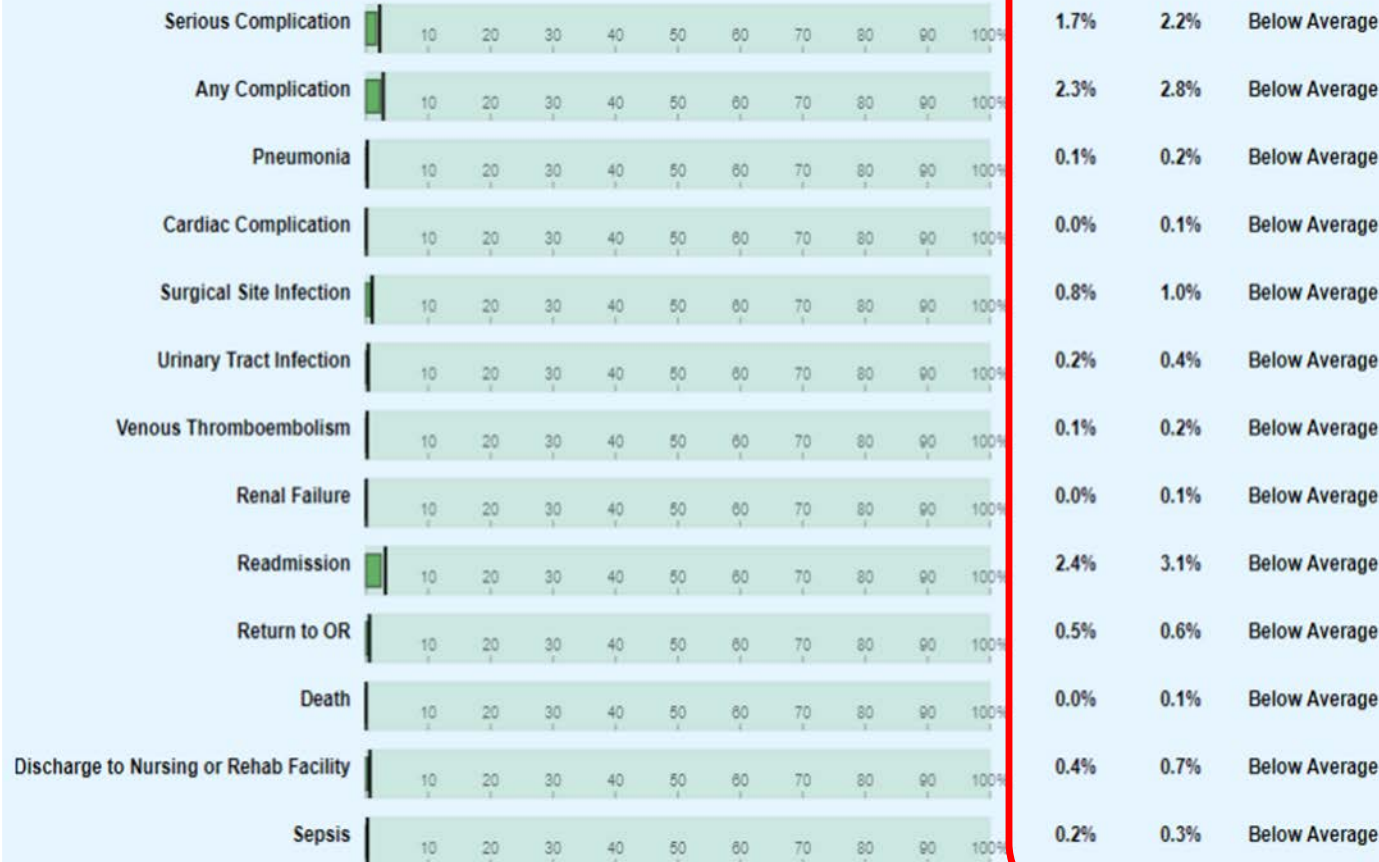
FAQ

ACS Website

ACS NSQIP Website

Note: *Your Risk* has been rounded to one decimal point.

Outcomes i



Predicted Length of Hospital Stay: 0.5 days



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NSQIP



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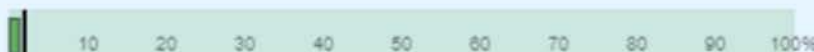
FAQ

ACS Website

ACS NSQIP Website

Geriatric Outcomes

Postoperative Delirium



Your Risk

1.3%

Average Risk

1.9%

Chance of Outcome

Below Average

Functional Decline

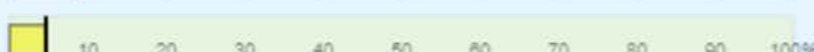


10.1%

9.0%

Above Average

New Mobility Aid Use

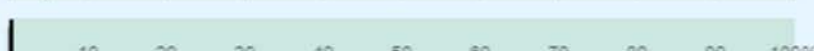


4.6%

4.6%

Average

New/Worsening Pressure Ulcer

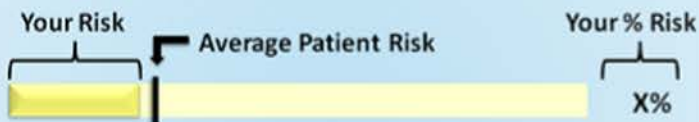


0.1%

0.2%

Below Average

How to Interpret the Graph Above:



Surgeon Adjustment of Risks

This will need to be used infrequently, but surgeons may adjust the estimated risks if they feel the calculated risks are underestimated. This should only be done if the reason for the increased risks was NOT already entered into the risk calculator.

1 - No adjustment necessary

Back

Continue

Step 3 of 4

Se recomienda:

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MICA

Myocardial Infarction/Cardiac Arrest Score

Age	<input type="text" value="85"/> years	
Functional status	<input type="radio"/> Independent <input checked="" type="radio"/> Partially dependent <input type="radio"/> Totally dependent	
<u>ASA class</u>	<input type="radio"/> 1: normal healthy patient <input type="radio"/> 2: mild systemic disease <input checked="" type="radio"/> 3: severe systemic disease <input type="radio"/> 4: severe systemic disease that is a constant threat to life (i.e., patient could die acutely without intervention) <input type="radio"/> 5: moribund, not expected to survive without surgery	
		Creatinine <input type="radio"/> Normal (≤ 1.5 mg/dL, 133 μ mol/L) <input checked="" type="radio"/> Elevated (> 1.5 mg/dL, 133 μ mol/L) <input type="radio"/> Unknown
		Type of procedure <input type="text" value="Orthopedic and non-vascular extremity"/>
		3.1 % Risk of myocardial infarction or cardiac arrest, intraoperatively or up to 30 days post-op <input type="button" value="Copy Results"/> <input type="button" value="Next Steps"/>

1. Edad
2. Estado funcional
3. ASA
4. Cr
5. QX

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En resumen...

❖ La escalas de riesgo cardíaco perioperatorio → **MICA & NSQIP** validados solo retrospectivamente → subestiman el riesgo de isquemia miocárdica.

❖ **RCRI** validado por múltiples estudios durante los últimos 15a & predicción moderada **MACE**.

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STOP-BANG



<https://www.mdcalc.com/stop-bang-score-obstructive-sleep-apnea>

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Snoring
Do you snore loudly?

Tired

Do you feel tired during the day?



Observe
Has anyone observed you choke/gasp during sleep?

Pressure

Do you have high blood pressure?



BMI
Is your BMI over 35?

Age

Are you over 50 years old?



Neck Size
Is your neck large?

Gender
Are you a male?



STOP-BANG

Ask the patient the following:

Do you snore loudly? Louder than talking or loud enough to be heard through closed doors	No 0	Yes +1
Do you often feel tired, fatigued, or sleepy during the daytime?	No 0	Yes +1
Has anyone observed you stop breathing during sleep?	No 0	Yes +1
Do you have (or are you being treated for) high blood pressure?	No 0	Yes +1

Objective measures:

BMI	≤35 kg/m ²	0
	>35 kg/m ²	+1
Age	≤50 years	0
	>50 years	+1
Neck circumference	≤40 cm	0
	>40 cm	+1
Gender	Female	0
	Male	+1

4 points

STOP-BANG

High risk of OSA

Copy Results

Next Steps

Si **SAO de alto riesgo** (≥ 3 STOP-BANG) tienen $>$ incidencia de **complicaciones respiratorias** posoperatorias (ej: incapacidad para respirar profundamente & episodios de desaturación)

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En resumen...

- Las decisiones de evaluación de riesgo preoperatorias deben basarse en la HC, EF, la evaluación funcional y la complejidad de qx.
- Las herramientas de evaluación disponibles distinguen a los pacientes con (MACE 30d post):
 - riesgo bajo (<1%)
 - riesgo alto (\geq 1%)

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4. Biomarcadores



Dolor
ENCIA

REDUCING GLOBAL PERIOPERATIVE RISK

This resource center is jointly hosted by The American Journal of Medicine, The American Journal of Cardiology, and the Canadian Journal of Cardiology.

THE AMERICAN
JOURNAL of
MEDICINE.

The
American Journal
of Cardiology

CJC
Canadian Journal of
Cardiology
Journal canadien
de cardiologie



4. Biomarcadores

La estimación del riesgo preoperatorio potenciada por biomarcadores puede:

- (1) Apoyar las decisiones informadas
- (2) Alertar reevaluación o intensificación tto
- (3) Ayuda en monitorización cvc intraOp
- (4) Guiar el enfoque de la atención postQx

4. Biomarcadores

Biomarcadores Actuales	Biomarcadores Emergentes
<ul style="list-style-type: none">- Troponina I- Troponina T- BNP- NT- proBNP- PCR	<ul style="list-style-type: none">- LDL-oxidasa- Mieloperoidasa- Ligando CD 40 soluble- ICAM-1 – VCAM-1- Interleuquinas- PAPP-A- Copeptina

4. Biomarcadores

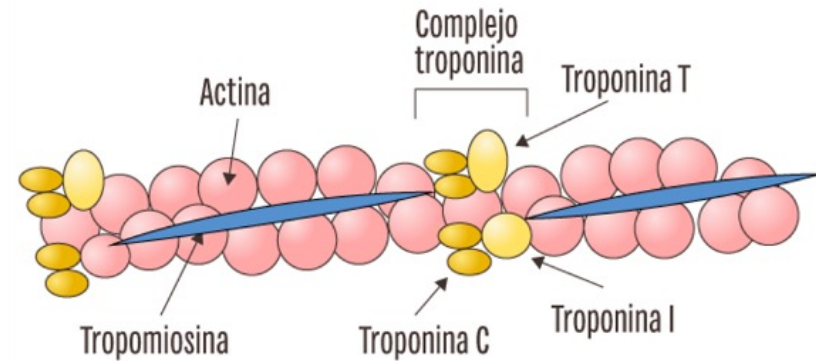
En cirugía no cardíaca, los biomarcadores cardíacos → antes de la qx para predecir los eventos adversos cardíacos (BNP) posoperatorios y posoperatoriamente para detectarlos / diagnosticarlos (Tn).

4. Biomarcadores

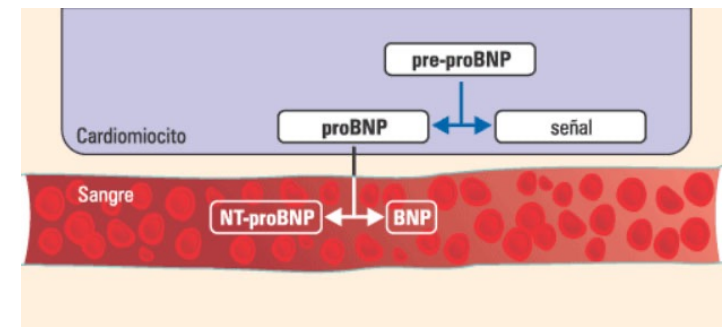
• TROPONINAS

Parte integral del filamento contráctil en el miocito que facilitan la interacción entre la actina y la miosina. 3 subunidades:

- TnT, que une el complejo Tn al filamento de actina
- TnC, que es el sitio de unión del ión calcio;
- TnI, que inhibe la interacción de la actina con las cabezas de miosina



4. Biomarcadores



• PEPTIDOS NATRIURÉTICOS

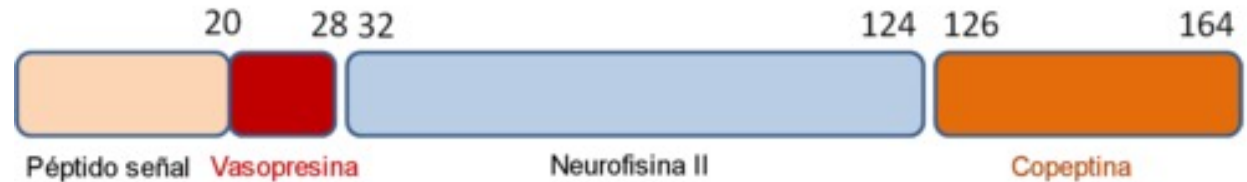
El estiramiento del miocardio desencadena la liberación de (BNP).

Aumentan la **tasa de filtración glomerular** y reducen la **reabsorción de sodio**, lo que resulta en natriuresis y diuresis.

La liberación y las **concentraciones de péptidos natriuréticos (NP)** están relacionadas con la magnitud de la sobrecarga auricular y ventricular.

4. Biomarcadores

- **COPEPTINA**



Péptido glicosilado que se libera del mismo precursor (preprovasopresina) que la hormona antidiurética. Se eleva en respuesta a estímulos osmóticos o por estrés, hipotensión e hipoxemia.

Parece ser un predictor independiente de MACE

No se pueden hacer recomendaciones sobre la medición de este marcador porque los datos actuales son escasos.

5. NUEVAS HERRAMIENTAS DE ESTRATIFICACIÓN

1. BNP preoperatorio
2. Troponinas Preoperatorias
3. Troponinas Postoperatorias

5.1. BNP preoperatorio

El péptido natriurético agrega valor a los métodos actuales de estratificación (BNP a la RCRI reclasificó al 16% de los pacientes en una categoría de riesgo diferente)

Journal of the American College of Cardiology
© 2014 by the American College of Cardiology Foundation
Published by Elsevier Inc.

Vol. 63, No. 2, 2014
ISSN 0735-1097/\$36.00
<http://dx.doi.org/10.1016/j.jacc.2013.08.1630>

The Prognostic Value of Pre-Operative and Post-Operative B-Type Natriuretic Peptides in Patients Undergoing Noncardiac Surgery

B-Type Natriuretic Peptide and N-Terminal Fragment of Pro-B-Type Natriuretic Peptide: A Systematic Review and Individual Patient Data Meta-Analysis

CME

SARTD-CHGUV Sesión de Formación Continuada
Valencia 14 de Septiembre de 2021

5.1. BNP preoperatorio

El 1/5 de los pacientes \uparrow BNP preoperatorio murieron o tuvieron IAM en los 30 DPO vs 1/20 de los pacientes con BNP en rango

Facilitan la selección de pacientes para una mayor vigilancia posoperatoria

Journal of the American College of Cardiology
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Vol. 63, No. 2, 2014
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<http://dx.doi.org/10.1016/j.jacc.2013.08.1630>

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CME

**SARTD-CHGUV Sesión de Formación Continuada
Valencia 14 de Septiembre de 2021**

5.1. BNP preoperatorio

El BNP o el NT-proBNP debe medirse preoperatoriamente
en ≥ 65 años o 45 - 64 años + RCRI ≥ 1

Canadian Journal of Cardiology 33 (2017) 17–32

Society Guidelines

Canadian Cardiovascular Society Guidelines on Perioperative Cardiac Risk Assessment and Management for Patients Who Undergo Noncardiac Surgery

Emmanuelle Duceppe, MD,^{a,b,c} Joel Parlow, MD, MSc (Co-chair),^d Paul MacDonald, MD,^e
Kristin Lyons, MDCM,^f Michael McMullen, MD,^d Sadeesh Srinathan, MD, MSc,^g
Michelle Graham, MD,^h Vikas Tandon, MD,ⁱ Kim Styles, MD,^j Amal Bessissow, MD, MSc,^k
Daniel I. Sessler, MD,^l Gregory Bryson, MD, MSc,^{m,n} and P.J. Devereaux, MD, PhD (Co-chair)^{b,c,i}

5.2 Troponinas preoperatorias

- **Objetivos:**

1. Herramienta para la **estratificación** del riesgo preoperatorio
2. **Valor "de referencia"** preoperatorio para la interpretación de los valores posoperatorios

Aproximadamente $\frac{1}{4}$ de los pacientes sometidos a cirugía mayor no cardíaca **↑ TnT basales**

EJA

Eur J Anaesthesiol 2018; **35**:815–824

ORIGINAL ARTICLE

Association of pre-operative troponin levels with major adverse cardiac events and mortality after noncardiac surgery

A systematic review and meta-analysis

Jian-Tong Shen*, Miao Xu*, Yan Wu*, Shi-Hong Wen, Xiang Li, Bing-Cheng Zhao and Wen-Qi Huang

5.2 Troponinas preoperatorias

PLOS ONE

OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

Prognostic performance of preoperative cardiac troponin and perioperative changes in cardiac troponin for the prediction of major adverse cardiac events and mortality in noncardiac surgery: A systematic review and meta-analysis

Caroline A. S. Humble, Stephen Huang, Ib Jammer, Jonas Björk, Michelle S. Chew

Published: April 22, 2019 • <https://doi.org/10.1371/journal.pone.0215094>

Systematic review

Meta-analysis of preoperative high-sensitivity cardiac troponin measurement in non-cardiac surgical patients at risk of cardiovascular complications

B.-C. Zhao¹, W.-F. Liu¹, Q.-W. Deng², P.-P. Zhuang¹, J. Liu¹, C. Li¹ and K.-X. Liu¹ on behalf of the PREvention of Vascular Events after Non-cardiac surGERy (PREVENGE) investigators

Departments of Anaesthesiology, ¹Nanfeng Hospital, Southern Medical University, and ²First Affiliated Hospital, Sun Yat-Sen University, Guangzhou, China

Correspondence to: Dr K.-X. Liu, Department of Anaesthesiology, Southern Medical University, Nanfang Hospital, 1838 Guangzhou Avenue North, Guangzhou 510515, China (e-mail: liukexuan705@163.com)



Eur J Anaesthesiol 2018; **35**:815–824

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5.2 Troponinas preoperatorias

La evidencia actual sugiere que los **niveles altos de Tn preoperatorios** se asocian significativamente con **eventos cardíacos adversos** y **mortalidad** después de una cirugía no cardíaca.

PERO...

SARTD-CHGUV Sesión de Formación Continuada
Valencia 14 de Septiembre de 2021

5.2 Troponinas preoperatorias

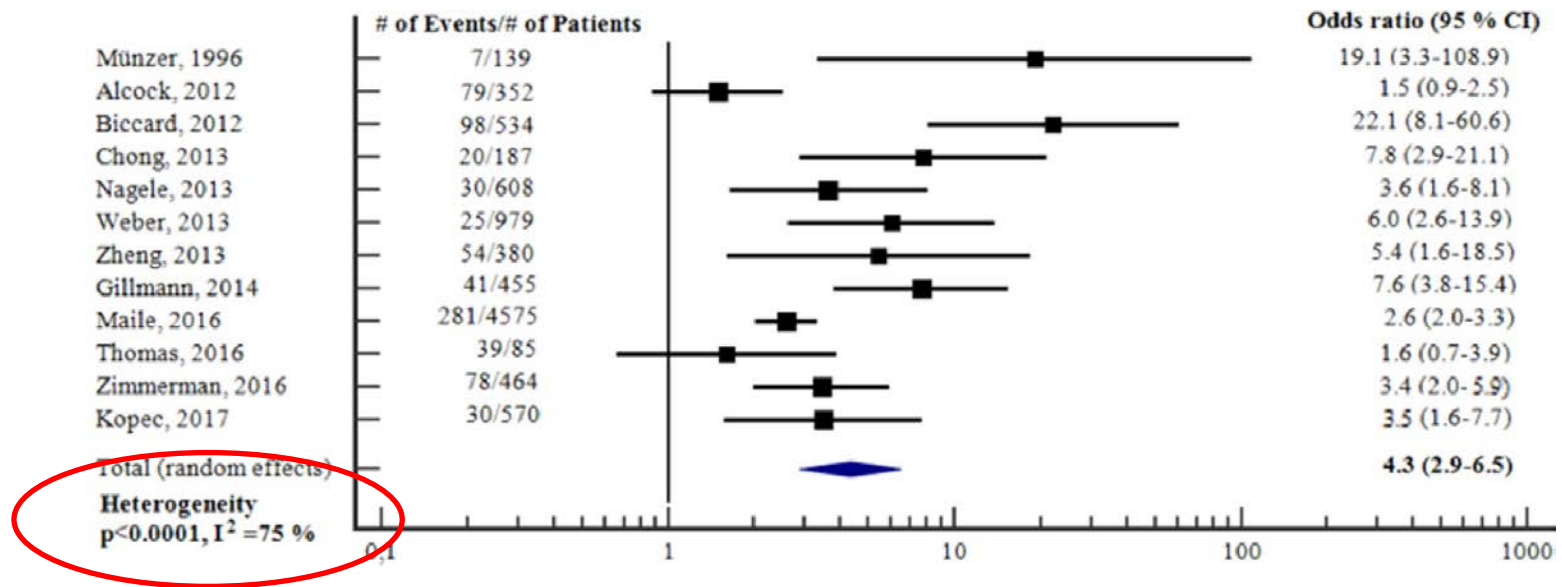
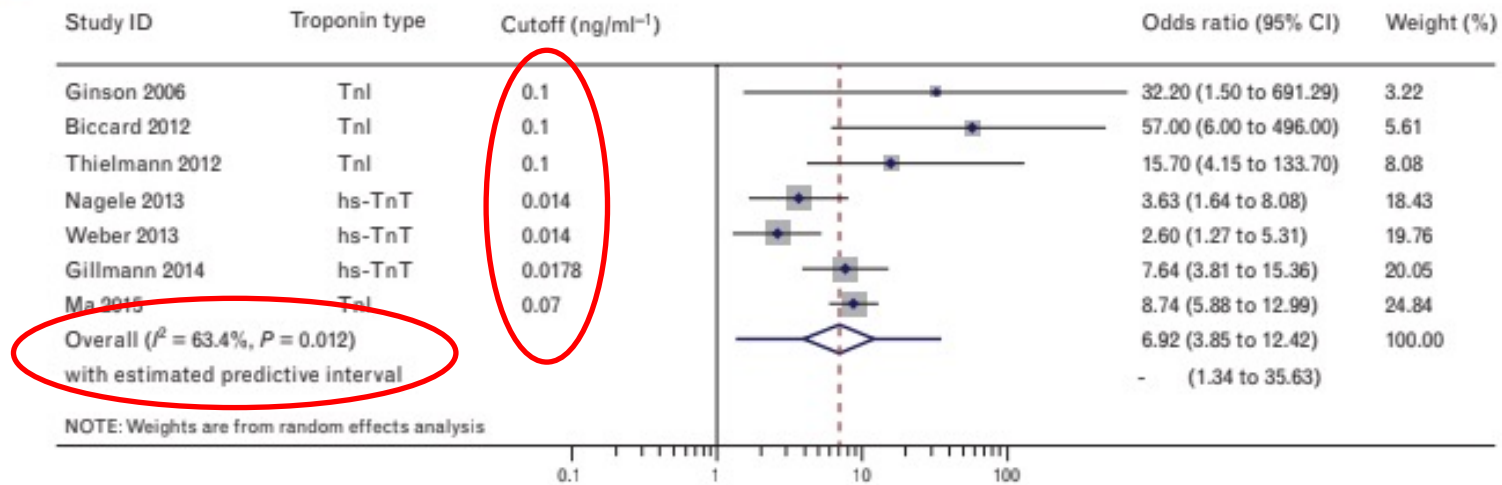


Fig. 2. Forest Plot que muestra los Odds ratios no ajustados para la elevación de la cTn preoperatoria como predictor de resultados adversos a corto plazo.

5.2 Troponinas

pre **EJA** AS

Fig. 2



Risk of major adverse cardiac event for patients with elevated pre-operative troponin versus those with normal levels during short-term follow-up. CI, confidence interval; OR, odds ratio.

Fig. 2. Forest Plot que muestra el riesgo de MACE para pacientes con troponina preoperatoria elevada versus aquellos con niveles normales durante el seguimiento a corto plazo

5.2 Troponinas preoperatorias

- Alta **heterogeneidad**
- Umbrales de **Tn no unificados**
- SROC con valor px de la cTn preOP moderado (**AUC 0.68**)
- **¿Cómo adecuar el manejo clínico a la información px?**

No se recomienda como herramienta de evaluación preoperatoria del riesgo.

Medir la Tn preoperatoria solo si está planificada la monitorización de la Tn posoperatoria.

5.3. Troponinas **Post**operatorias

Las mediciones de Tn posoperatorias tienen como **objetivo** detectar eventos cardíacos agudos potencialmente fatales.



PeriOperative ISchemic Evaluation-2 Trial

5.3. Troponinas **Post**operatorias

Las mediciones de Tn posoperatorias tienen como **objetivo** detectar eventos cardíacos agudos potencialmente fatales.



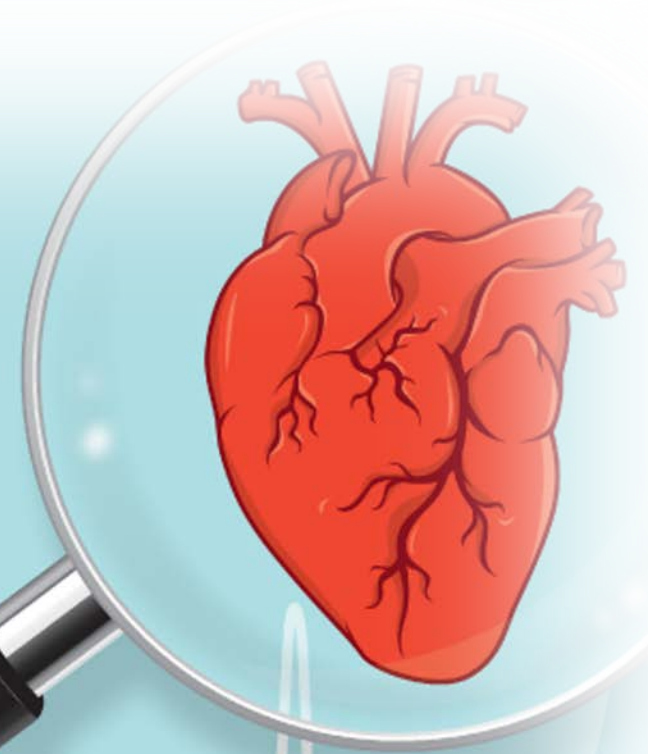
PeriOperative ISchemic Evaluation-2 Trial

MINS

Miocardial injury after noncardiac surgery

Lesión miocárdica con elevación de tn + al menos un valor por encima del LSN

MINS: Lesión del miocardio durante los primeros 30 días después de una cirugía no cardíaca debido a una **etiología isquémica**.



Incluye Infarto de Miocardio y pacientes con elevaciones posoperatorias de troponina pero que no presentan síntomas ni alteraciones ECG.

No incluye lesiones miocárdicas debida a una etiología no isquémica documentada (por ejemplo, fibrilación auricular rápida, sepsis, embolia



Perioperative Myocardial Injury After Noncardiac Surgery

Incidence, Mortality, and Characterization

MINS

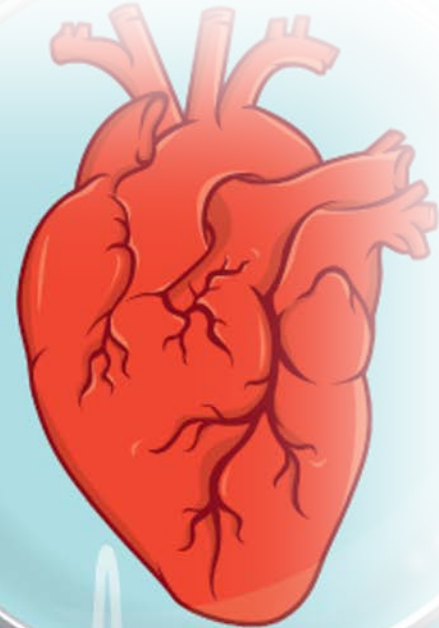
Aproximadamente el 20% de los pacientes ≥ 45 años de edad sometidos a cirugía no cardíaca experimentaron MINS

77% en 1º DPO

MINS



- Dolor torácico típico
- Otros síntomas isquémicos
- Alteracion EKG o Imagen
- Silente



Puelacher C, Lurati Buse G, Seeberger D, et al; BASEL-PMI Investigators. Perioperative myocardial injury after non- cardiac surgery: incidence, mortality, and characterization. Circulation. 2018;137:1221–1232.



JAMA | Original Investigation

Association of Postoperative High-Sensitivity Troponin Levels With Myocardial Injury and 30-Day Mortality Among Patients Undergoing Noncardiac Surgery

Writing Committee for the VISION Study Investigators

La mortalidad a 30 días es similar entre **MINS asintomáticos** y aquellos con **≥ 1 característica isquémica**

8,7% [IC 95%, 4,2-16,7] vs **10,4%** [IC 95%, 6,7-15,7],
P = 0,68)

Writing Committee for the VISION Study Investigators. Association of Postoperative High-Sensitivity Troponin Levels With Myocardial Injury and 30-Day Mortality Among Patients Undergoing Noncardiac Surgery. *JAMA*. 2017;317(16):1642–1651. doi:10.1001/jama.2017.4360



Association of Postoperative High-Sensitivity Troponin Levels With Myocardial Injury and 30-Day Mortality Among Patients Undergoing Noncardiac Surgery

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8,7% [IC 95%, 4,2-16,7] vs **10,4%** [IC 95%, 6,7-15,7], $p = 0,68$)

Se hace patente la importancia de la **PREVENCIÓN**, pronto **RECONOCIMIENTO** y **TRATAMIENTO PRECOZ** de esta problemática

5.3. Troponinas **Post**operatorias

- **Casi 1 de cada 5 pacientes (>45 años) postoperatorios tiene Tn posoperatorias alta**
 - La medición universal de Tn postoperatorias en **pacientes de alto riesgo** identifica a un gran grupo de pacientes **asintomáticos con lesión miocárdica** que de otra manera no serían reconocidos
- **MINS asintomática**



5.3. Troponinas **Post**operatorias

- Los niveles de hsTnT posoperatoria se asociaron significativamente con:
 - >Mortalidad a **los 30 días** (incluso en ausencia de una característica isquémica)
 - **Valor del pico de Tn postoperatorios tiene un significado pronóstico.**

> Mortalidad por todas las causas al año



5.3. Troponinas **Postoperatorias**

- ¿Cuándo?

Se recomienda la vigilancia posoperatoria en:

- Pacientes **alto riesgo** (RCRI ≥ 1 p o ≥ 65 años o 45 - 64 años + Hx de aterosclerosis)
- Niveles de **BNP preoperatorios elevados.**

Medir una troponina inmediatamente después de la operación y una vez al día hasta el día 3 del posoperatorio.



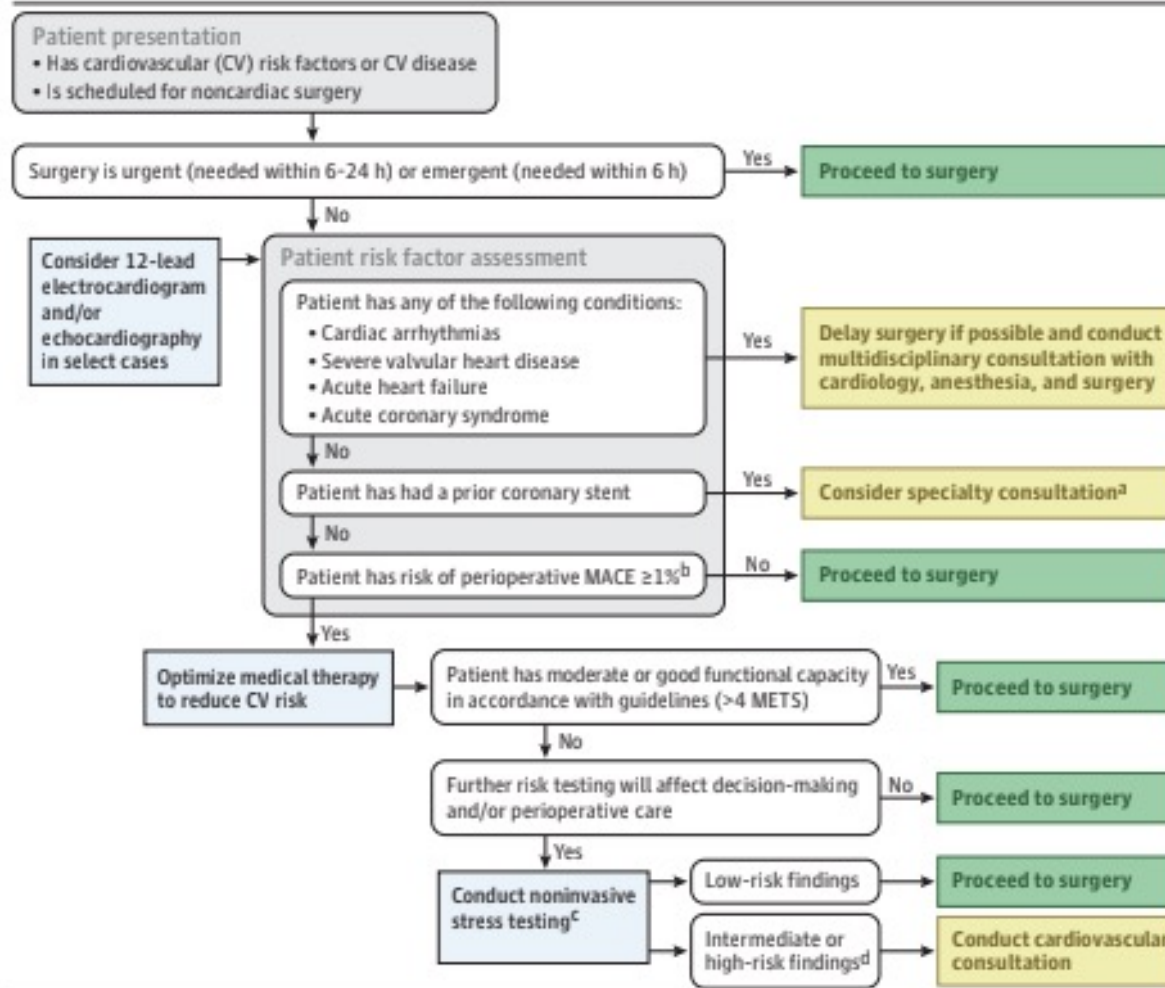
Algunas propuestas....

JAMA | Review

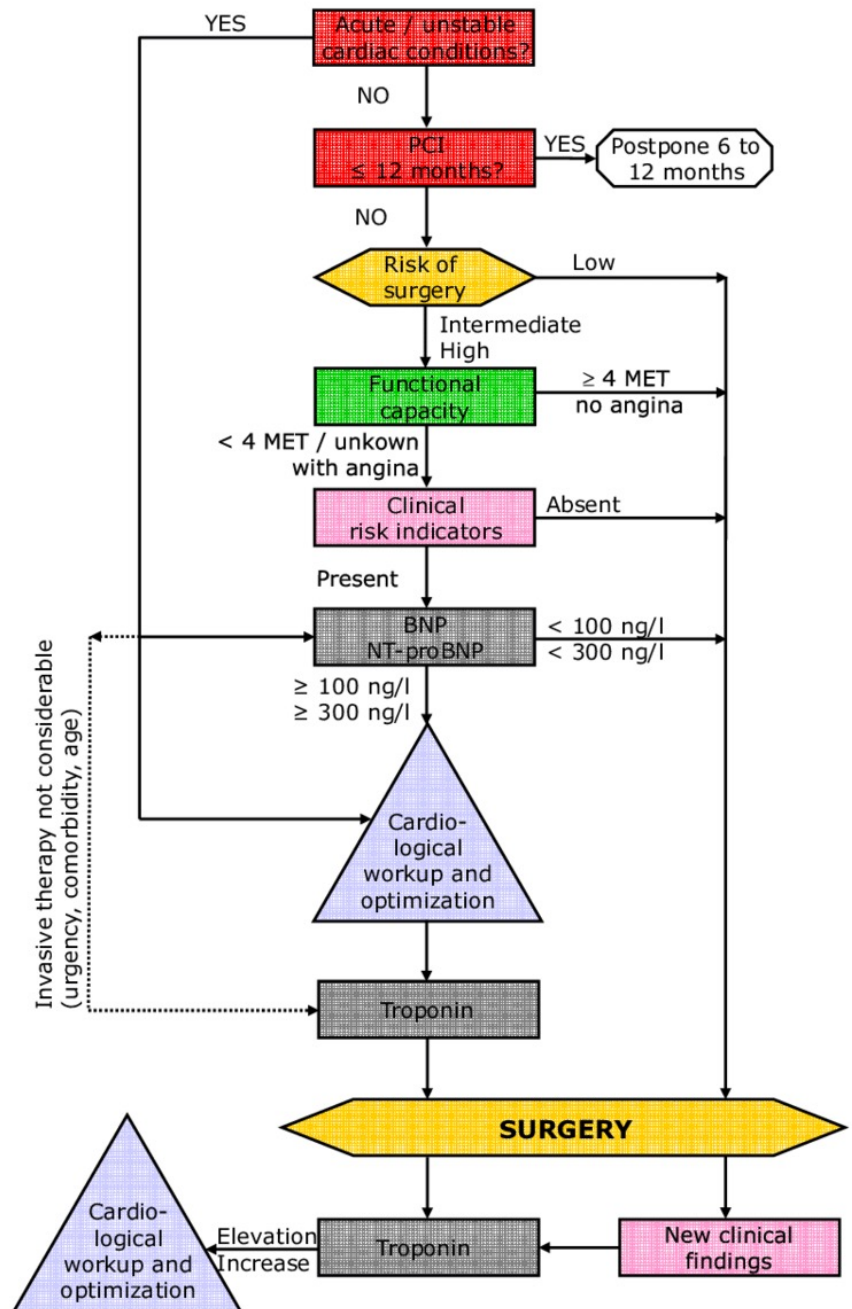
Perioperative Cardiovascular Risk Assessment and Management for Noncardiac Surgery A Review

Nathaniel R. Smilowitz, MD, MS; Jeffrey S. Berger, MD, MS

Figure 1. A Proposed Algorithm for Perioperative Cardiovascular Risk Assessment



Swiss Algorithm



Society Guidelines

Canadian Cardiovascular Society Guidelines on Perioperative Cardiac Risk Assessment and Management for Patients Who Undergo Noncardiac Surgery

Emmanuelle Duceppe, MD,^{a,b,c} Joel Parlow, MD, MSc (Co-chair),^d Paul MacDonald, MD,^e Kristin Lyons, MDCM,^f Michael McMullen, MD,^d Sadeesh Srinathan, MD, MSc,^g Michelle Graham, MD,^h Vikas Tandon, MD,ⁱ Kim Styles, MD,^j Amal Bessisow, MD, MSc,^k Daniel I. Sessler, MD,^l Gregory Bryson, MD, MSc,^{m,n} and P.J. Devereaux, MD, PhD (Co-chair)^{b,c,i}

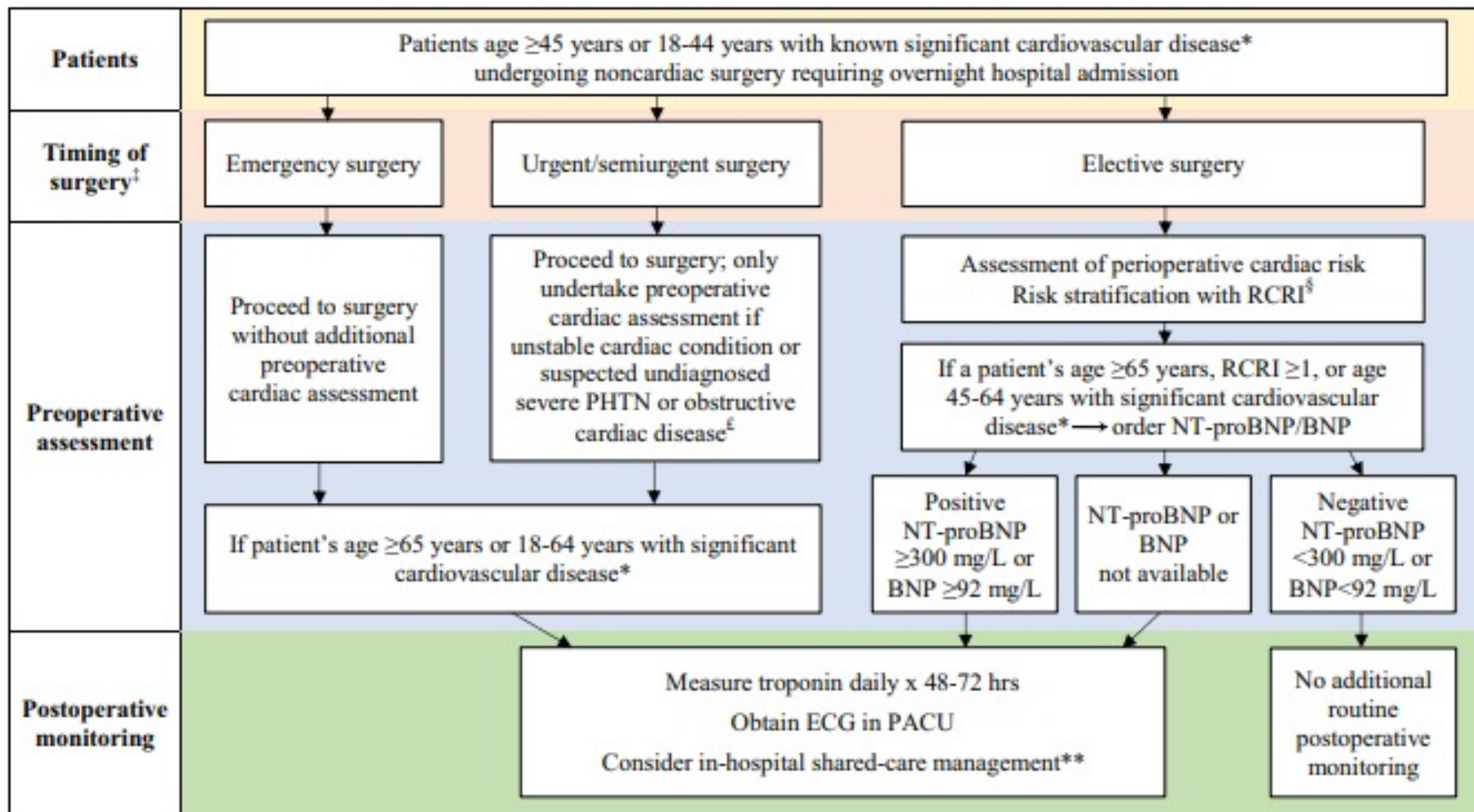


Figure 1 Preoperative risk assessment and postoperative monitoring flow diagram.

BNP, brain natriuretic peptide; ECG, electrocardiogram; NT-proBNP, N-terminal pro-brain natriuretic peptide; PACU, postanesthesia care unit; PHTN, pulmonary hypertension; RCRI, Revised Cardiac Risk Index. * Significant cardiovascular disease includes known history of coronary artery disease, cerebral vascular disease, peripheral artery disease, congestive heart failure, severe PHTN or a severe obstructive intracardiac abnormality (eg, severe aortic stenosis, severe mitral stenosis, or severe hypertrophic obstructive cardiomyopathy). ‡ Timing of surgery refers to emergency surgery (eg, severe trauma, ruptured aortic aneurysm), urgent surgery (eg, hip fracture, bowel obstruction), semiurgent surgery (eg, cancer with potential to metastasize), or elective surgery (eg, knee arthroplasty). £ If physical examination suggests there is an unknown severe obstructive intracardiac abnormality (eg, severe aortic stenosis, severe mitral stenosis, or severe hypertrophic obstructive cardiomyopathy) or severe PHTN, then obtain an echocardiogram before surgery to inform the anesthesiologist, surgeon, and medical team of the type and degree of disease. If the history suggests the patient has an unstable cardiac condition (eg, unstable angina) then discussion with the patient and surgical/medical team is required to decide whether to delay, cancel, or proceed with surgery. § RCRI score (each worth 1 point): history of coronary artery disease, cerebrovascular disease, congestive heart failure, preoperative insulin use, preoperative creatinine > 177 µmol/L, and high-risk surgery (ie, intraperitoneal, intrathoracic, or suprainguinal vascular surgery). ** Shared-care management refers to a multidisciplinary approach to inpatient postoperative care; this includes the surgeon and a medical specialist (eg, internist, cardiologist, gerontologist), who will help with perioperative monitoring and management of cardiovascular complications.



**Canadian Cardiovascular Society Guidelines on
Perioperative Cardiac Risk Assessment and Management
for Patients Who Undergo Noncardiac Surgery**

Emmanuelle Duceppe, MD,^{a,b,c} Joel Parlow, MD, MSc (Co-chair),^d Paul MacDonald, MD,^e
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Daniel I. Sessler, MD,^l Gregory Bryson, MD, MSc,^{m,n} and P.J. Devereaux, MD, PhD (Co-chair)^{b,c,i}

RECOMMENDATION

7. We recommend measuring NT-proBNP or BNP before noncardiac surgery to enhance perioperative cardiac risk estimation in patients who are 65 years of age or older, are 45-64 years of age with significant cardiovascular disease, or have an RCRI score ≥ 1 (Strong Recommendation; Moderate-Quality Evidence).

PROXIMAMENTE...



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2021!



More Info to come soon >



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**SARTD-CHGUV Sesión de Formación Continuada
Valencia 14 de Septiembre de 2021**

PROXIMAMENTE...

Selected categories: GUIDELINES IN DEVELOPMENT X



GUIDELINES IN DEVELOPMENT

Guideline on the use of biomarkers to predict cardiovascular events



GUIDELINES IN DEVELOPMENT

2nd update Task Force for Revision of Severe Perioperative Bleeding Management Guideline [↗](#)



GUIDELINES IN DEVELOPMENT

Revision of the Postoperative Delirium Guideline [↗](#)



GUIDELINES IN DEVELOPMENT

ESAIC/ERC/ESTES Guidelines on Cardiac Arrest in the Operating Room [↗](#)



GUIDELINES IN DEVELOPMENT

Guidelines on regional anaesthesia / antithrombotic drugs [↗](#)



GUIDELINES IN DEVELOPMENT

Preoperative Fasting in Children Guidelines [↗](#)

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The EJA Podcast collection

The EJA Podcast collection is an in-depth view into our Journal's articles and explores conversations with authors, healthcare workers and medical thought leaders throughout the year to discuss topics relevant to Anaesthesia, Intensive Care, Perioperative Care, Pain Management and more.

The EJA Podcast collection...Q&A with Christian Puelacher, author of “Expert consensus on peri-operative myocardial injury screening in noncardiac surgery”.

Duration: 20:42

European Journal of Anaesthesiology | EJA [European Journal of Anaesthesiology](#) | EJA. 38(6):600-608, June 2021
Listen to the Q&A between Prof. Michelle Chew and author Dr Christian Puelacher on his article “Expert consensus on peri-operative myocardial injury screening in noncardiac surgery” and discover further insights.

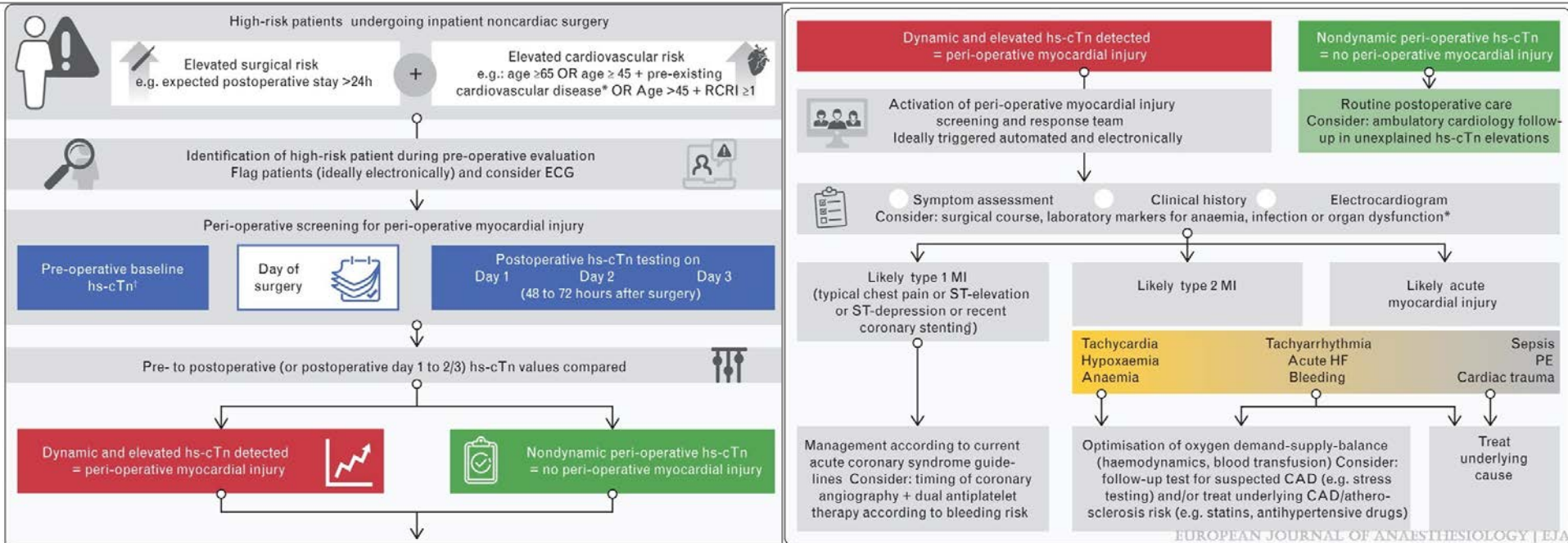
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REVIEW ARTICLE

Expert consensus on peri-operative myocardial injury screening in noncardiac surgery

A literature review

Christian Puelacher, Bernardo Bollen Pinto, Nicholas L. Mills, Emmanuelle Duceppe, Ekaterine Popova, Andreas Duma, Peter Nagele, Torbjørn Omland, Angelika Hammerer-Lercher and Giovanna Lurati Buse



6. LIMITACIONES

1. Faltan ejemplos de como aplicar las vías de manejo perioperatorio guiadas por biomarcadores y su IMPACTO
2. Se desconocen los puntos de cortes adecuados para los diferentes biomarcadores

6. LIMITACIONES

3.- Se desconoce manejo preoperatorios de elevaciones de Tn en pacientes con troponinas elevadas crónicamente.

4.- Falta evidencia de que el tratamiento de pacientes con MINS reduzca la mortalidad y mejore los resultados pronósticos.

7. CONCLUSIONES

1. Los biomarcadores cardíacos para las evaluaciones de riesgo perioperatorio
→ **cambio de paradigma en la medicina perioperatoria.**
2. Los **niveles preoperatorios de péptidos natriuréticos mejoran los índices de riesgo**

7. CONCLUSIONES

3.- Son necesarios los **niveles Tn preop**

4.- Las **Tn postop** identifican a los pacientes con **MINS**

5.- Se recomienda realizar **screening** preop en pacientes **asintomáticos** con un **alto riesgo cardíaco**.

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