

INDICACIÓN Y EVALUACIÓN DE PRUEBAS CARDIOLÓGICAS PREOPERATORIAS

I Curso de Medicina Preoperatoria del HGUGM

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MAGNITUD DEL PROBLEMA

- ▶ Aumento de cirugía mayor en pacientes de más edad.
- ▶ Pacientes de entre 75-85 años el 19% hombres y 12% mujeres tienen enfermedad cardiovascular
- ▶ Evaluación cardiovascular para establecer el riesgo quirúrgico.



EVALUACIÓN PREQUIRÚRGICA

1. Tipo de cirugía
1. Evaluación del paciente



TIPO DE CIRUGÍA

Low-risk < 1%	Intermediate-risk 1–5%	High-risk > 5%
▪ Breast ▪ Dental ▪ Endocrine ▪ Eye ▪ Gynaecology ▪ Reconstructive ▪ Orthopaedic—minor (knee surgery) ▪ Urologic—minor	▪ Abdominal ▪ Carotid ▪ Peripheral arterial angioplasty ▪ Endovascular aneurysm repair ▪ Head and neck surgery ▪ Neurological/orthopaedic—major (hip and spine surgery) ▪ Pulmonary renal/liver transplant ▪ Urologic—major	▪ Aortic and major vascular surgery ▪ Peripheral vascular surgery

ESC Guidelines. Eur Heart J. 2009;30:2769-2812

EVALUACIÓN DEL PACIENTE

- ▶ Historia y exploración física
- ▶ Analítica de sangre y radiografía de tórax.
- ▶ ECG en varones >40 años y mujeres >55 años

EVALUACIÓN DEL PACIENTE

Recommendations on ECG

Recommendations	Class ^a	Level ^b
Pre-operative ECG is recommended for patients who have risk factor(s) and are scheduled for intermediate- or high-risk surgery	I	B
Pre-operative ECG should be considered for patients who have risk factor(s) and are scheduled for low-risk surgery	IIa	B
Pre-operative ECG may be considered for patients who have no risk factor and are scheduled for intermediate-risk surgery	IIb	B
Pre-operative ECG is not recommended for patients who have no risk factor and are scheduled for low-risk surgery	III	B

EVALUACIÓN DEL PACIENTE

► Factores de riesgo cardiovasculares del paciente

Table 12 Unstable cardiac conditions

Unstable angina pectoris
Acute heart failure
Significant cardiac arrhythmias
Symptomatic valvular disease
Recent MI^a and residual ischemia

^aAn MI within 30 days, according to the definition of the ESC

Table 13 Clinical risk factors

Angina pectoris
Prior MI^a
Heart failure
Stroke/transient ischaemic attack
Renal dysfunction (creatinine clearance < 30 mL/min)
Diabetes mellitus

Edad avanzada >70 años

Alteraciones en el ECG

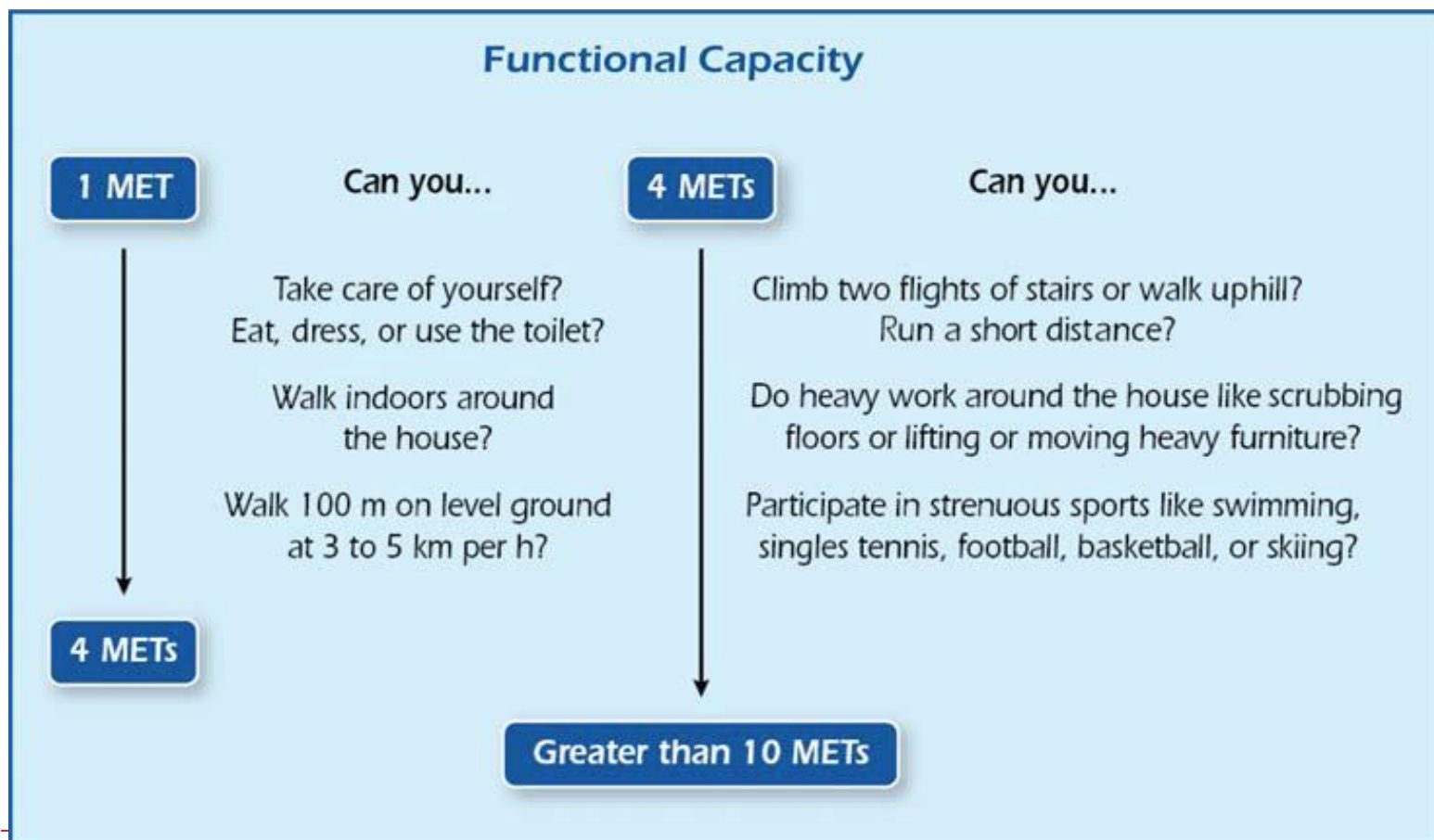
- Hipertrofia de VI
- BCRI
- Alteraciones del ST

Ausencia de ritmo sinusal

Hipertensión arterial no controlada

EVALUACIÓN DEL PACIENTE

► Evaluación de la capacidad funcional



Recommendations for Perioperative Cardiac Assessment

Class I

1. Patients who have a need for emergency noncardiac surgery should proceed to the operating room and continue perioperative surveillance and postoperative risk stratification and risk factor management. (*Level of Evidence: C*)
2. Patients with active cardiac conditions* should be evaluated and treated per ACC/AHA guidelines and, if appropriate, consider proceeding to the operating room. (*Level of Evidence: B*)
3. Patients undergoing low-risk surgery are recommended to proceed to planned surgery.† (*Level of Evidence: B*)
4. Patients with poor (less than 4 METs) or unknown functional capacity and no clinical risk factors‡ should proceed with planned surgery.† (*Level of Evidence: B*)

Class IIa

1. It is probably recommended that patients with functional capacity greater than or equal to 4 METs without symptoms§ proceed to planned surgery.|| (*Level of Evidence: B*)

2. It is probably recommended that patients with poor (less than 4 METs) or unknown functional capacity and 3 or more clinical risk factors‡ who are scheduled for vascular surgery consider testing if it will change management.|| (*Level of Evidence: B*)
3. It is probably recommended that patients with poor (less than 4 METs) or unknown functional capacity and 3 or more clinical risk factors‡ who are scheduled for intermediate-risk surgery proceed with planned surgery with heart rate control.|| (*Level of Evidence: B*)
4. It is probably recommended that patients with poor (less than 4 METs) or unknown functional capacity and 1 or 2 clinical risk factors‡ who are scheduled for vascular or intermediate-risk surgery proceed with planned surgery with heart rate control.|| (*Level of Evidence: B*)

Class IIb

1. Noninvasive testing might be considered if it will change management for patients with poor (less than 4 METs) or unknown functional capacity and 3 or more clinical risk factors‡ who are scheduled for intermediate-risk surgery. (*Level of Evidence: B*)
2. Noninvasive testing might be considered if it will change management for patients with poor (less than 4 METs) or unknown functional capacity and 1 or 2 clinical risk factors‡ who are scheduled for vascular or intermediate-risk surgery. (*Level of Evidence: B*)

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- ▶ Ecocardiograma
 - ▶ Pruebas no invasivas de detección de isquemia
 - ▶ Ergometría
 - ▶ Ecocardiografía de estrés
 - ▶ Ejercicio
 - ▶ Farmacológico
 - ▶ Imágenes de perfusión miocárdica

Recommendations on resting echocardiography

Recommendations

Class

Rest echocardiography for LV assessment should be considered in patients undergoing high-risk surgery

IIa

Rest echocardiography for LV assessment in asymptomatic patients is not recommended

III

Recommendations for Preoperative Noninvasive Evaluation of LV Function

Class IIa

1. It is reasonable for patients with dyspnea of unknown origin to undergo preoperative evaluation of LV function. (*Level of Evidence: C*)
2. It is reasonable for patients with current or prior HF with worsening dyspnea or other change in clinical status to undergo preoperative evaluation of LV function if not performed within 12 months. (*Level of Evidence: C*)

Class IIb

1. Reassessment of LV function in clinically stable patients with previously documented cardiomyopathy is not well established. (*Level of Evidence: C*)

Class III

1. Routine perioperative evaluation of LV function in patients is not recommended. (*Level of Evidence: B*)

- ▶ Evaluación de la función ventricular (FEVI)
- ▶ Severidad de valvulopatías

ACCF/AHA Guidelines. Circulation. 2009;120:169-276

ESC Guidelines. Eur Heart J. 2009;30:2769-2812

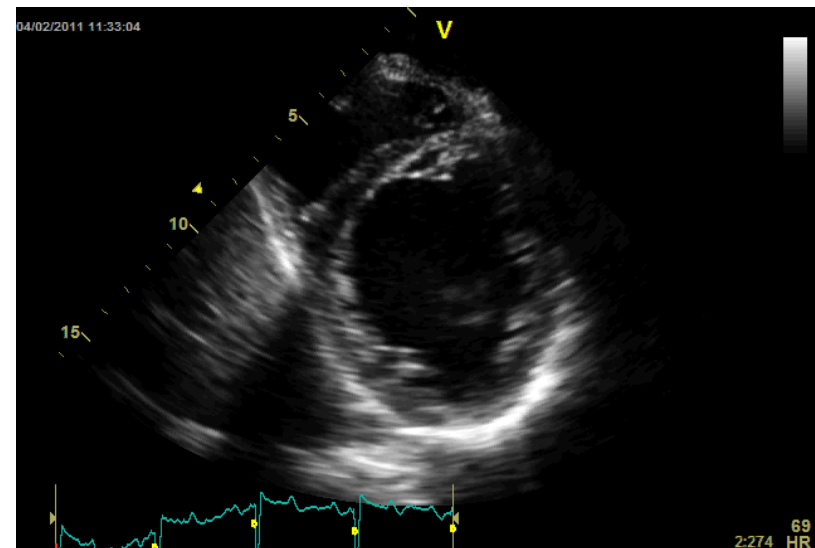
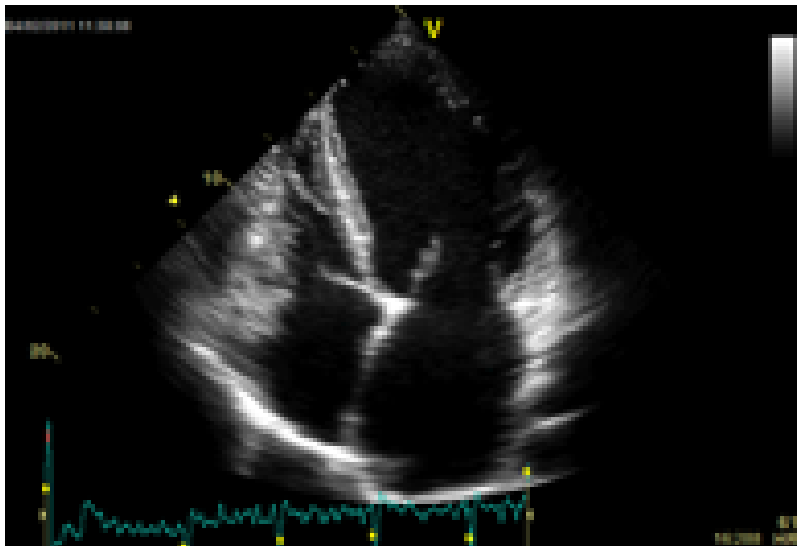
INTERVENTIONAL CARDIOLOGY AND SURGERY

A meta-analysis comparing the prognostic accuracy of six diagnostic tests for predicting perioperative cardiac risk in patients undergoing major vascular surgery

M D Kertai, E Boersma, J J Bax, M H Heijenbrok-Kal, M G M Hunink, G J L'talien, J R T C Roelandt, H van Urk, D Poldermans

Heart 2003;89:1327-1334

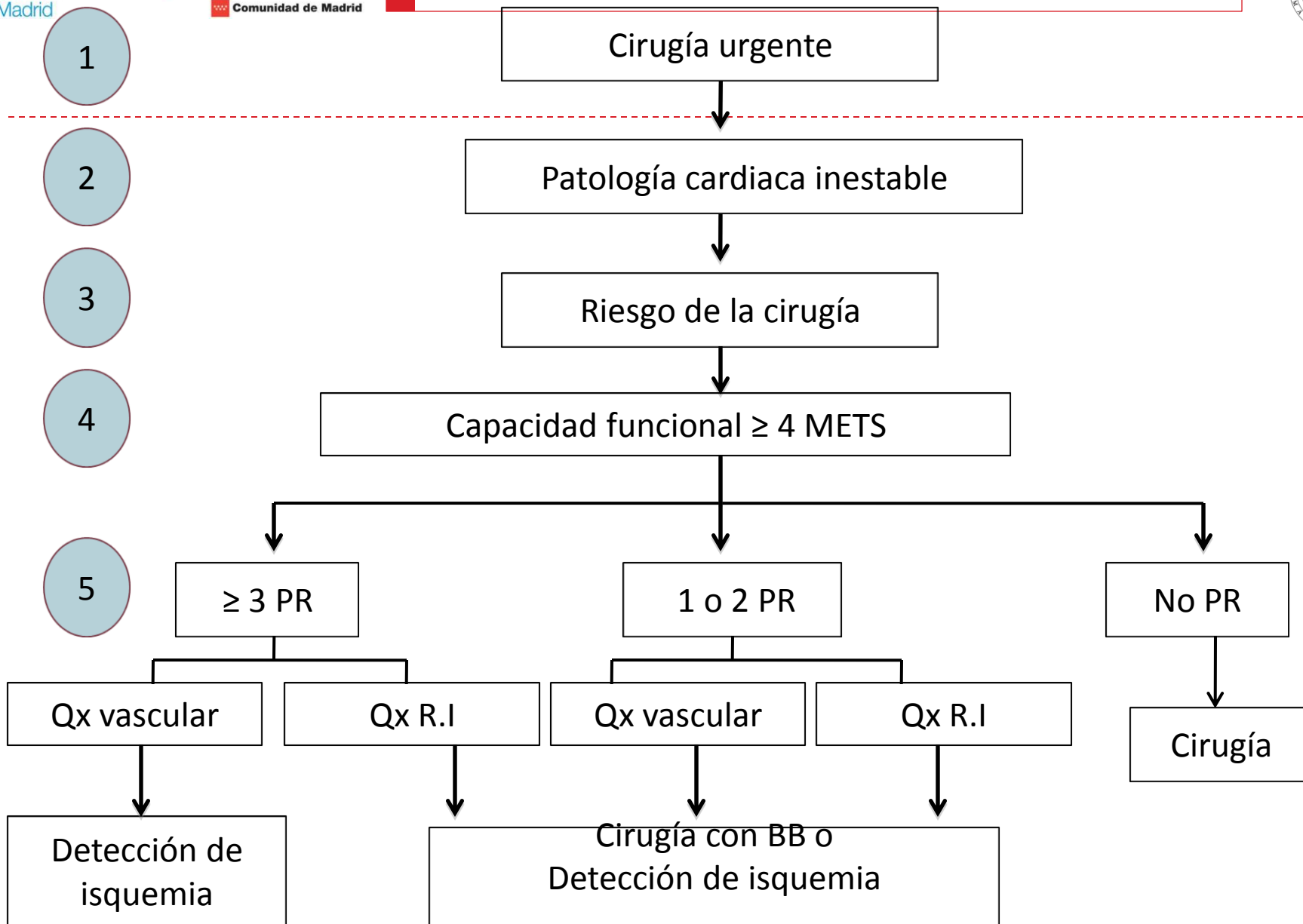
- FEVI < 35% mostraba una S 50%, E 92% y VPN 90% para la predicción de IAM o muerte cardíaca en el perioperatorio.



PRUEBAS NO INVASIVAS DE DETECCIÓN DE ISQUEMIA

Recommendations on stress testing prior to surgery

Recommendations	Class ^a	Level ^b
Stress testing is recommended in high-risk surgery patients with ≥ 3 clinical factors ^c	I	C
Stress testing may be considered in high-risk surgery patients with ≤ 2 clinical factors	IIb	B
Stress testing may be considered in intermediate-risk surgery	IIb	C
Stress testing is not recommended in low-risk surgery	III	C



PRUEBAS NO INVASIVAS DE DETECCIÓN DE ISQUEMIA

- ▶ Ergometría
- ▶ Ecocardiografía de estrés
 - ▶ Ejercicio
 - ▶ Farmacológico
- ▶ Imágenes de perfusión miocárdica
- ▶ RMN

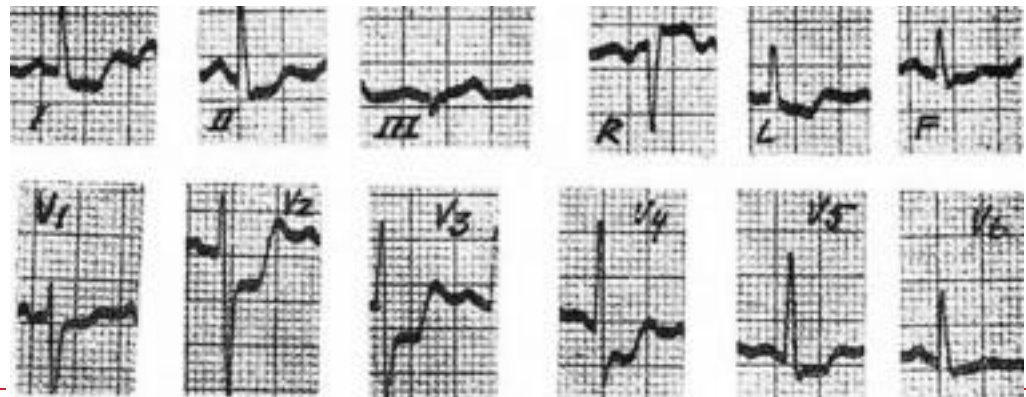
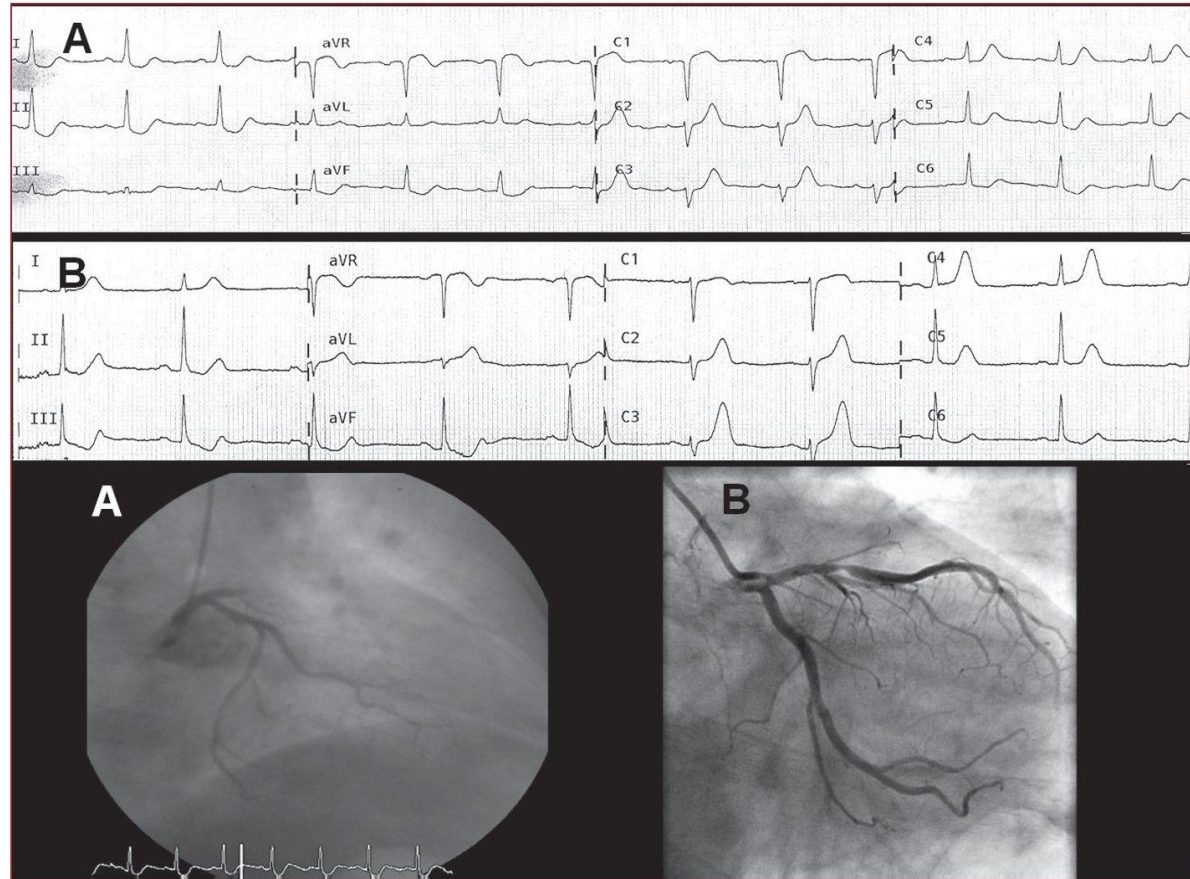


ERGOMETRÍA

- La más utilizada para el diagnóstico no invasivo de isquemia.
- Evalúa capacidad funcional, TA y FC con el ejercicio.
- Limitaciones
 - Alteraciones basales en el ECG
 - Incapacidad para realizar ejercicio
 - Sensibilidad (60%), especificidad (70%)



SEAC



PRUEBAS NO INVASIVAS DE DETECCIÓN DE ISQUEMIA

- ▶ Ergometría
- ▶ Imágenes de perfusión miocárdica
- ▶ Ecocardiografía de estrés
 - ▶ Ejercicio
 - ▶ Farmacológico
- ▶ RMN



IMÁGENES DE PERFUSIÓN MIOCÁRDICA

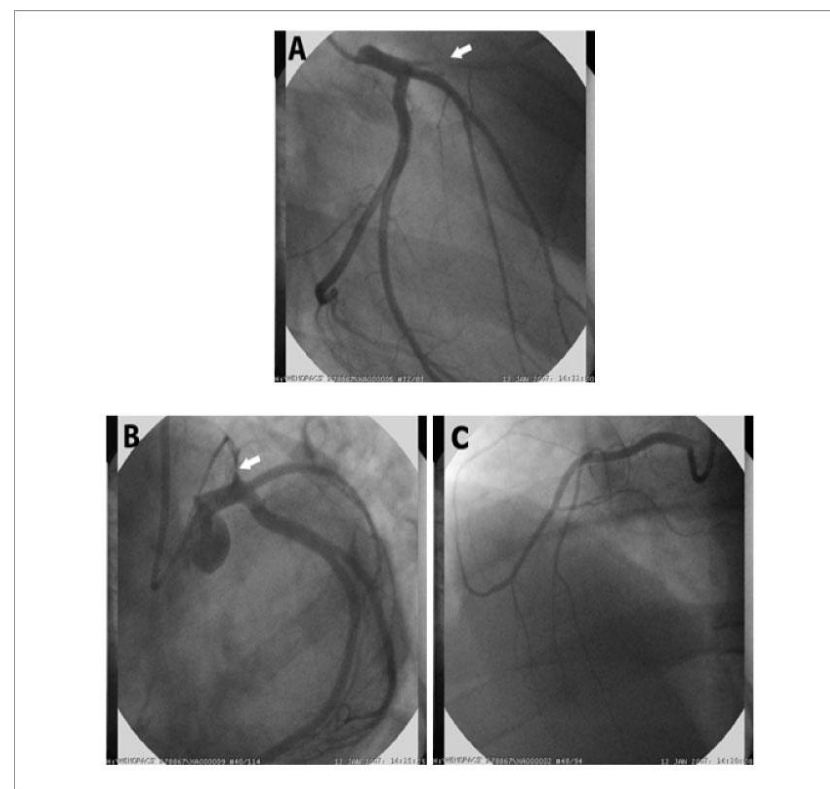
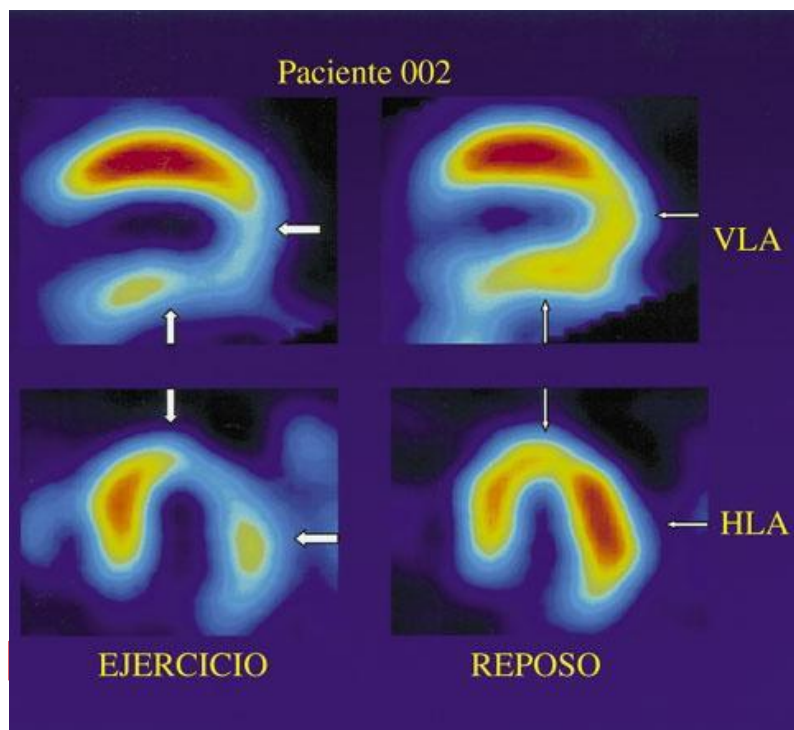
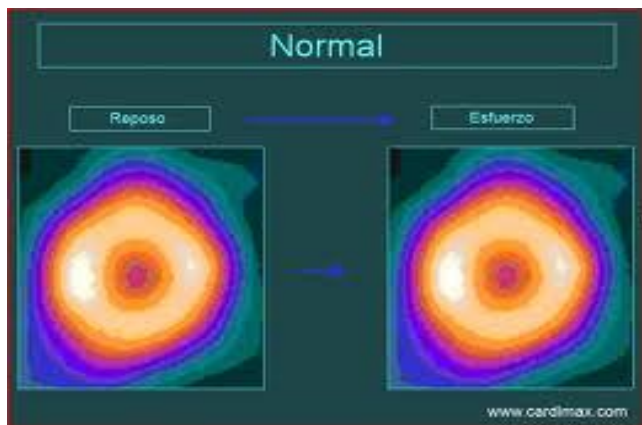


Figura 2 - Angiografías coronarias mostrando una lesión en la arteria coronaria descendente anterior izquierda con obstrucción estimada del 99% (Paneles A y B) y una arteria coronaria derecha normal (Panel C).

Semiquantitative dipyridamole myocardial stress perfusion imaging for cardiac risk assessment before noncardiac vascular surgery: A metaanalysis

Edward Etchells, MD, MSc,^{a,c} Maureen Meade, MD, MSc (Epid),^e George Tomlinson, PhD,^{b,d} and Deborah Cook, MD, MSc (Epid),^e *Toronto and Hamilton, Ontario, Canada* (J Vasc Surg 2002;36:534-40.)

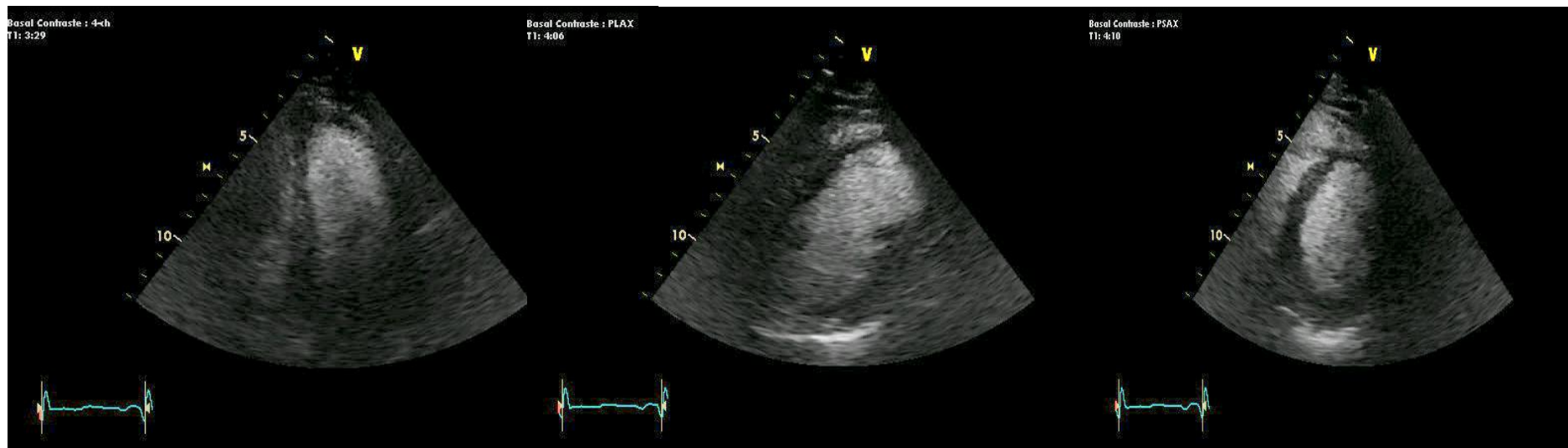
<i>Extent of reversibility</i>	<i>Likelihood ratio (all studies; 95% CI)</i>	<i>Likelihood ratio (excluding studies 26 and 28; 95% CI)</i>	<i>Posttest probability of MI or cardiac death</i>
No defects	0.42 (0.20 - 0.88)	0.18 (0.07 - 0.49)	3.1%
Fixed defects only	<u>0.51 (0.24 - 1.1)</u>	0.46 (0.17 - 1.2)	3.7%
Reversibility <20%	<u>1.3 (0.88 - 1.9)</u>	1.3 (0.86 - 2.0)	8.8%
Reversibility 20%-29%	<u>1.6 (1.0 - 2.6)</u>	1.6 (0.96 - 2.6)	11%
Reversibility 30%-39%	2.9 (1.6 - 5.1)	2.8 (1.4 - 5.4)	18%
Reversibility 40%-49%	2.9 (1.4 - 6.2)	2.9 (1.3 - 6.4)	18%
Reversibility ≥50%	<u>11 (5.8 - 20)</u>	11 (5.6 - 20)	45%



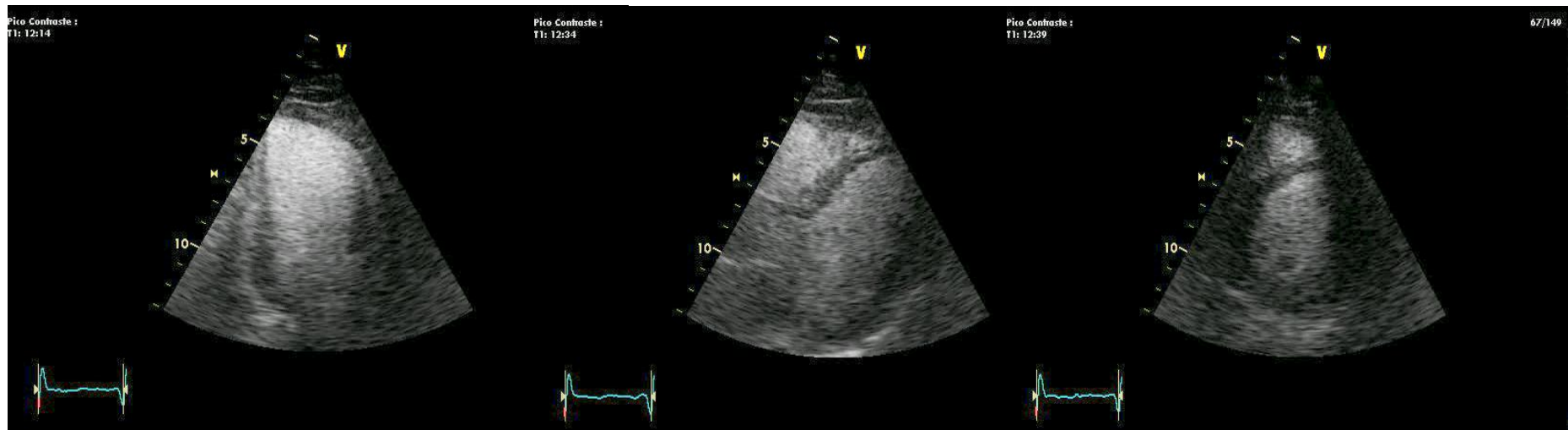
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- ▶ Isquemia= alteraciones de la contracción
 - ▶ Evalúa la presencia y extensión de la isquemia, función VI y valvulopatías.
 - ▶ Ejercicio o farmacológico (dobutamina, dipiridamol, adenosina)
 - ▶ A mayor extensión de isquemia y a menor carga de ejercicio mayor probabilidad de eventos cardiacos.
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BASAL



DOSIS PICO



ECOCARDIOGRAFÍA DE ESTRÉS

- ▶ Ecocardiografía de estrés con DBT es la más utilizada en cirugía vascular.
- ▶ Predictores de eventos perioperatorios
 - ▶ FEVI <35%
 - ▶ Alteraciones extensas en la contracción segmentaria
 - ▶ Aparición a FC<60% FCMT

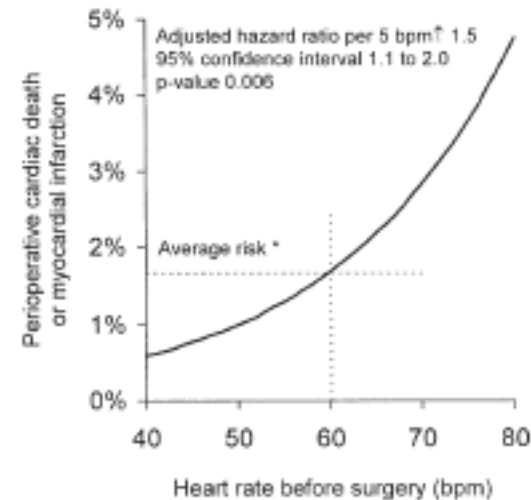
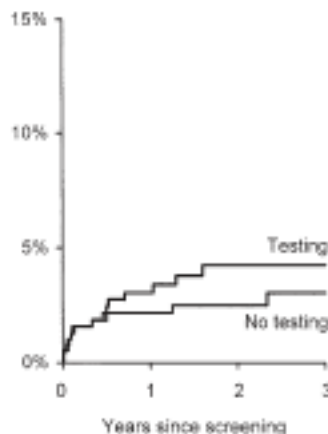
J Am Cardiol. 2000;35:1647-53

J Am Cardiol. 2004;44:85-7

Should Major Vascular Surgery Be Delayed Because of Preoperative Cardiac Testing in Intermediate-Risk Patients Receiving Beta-Blocker Therapy With Tight Heart Rate Control?

(*J Am Coll Cardiol* 2006;48:964–9)

- ▶ El VPP de los defectos reversibles ha disminuido por la mejora en el manejo prequirúrgico.
- ▶ El estudio DECREASE-II demostró que en pacientes de riesgo intermedio tratados con BB no era necesario realizar un test de isquemia para evaluar su pronóstico



ECOCARDIOGRAFÍA DE ESTRÉS

- ▶ Cirugías de alto riesgo en pacientes de riesgo moderado tiene una tasa de eventos 3-7%
- ▶ Disminución mayor con BB prequirúrgicos
- ▶ No es necesario realizar un ecocardiograma con DBT para estimar el riesgo quirúrgico. Útil para la estratificación pronóstica a medio-largo plazo

JAMA. 2001;258:1865-1873

Arch Inter Med.2003;163:2230-5

ANGIOGRAFÍA

- ▶ No está indicada para la valoración del riesgo de cirugías no cardíacas.
- ▶ Pacientes con CI tiene las mismas indicaciones que en aquellos que no van a someterse a Qx.

Recommendations on pre-operative coronary angiography

Recommendations	Class ^a	Level ^b
Pre-operative angiography is recommended in patients with acute STEMI	I	A
Pre-operative angiography is recommended in patients with NSTEMI and unstable angina	I	A
Pre-operative angiography is recommended in patients with angina not controlled with adequate medical therapy	I	A
Pre-operative angiography may be considered in cardiac-stable patients undergoing high-risk surgery	IIb	B
Pre-operative angiography may be considered in cardiac-stable patients undergoing intermediate-risk surgery	IIb	C
Pre-operative angiography is not recommended in cardiac-stable patients undergoing low-risk surgery	III	C

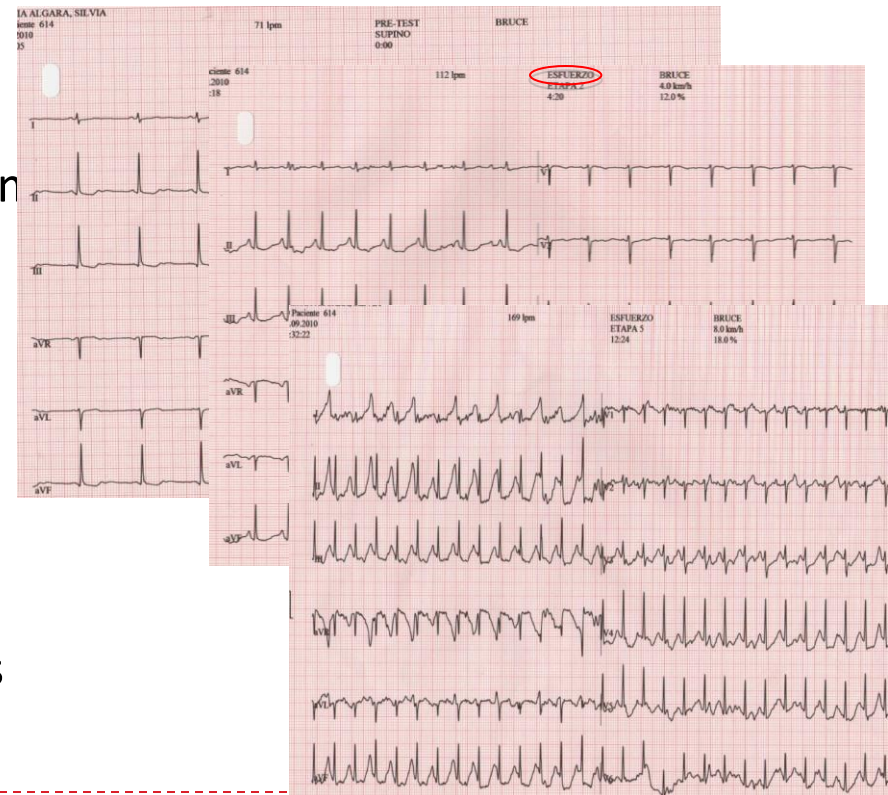
PATOLOGÍAS CARDIACAS ESPECÍFICAS

- ▶ C. Isquémica
- ▶ Insuficiencia cardiaca
- ▶ Valvulopatías
- ▶ Arritmias
- ▶ Miocardiopatía hipertrófica

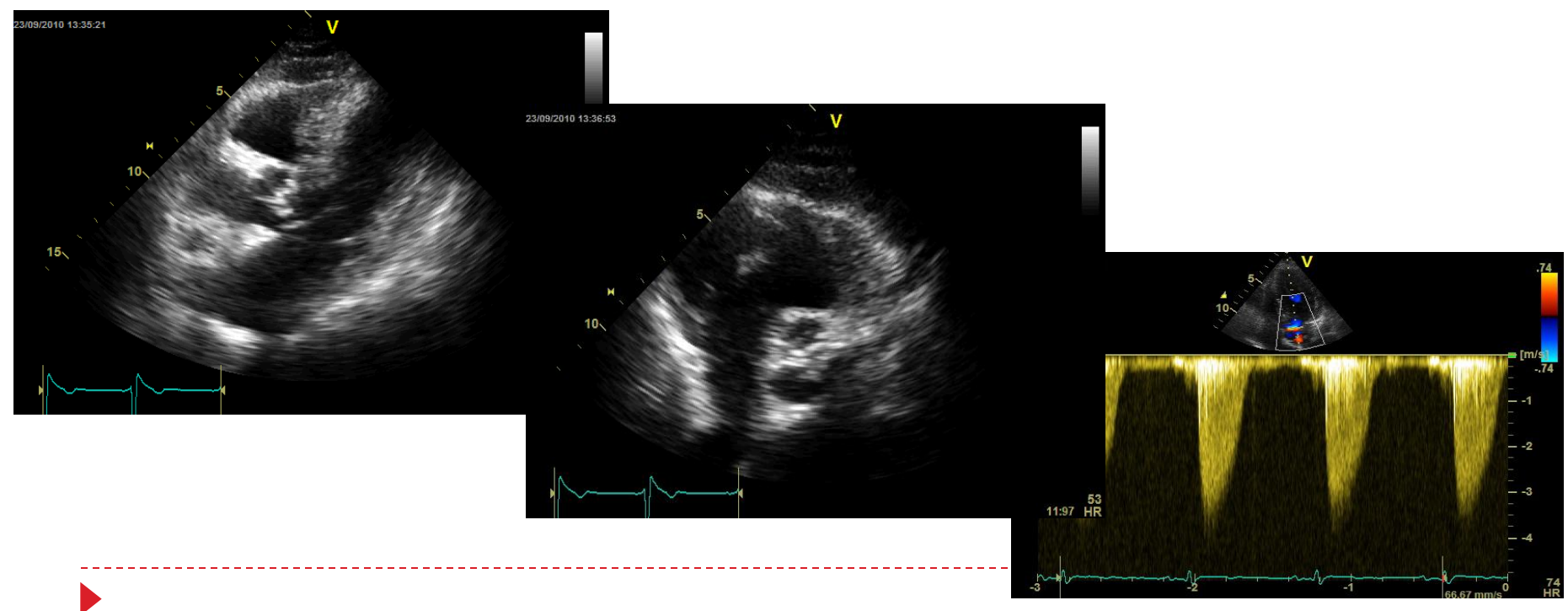


C. ISQUÉMICA

- ▶ Angina de esfuerzo
 - ▶ Capacidad funcional -> ergometría
 - ▶ Coronariografía si
 - ▶ Angina III-IV
 - ▶ Ergometría positiva precoz (<120 lpm)
 - ▶ Hipotensión arterial
- ▶ Si no puede realizar ejercicio
 - ▶ Ecocardiograma de estrés
 - o gammagrafía de perfusión fármacos

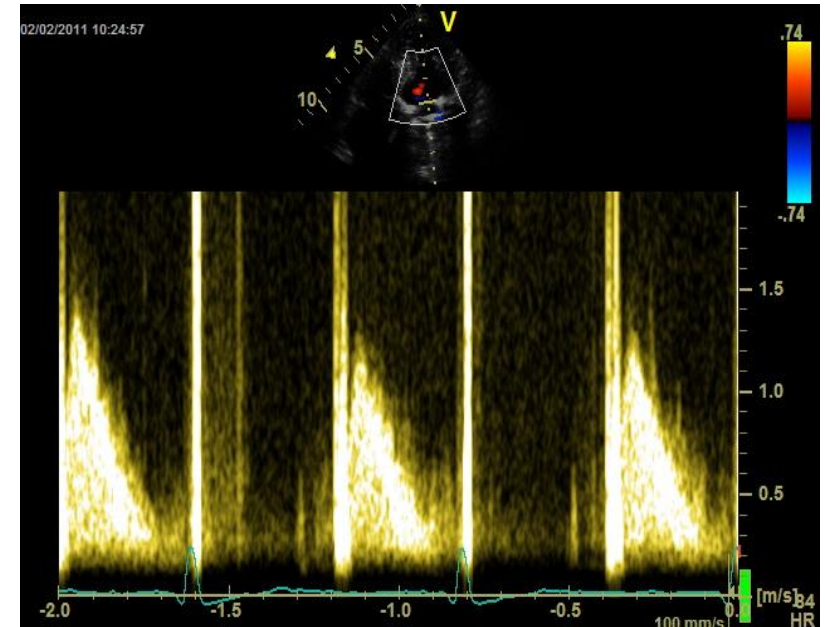
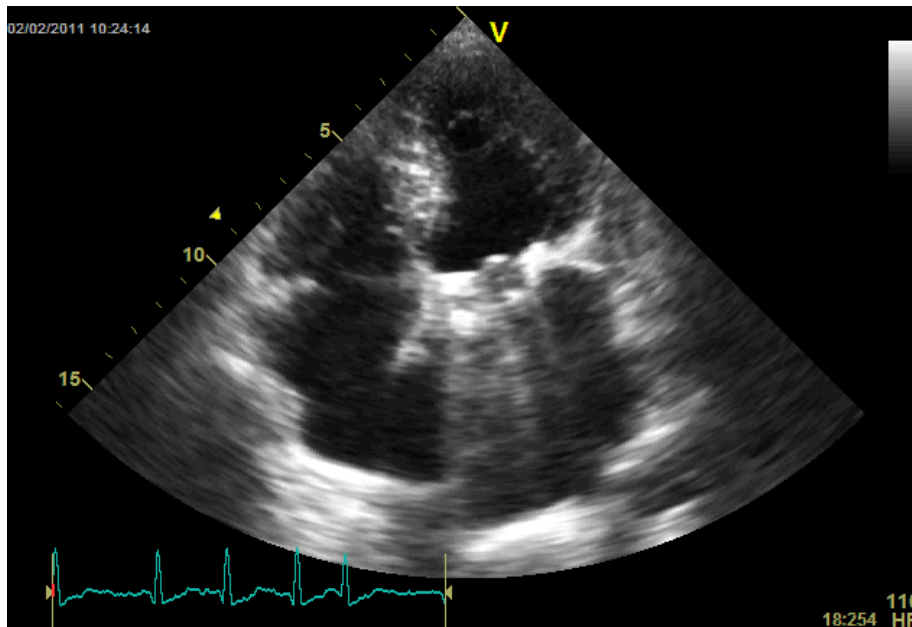


- ▶ Clase funcional I-II riesgo bajo
- ▶ Ecocardiograma para valoración de la severidad
- ▶ Corregir estenosis aórtica severa y estenosis mitral severa sintomática



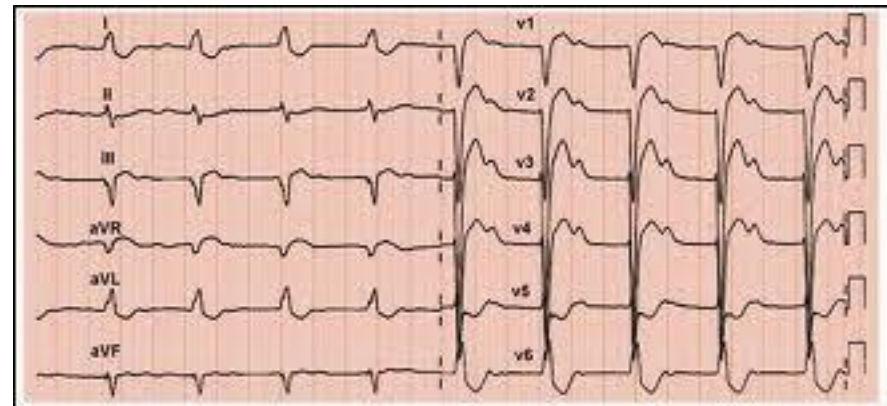
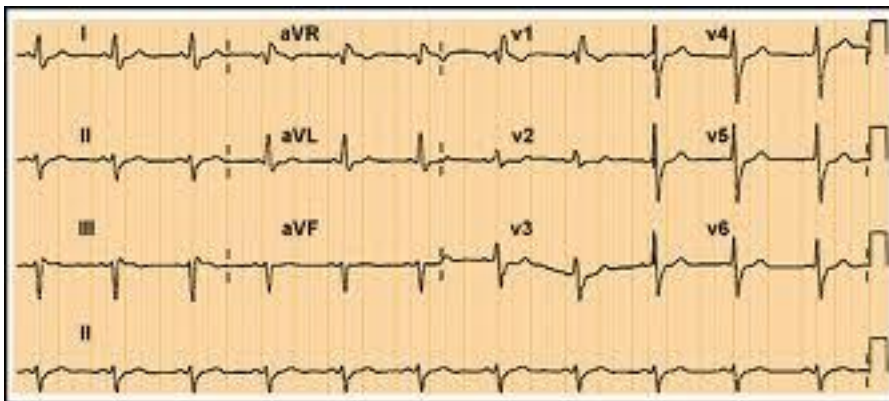
VALVULOPATÍAS

- ▶ Prótesis normofuncionantes no aumentan el riesgo.



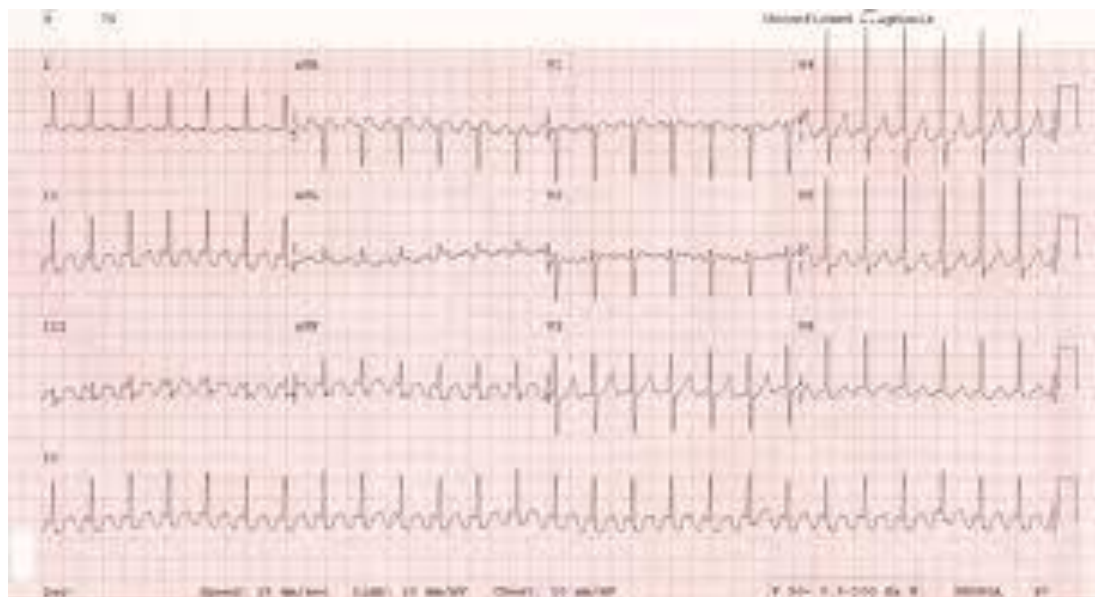
TRASTORNOS DE CONDUCCIÓN

- ▶ BCRI y bloqueo bifascicular hay que descartar cardiopatía estructural
- ▶ Ecocardiograma
- ▶ En pacientes sin cardiopatía no aumenta el riesgo quirúrgico



ARRITMIAS

- ▶ Marcador de cardiopatía estructural
- ▶ Ecocardiograma
- ▶ No aumentan el riesgo quirúrgico en pacientes asintomáticos y con FC controlada



-
1. El envejecimiento progresivo de los pacientes quirúrgicos aumenta la prevalencia de enfermedades cardiovasculares
 1. En una evaluación prequirúrgica hay que tener en cuenta tanto el tipo de cirugía como los factores de riesgo cardiacos del paciente.
 1. En la mayoría de los casos la historia clínica, la EF y las pruebas complementarias básicas son suficientes para evaluar el riesgo cardiológico.
 2. Existen patologías cardiacas agudas que contraindican la cirugía no urgente y patologías predictoras de eventos cardiacos perioperatorios.
 1. El ecocardiograma no debe emplearse de forma rutinaria, pero es imprescindible para valorar la función ventricular y las valvulopatías.
-



CONCLUSIONES

6. Los estudios prequirúrgicos de detección de isquemia deben realizarse en pacientes de alto riesgo candidatos a cirugía vascular
7. Las principales variables predictoras de eventos cardiacos (muerte o IAM) son la cantidad de miocardio en riesgo, la presencia de isquemia con cargas bajas de estrés y la disfunción ventricular severa.
8. En los pacientes con riesgo moderado en tratamiento prequirúrgico con BB, la detección de isquemia no predice los eventos cardiacos perioperatorios, aunque sí tiene valor pronóstico a medio plazo y largo plazo



