Ecocardiograma en el seguimiento
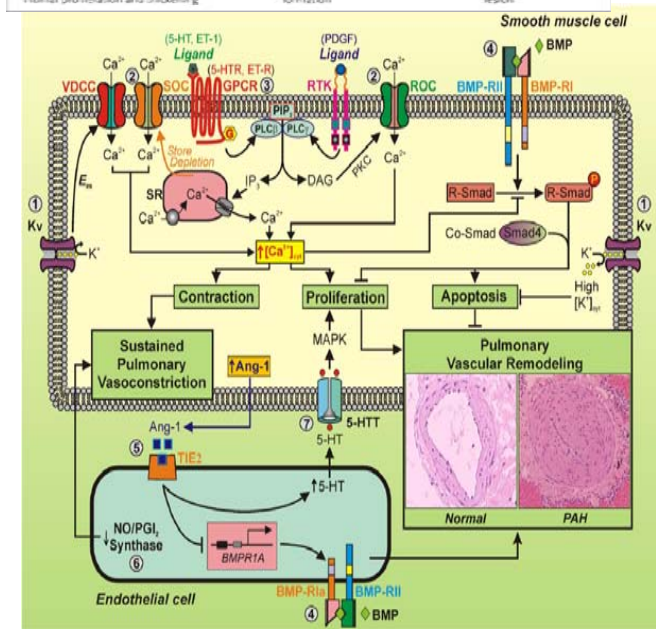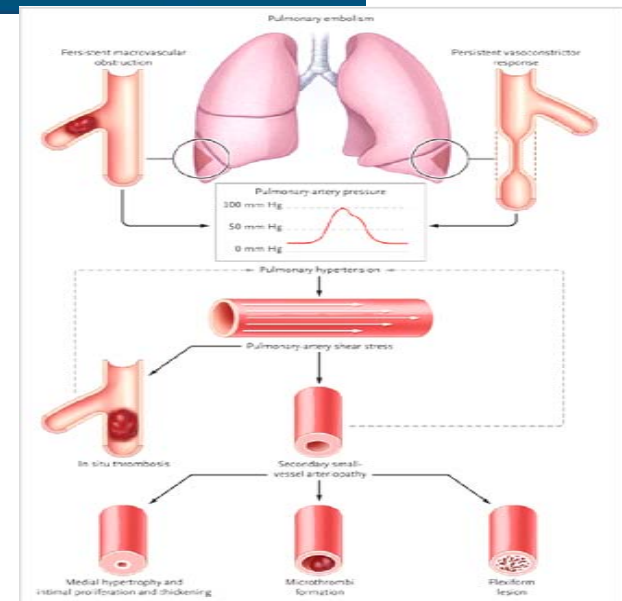
Dra. Remedios Otero Candelera
Servicio de Neumología
Hospital Universitario Virgen del Rocío. Sevilla

MARCO CONCEPTUAL:

– HPTEC es consecuencia de una resolución incompleta de la obstrucción vascular pulmonar asociada a un EP

– HPTEC es una de las principales causas de HTP grave

– La etiopatogenía de la HPTEC es compleja y parcialmente conocida

- La HPTEC es la única causa curable por cirugía sin recurrir al transplante pulmonar

- Los casos no quirúrgicos se beneficiarían de tratamiento médico

- Un diagnóstico certero y precoz es importante para que el tratamiento sea efectivo

- Es dificil predecir la posibilidad de HPTEC. El 91% de test de cribado son negativos.

- El ecocardiograma es la prueba más importante en el screening de HPTEC

Ecocardiograma en el seguimiento

INCIDENCIA SUBESTIMADA

- Fedullo NEJM 2001: 0.1-0.5%

- Pengo NEJM 2004: 3,8% [IC95%: 1,1-6,5] a los 2 años

- Becattini Chest 2006: 1% [IC95%: 0-3,6]

- Dentelli Thrombosis Research 2009: 8,8% a los 6-12 meses [IC95%: 4,5-16,4]

- Martí Arch Bronconeumol 2010: 9,1% a los 2 años [IC95%: 3,7-14,5]

- Klok Haematologica 2010: 1,5% [IC95%: 0.08-3,1]

Ecocardiograma en el seguimiento

Echocardiographic assessment of pulmonary arterial pressure in the follow-up of patients with pulmonary embolism

- **Diseño del estudio**
  - 744 pacientes: cohorte multicentrica Servicios de Neumología
  - Enero 2003-Diciembre 2004
- Pacientes
  - Mayor de 18 años
  - TEP sintomatico
  - TTO: HBPM/rTPA y ACO
- **Valoración clínica**
  - Datos epidemiologicos y clinicos del episodioagudo
  - Indice de severidad del Embolismopulmonar
- **Seguimiento y determinación de las variables de resultados**
  - Cada 6 meses en los dos primeros años. Posteriomente cada año
  - Ante disnea persistente inexplicada a ejercicios o reposo: Ecocardiografía
  - Probable HPTEC si PAPs >50 mmHg.
- **Análisis de resultados**
  - ANOVA
  - Fischer o Chi-square
  - Gráfica de Kaplan-Meier

Echocardiographic assessment of pulmonary arterial pressure in the follow-up of patients with pulmonary embolism

Characteristics of patients with and without clinically suspected CTEPH.

Variable	With clinically suspected CTEPH (n = 121)	Without clinically suspected CTEPH (n = 623)	P
Age, years	63 ± 16	68. 23 ± 16	0.000
Female, n (%)	73 (60%)	322 (52%)	0.050
Patient history			
Comorbidites, n (%)	85 (70%)	478 (77%)	0.069
Heart failure, n (%)	9 (90%)	51 (81%)	0.431
Chronic pulmonary disease, n (%)	18 (95%)	73 (87%)	0.305
Risk factors for thromboembolic disease			
History of thromboembolic disease, n (%)	20 (16.5%)	85 (13.6%)	0.241
Cancer, n (%)	8 (6.6%)	162 (26%)	0.000
History of surgery, n (%)	31 (26%)	92 (15%)	0.003
History of immobilization due to medical reasons, n (%)	25 (21%)	151 (24%)	0.235
History of thrombophilia, n (%)	4 (3.3%)	6 (1%)	0.071
Varicose veins of lower limbs, n (%)	21 (17%)	90 (14%)	0.230
Clinical characteristics of the index PE event			
Dyspnea, n (%)	96 (77%)	503 (81%)	0.177
Syncope, n (%)	25 (21%)	109 (17%)	0.241
Pleuritic chest pain, n (%)	71 (59%)	300 (48%)	0.022
Hemoptysis, n (%)	7 (6%)	27 (4%)	0.310
Pain of the lower limbs, n (%)	30 (25%)	109 (18%)	0.051
Heart rate, beats/min	96 ± 19	94 ± 19	0.303
Systolic blood pressure, mm Hg	125 ± 25	127 ± 25	0.587
Partial arterial pressure of O_2, mm Hg	74 ± 27	64 ± 17	0.000
Partial arterial pressure of CO_2, mm Hg	35 ± 7	36 ± 9	0.355
Increased creatinine levels, n (%)	20 (16%)	147 (24%)	0.052
Elevated troponin T levels, n (%)	20 (30%)	108 (35%)	0.301
Normal ECG, n (%)	55 (46%)	270 (47%)	0.483
Right bundle branch block, n (%)	17 (14%)	122 (21%)	0.055
Normal chest X-ray, n (%)	50 (42%)	223 (37%)	0.179
Cardiomegaly, n (%)	33 (28%)	111 (18%)	0.016
Increased parenchymal density, n (%)	12 (10%)	116 (19%)	0.009
Pulmonary artery systolic pressure (echocardiography), mm Hg	35 ± 24	39 ± 19	0.134
Right ventricular dysfunction (echocardiography), n (%)	18 (25%)	37 (19%)	0.187
Lower limb thrombosis (ultrasound), n (%)	54 (53%)	267 (56%)	0.378
Distal thrombosis of the lower limbs, n (%)	9 (16%)	28 (11%)	0.162
Fibrinolytic treatment, n (%)	1 (0.8%)	7 (1.1%)	0.614
Vena cava filter, n (%)	1 (0.8%)	23 (3.7%)	0.077
Clinical follow-up			
Death, n (%)	4 (3.3%)	121 (19.5%)	0.000
Recurrence of thrombotic events, n (%)	7 (5.8%)	32 (5.2%)	0.462

PE, pulmonary embolism; ECG, electrocardiogram.

Characteristics of patients with and without echocardiographically diagnosed probable CTEPH.

| Variable	With PAP >o = 50 mm Hg on echocardiography (n = 10)	With PAP < 50 mm Hg on echocardiography (n = 111)	P
Age, years	67 ± 12	62 ± 16	0.425
Female, n (%)	3 (30%)	45 (40.5%)	0.384
Patient history			
Comorbidites, n (%)	9 (90%)	76 (68%)	0.142
Heart failure, n (%)	2 (20%)	7 (87%)	0.801
Chronic pulmonary disease, n (%)	1 (10%)	17 (93%)	0.940
Risk factors for thromboembolic disease			
History of thromboembolic disease, n (%)	1 (10%)	19 (17%)	0.482
Cancer, n (%)	0	8 (7%)	0.491
History of surgery, n (%)	1 (10%)	30 (27%)	0.218
History of immobilization due to medical reasons, n (%)	3 (30%)	22 (20%)	0.340
History of thrombophilia, n (%)	1 (10%)	3 (3%)	0.295
Varicose veins of lower limbs, n (%)	3 (30%)	18 (16.5%)	0.247
Clinical characteristics of the index PE event			
Dyspnea, n (%)	9 (90%)	84 (76%)	0.277
Syncope, n (%)	1 (10%)	24 (22%)	0.345
Pleuritic chest pain, n (%)	5 (50%)	45 (40.5%)	0.397
Hemoptysis, n (%)	0	7 (6.3%)	0.538
Pain of the lower limbs, n (%)	7 (70%)	83 (75%)	0.478
Heart rate, beats/min	91 ± 14	96 ± 20	0.375
Systolic blood pressure, mm Hg	127 ± 36	125 ± 24	0.790
Partial arterial pressure of O_2, mm Hg	71 ± 20	75 ± 28	0.682
Partial arterial pressure of CO_2, mm Hg	41 ± 14	35 ± 6	0.019
Increased creatinine levels, n (%)	8 (80%)	93 (84%)	0.518
Elevated troponin T levels, n (%)	6 (60%)	14 (24%)	0.008
Normal ECG, n (%)	4 (40%)	51 (46%)	0.481
Right bundle branch block, n (%)	4 (40%)	13 (12%)	0.035
Normal chest X-ray, n (%)	4 (40%)	46 (42%)	0.584
Cardiomegaly, n (%)	6 (60%)	79 (73%)	0.291
Increased parenchymal density, n (%)	2 (20%)	10 (9.3%)	0.269
Pulmonary artery systolic pressure (echocardiography), mm Hg	34 ± 23	35 ± 24	0.953
Right ventricular dysfunction (echocardiography), n (%)	1 (10%)	17 (26%)	0.625
Lower limb thrombosis (ultrasound), n (%)	7 (70%)	47 (51%)	0.118
Distal thrombosis of the lower limbs, n (%)	3 (30%)	6 (12.5%)	0.078
Fibrinolytic treatment, n (%)	0	1 (0.9%)	0.970
Vena cava filter, n (%)	0	1 (0.9%)	0.970
Clinical follow-up			
Death, n (%)	0	4 (3.6%)	0.705
Recurrence of thrombotic events, n (%)	0	7 (6.3%)	0.538

Ecocardiograma en el seguimiento

Echocardiographic assessment of pulmonary arterial pressure in the follow-up of patients with pulmonary embolism

Diagnosis of CTEPH by echocardiography during the follow-up period.

Echocardiographic diagnosis	Pulmonary artery systolic pressure	Prevalence	
		n (%)	95% CI
CTEPH unlikely	≤ 36 mm Hg	82 (67.7%)	59% - 75%
CTEPH possible	37–50 mm Hg	29 (24%)	17% - 32%
CTEPH likely	> 50 mm Hg	10 (8.3%)	4.6% - 14.5%

CTEPH, chronic thromboembolic pulmonary hypertension; CI, confidence interval.

Diagnóstico ecocardiográfico de HTPTEC
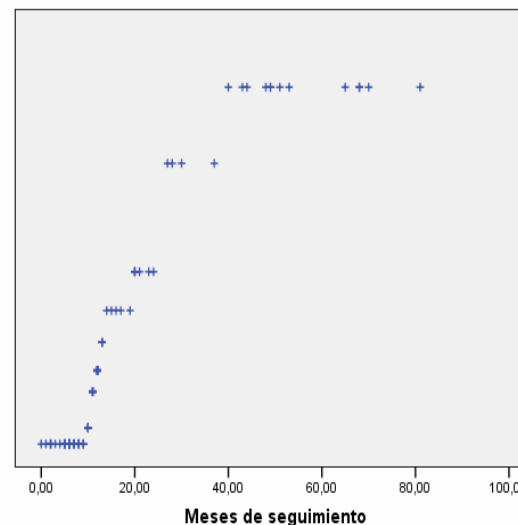
Meses de seguimiento

Echocardiographic assessment of pulmonary arterial pressure in the follow-up of patients with pulmonary embolism

Sensitivity, specificity, positive and negative predictive values, and positive and negative likelihood ratios for an echocardiographic diagnosis of probable CTEPH given a severe index thromboembolic episode.

Diagnostic test	Value (95% confidence interval)
Sensitivity	80.0% (49.0%–94%)
Specificity	66.7% (57.5%–74.7%)
Positive predictive value	17.8% (9.3%–31.3%)
Negative predictive value	97.4% (90.9%–99.3%)
Positive likelihood ratio	2.40 (1.60– 3.60)
Negative likelihood ratio	0.30 (0.09–1.05)
Positive post-test probability	17.8% (9.3%–31.4%)
Negative post-test probability	2.6% (0.7%–9.1%)

The index thromboembolic episode was considered severe if: (a) the patient was immobilized for medical reasons, or (b) systolic blood pressure was less than 90 mm Hg; or troponin T values were above the reference range.

Ecocardiograma en el seguimiento

Table 1. Risk Factors for Chronic Thromboembolic Pulmonary Hypertension.

Factors specific to pulmonary embolism

Recurrent or unprovoked pulmonary embolism

Large perfusion defects when pulmonary embolism detected

Young or old age when pulmonary embolism detected

Pulmonary-artery systolic pressure >50 mm Hg at initial manifestation of pulmonary embolism

Persistent pulmonary hypertension on echocardiography performed 6 mo after acute pulmonary embolism detected

Chronic medical conditions

Infected surgical cardiac shunts or pacemaker or defibrillator leads

Postsplenectomy

Chronic inflammatory disorders

Thyroid-replacement therapy

Cancer

Thrombotic factors

Lupus anticoagulant or antiphospholipid antibodies

Increased levels of factor VIII

Dysfibrinogenemia

Genetic factors

ABO blood groups other than O

HLA polymorphisms

Abnormal endogenous fibrinolysis

| Time after anticoagulation stopped	Cumulative incidence of recurrent VTE: events per patient year of follow-up (95% CI)				
	All men	All women	Men with unprovoked VTE	Women with unprovoked VTE (including women with previous hormone associated VTE)	Women with unprovoked VTE (excluding women with previous hormone associated VTE)
1 year	9.5 (7.9 to 11.4)	5.3 (4.1 to 6.7)	10.4 (8.6 to 12.8)	5.6 (4.3 to 7.3)	6.7 (4.9 to 9.2)
2 years	14.1 (11.9 to 16.6)	7.9 (6.4 to 9.8)	15.8 (13.2 to 18.8)	8.3 (6.6 to 10.5)	10.6 (8.1 to 13.8)
3 years	19.7 (16.5 to 23.4)	9.1 (7.3 to 11.3)	22.5 (18.8 to 27.0)	9.1 (7.2 to 11.6)	10.6 (8.1 to 13.8)
5 years	36.3 (28.7 to 45.9)	11.1 (8.6 to 14.4)	43.1 (33.8 to 55.1)	11.5 (8.7 to 15.2)	12.2 (9.3 to 16.2)

Groups of patients for comparison	Risk of recurrent VTE— hazard ratio (95% CI)*
Initial VTE unprovoked†:	
Men v all women‡	2.2 (1.7 to 2.8)
Men v women (excluding women with previous hormone associated VTE)§	1.8 (1.4 to 2.5)
Women with previous hormone associated VTE v women without previous hormone associated VTE and no other antecedent risk factors	0.5 (0.3 to 0.8)
Initial VTE provoked¶:	
Men v all women‡	1.2 (0.6 to 2.4)
Men v women (excluding women with previous hormone associated VTE)§	1.2 (0.6 to 2.3)

*All estimates came from study stratified Cox regression model with fixed effect (as no significant variance of γ distribution for "shared frailty" was seen).
†VTE occurring in absence of major antecedent risk (for example, surgery, trauma).
‡Hazard ratio from model including age, unprovoked/provoked VTE, interaction between unprovoked/provoked and sex, and proximal/distal VTE as covariates.
§Hazard ratio from model including use/non-use of hormonal therapy, age, unprovoked/provoked VTE, interaction between unprovoked/provoked VTE and sex, and proximal/distal VTE as covariates.
¶VTE occurring in presence of antecedent transient major risk.

Resultados de RIETE
(datos no publicados)

INCIDENCE OF PAP>50 mmHg ON ECHOCARDIOGRAPHY IN MEN AND WOMEN
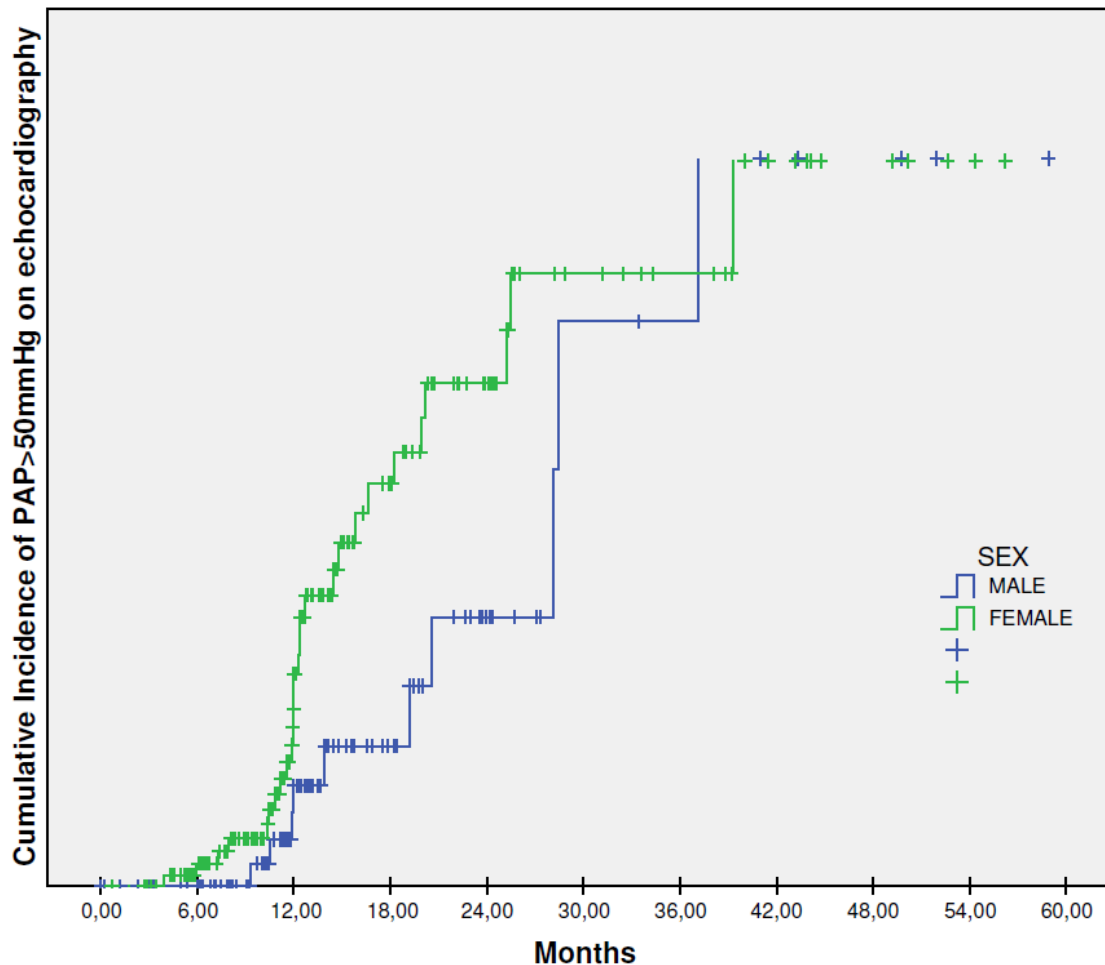
Es probable que las cifras de HPTEC estén infraestimadas

La medida de PAPs no es suficiente para detectar HPTEC

Parece existir diferencias en cuanto a genero en la incidencia, quizás en el fenotipo de la HPTEC

NECESITAMOS AUMENTAR EL NUMERO DE ECOCARDIOGRAFIAS DE SEGUIMIENTO EN EL REGISTRO RIETE

PII-TEP (Proyecto Investigación Integrada en Tromboembolia Pulmonar) de SEPAR
        Estudio PROTECT-EXTENSIÓN: Incidencia y factores relacionados con la HPTEC

moribe@hgda.osakidetza.net
rotero@separ.es