





Hospital Universitario

1st trimester screening of preterm preeclampsia



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National screening program

- Resources
- Opportunity costs
- Equity
- Quality
- Controls



MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD



Is preterm-PE suitable for POPULATION screening?

Evaluation





Characteristics of the disease Characteristics of the test Characteristics of the program



Is preterm-PE suitable for POPULATION screening?

Characteristics of the disease

- Major health problem
- Known disease
- Predictable
- Preventable
- Improvement from current interventions



Major health problem

PRETERM PRECLAMPSIA PREVALENCE: 0.8%

- 18% maternal deaths
- 15% of global prematurity









< 16 weeks

Know disease, predictible and preventable

10

0

Aspirin 150 mg/d from 12 to 36 weeks



ASPRE

Night time







11%

<32w

Rolnik DL, Wright D, Poon L, et al. Aspirin versus placebo in pregnancies at high risk of preterm preeclampsia. N Engl J Med 2017:377:613-22.

<34w

<37w

>37w

O'Gorman et al. Competing risks model in screening for preeclampsia by maternal factors and biomarkers at 11-13 weeks' gestation. Am J Obstet Gynecol 2016; 214: 103



Cost-effective strategies: current care









Is preterm-PE suitable for POPULATION screening?

Characteristics of the test

- Safe and simple
- Reliable, valid and efficient
- Well accepted by patients



Characteristics of the test

Reliability, Validity and efficiency



O'Gorman et al. Competing risks model in screening for preeclampsia by maternal factors and biomarkers at 11-13 weeks' gestation. Am J Obstet Gynecol 2016; 214: 103



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SAFE AND SIMPLE

Predictive model (FMF): Bayes Theorem

Maternal factors: prior risk

Biophysical measurements

- Mean arterial pressure (MAP)
- Mean uterine arterial pulsality index (UT PI)

Biochemical measurements: PAPP-A; PLGF

1 in -----



Maternal factors: influence







Biophysical factors: Mean arterial pressure





- Automated (3BTO-A2, Microlife, Taipei, Taiwan), calibrated at regular intervals.
- Women rested for 5 minutes, arms supported at the level of the heart.
- Cuff size:

• Device:

• Method:

- Small (<22 cm), normal (22-32 cm) or large (33-42 cm), depending on the midarm circumference.
- Both arms: Take average of two measurements in each arm.



Biophysical factors: MAP

Correct body & arm position





Biophysical factors: Mean UTPI







1st trimester – transabdominal ultrasound

Identify the uterine arteries

-Obtain a sagittal section of the cervix and use colour Doppler

-Rotate the transducer from side to side to identify the uterine arteries at the level of the internal cervical os

PRF

Mean PI:

Sampling gate: 2 mm to cover the whole vessel

Angle of insonation: less than 30°

3-4 kHz

Peak systolic velocity: more than 60 cm/s

average PI (left + right / 2)



Biochemical measurements: blood test

Pregnancies: n = 61,174

Preeclampsia • total: n = 1,770 (2.9%) • <37 w: n = 493 (0.8%)



Method of screening	DR %
History	45
+ MAP	51
+ MAP, PAPP-A	56
+ MAP, UTPI	68
+ MAP, UTPI, PAPP-A	68
+ MAP, PLGF	66
+ MAP, UTPI, PLGF	75
+ MAP, UTPI, PLGF, PAPP-A	75

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Tan et al. Screening for preeclampsia by maternal factors and biomarkers at 11-13 weeks' gestation. 2018

Preeclampsia risk assessment: First trimester

Date: 15-11-2015 Gestational age: 12 weeks plus 6 days (Measured at 15-11-2015)

Maternal factors



Maternal characteristics	Medical history
Date of birth: 1979-06-26	Chronic hypertension: Yes
Height: 162 cm	Diabetes type I: No
Weight: 55 kg	Diabetes type II: No
Racial origin: Afro-Caribbean	Systemic lupus erytheromatosus: No
Method of conception: Spontaneous	Anti-phospholipid syndrome: No
Family history of PE: Yes	Obstetric history
	Nulliparous (no previous pregnancies ≥24 weeks)

Biophysical measurements

Date of measurementWeight15-11-201555 kg	MAP 97.08 mmHg (1 MoM)	Mean UTPI 2 (1.18 MoM)
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Biochemical measurements

Date of measurement	Weight	PLGF	PAPP-A
15-11-2015	55 kg	0.5 MoM	1.2 MoM

Preeclampsia risk from history only

< 32 weeks: 4 % 1 in 25 < 37 weeks: 16 % 1 in 6 ≥ 37 weeks: 28 % 1 in 4

Preeclampsia risk from history plus MAP, UTPI, PLGF, PAPP-A

< 32 weeks: 5.2 % 1 in 20 < 37 weeks: 25 % 1 in 4 ≥ 37 weeks: 36 % 1 in 3



Characteristics of the test

Well accepted by patients

Early screening and diagnosis of genetical abnormalities

RUTINARY CARE IN SPAIN

- HISTORY + MAP
- BLOOD SAMPLE: 10-12 Wks
- FIRST TRIMESTER SCAN: 11.4-13 Wks

More than 80% pregnant women



Characteristics of the test



Trained teams Pilot study



Is preterm-PE suitable for POPULATION screening?

Characteristics of the program

- Evidence of efficacy
- Well defined target population
- Benefits outweigh harms
- Economically balanced





Characteristics of the program

Benefits outweight harms

Aspirin >100 mg onset at <16 w:		
 Reduction in PE <32 w 	90%	
- Reduction in PE <34 w	80%	
- Reduction in PE <37 w	65%	
 Reduction in abruption 	30%*	
 Reduction in SGA <32 w 	40%	
- Reduction in LOS in NICU	65%	



Economically balanced



SNP: Screened Number to Prevent 1 case NNT: Needed Number to Prevent 1 case PR: Prevention Rate

Assuming 0.8% prevalence: 80 cases PPE



Economically balanced

0.8 prevalence: 3,200 cases PPE



FMF: 10 % POPULATION INTAKE AAS TO PREVENT 49% PPE

NICE: 10% POPULATION INTAKE AAS TO PREVENT 27% PPE



Economically balanced





Economically balanced

SCRENING OF PPE PROGRAMME: + 4 Million € OVER CURRENT POLICY



Aspirin for Evidence-Based Preeclampsia Prevention trial: effect of aspirin on length of stay in the neonatal intensive care unit David Wright et al. American Journal of Obstetrics and Gynecology Feb 2018



Maternal admission

Births at Hospital Uni	versitario Torrejór	n 2017 (I	n = 2,451)	400,000 pregnancies
PE total: 57 (2.3%))			Screening of PPE
	Admission (d)	IUC	Ward	
PE < 37 SG: 31 (1.3%)		34	118	1,584 cases prevented
PE < 34 SG: 23 (0.9%)		27	92	
PE < 32 SG: 12 (0.5%)		16	68	1,511 d/IUC x 1,280€ = 2,230,272€ 109 d/planta x 640€ = 1,622,016€
1.1 ICU day / case vs 0 without PE 3.8 Ward d/case vs 2.2 without PE: 1.6 extra day/case		- 3,618,000 €		
NET COST PER	TEST: + 1 € NEUT			



Characteristics of the program





Is preterm-PE suitable for POPULATION screening?







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PREVAL Validation study for first-trimester preterm-preclampsia screening in Spain





PREVAL STUDY

Objectives

- To prospectively validate of all four methods of screening
- To determine the performance of each method
- To define cut-offs for our Mediterranean population
- Training for the measurement of uterine artery PI and MAP
- Establish a QA process for the measurement of biomarkers
- To know the acceptability of the programm
 - To elaborate national recommendations



PREVAL STUDY





10.000 patients

Hospital Universitario

Thermo Fisher SCIENTIFIC



healthnetconnections ViewPoint[®] en conexión con la salud







PREVAL STUDY: Recruitment







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