Prediction of pregnancy complications in PCOS

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On behalf of..

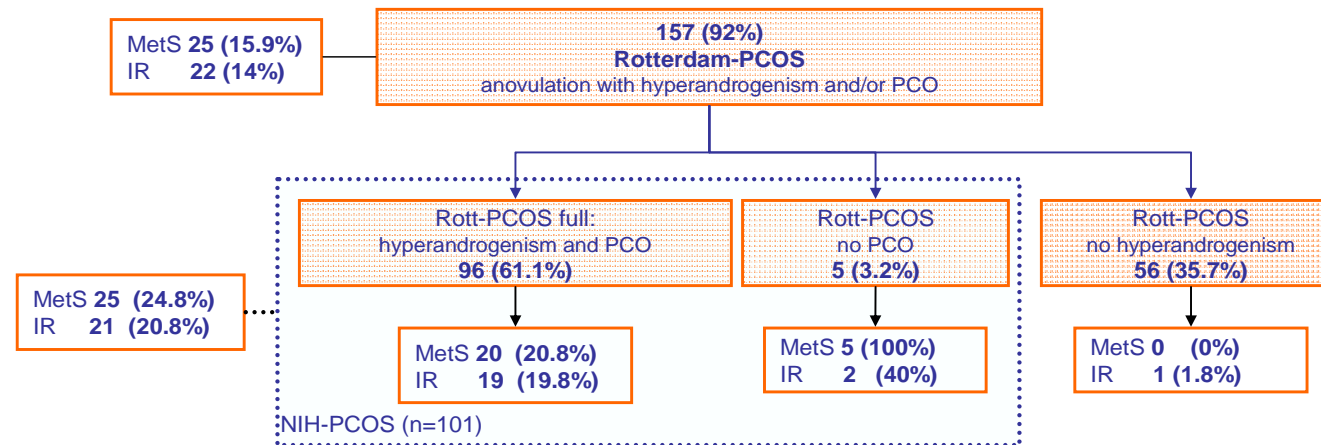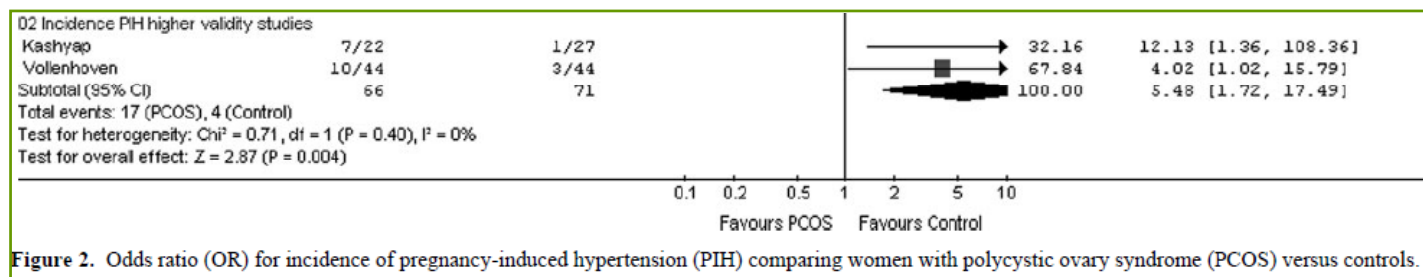# PCOS and metabolic health

- Dutch cohort: 22% metabolic syndrome and/or insulin resistance
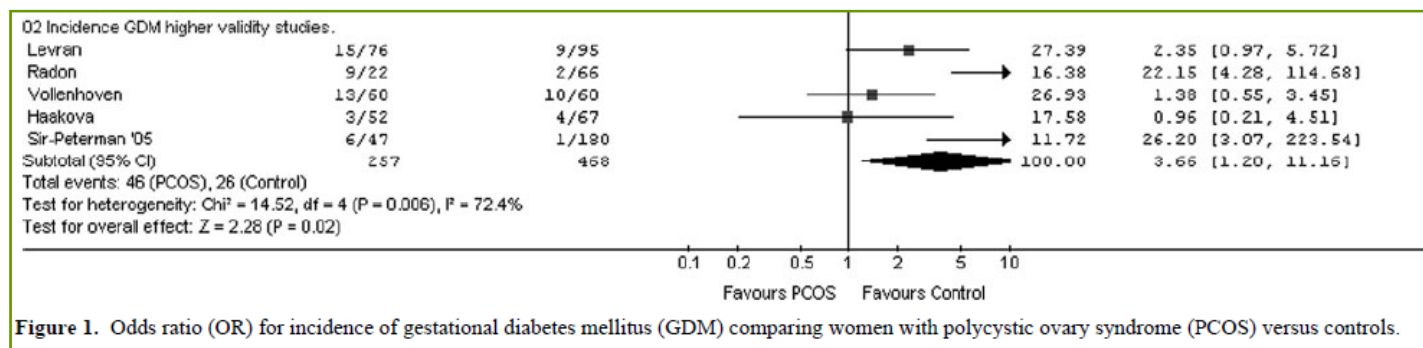
- Hyperandrogenic phenotype particularly affected

PCOS and pregnancy complications

- Pregnancy induced hypertension: OR 3.71 (95% CI 1.71 – 17.49)

Figure 2. Odds ratio (OR) for incidence of pregnancy-induced hypertension (PIH) comparing women with polycystic ovary syndrome (PCOS) versus controls.

- Gestational diabetes: OR 3.66 (95% CI 1.20 – 11.16)

Figure 1. Odds ratio (OR) for incidence of gestational diabetes mellitus (GDM) comparing women with polycystic ovary syndrome (PCOS) versus controls.

Pregnancy complications in PCOS

- Prospective multicenter study
- Aiming at 200 PCOS pregnancies
- Standardized evaluation before attempting to conceive
- To predict before conception those women at risk of pregnancy complications

Pregnancy complications in PCOS

Complications of PCOS Pregnancy: Evaluating Risk

- Inclusions: 256
- Pregnancies/deliveries: 114

- Average duration between inclusion and pregnancy: 4 months

Study design

- 50 consecutive pregnant women

- Preconception standardized evaluation
  - Biometry
  - Endocrinology
  - Metabolic features, including OGTT
  - Ultrasound

- OGTT at 24-26 weeks

Results preconception investigation

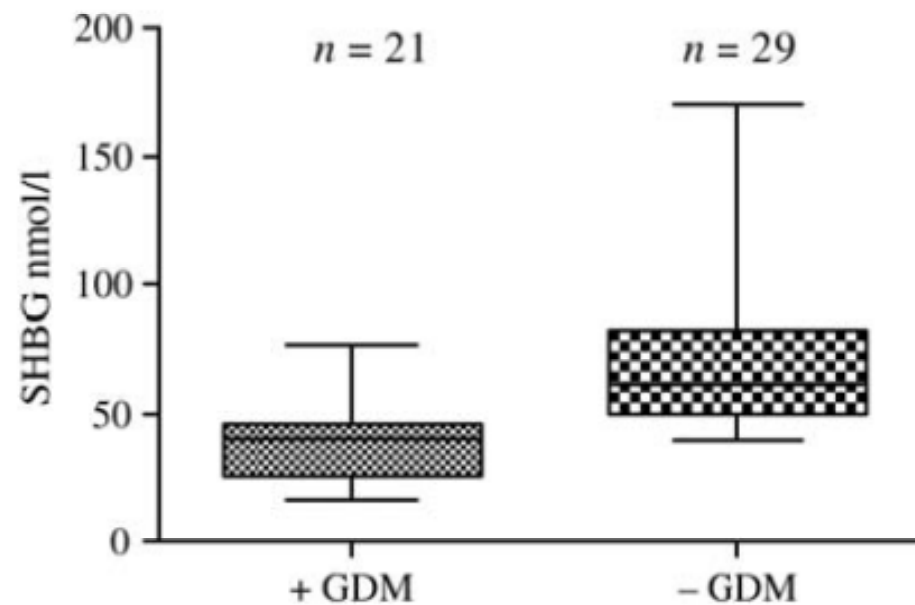|	GDM N = 21	No GDM N = 29	P
Age (yr)	26.6 ± 3.5	25.6 ± 3.0	0.25
BMI (kg/m^2)	28.2 ± 5.8	24.7 ± 5.7	0.04
Fasting glucose (mmol/L)	5.4 ± 0.6	5.0 ± 0.3	< 0.01
Post load glucose (mmol/L)	5.8 ± 2.0	4.7 ± 1.4	0.09
Fasting Insulin (mU/L)	11.5 ± 6.2	6.0 ± 3.0	<0.01
HOMA-IR	2.45 (0.85 – 6.36)	1.17 (0.40 – 2.93)	<0.001
SHBG (nmol/L)	40 (16 – 77)	63 (40 -170)	<0.001

Data presented as mean ± SD (HOMA-IR and SHBG as median and range)
HOMA-IR = glucose x insulin / 22.5

Preconception SHBG concentrations

Figure I Box Whisker plot of the SHBG concentrations in women with PCOS with and without GDM.

Preconception predictors of GDM

Table II Regression analysis of three candidate variables as predictor for GDM.

Variable(s)	OR	95% confidence interval	P-value
Univariate			
SHBG (nmol/l)	0.92	0.87–0.97	0.001
HOMA-IR	3.9	1.7–9.3	0.002
Waist circumference (cm)	1.1	1.0–1.1	0.015
Multivariate—2 variables[a]			
SHBG (if WAIST in the model)	0.93	0.87–0.98	0.005
WAIST (if SHBG in the model)	1.02	0.97–1.08	0.405
SHBG (if HOMA-IR in the model)	0.94	0.89–0.99	0.031
HOMA-IR (if SHBG in the model)	2.01	0.82–4.93	0.126
Multivariate—3 variables[b]			
SHBG (if WAIST and HOMA-IR in the model)	0.94	0.89–0.99	0.034
WAIST (if SHBG and HOMA-IR in the model)	1.00	0.94–1.06	0.995
HOMA-IR (if SHBG and WAIST in the model)	2.01	0.76–0.99	0.158

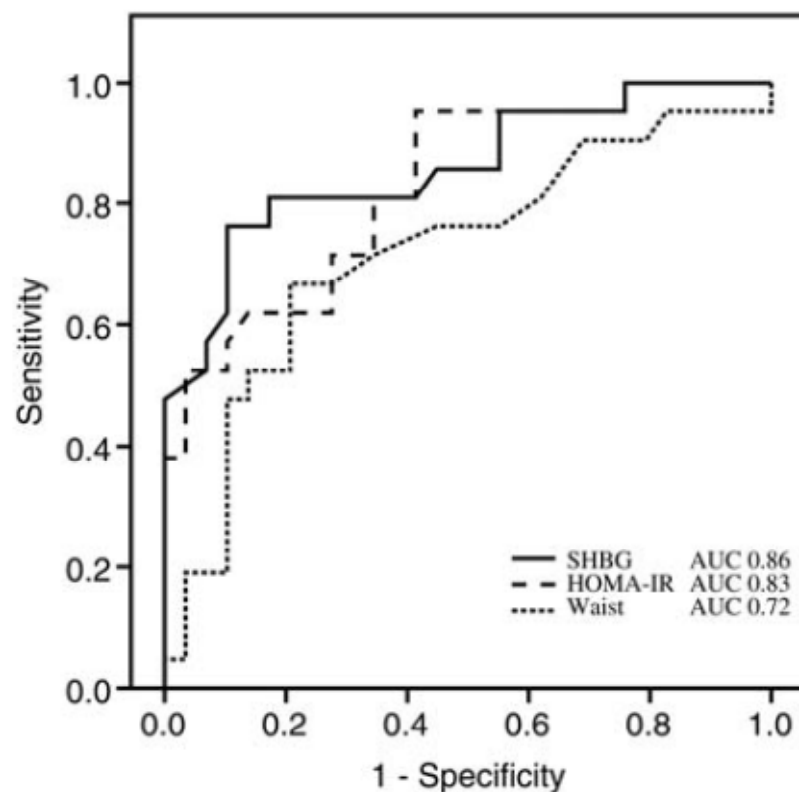Binary logistic regression analysis was performed. Data are presented as OR and 95% CI and P-value.
[a]Two variables entered in the model.
[b]The variables entered in the model.

ROC analysis of SHBG, BMI and HOMA-IR

Figure 2 ROC curves showing the predictive probabilities of SHBG, HOMA-IR and waist circumference for GDM.

SHBG threshold of 58.5 nmol/L

Sensitivity 81 %
Sensitivity 82.8 %

Veltman-Verhulst et al. Hum Reprod 2010

Conclusions

- Women with PCOS have increased risk of gestational diabetes

- Risk of gestational diabetes could be higher than previously suggested

- Preconception SHBG is strong predictor of gestational diabetes in PCOS pregnancies