

# Managing Gestational Diabetes my way: An Obstetrician's View

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- Gestational Diabetes and Congenital Malformations
- Gestational Diabetes and Fetal Metabolism
- Management of Gestational Diabetes
- Timing of Delivery in Gestational Diabetes

# Database: Pregnancies by Diagnostic Classification

	Type 1	Type 2	GDM	IGT	Total
n =	151	58	52	341	602
%	(25)	(10)	(9)	(56)	(100)

- Gestational Diabetes and Congenital Malformations

# Congenital Malformation Rates

	<b>Type 1/2</b>	<b>GDM/IGT</b>
TOP for congenital malformations	4	1
Major malformations at birth	12	7
Percent major malformations	(7.6%)	(2.0%)
Minor malformations at birth	1	12



# Patterns of Malformations and Relationships to Initial Maternal Fasting Serum Glucose Levels in Gestational Diabetes

	<b>No Malformations</b>	<b>Major Malformations</b>	<b>Aneuploidy</b>
	<b>n = 3895</b>	<b>n = 143</b>	<b>n = 21</b>
<b>Initial FPG level mmol/L ± SD</b>	<b>6.4 ± 2.0</b>	<b>8.0 ± 3.1</b>	<b>6.4 ± 2.1</b>

(Schaefer-Graf et al 2000)

# Congenital Malformations and Initial Fasting Blood Glucose and Maternal BMI in Gestational Diabetes (n= 1971)

		Major Malformations (%)
Pre-pregnancy BMI Tertiles	Lower	1.8
	Mid	4.4*      * P <0.01
	Upper	4.9*
Initial Fasting Blood Glucose Tertiles (mmol/L)	Lower (2.4 – 4.49)	2.9
	Mid (4.5 – 4.91)	3.8 ns
	Upper (4.92 – 10.5)	4.8 ns

(Garcia-Patterson et al 2004)

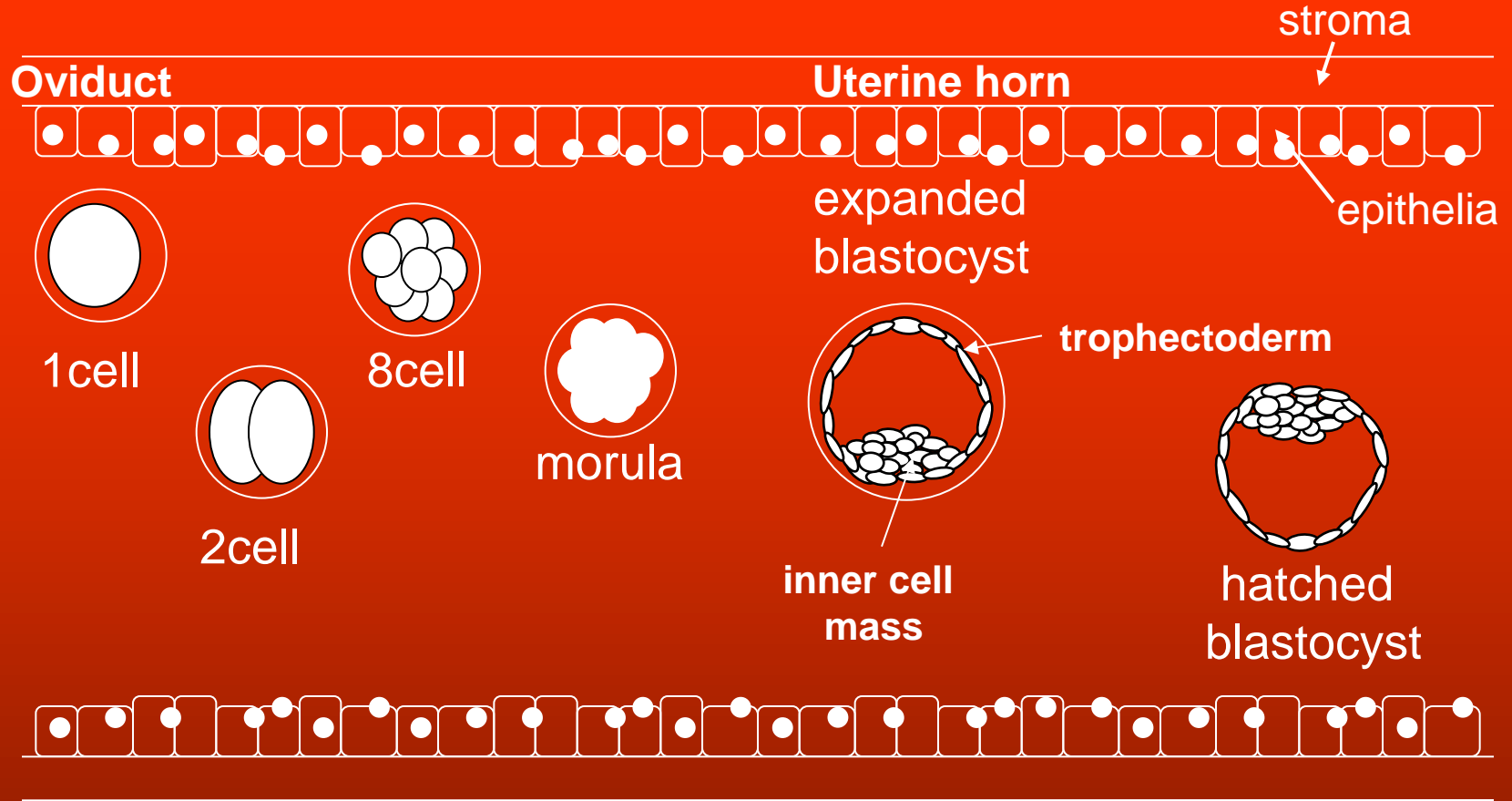


# Congenital Malformations in Gestational Diabetes

Major Congenital Malformations	(%)
Type 1 diabetes (95% CI)	5.9 (3.2 – 9.8)
Type 2 diabetes	4.4 (2.4 – 7.3)
Gestational diabetes	1.4 (0.9 – 2.0)
<u>but</u>	
New onset Type 2 in GDM group (13% of 1822)	4.6 (2.3 – 8.2)

(Farrell et al 2002)

# Preimplantation Embryo Development

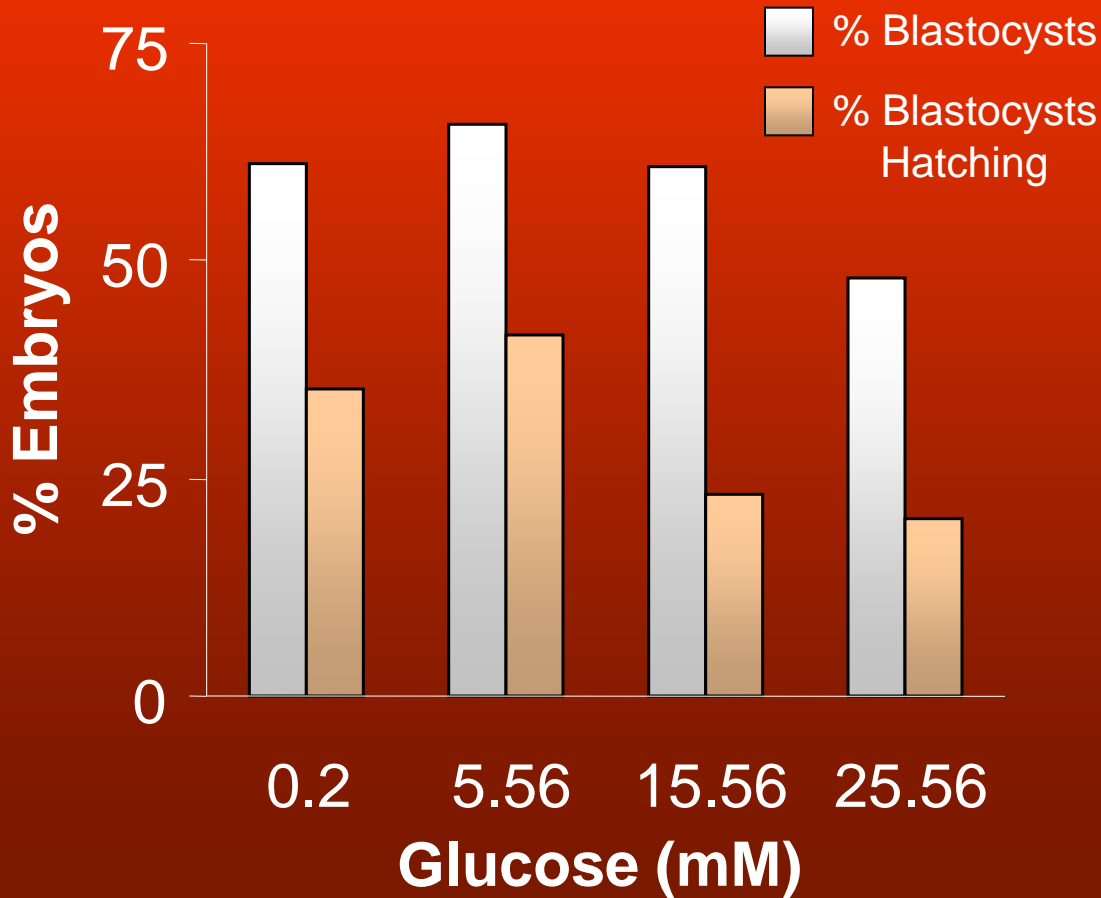


# 1. Embryopathic Concentrations

Morphological development

% 2cells forming hatched expanded blastocysts

$\chi^2$ :  $P < 0.001$  (n > 201)



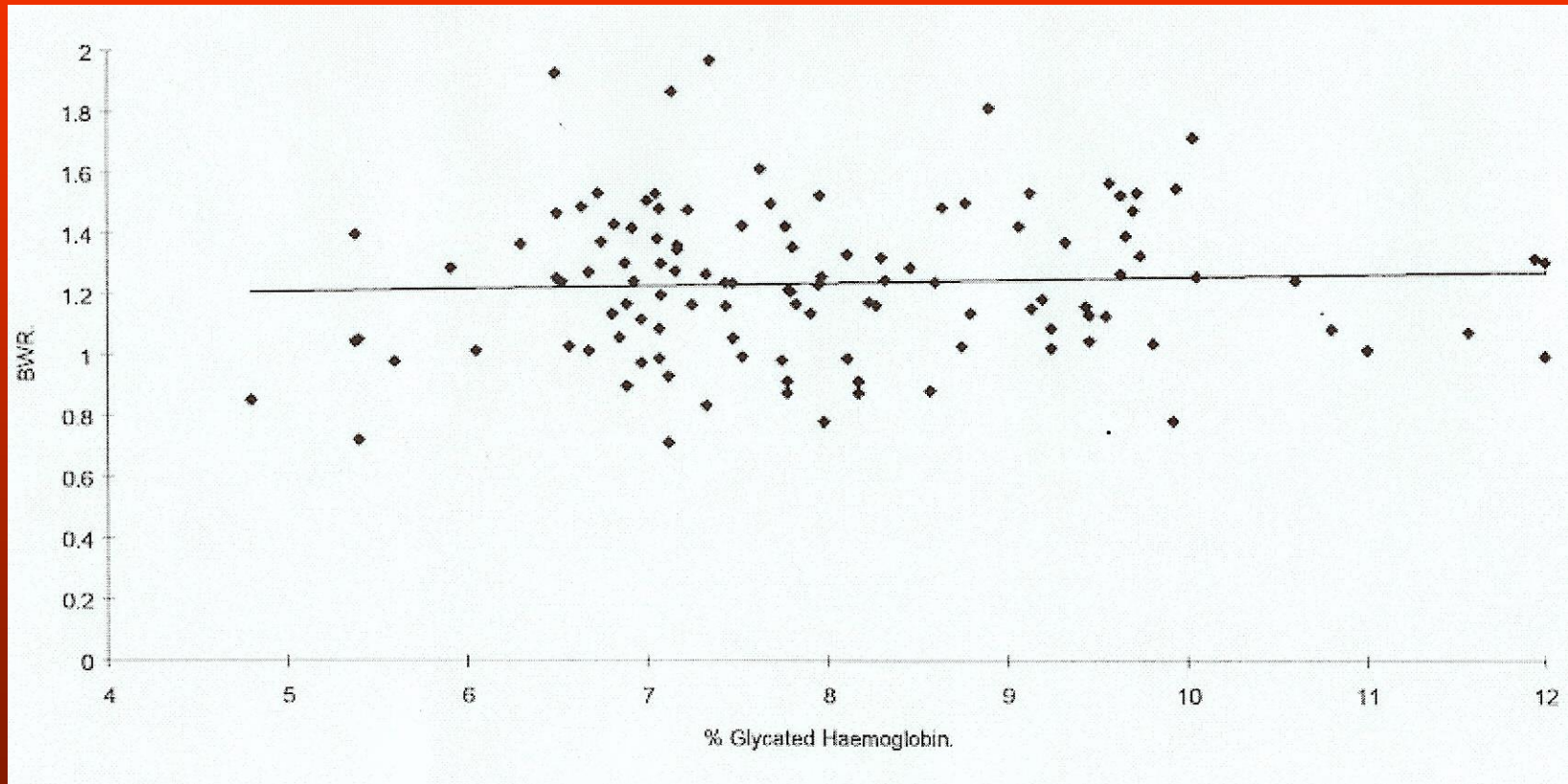
4cell → Blastocyst



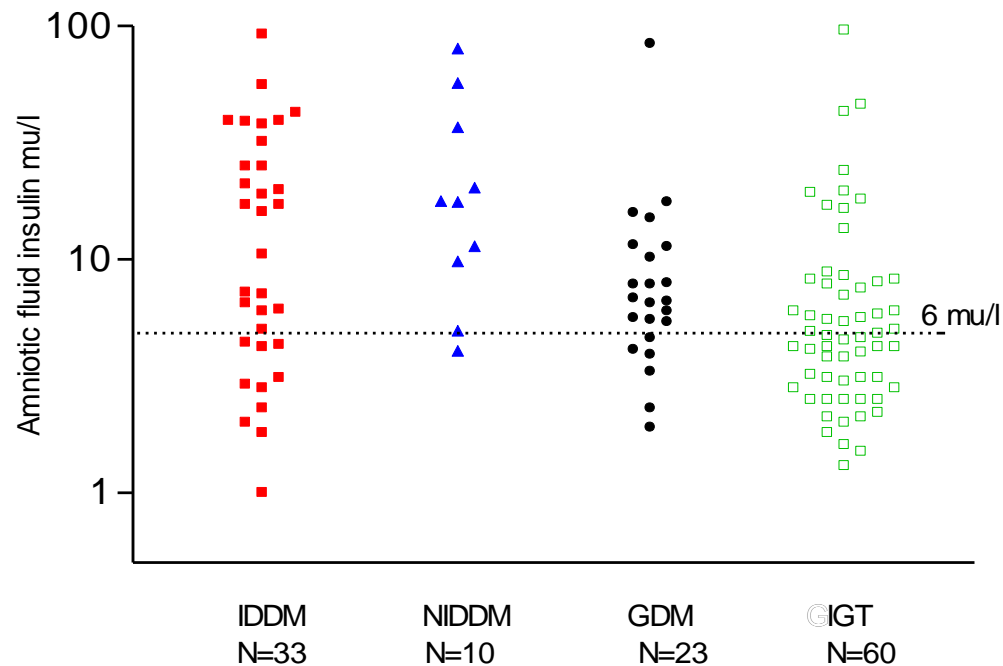
2cell → Arrested development

- Gestational Diabetes and Fetal Metabolism

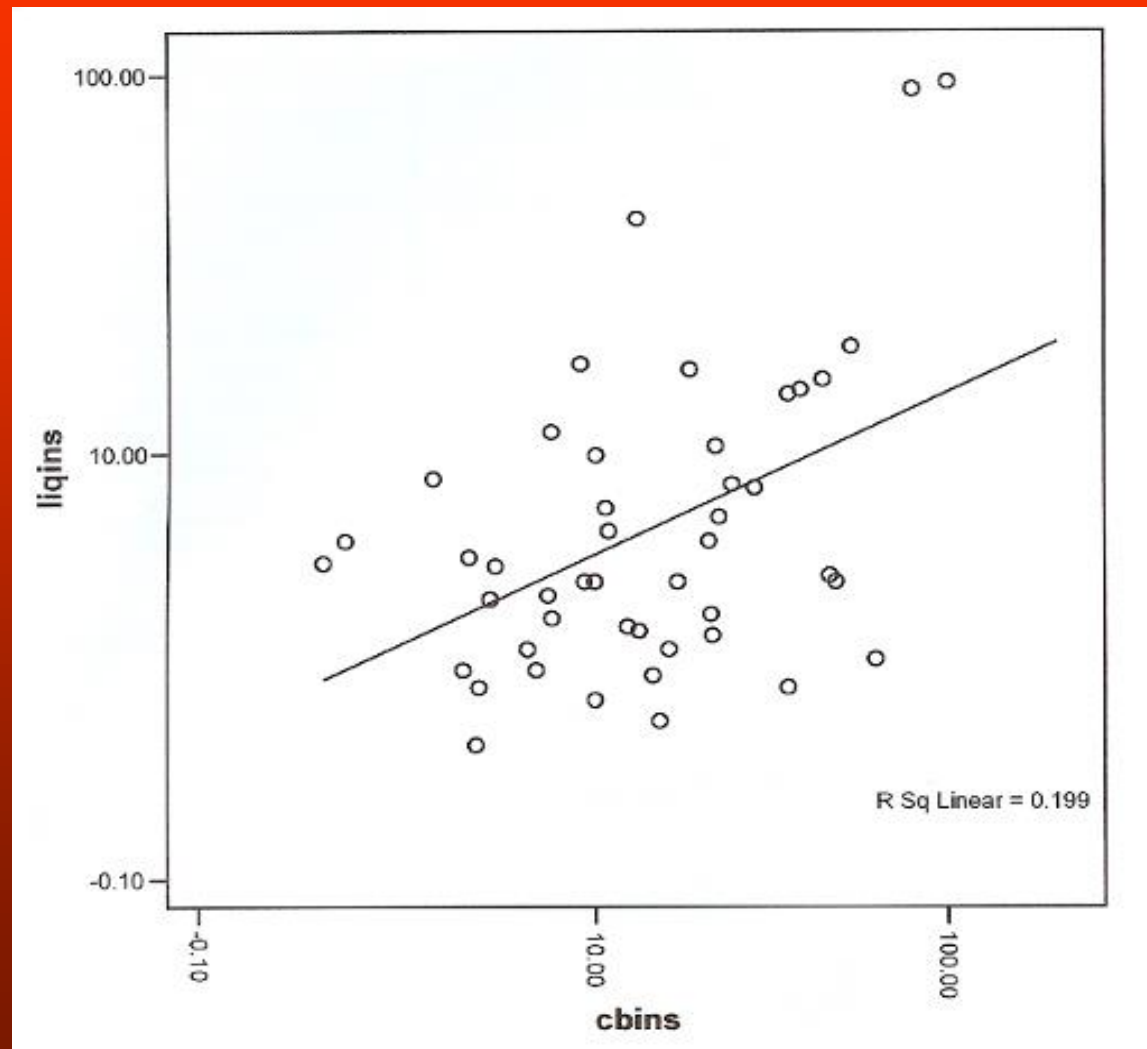
# The Relationship between Birth Weight Ratio and mean HbA<sub>1c</sub> in Pregnancy



# Amniotic Fluid Insulin Levels in Pregnancies Complicated by Maternal Diabetes

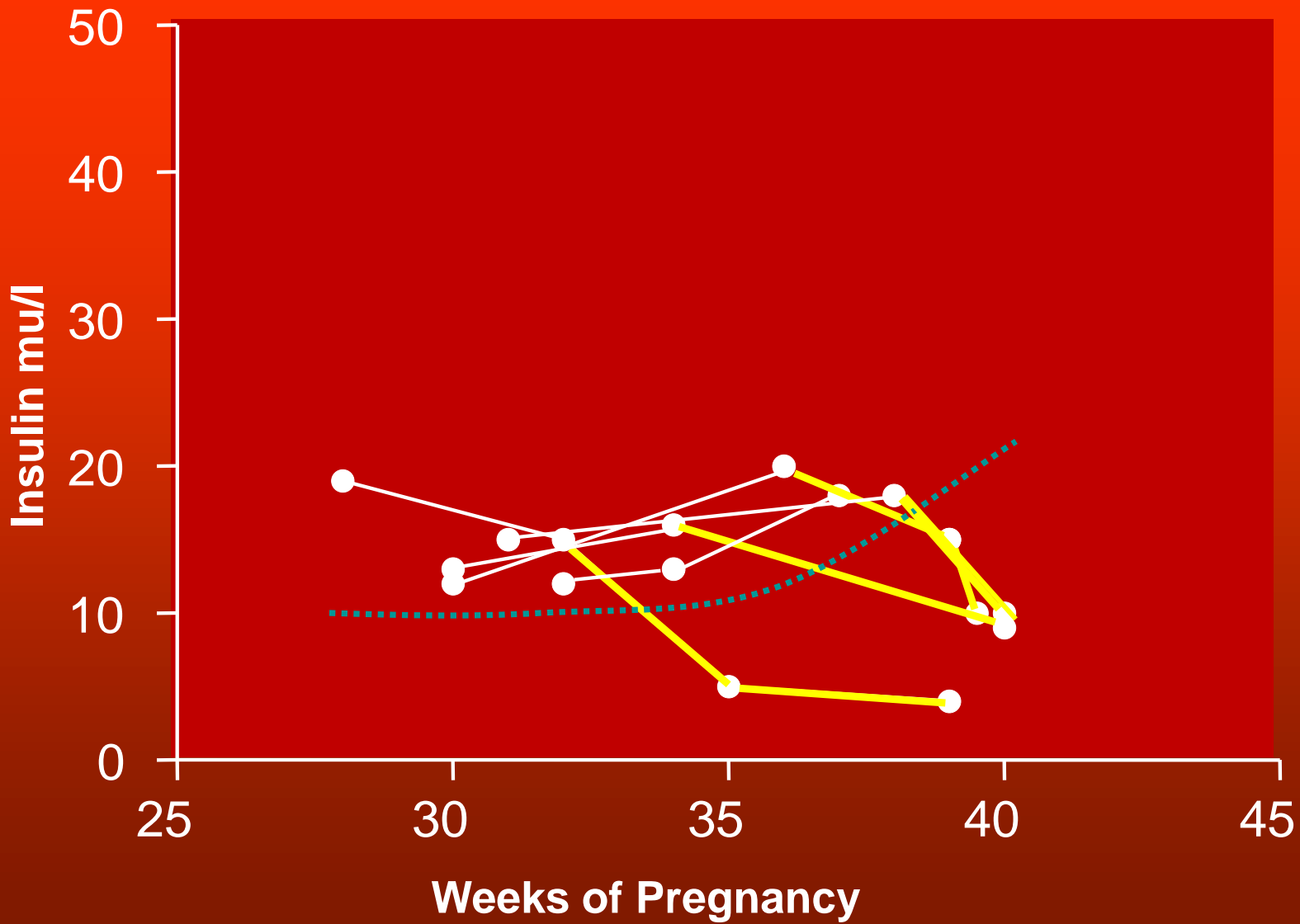


# Correlation Between Cord Plasma Insulin and Liquor Insulin Levels



- Management of Gestational Diabetes





Weiss 1986

# ACHOIS Trial

- Women with IGT
- Randomised
- “Not Gestational Diabetes Group”
  - Routine Obstetric Care (Double-Blind)
- “Glucose Intolerance Group”
  - Diet, Blood Sugar Monitoring + Insulin if blood sugar rises

# ACHOIS Result Summary

“Significant excess of Adverse Perinatal Outcomes in Untreated Women”

Can insulin treatment be  
rationalized?

# Size at Birth

	Diet (n = 105)	Diet & insulin (n = 97)	Statistical Difference
Mean Birth Wt.(g)	3560	3630	ns
Small for Gestational Age	3	0	ns
Appropriate for GA	88	86	ns
Large for GA	14	11	ns
Triceps Skinfold Thickness (mm)	5.1	4.9	ns

(Persson 1985)

# Neonatal Morbidity

	Diet (n = 105)	Diet & insulin (n=97)	Statistical Difference
Respiratory distress	9	15	ns
Hypoglycaemia	13	18	ns
Hyperbilirubinaemia	6	8	ns
Polycythaemia	5	6	ns

(Persson 1985)

# Ultrasound Measurements of Fetal Abdominal Circumference



# RCT of Glycaemic Parameters ± Fetal Ultrasound to Determine Insulin Therapy in GDM

- 98 women with FGP 5.8 – 6.7 mmol/L
- Experimental group – insulin only if AC ≥ 70<sup>th</sup> centile or Plasma Glucose > 6.7 mmol/L
- Control group – all received insulin  
(targets: preprandial ≤ 5.0, 2h postprandial ≤ 6.7)

(Kjos et al 2001)



# RCT of Glycaemic Parameters ± Fetal Ultrasound to Determine Insulin Therapy in GDM

<b>Outcomes</b>	<b>Controls</b>	<b>Experimental Group</b>
Insulin R <sub>x</sub>	100%	62%
Birthweight	3.27 Kg ± 0.5	3.37 ± 0.5
BWT >90 <sup>th</sup> centile	6.3%	8.3%
Neonatal Morbidity	25%	25%

- Timing of Delivery in Gestational Diabetes

# Insulin requiring diabetes in pregnancy: A randomised trial of active induction of labour and expectant management

200 subjects (187 GDM 13 Type 2)

Randomised at 38 weeks gestation

Active group: Induction within 5 days

Expectant group: Twice weekly CTG and  
weekly Amniotic Fluid Volume measurement  
until labour

(Kjos et al 1993)

# RCT of active induction of labour and expectant management

	Active	Expectant	
BWT >90 <sup>th</sup> centile	10%	23%	(p = 0.02)
CS rate	25%	31%	(ns)
Shoulder Dystocia	0%	3%	
Spontaneous labour	22%	44%	

(Kjos et al 1993)





# Cord Blood Insulin Levels in Pregnancies Complicated by Maternal Diabetes and Controls

