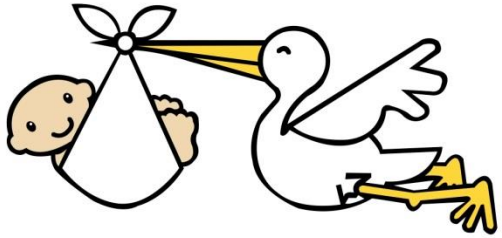

Prevention of Type 2 DM after GDM

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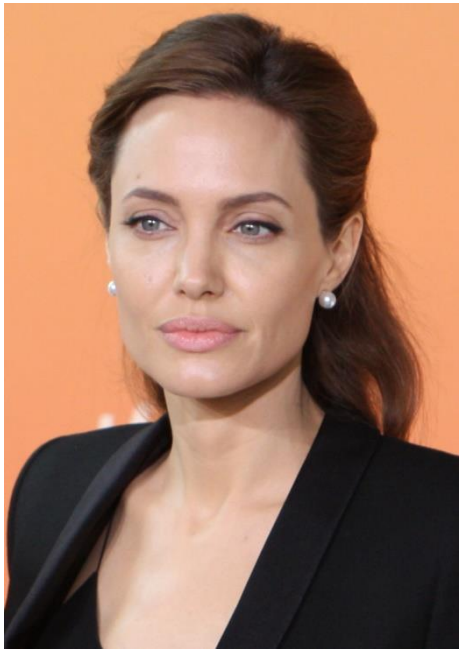


Prevention of Type 2 DM after GDM

1. Diabetes in pregnancy
2. Gestational diabetes mellitus
   - Diagnosis
   - Management
   - Complications
3. Risk of developing type 2 diabetes
4. Prevention of type 2 diabetes
   - Pre-diabetes
   - Screening
   - Future

Pregnancy and diabetes

- Approx 650,000 pregnancies in UK/yr
- 2-5% involve mothers with diabetes
- GDM / type 1 diabetes / type 2 diabetes (87.5% / 7.5% / 5%)

	Prevalence	Number of pregnancies in England
Total singleton pregnancies		600,200
Type 1 diabetes	0.3%	1,800
Type 2 diabetes	0.2%	1,200
Gestational diabetes	3.5%	20,400
Total diabetes in pregnancy		**23,400**

www.nice.org.uk

Gestational Diabetes Mellitus

Definition

- Any impairment of glucose tolerance first recognised in pregnancy

Risk factors

- pre-pregnancy body mass index above 30 kg/m2
- previous gestational diabetes
- family history of diabetes (first-degree relative with diabetes)
- previous macrosomic baby weighing ≥ 4.5 kg
- family origin with a high prevalence of diabetes

- 70% will need oral agents +/or insulin

NICE National Institute for Health and Care Excellence

NICE guideline

GDM – latest guidance

- New NICE guidance based on QALYs
  - If willing to pay £20,000 per QALY (no Rx)
  - If willing to pay £30,000 per QALY most cost effective

Diabetes in pregnancy: management of diabetes and its complications from preconception to the postnatal period

NICE guideline
Published: 25 February 2015
nice.org.uk/guidance/ng3

→ WHO 1999:

LABORATORY PLASMA GLUCOSE (mmol/L)		
	Fasting	2 hour
GDM	≥ 5.6	≥ 7.8
Normal	< 5.6	< 7.8

Screening for GDM

- Plasma glucose (fasting or non-fasting)
  - Raised fasting or random BG

  → 75g OGTT

- Note of risk factors for GDM
  - Any x 1 → booked for 75g OGTT at 24-28 weeks

- Random BG ≥ 11mmol/L = GDM
  - No need for OGTT

- Previous GDM
  - Offer home CBG testing **OR** OGTT approx 16/40

Treatment of diabetes in pregnancy

- Frequent SMBG, 4-7 times daily
- See every 2 – 4 weeks
- Dietician review
- Weights

TIME	BG (mmol/L)
Fasting	< 5.3
1-hour	< 7.8
2-hour	< 6.4

- Treatment
  - Diet
  - Metformin
  - Insulin

ACHOIS study *NEJM 2005*; **352(24):** 2477 - 2486

- Prospective interventional study to examine whether screening and treatment to reduce maternal glucose levels reduce pregnancy risk
- Methods:
  - OGTT 24 – 34 weeks (WHO definition for GDM, if +ve → blinded and randomized)
  - Dietary advice, monitoring and treatment to achieve normoglycaemia vs. no treatment unless attending team felt appropriate on the basis of indications that arose
  - Primary outcomes infants – serious perinatal complications
  - Primary outcomes mothers – IOL, c-section
- Results:
  - 490 (Rx group) vs. 510 (no Rx group) women
  - Relative risk of serious perinatal complications 1% vs 4% (adjusted for maternal age, ethnicity, parity)
  - IOL: 39% vs. 29%
  - C-section rates similar

HAPO – Hyperglycaemia and Adverse Pregnancy Outcomes

NEJM 2008; **358(19):** 1991-2002

- 25000 patients from 15 centres
- 75g OGTT at 24-32/40

- 1º outcomes:
  - BW > 90th centile
  - C-section
  - Neonatal hypoglycaemia
  - Cord blood c-peptide > 90th centile
- 2º outcomes:
  - Premature delivery
  - Dystocia/birth injury
  - Need for NICU
  - Hyperbilirubinaemia
  - PET

HAPO – Hyperglycaemia and Adverse Pregnancy Outcomes

NEJM 2008; **358(19):** 1991-2002

- 25000 patients from 15 centres
- 75g OGTT at 24-32/40

	OR
• 1º outcomes:	
– BW > 90th centile	1.38
– C-section	1.55
– Neonatal hypoglycaemia	1.11
– Cord blood c-peptide > 90th centile	1.08
• 2º outcomes:	
– Premature delivery	1.05
– Dystocia/birth injury	1.18
– Need for NICU	0.99
– Hyperbilirubinaemia	1.21
– PET	1.00

Risk of developing type 2 diabetes

- Depends what paper you read!
  - Old studies
  - Variable ethnicity
  - Different diagnostic criteria
- What is useful?
  - Incidence of type 2 diabetes following GDM
  - Predictors of type 2 diabetes following GDM
  - What is the risk for women with GDM?
    - Systemic reviews
    - Meta-analysis

→ education and intensive screening of these groups

→prevention

Gestational Diabetes and the Incidence of Type 2 Diabetes

Diabetes Care 2002; **25:** 1862 – 1868

- PubMed search 1965 – 2001
  - 28 studies
- Culmulative incidence of diabetes ranged from 2.6% to > 70% (6 wks post-partum to 28 years)
- Longest study: Boston Mass = 50% after 6 yrs, 70% after 28 yrs
- Women from mixed or non-white cohorts progress to type 2 diabetes at similar rates
- Whites and non-whites appear to progress to type 2 diabetes at similar rates (however fewer studies in white cohort)
- Progression greatest in first 5 years post-partum

Predictors of Postpartum Diabetes in Women with Gestational Diabetes Mellitus

Diabetes 2006; **55:** 792 – 797

- Prospective study from Germany recruiting between 1989 – 1999
  - 302 patients
  - 53% culmulative 8yr progression to type 2 diabetes
- Risks:
  - autoAbs (HR 4.1)
  - Requirement of insulin during pregnancy (HR 4.7)
  - BMI > 30 (HR 1.5)
  - Women with more than two prior pregnancies (HR 2.5)
- No association:
  - FHx
  - Maternal age
  - Child's birth weight
  - CRP at 9 months

Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis *Lancet 2009;* **373(9677):** 1773-9

- Identified cohort studies between 1960 and 2009
  - 20 studies selected including 675455 women
  - Calculated unadjusted relative risks
  - Sub-group analysis incl. ethnicity, maternal age, BMI

→ Increased risk of developing type 2 diabetes compared with those who had a normoglycaemic pregnancy – relative risk 7.43

> "there is no reference to the power that the term 'gestational diabetes' has to transform a happy pregnant woman into an anxious or depressed one

DIABETES UK
CARE. CONNECT. CAMPAIGN.

- 44 page Guide to Gestational Diabetes

"After having gestational diabetes, you are at an increased risk of developing the condition in future pregnancies, and you're also more likely to develop Type 2 diabetes later on."

NHS choices
www.nhs.uk

Dietary advice when pregnant

- “weight gain varies greatly during pregnancy”
- “most women gain between 10kg and 12.5kg (22-26lb)”
- “a healthy diet is an important part of a healthy lifestyle at any time”
- “you don’t need a special diet”
- “you will probably find that you are hungrier than usual but you don’t need to eat for two even if you are having twins”
- “you need to be careful with your diet if you develop gestational diabetes, your Doctor or Midwife will advise you”
- NICE: Public health guideline [PH27] July 2010 “Do not weigh women repeatedly during pregnancy as a matter of routine”

Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

Check the label on packaged foods

Each serving (150g) contains

Energy	Fat	Saturates	Sugars	Salt
1046kJ 250kcal	3.0g	1.3g	34g	0.9g
	LOW	LOW	HIGH	MED
13%	4%	7%	38%	15%

of an adult's reference intake
Typical values (as sold) per 100g: 697kJ/ 167kcal

Choose foods lower in fat, salt and sugars

Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat

Choose lower fat and lower sugar options

Choose unsaturated oils and use in small amounts

Eat less often and in small amounts

Water, lower fat milk, sugar-free drinks including tea and coffee all count.

Limit fruit juice and/or smoothies to a total of 150ml a day.

Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS

Source: Public Health England in association with the Welsh government, Food Standards Scotland and the Food Standards Agency in Northern Ireland

Prevention of type 2 DM after GDM

- No intervention trial to date except one that examined troglitazone that was subsequently discontinued because of hepatotoxicity in other populations

- Complications in discontinuity of care
  - Loss to any follow-up post delivery
  - Maternal underestimates of risk
  - Difficulties in continued implementation of exercise and diet

Pre-diabetes

- Synonyms
  - IFG, IGT, borderline diabetes
- Not recognised by the WHO
  - ADA – HbA1c 5.7% / 39mmol/mol
- Simply put means that blood glucose levels higher than normal and at greater risk of developing type 2 diabetes
- Are we screening this cohort?
- How do we improve screening uptake?

Screening for type 2 diabetes in mothers with previous GDM

- Main NPID outcomes
  - Growing proportion of pregnancies in women with T2 DM
  - 44.9% vs. CEMACH 27.3%
  - Proportion of mothers with type 2 diabetes up by 60%

- Post-natal screening
  - **No** 6 week OGTT

    → Fasting glucose
  - Annual HbA1c and/or fasting glucose

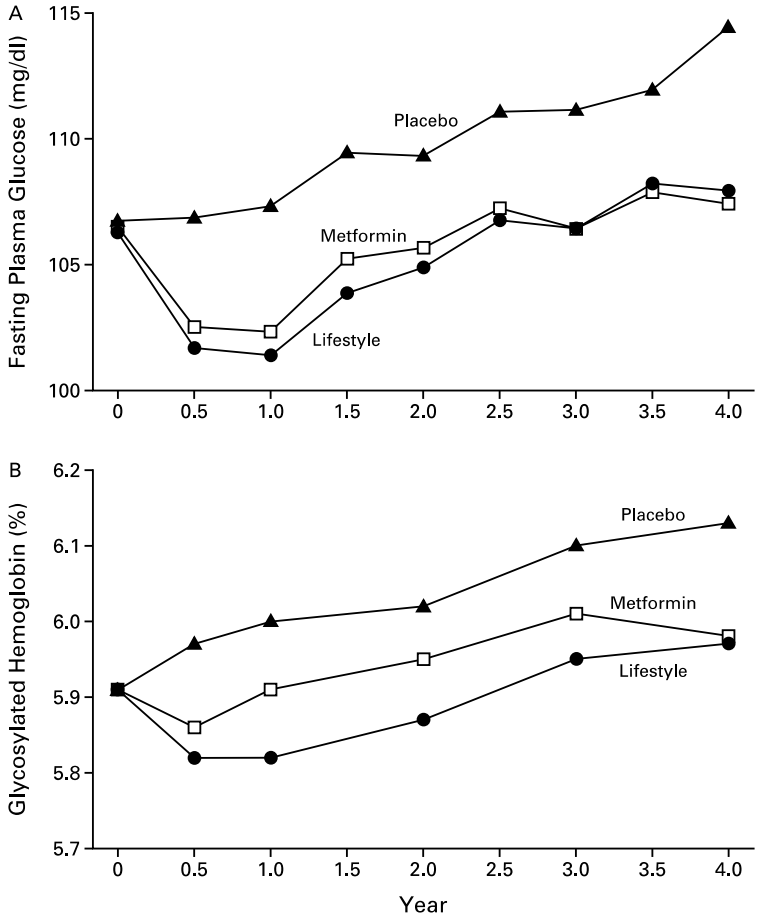
DIAMIND trial – *Diabet Med 2015*; **32(10):**1368-76

- Randomized controlled trial assessing whether an SMS reminder system for women, after GDM, would increase their attendance for OGTT by 6 months
- Subjects:
  - GDM in recent pregnancy
  - Mobile phone
  - normal glucose prior to discharge
  - n = 140 sent SMS at 6/52, 3/12, 6/12 vs. n = 136 sent x1 SMS at 6/12
- Results:
  - SMS group = 104 vs. control 103

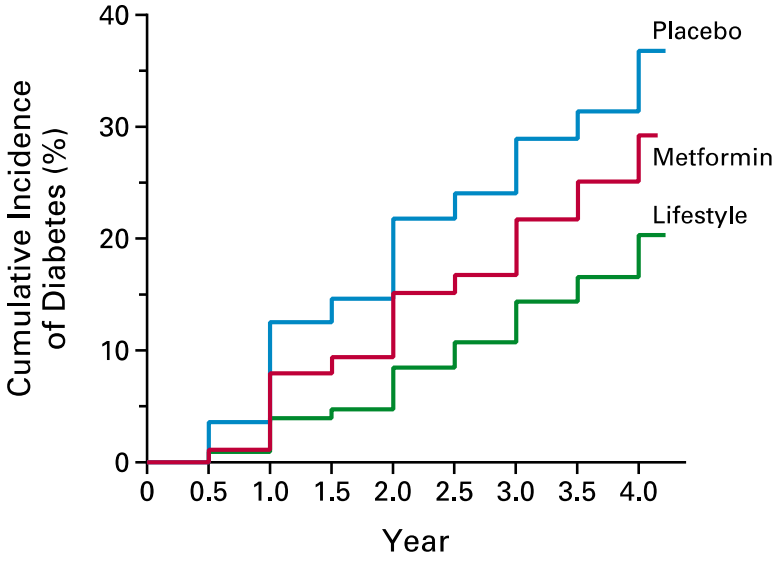
Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin - DPPR Group. *NEJM 2002*; **346(6):** 393-403

- Methods
  - 3234 persons without diabetes (50% from ethnic minorities)
  - Elevated fasting and post-prandial glucose concentrations
  - BMI > 24
  - Placebo vs. metformin (850mg tds) vs. intensive lifestyle modification
    - Aim 7% weight loss
    - 150 minutes of physical activity/wk
    - 16 lesson curriculum covering diet, exercise and behaviour modification; 1 to 1 basis in first 24wks and subsequent individual monthly sessions and group sessions
- Primary Outcome
  - Diabetes diagnosed on annual OGTT or semi-annual fasting glucose

DPPR – Results



DPPR - Results



- High rates of diabetes
- Lifestyle intervention reduced the incidence of diabetes by 58%
- Metformin reduced the incidence of diabetes by 31%
- To prevent one case of DM in 3 years:
  - 6.9 persons would have to participate in the lifestyle intervention program
  - 13.9 would have to receive metformin
- Results the same regardless of ethnicity, BMI, age

The future - big decisions to be made…

- NHS England – Diabetes Prevention Strategy
- Public Health policy
  - Childhood obesity strategy
- Governmental role
  - Childhood obesity strategy????
  - Advertising restrictions
  - Some supermarket promotions banned
  - Extension of sugar tax
- School role re: exercise
- Prevention of type 2 diabetes study in mothers with GDM!

Summary

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Many thanks

- Any questions?