High Risk Pregnancy

台北榮民總醫院

婦女醫學部

葉長青

足月

37 weeks

EARLY TERM

37 weeks through
38 weeks and 6 days

預產期 EDC

40 weeks

FULL TERM

39 weeks through
40 weeks and 6 days

Full term

39-41 weeks

LATE TERM

41 weeks through
41 weeks and 6 days

POSTTERM

42 weeks
and beyond

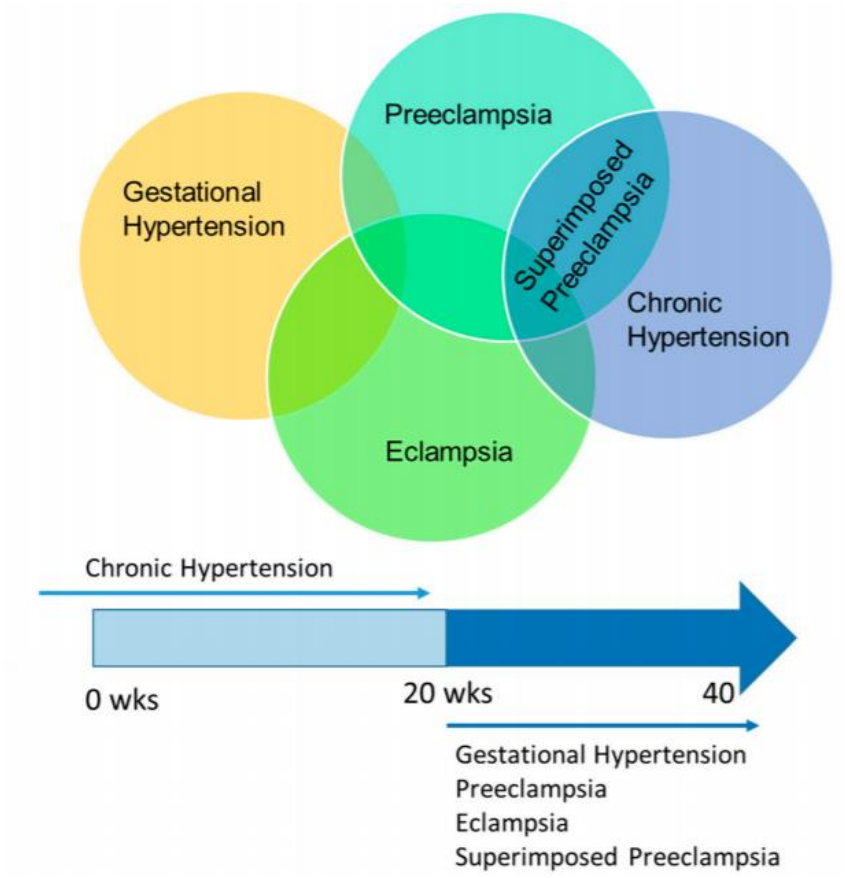
過期妊娠

42 weeks

Hypertensive Disorders in Pregnancy

Hypertensive Disorders

- Gestational hypertension
- Preeclampsia
- Eclampsia
- HELLP syndrome
- Chronic hypertension



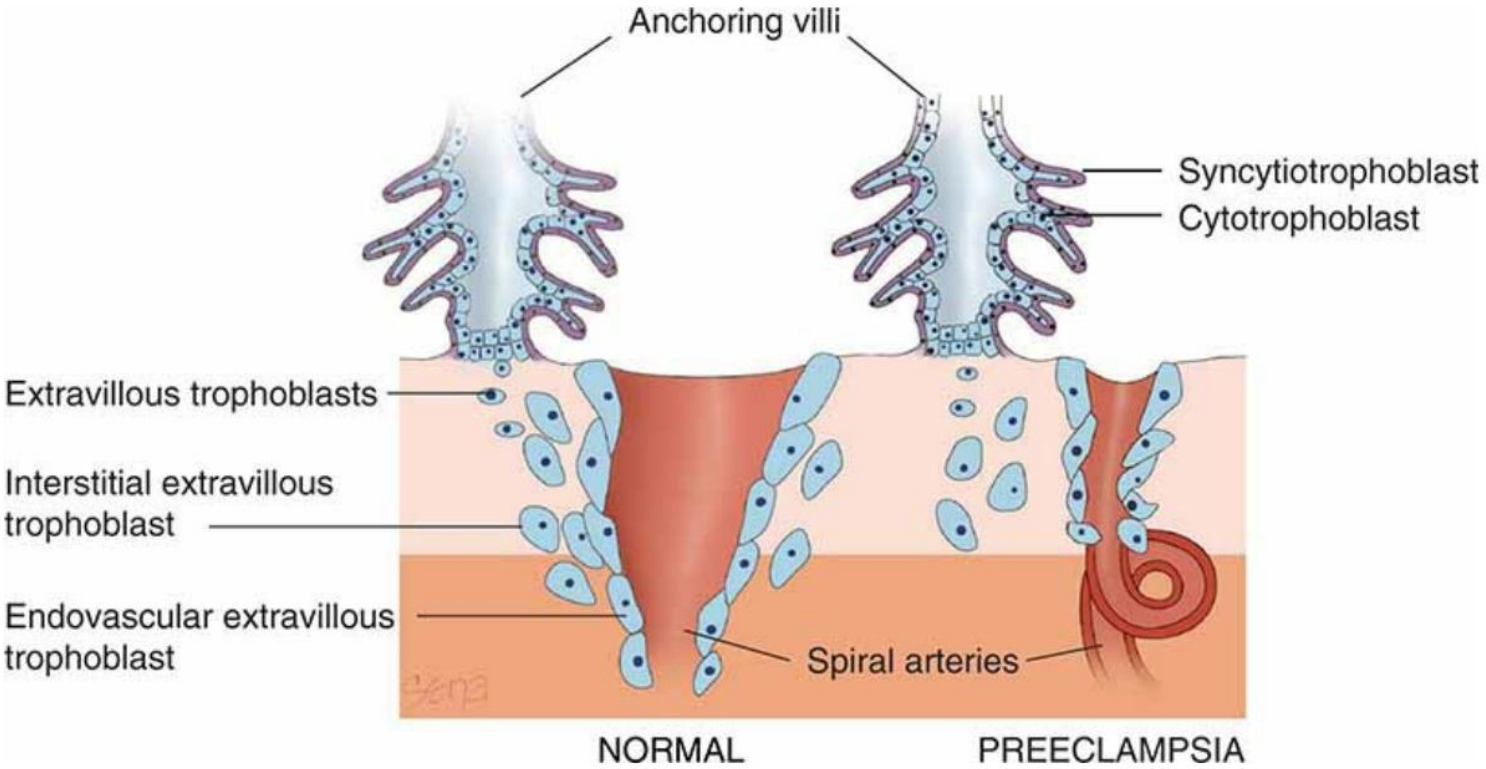


FIGURE 40-2 Schematic representation of normal placental implantation shows proliferation of extravillous trophoblasts from an anchoring villus. These trophoblasts invade the decidua and extend into the walls of the spiral arteriole to replace the endothelium and muscular wall to create a dilated low-resistance vessel. With preeclampsia, defective implantation is characterized by incomplete invasion of the spiral arteriolar wall by extravillous trophoblasts. This results in a small-caliber vessel with high resistance to flow.

Pre-eclampsia: etiology

- It is recognized that abnormal placentation and placental vascular insufficiency are core features of preeclampsia.

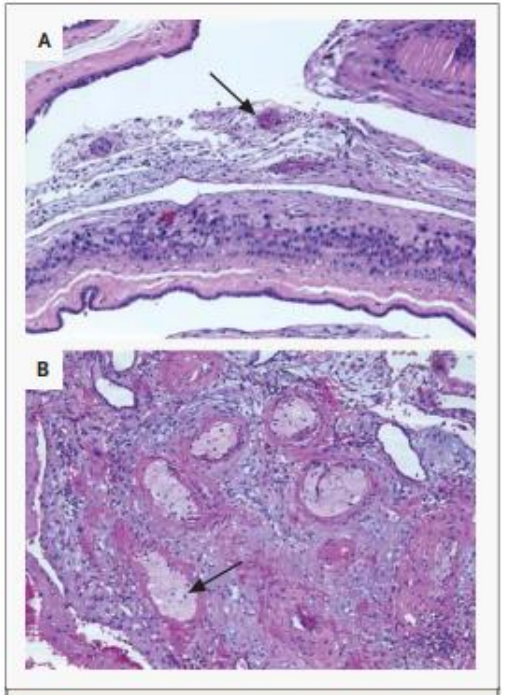


Figure. **Placental Vascular Pathology in Preeclampsia (Hematoxylin and Eosin, ×10).**

Panel A shows normal term decidua capsularis with small spiral arterioles (arrow). Panel B shows decidual arterioles in preeclampsia with fibrinoid necrosis and atherosis, the presence of foamy cells in the necrotic vascular wall (arrow). Courtesy of Dr. Drucilla Roberts, Department of Pathology, Massachusetts General Hospital, Boston.

Epidemiology and Etiology

- Pre-eclampsia found in 2-8% of pregnancies.
- True cause unknown.

Steegers EA, von Dadelszen P, Duvekot JJ, Pijnenborg R. Pre-eclampsia. Lancet 2010;376:631–44.

Risk Factors

Box 1. Risk Factors for Preeclampsia

- Nulliparity
- Multifetal gestations
- ✓ Preeclampsia in a previous pregnancy
- ✓ Chronic hypertension
- ✓ Pregestational diabetes
- Gestational diabetes
- Thrombophilia
- Systemic lupus erythematosus
- Prepregnancy body mass index greater than 30
- Antiphospholipid antibody syndrome
- Maternal age 35 years or older
- Kidney disease
- Assisted reproductive technology
- Obstructive sleep apnea

American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics Gestational hypertension and preeclampsia: ACOG Practice Bulletin, Number 222. Obstet Gynecol. 2020;135:e237–e260.

Diagnosis

TABLE 40-1. Classification and Diagnosis of Pregnancy-Associated Hypertension

Condition	Criteria Required
Gestational hypertension	BP >140/90 mm Hg after 20 weeks in previously normotensive women
Preeclampsia: Hypertension plus	兩次間隔四小時
Proteinuria	• ≥300 mg/24 h, or • Urine protein: creatinine ratio ≥0.3, or • Dipstick 1+ persistent[a] / 2+ (ACOG)
	or
Thrombocytopenia	• Platelet count <100,000/μL
Renal insufficiency	• Creatinine level >1.1 mg/dL or doubling of baseline[b]
Liver involvement	• Serum transaminase levels[c] twice normal
Cerebral symptoms	• Headache, visual disturbances, convulsions
Pulmonary edema	—

[a]Recommended only if sole available test.
[b]No prior renal disease.
[c]AST (aspartate transaminase) or ALT (alanine transaminase).
BP = blood pressure.
Modified with permission from American College of Obstetricians and Gynecologists Pregnancy: Hypertension in pregnancy. Report of the American College of Obstetrici Hypertension in Pregnancy, Obstet Gynecol. 2013 Nov;122(5):1122–31

Box 2. Diagnostic Criteria for Preeclampsia

Blood pressure

- Systolic blood pressure of 140 mm Hg or more or diastolic blood pressure of 90 mm Hg or more on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure
- Systolic blood pressure of 160 mm Hg or more or diastolic blood pressure of 110 mm Hg or more. (Severe hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy).

William Obstetrics 25th edition, Chapter 40

Clinical Manifestation

- 母親: end organ dysfunction
  - 嚴重高血壓、頭痛、視力模糊、畏光、腦中風、意識改變
  - 肝功能損傷
  - 腎功能損傷
  - 凝血功能異常
  - 右上腹痛
  - 未來健康風險增加
- 胎兒
  - 早產
  - 生長遲滯
  - 胎盤剝離

DDx

- Gestational hypertension:
  - SBP ≥ 140mmHg or DBP ≥ 90 mmHg after 20w
- Severe HTN: **severe range blood pressure management with same approach with severe pre-eclampsia**
  - SBP ≥ 160 mmHg or DBP ≥ 110 mmHg
  - Confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy
- ***Pre-eclampsia with severe feature:***
  - Severe HTN
  - Impaired liver function (2x upper limit) or severe persistent RUQ pain
  - Renal insufficiency (Cr > 1.1 or doubling)
  - Pulmonary edema
  - Newly onset headache, visual disturbance
  - Platelet < 100,000

Eclampsia

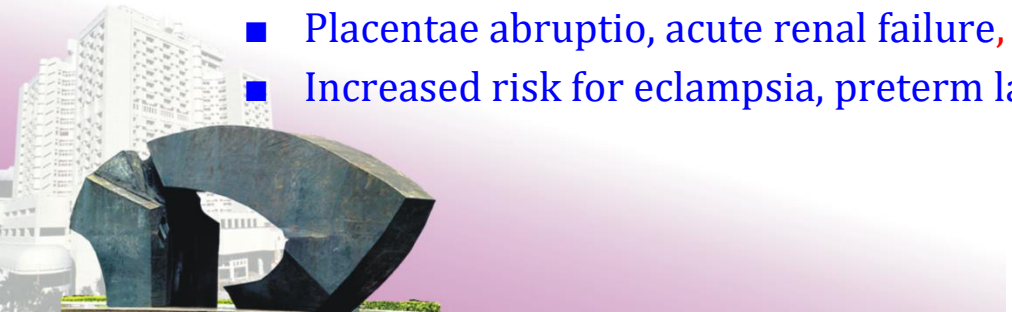
- Newly onset of convulsion not attributed to other causes in women with preeclampsia

  Severe and persistent occipital or frontal headaches, blurred vision, photophobia, and altered mental status

- Can occurs ***before / during / after labor***
- 1 in 2000-3400 pregnancies, accounts for 10% of postpartum seizure
- Management
  - Stabilize mother, give me 2 fives (5 mg MgSO4 IM to each buttock) or **MgSO4 loading dose 4-6 g, maintain dose 2 g/hr**)
  - Anticonvulsant
  - Fetal bradycardia frequently occurs, continuous monitoring
  - Target blood pressure: SBP 140-150 mmHg and DBP 90-100 mmHg
  - Method of delivery depends on gestational age, presentation, cervical condition, maternal status…

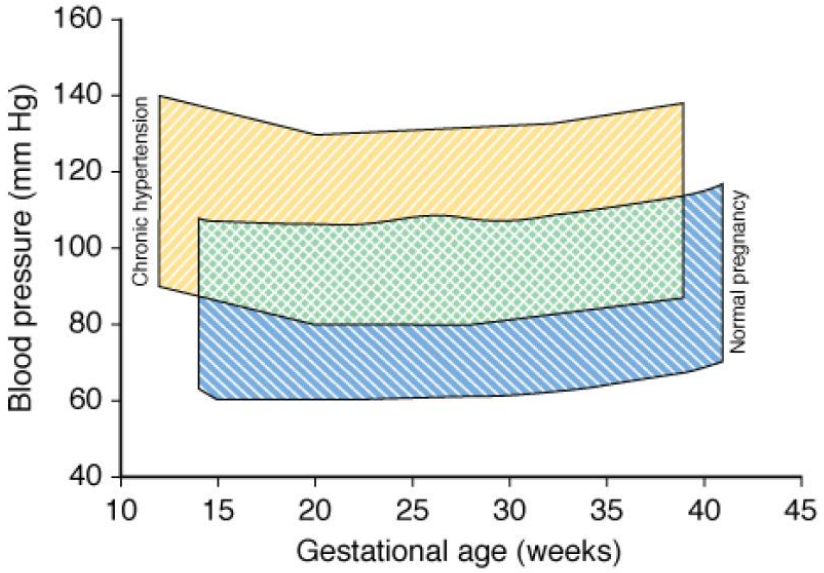
HELLP Syndrome - Variant of Severe Preeclampsia

- Hemoylsis:
  - Total bilirubin ≥1.2 mg/dL (Sibai criteria) or
  - Serum LDH ≥600 IU/L (Martin criteria)
- Elevated Liver Enzyme
  - Serum AST and ALT ≥70 IU/L (>2X ULN)
- Low Platelet
  - Platelet count ≤100,000
- Accounts for 0.5% - 0.9% of all pregnancies
- Sign and symptoms:
  - Severe features of pre-eclampsia, RUQ pain, epigastric pain, nausea, vomiting.
- Complications:
  - Placentae abruptio, acute renal failure, subcapsular liver hematoma, and DIC.
  - Increased risk for eclampsia, preterm labor & perinatal mortality.



Chronic Hypertension

- BP >140/90 mmHg before pregnancy or diagnosed before 20 weeks GA
- Hypertension persists 12 weeks postpartum



Source: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY: *Williams Obstetrics, 23rd Edition*: http://www.accessmedicine.com

Preeclampsia Superimposed on Chronic HTN

[Chronic HTN + Preeclampsia]

Preexisting Hypertension

- + new onset proteinuria > 300 mg in 24-h urine (or Protein/Creatinine ratio > 0.3) or
- End-organ damage

Preexisting Hypertension and Proteinuria

- + sudden increase in proteinuria from baseline

Management

- Delivery
- Eclampsia prevention
- Blood pressure control
- Fetal ultrasound evaluation
- Fetal monitor
- Preeclampsia prevention

Timing of Delivery

Maternal Conditions		
Hypertensive disorders of pregnancy		
Chronic hypertension: isolated, uncomplicated, controlled, not requiring medications	Early term/full term	38 0/7–39 6/7 weeks of gestation[§]
Chronic hypertension: isolated, uncomplicated, controlled on medications	Early term/full term	37 0/7–39 6/7 weeks of gestation[§]
Chronic hypertension: difficult to control (requiring frequent medication adjustments)	Late preterm/early term	36 0/7–37 6/7 weeks of gestation
Gestational hypertension, without severe-range blood pressure	Early term	37 0/7 weeks or at diagnosis if diagnosed later
Gestational hypertension with severe-range blood pressures	Late preterm	34 0/7 weeks of gestation or at diagnosis if diagnosed later
Preeclampsia without severe features	Early term	37 0/7 weeks of gestation or at diagnosis if diagnosed later
Preeclampsia with severe features, stable maternal and fetal conditions, after fetal viability (includes superimposed)	Late preterm	34 0/7 weeks of gestation or at diagnosis if diagnosed later
Preeclampsia with severe features, unstable or complicated, after fetal viability (includes superimposed and HELLP)	Soon after maternal stabilization	Soon after maternal stabilization
Preeclampsia with severe features, before viability	Soon after maternal stabilization[‖]	Soon after maternal stabilization[‖]

Timing of Delivery

- Fetal monitor
  - NST: non-reactive
  - OCT: late deceleration
- Sonography
  - AEDV or REDV of Umbilical artery
  - CPR (MCA/UmA PI) suggestive of brain-sparing/arterial redistribution

Eclampsia Prevention

[Pre-eclampsia with severe feature]

- Give ***MgSO4*** to prevent seizure until *24 hours post-partum*
- Monitor for toxicity (pulmonary edema, patellar reflexes, respiratory depression, mental status..etc)

Table 2. Serum Magnesium Concentration and Toxicities

Serum Magnesium Concentration			
mmol/L	mEq/L	mg/dL	Effect
2–3.5	4–7	5–9	Therapeutic range
>3.5	>7	>9	Loss of patellar reflexes
>5	>10	>12	Respiratory paralysis
>12.5	>25	>30	Cardiac arrest

Data from Duley L. Magnesium sulphate regimens for women with eclampsia: messages from the Collaborative Eclampsia Trial. Br J Obstet Gynaecol 1996;103:103–5 *and* Lu JF, Nightingale CH. Magnesium sulfate in eclampsia and pre-eclampsia: pharmacokinetic principles. Clin Pharmacokinet 2000;38:305–14.

Blood Pressure Control

- CCB: amlodipine, nifedipine
- βB: labetalol
- Vasodilators: Hydralazine, Methyldopa
- ARBs, ACEi **contraindicated** during pregnancy

Blood Pressure Control

Table 2. Common Oral Antihypertensive Agents in Pregnancy

Drug	Dosage	Comments
Labetalol	200–2,400 mg/d orally in two to three divided doses. Commonly initiated at 100–200 mg twice daily	Potential bronchoconstrictive effects. Avoid in women with asthma, preexisting myocardial disease, decompensated cardiac function, and heart block and bradycardia.
Nifedipine	30–120 mg/d orally of an extended-release preparation. Commonly initiated at 30–60 mg once daily (extended-release)	Do not use sublingual form. Immediate-release formulation should generally be reserved for control of severe, acutely elevated blood pressures in hospitalized patients. Should be avoided in tachycardia.
Methyldopa	500–3,000 mg/d orally in two to four divided doses. Commonly initiated at 250 mg twice or three times daily	Safety data up to 7 years of age in offspring. May not be as effective as other medications, especially in control of severe hypertension. Use limited by side effect profile (sedation, depression, dizziness).
Hydrochlorothiazide	12.5–50 mg daily	Second-line or third-line agent

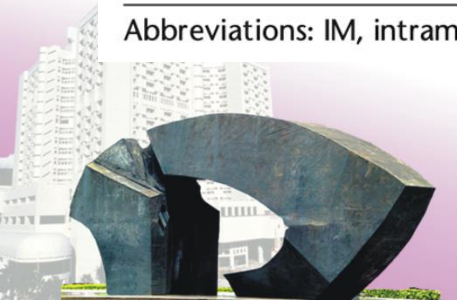
Obstet Gynecol. 2019 Feb;133(2):409-412

Blood Pressure Control

Table 3. Antihypertensive Agents Used for Urgent Blood Pressure Control in Pregnancy

Drug	Dosage	Comments	Onset of Action
Labetalol	10–20 mg IV, then 20–80 mg every 10–30 minutes to a maximum cumulative dosage of 300 mg; or constant infusion 1–2 mg/min IV	Tachycardia is less common and fewer adverse effects than other agents. Avoid in women with asthma, preexisting myocardial disease, decompensated cardiac function, and heart block and bradycardia.	1–2 minutes
Hydralazine	5 mg IV or IM, then 5–10 mg IV every 20–40 minutes to a maximum cumulative dosage of 20 mg; or constant infusion of 0.5–10 mg/hr	Higher or frequent dosage associated with maternal hypotension, headaches, and abnormal fetal heart rate tracings; may be more common than other agents.	10–20 minutes
Nifedipine (immediate release)	10–20 mg orally, repeat in 20 minutes if needed; then 10–20 mg every 2–6 hours; maximum daily dose is 180 mg	May observe reflex tachycardia and headaches.	5–10 minutes

Abbreviations: IM, intramuscularly; IV, intravenously.



Obstet Gynecol. 2019 Feb;133(2):409-412

Ultrasound Evaluation

- Fetal biometry (EFW): FGR
- Doppler evaluation:
  - Uterine artery: high resistance pattern
  - Umbilical artery: AEDV, REDV
  - Cerebroplacental ratio: MCA/UmA PI

Uterine Artery

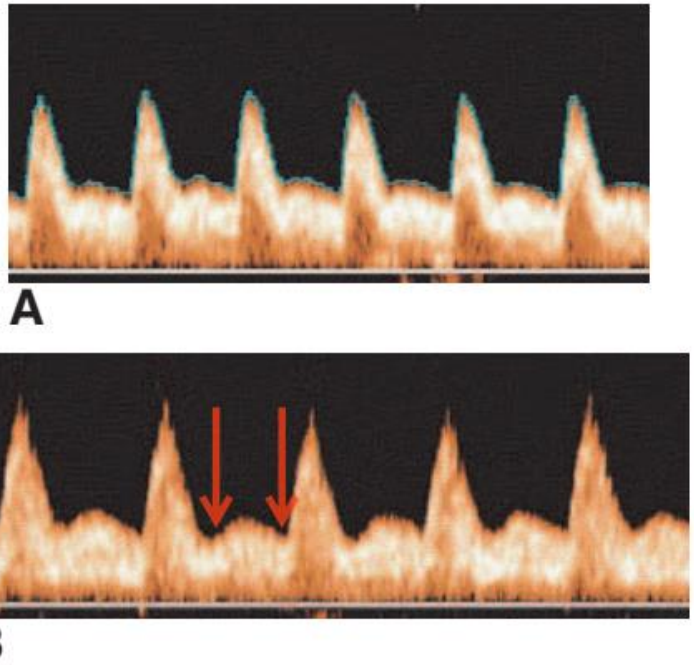
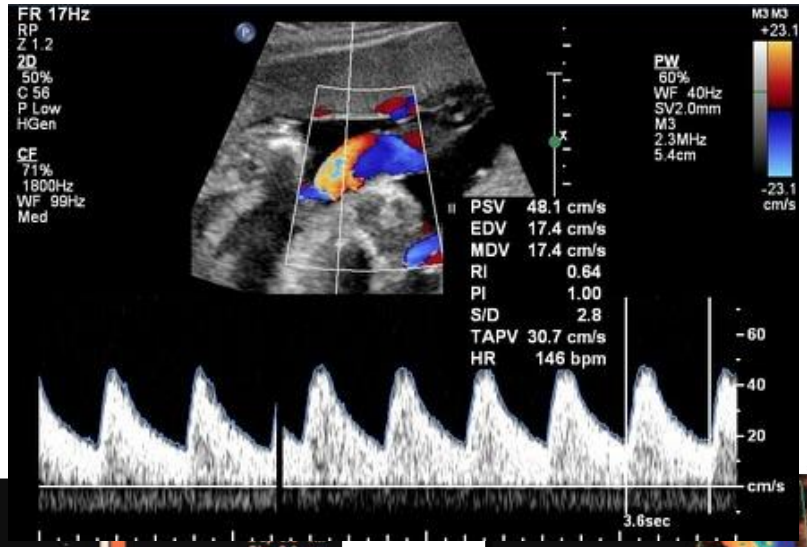


Figure 16.1 A. Normal color Doppler waveform of the uterine artery at 24 weeks. Note the shape of the waveform. B. Abnormal color Doppler waveform of the uterine artery at 24 weeks. Note the presence of a 'notch' at the end of systole and reduced end-diastolic frequencies.

Umbilical Artery

Normal



AEDV

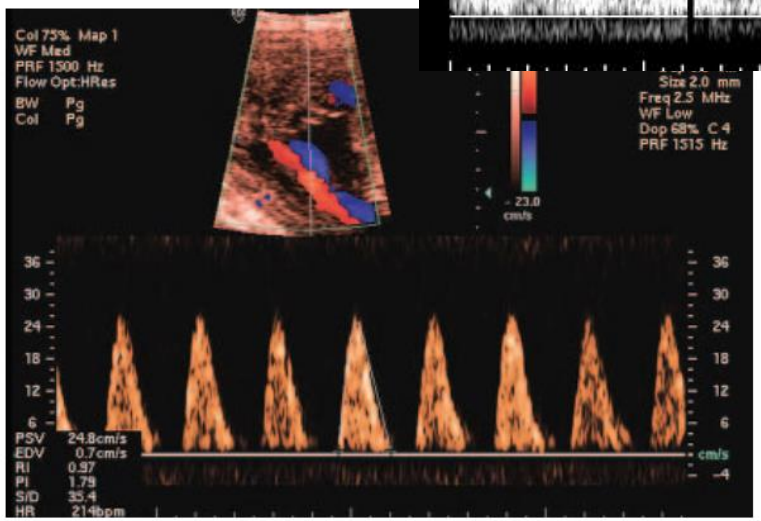


Figure 16.7 Color Doppler umbilical artery waveform demonstrating absent end-diastolic frequencies. Compare these appearances with the normal appearances shown in Fig. 16.6.

REDV

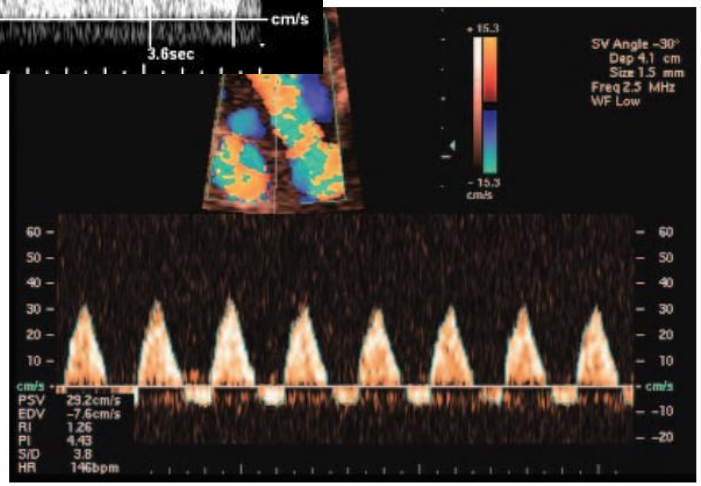


Figure 16.8 Color Doppler umbilical artery waveform demonstrating reversed end-diastolic frequencies. Compare these appearances with the less severe appearances shown in Fig. 16.7 and with the normal appearances shown in Fig. 16.6.

Cerebroplacental Ratio

- PI ratio of umbilical artery and MCA
  - Suggestive of arterial redistribution/brain-sparing

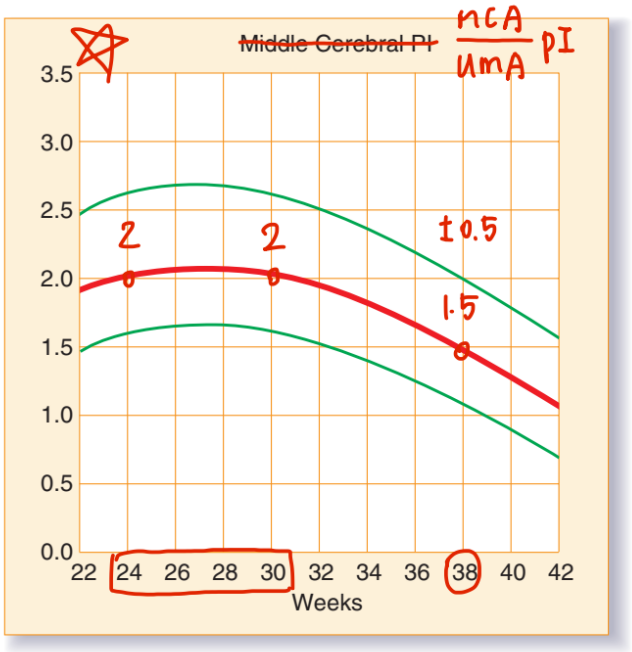


Figure 16.15 Reference range, showing 95th, 50th, and 5th centiles, for ratio of the MCA PI over the umbilical artery PI (cerebroplacental ratio) with gestation (with kind permission of A. Baschat).

Brain sparing:

MCA ↓血流才能供應到腦部

------ PI

UmA ↑阻力

Gestational Diabetes

Classification of DM

TABLE 57-1. Etiological Classification of Diabetes Mellitus

Type 1: β-Cell destruction, usually absolute insulin deficiency
Immune-mediated
Idiopathic

Type 2: Ranges from predominantly insulin resistance to predominantly an insulin secretory defect with insulin resistance

Other types
Genetic mutations of β-cell function—MODY 1–6, others
Genetic defects in insulin action
Genetic syndromes—Down, Klinefelter, Turner
Diseases of the exocrine pancreas—pancreatitis, cystic fibrosis
Endocrinopathies—Cushing syndrome, pheochromocytoma, others
Drug or chemical induced—glucocorticosteroids, thiazides, β-adrenergic agonists, others
Infections—congenital rubella, cytomegalovirus, coxsackievirus

Gestational diabetes

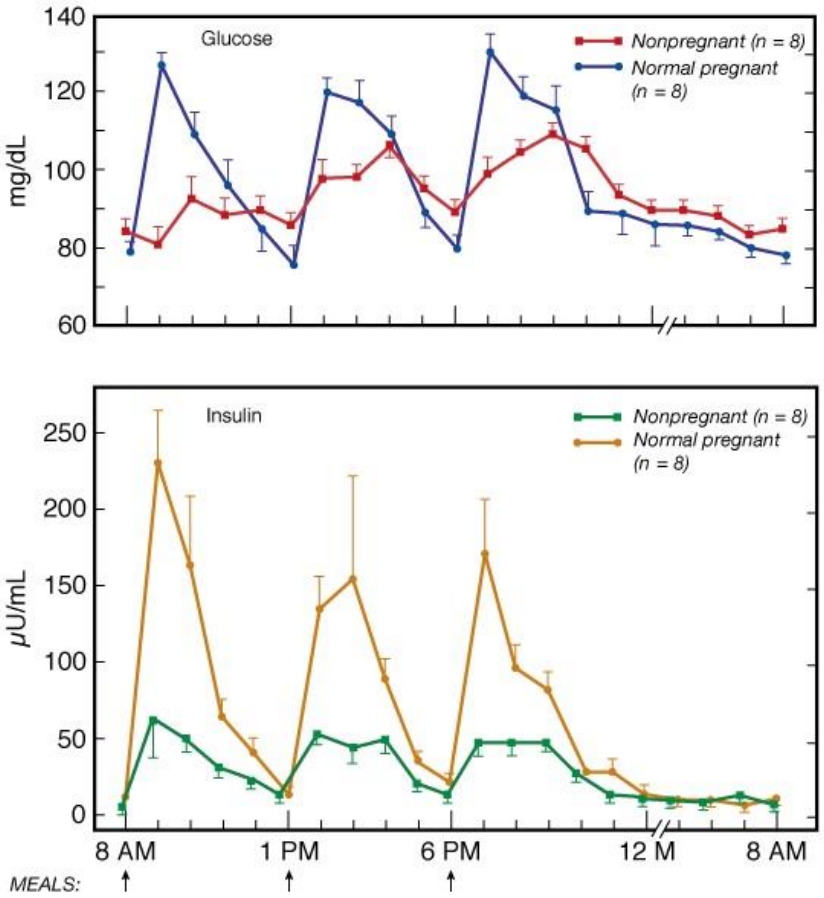
MODY = maturity-onset diabetes of the young.
Data from Powers, 2012.

Class	Onset	Plasma Glucose Level		Therapy
		Fasting	2-Hour Postprandial	
A_1	Gestational	<105 mg/dL	<120 mg/dL	Diet
A_2	Gestational	>105 mg/dL	>120 mg/dL	Insulin

William Obstetrics 25th edition, Chapter 57

懷孕生理變化

- Accelerated starvation
  - Fasting hypoglycemia
  - Postprandial hyperglycemia
  - Postprandial hyperinsulinemia



盛行率

- 因診斷標準與篩檢族群而有所不同
- NIH criteria: 6-7% in USA, higher in African American, Hispanic American, Native American, Pacific Islander, and South or East Asian women than in white women
- IADPSG (one-step) criteria: 10-15%
- 台北長庚: 4.6% (two-step), 12.4% (one-step)
- 逐年增加 (高齡產婦、肥胖人口增加)

危險因子

- 懷孕初期須排除 preexisting DM!
  - High-risk race or ethnicity (eg, African American, Latino, Native American, Asian American, Pacific Islander)
  - 前胎妊娠糖尿病
  - 家族糖尿病史，尤其一等親內
  - 過重 (BMI >24)/肥胖 (BMI >27)
  - 曾經生產過巨嬰 (>4000 gm)
- 高血壓、代謝症候群、多囊性卵巢症候群、使用類固醇

初期診斷 Preexisting DM

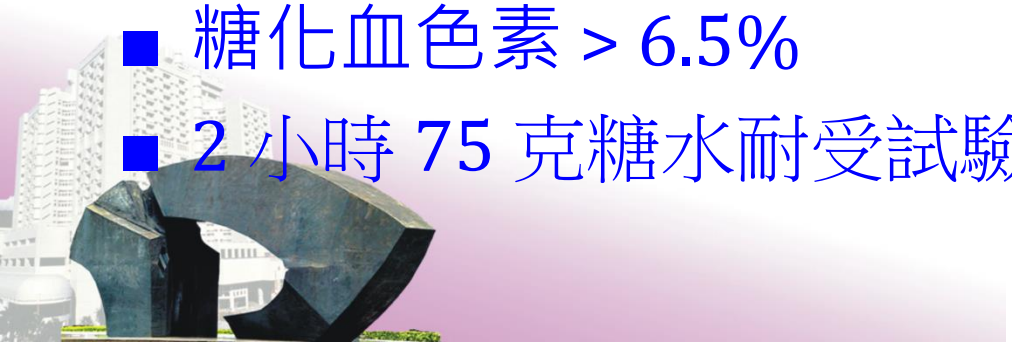
(1) 妊娠初期潛在的糖尿病PDM篩檢

對象：過重（BMI > 25,或亞洲婦女BMI > 23）併有糖尿病危險因子的孕婦危險因子（以下任何一項）

- 一等親患有糖尿病
- 有高血壓，高血脂，心血管疾病，多囊性卵巢（PCOS）或病態性肥胖等史。
- 有過糖尿病前期的檢查結果：HbA1c ≥ 5.7%，impaired glucose tolerance or impaired fasting glucose。
- 前胎妊娠糖尿病或前胎產下giant baby (> 4000 gm)。

方法：於初次產檢時檢查空腹血糖 ≥ 126 mg/dL或75-g, 2-hour OGTT > 200 mg/dL（或隨機血糖值 > 200 mg/dL）或 HbA1c ≥ 6.5%。

- 空腹血糖 > 126 mg/dl
- 飯後血糖 > 200 mg/dl
- 糖化血色素 > 6.5%
- 2 小時 75 克糖水耐受試驗 > 200 mg/dl



妊娠糖尿病對懷孕的影響

- 胎兒大 (macrosomia)
- 羊水多 (polyhydramnios)
- 剖腹產/器械生產 (C/S or operative delivery)
- 母體生產損傷
- 子癇前症 (preeclampsia)
- 胎死腹中 (unexplained stillbirth)

Congenital Malformation

Organ System	Type 1 DM n = 482	Type 2 DM n = 4166	GDM n = 31,700
Total	55	454	2203
Cardiac	38	272	1129
Musculoskeletal	1	31	231
Urinary	3	28	260
CNS	1	13	64
GI	1	30	164
Other	11	80	355

CNS = central nervous system; DM = diabetes mellitus; GDM = gestational diabetes; GI = gastrointestinal.
Data from Jovanovič, 2015.

William Obstetrics 25th edition, Chapter 57

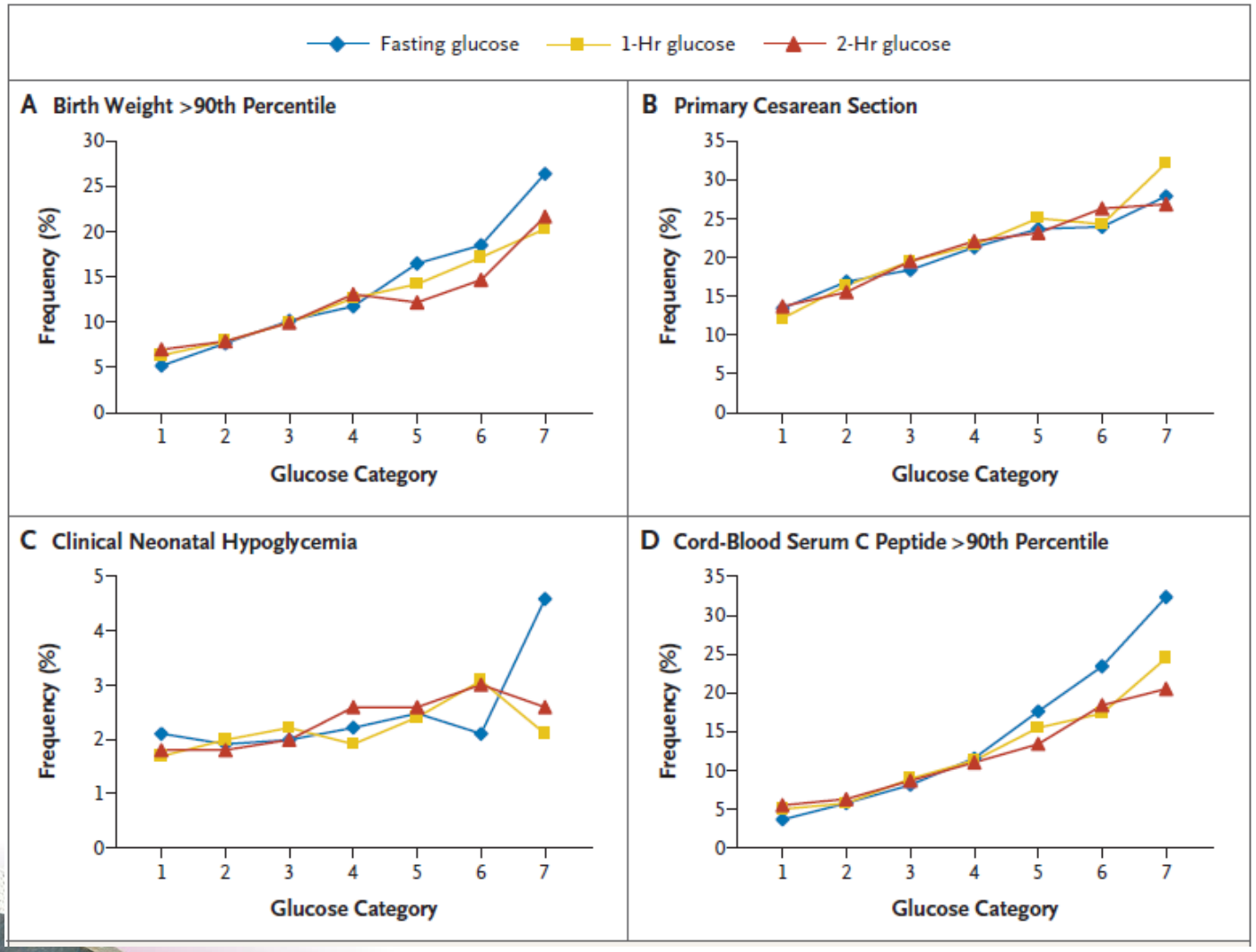
Neonatal Effect

- 生產損傷
- 呼吸窘迫 (RDS)
- 低血糖 (hypoglycemia)
- 高膽紅素 (hyperbilirubinemia)
- 低血鈣 (hypocalcemia)
- 多紅血球症 (polycythemia)
- 心肌病變 (cardiomyopathy)
- 長期認知功能 (Long-term cognitive function)
- 糖尿病 (inheritance of diabetes)

Maternal Effect

- Preeclampsia
- Developing diabetes
- Diabetic nephropathy
- Diabetic retinopathy
- Diabetic neuropathy
- Diabetic ketoacidosis
- Infections

The HAPO Study



HAPO Study 告訴我們

積極治療可減少
相關併發症！

血糖值↑
懷孕併發症↑

線性關係

篩檢與診斷
(GA 24-28w)

- Two-step approach:
  - 50gm (nonfasting) 1hr OGTT [screening]
  - 100gm (fasting) 3hr OGTT [diagnosis]
- One-step approach:
  - 75gm (fasting) 2hr OGTT [screening + diagnosis]

Table 4—Screening for and diagnosis of GDM

"One-step" (IADPSG consensus)

Perform a 75-g OGTT, with plasma glucose measurement fasting and at 1 and 2 h, at 24–28 weeks of gestation in women not previously diagnosed with overt diabetes.

The OGTT should be performed in the morning after an overnight fast of at least 8 h.

The diagnosis of GDM is made when any of the following plasma glucose values are exceeded:

- Fasting: ≥92 mg/dL (5.1 mmol/L)
- 1 h: ≥180 mg/dL (10.0 mmol/L)
- 2 h: ≥153 mg/dL (8.5 mmol/L)

"Two-step" (NIH consensus)

Perform a 50-g GLT (nonfasting), with plasma glucose measurement at 1 h (Step 1), at 24–28 weeks of gestation in women not previously diagnosed with overt diabetes.

If the plasma glucose level measured 1 h after the load is ≥140 mg/dL* (7.8 mmol/L), proceed to 100-g OGTT (Step 2). The 100-g OGTT should be performed when the patient is fasting.

The diagnosis of GDM is made when at least two of the following four plasma glucose levels (measured fasting, 1 h, 2 h, 3 h after the OGTT) are met or exceeded:

	Carpenter/Coustan	or	NDDG
• Fasting	95 mg/dL (5.3 mmol/L)		105 mg/dL (5.8 mmol/L)
• 1 h	180 mg/dL (10.0 mmol/L)		190 mg/dL (10.6 mmol/L)
• 2 h	155 mg/dL (8.6 mmol/L)		165 mg/dL (9.2 mmol/L)
• 3 h	140 mg/dL (7.8 mmol/L)		145 mg/dL (8.0 mmol/L)

100gm OGTT diagnosis

Table 1. Proposed Diagnostic Criteria for Gestational Diabetes Mellitus*

	Plasma or Serum Glucose Level Carpenter and Coustan Conversion		Plasma Level National Diabetes Data Group Conversion	
Status	mg/dL	mmol/L	mg/dL	mmol/L
Fasting	95	5.3	105	5.8
1 hour	180	10.0	190	10.6
2 hours	155	8.6	165	9.2
3 hours	140	7.8	145	8.0

*A diagnosis generally requires that two or more thresholds be met or exceeded, although some clinicians choose to use just one elevated value.

Adapted with permission from the American Diabetes Association. Classification and Diagnosis of Diabetes. Diabetes Care 2017;40 (Suppl. 1):S11–S24. Copyright 2017 American Diabetes Association.

確定診斷需**至少有二項**靜脈血漿糖濃度超過或符合標準值

75gm OGTT

International Association of Diabetes and Pregnancy Study Group (2010)

Fasting	92 mg/dL
1hr	180 mg/dL
2hr	153 mg/dL

有任何一個值超過標準即可確診

孕期增加體重↓

出生體重↓

LGA和巨嬰↓

PLOS ONE

RESEARCH ARTICLE

The Effects of Implementing the International Association of Diabetes and Pregnancy Study Groups Criteria for Diagnosing Gestational Diabetes on Maternal and Neonatal Outcomes

Tai-Ho Hung[1,2]*, T'sang-T'ang Hsieh[1]

1 Department of Obstetrics and Gynecology, Chang Gung Memorial Hospital at Taipei, Taipei, Taiwan, 2 Department of Chinese Medicine, College of Medicine, Chang Gung University, Taoyuan, Taiwan

Treatment

- 自我血糖監測：GDM的控制關鍵
- 衛教：為什麼治療？如何治療？
- 飲食與運動
  - 約 90% 的 GDM 孕婦可以藉此達到血糖標準
- 可能需要藥物治療
  - Insulin, Metformin, Glyburide
- 增加產檢次數
- 更多母體與胎兒的檢查和監測

Cost vs. Benefit ?

Glycemic Targets in Pregnancy

- 4 times/day [QDAC+TIDPC]
- Gestational diabetes
  - Preprandial < 95 mg/dl
  - 1-hour postmeal < 140 mg/dl
  - 2-hour postmeal < 120 mg/dl
- Pre-existing type 1 or type 2 diabetes
  - Premeal, bedtime, overnight: 60-99 mg/dl
  - Peak postprandial glucose: 100-129 mg/dl
  - A1C < 6%
- Intrapartum: 72-126 mg/dl

飲食、運動

- Diet: 3 meals + 2-3 snacks

  (少量多餐 reduce postprandial glucose fluctuation)
  - Carbohydrate (low-GI, high-fiber) 33-40%
  - Protein 20%
  - Fat 40%

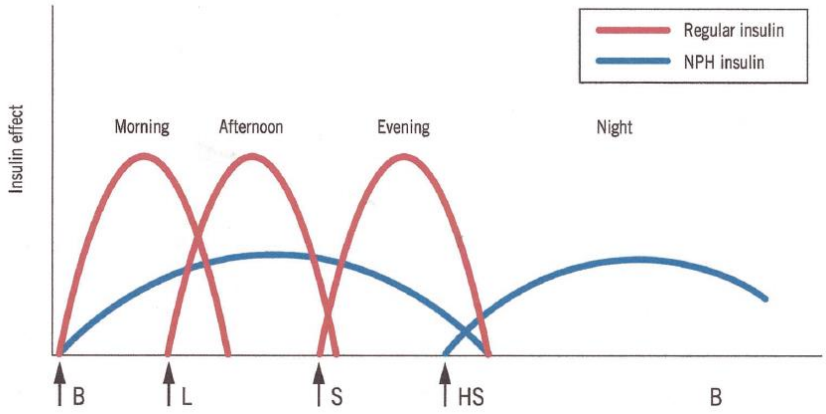
- Exercise: moderate exercise program
  - 30 minutes of moderate-intensity aerobic exercise at least 5 days/week
  - or a minimum of 150 minutes/week

Insulin

(Long/intermediate + short acting insulin)

- 常在飲食與運動控制 1-2 週後開始
- FDA Pregnancy class B

  not cross placenta
- Requirements:
  - 0.8 units/kg/day in the first trimester
  - 1.0 unit/kg/day in the second trimester
  - 1.2 units/kg/day in the third trimester



Fetal assessment

- 超音波檢查:
  - 胎兒先天異常及追蹤胎兒發育
  - Macrosomia
  - IUGR
  - Polyhydramnios
- Poorly-controlled or A2GDM:

  Antenatal fetal testing from GA 32w
  - BPP
  - NST
  - Doppler

Timing for Delivery

The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

Society for Maternal-Fetal Medicine

ACOG COMMITTEE OPINION

Number 764

(Replaces Committee Opinion No. 560, April 2013)

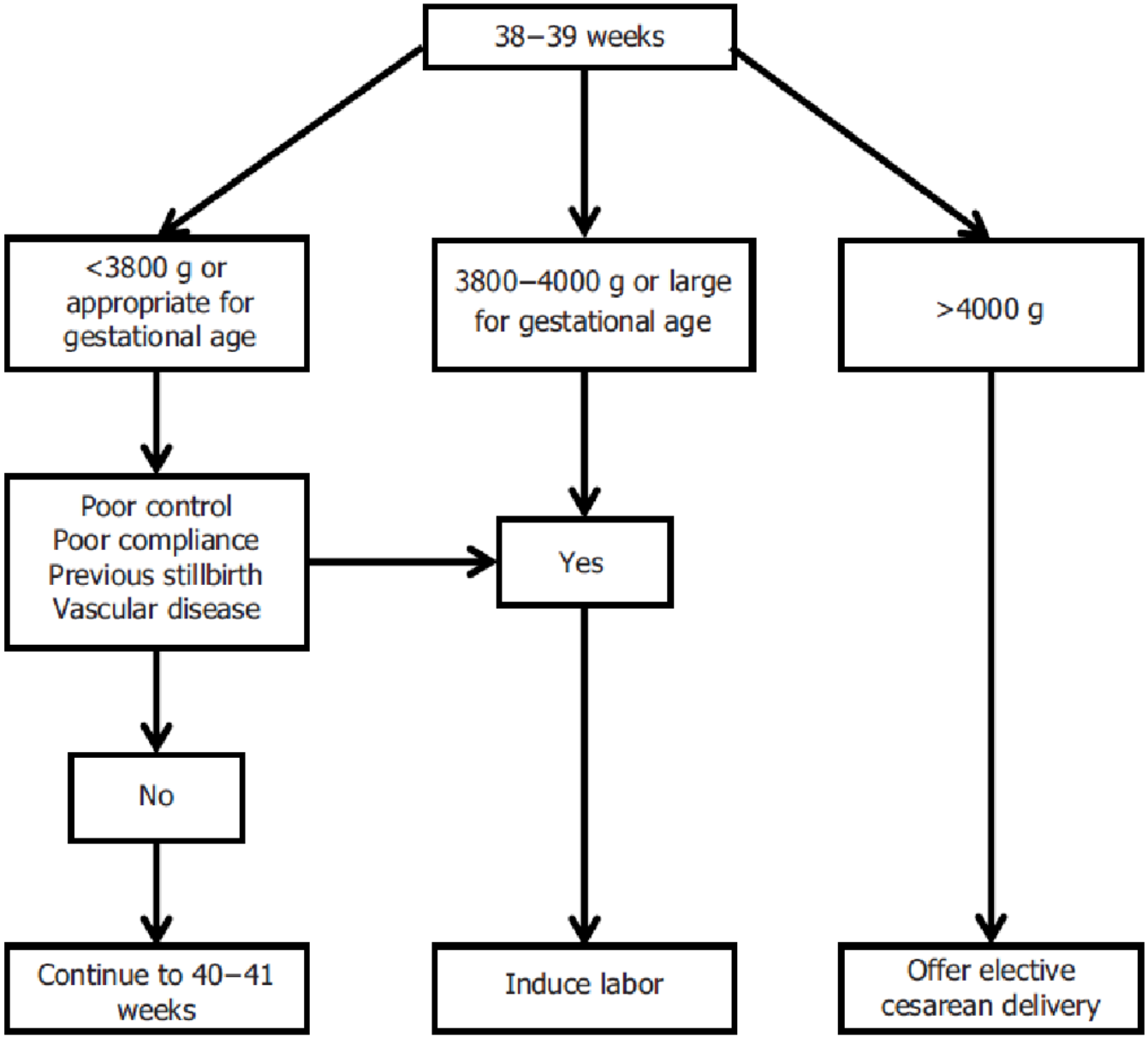
Committee on Obstetric Practice
Society for Maternal-Fetal Medicine

This Committee Opinion was developed by the Committee on Obstetric Practice in collaboration with Society for Maternal-Fetal Medicine liaison member Cynthia Gyamfi-Bannerman, MD, MS, committee members Angela B. Gantt, MD, MPH and Russell S. Miller, MD, and the Society for Maternal-Fetal Medicine.

Medically Indicated Late-Preterm and Early-Term Deliveries

Table 1. Recommendations for the Timing of Delivery When Conditions Complicate Pregnancy*

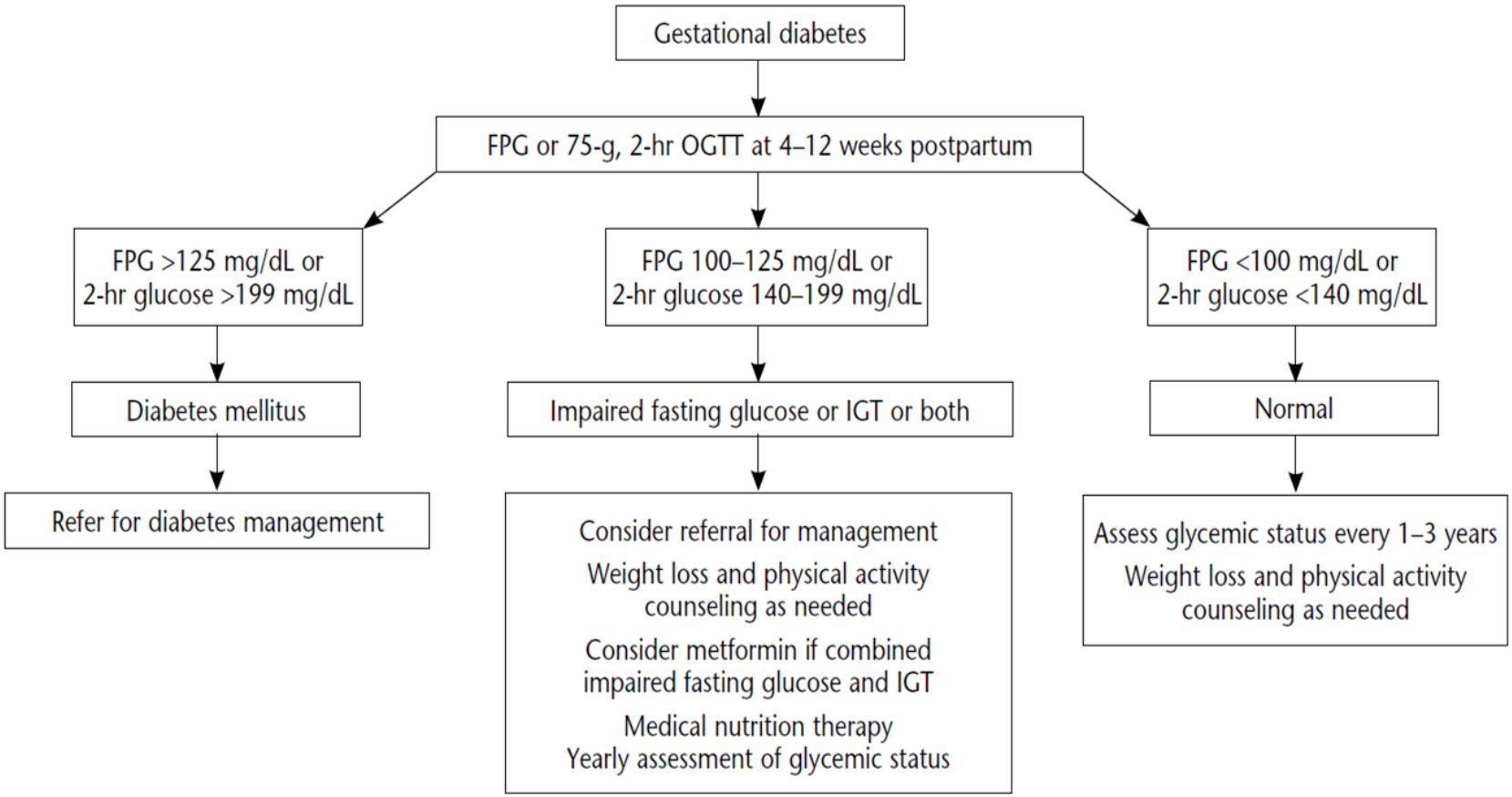
Condition	General Timing	Suggested Specific Timing
Diabetes		
Pregestational diabetes well-controlled†	Full term	39 0/7–39 6/7 weeks of gestation
Pregestational diabetes with vascular complications, poor glucose control, or prior stillbirth	Late preterm/early term	36 0/7–38 6/7 weeks of gestation
Gestational: well controlled on diet and exercise	Full term	39 0/7–40 6/7 weeks of gestation
Gestational: well controlled on medications	Full term	39 0/7–39 6/7 weeks of gestation
Gestational: poorly controlled	Late preterm/early term	Individualized



International Journal of Gynecology and Obstetrics 131 S3 (2015) S173–S211

Postpartum follow-up

- 15-70% develop type 2 DM later in life
- Encourage breastfeeding
- Contraception



27 歲 G1P0 懷孕 38 週孕婦，因下腹部疼痛合併子宮收縮前來求診，到院時血壓 160/110 mmHg，尿蛋白 4+，血清穀草轉氨酶 AST 308 U/L，血小板數 60,000/uL，經診斷為重度子癇前症。醫師建議此位孕婦住院並給予硫酸鎂（magnesium sulfate， MgSO4）治療。對此一疾病，給予硫酸鎂處方的主要目的是：

A.預防痙攣

B.控制高血壓

C.抑制子宮收縮

D.保護胎兒中樞神經

一位35歲懷孕28週婦女，因血壓過高至急診就診，經評估後懷疑是子癲前症（pre-eclampsia）。下 列何者不是此病之臨床表現？

A.高血壓（hypertension）

B.蛋白尿（proteinuria）

C.寡尿（oliguria）

D.癲癇（seizure）

34歲G2P1孕婦，妊娠25週被診斷為子癇前症（preeclampsia），現妊娠31週主訴近3天來常感呼吸急促（shortness of breath），且無法平躺，經基層診所轉診至醫院急診。理學檢查血壓 158/96 mmHg，體重較2週前增加4 kg，尿蛋白4+。此時的最優先處置為：

A.胸部聽診及胸部X光（chest X-ray）檢查

B.給予安胎治療

C.給予利尿劑治療

D.安排剖腹生產

37歲孕婦，G1P0，妊娠36週，血壓180/110 mmHg，接受下列超音波檢查，如圖所示。則該檢查是：

A.臍動脈血流速度波形

B.臍靜脈血流速度波形

C.胎心音加壓性試驗

D.胎動檢查

54.承上題，正確的判讀為下列何者？

A.胎兒腦波反應

B.胎兒睡眠反應

C.胎兒正常

D.胎兒窘迫

20歲林小姐，沒有任何過去病史且第一次懷孕。當懷孕26週時被告知有妊娠糖尿病，經過飲食控制後再回來門診追蹤時發現空腹血糖168 mg/dL，此時醫生應該建議她如何控制接下來孕期的血糖？

A.只需要飲食控制

B.只需口服的降血糖藥物

C.胰島素和飲食控制

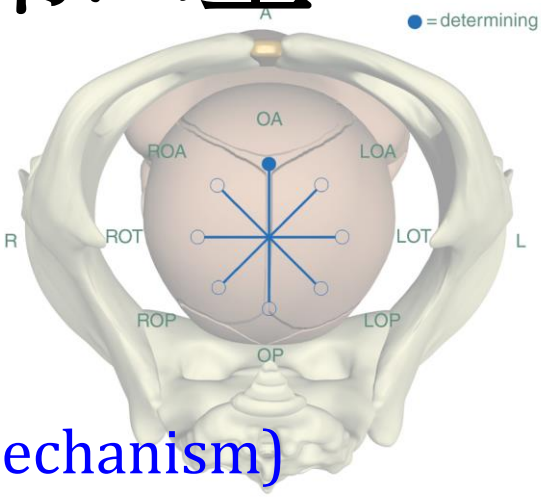
D.產檢時追蹤血糖值即可，不用特別控制

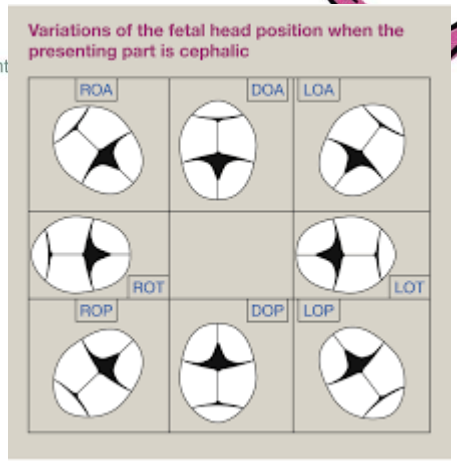
Obsterics Clerk 臨床工作

- 產房白板:
  - 一線-第四室、第九室
    - NSD/VE/CS
    - Indication
  - 守台
  - 病房

第四室

- NSD/VD/VE
- Presentation
- Fetal head position
- Placenta
  - 希氏法(Schultze Mechanism)
  - 鄧氏法(Duncan Mechanism)
  - Manual removal
  - ✔ Check intact, cord insertion, abnormality
- Episiotomy
  - Midline/mediolateral
  - Degree
- PPH: atony(Oxytocin,Cytotec, methylergonovine)
  laceration





第九室

- CS indication

Previous c/s (previous not elective)

Previous uterus surgery

NRFS

Dysfunction

Induction failure

APH (abuption)

Cord prolapse

Genital tract herpes (active)

Genital tract condyloma

Fetal anomaly

Pre-eclampsia

EFW <1500g or >4000g (Sono

Pelvis anamoly

Cephalopelvic disproportion

Obstructive labor(ex. Cx myom

Underlying systemic disease o

complication (ex. AVM)

HIV

第九室

- CS indication

情況危險	媽媽本身	寶寶本身
NRFS	Previous c/s or UT op	太輕太重
生不下來 (dysfuction/ induction X / CPD)	Pre-eclampsia	Anomaly
Cord prolapse	HIV, Condyloma, Herpes	
APH	Obstruction/pelvic anamoly	
	Underlying systemic disease	

Thank You