Caution in Pregnancy

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101.02.06

Case present

- Age: 29 y/o
- Gender: female
- 2012/01/02, 01:33AM arriving in ER
- Triage level: II
- GCS: E4V5M6
- T 36.4/P 92/R 18 BP:144/92 mmHg SpO2: 100%
- 主訴:晚上吃完喜酒後回家肚子突然很脹痛 已懷孕32週

Question
孕婦正常的生理機轉生命徵像爲何?

- 總血液容積輸出增加(心臟大小增加12%)
- HR 70->85
- 舒張壓: 懷孕中期降低
- 周邊阻力(peripheral resistance)降低
- Tidal volume增加200ml/residual volme減少300 ml
- 陰道PH降至3.5(念珠菌)
- 總氧氣消耗量約增加15-20%
- GFR腎血流量會增加30-50%
- 副甲狀腺分泌增加

懷孕的解剖改變

- 12 週 – 高出骨盆腔而在腹腔內
- 20 週 – 肚臍
- 34-36 週 – 肋緣
- 最後二週稍降 – 胎頭往下降
- first trimester – 骨盆腔內保護
- 2nd trimester – 羊水緩衝保護，外傷羊水栓塞
- 3rd trimester – 胎頭下落骨盆內，骨盆骨折可能造成**胎兒頭骨骨折及顱內**嚴重傷害及**胎盤早期剝離**
- 子宮及胎兒易受傷害，包括穿透傷、子宮破裂、胎盤剝離及早期破水

4

Present Illness

- G1P0 懷孕32週 有固定產檢產檢沒說有任何問題
- 今天吃完喜酒晚上肚子突然脹痛 痛的一直彎腰 有不小心撞到手肘有擦傷
- 一直有噁心感 ,之前沒有這樣子過
- 沒有拉肚子 任何姿勢都不舒服 一陣一陣痛
- 痛的時候背部肌肉很僵硬快抽筋沒有辦法躺
- 沒發燒 之前沒有開過刀
- 痛到呼吸急促 胸口悶痛但手腳不會麻
- 有先去產科但是產科請病人先過來急診評估
- 沒有高血壓或陰道出血

Physical Exam

- Conscious clear
- HEENT: no JVE
- Chest: clear breathing sound
- Abdomen: soft, distention epigastric area tenderness
- Extremities: warm, no numbness left hand a/w,no edema
- EKG: NSR
- Echo: no ascites, FHB(+), no hydronephrosis

Question 1

- 你的初步診斷爲何?
- 你的下一步?

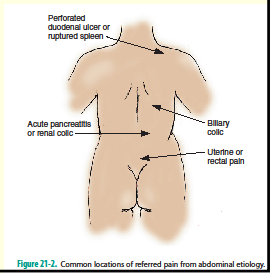

Figure 21-2. Common locations of referred pain from abdominal etiology.

- 所以抽血/EKG
- Wound CD/打破傷風
- NPO
- NS run 60 c.c./hr
- Pain control

Question 病人問:

醫師…

- 這是不是孕吐?
- 一定要打破傷風? 打了對小朋友會不會有影響?
- 醫生 你打甚麼止痛針? 小朋友會不會有危險?
- 我不想照CXR 那個不是會有輻射劑量對小朋友不好?

- 請試著和病患解釋

Drug contraindication in AP?

- 何者藥物能安全使用?
- PTU
- Methimazole
- Thiazide diuretics
- ACEI
- B-blocker
- Insulin.
- Amaryl
- Bosmin
- Amiodarone
- Adenosine.
- antiacids
- Carbamazepine
- Aspirin
- NASID
- Cravit
- Erythromycin
- Warfarin
- Clexane.
- Heparin.
- Corticosteroid
- midazolam
- PPI
- Cimetidine/ranitidine
- naloxone

Medications Contraindicated during Breastfeeding

- Amphetamines
- Aspirin (high doses)
- Bromocriptine (Parlodel)
- Cytotoxic agents
- Ergotamines
- Lithium
- Nitrofurantoin (for <1 mo old, and for those with glucose-6-phosphate dehydrogenase deficiency)
- Radiopharmaceuticals

如何解釋藥物對懷孕的安全?

TABLE 104-1 Food and Drug Administration Categorization of Drug Risk in Pregnancy*

Drug Category	Risk During Pregnancy
A	Controlled studies have failed to demonstrate a fetal risk in the first trimester (and there is no evidence of risk in later trimesters), and the possibility of fetal harm is remote.
B	*Either* animal studies have not demonstrated a fetal risk but there are no controlled human studies, *or* animal studies have demonstrated an adverse effect that was not confirmed in controlled human studies in women in the first trimester (and there is no evidence of risk in later trimesters).
C	*Either* animal studies have revealed adverse effects on the fetus (teratogenic or embryocidal) and there are no controlled studies in humans, *or* no human or animal studies are available. Drugs should only be used if the potential benefit justifies the potential fetal risk.
D	Evidence of human fetal risk exists, but the benefits of use in pregnant women may be acceptable despite the risk.
X	Studies in animals or humans have demonstrated fetal risk, or there is evidence of fetal risk based on human experience. The risk of use in pregnancy clearly outweighs any possible benefit. Drugs are contraindicated for use in women who are or may become pregnant.

TABLE 104-2 Medications Generally Considered Safe During Pregnancy

Agent
Antimicrobial agents
Cephalosporins
Erythromycin and azithromycin*
Nitrofurantoin Penicillins
Analgesic agents
Acetaminophen
Gastrointestinal agents
Promethazine
Prochlorperazine
Metoclopramide
Ondansetron Tums,
Rolaids Cimetidine
Ranitidine
Antihistamines
Diphenhydramine
Cold preparations
Pseudoephedrine
Dextromethorphan
Guaifenesin
Anesthetics
Lidocaine

TABLE 105-1 Therapeutic Agents Commonly Used in Emergency Settings with Known Adverse Effects in Human Pregnancy

Drug	Effect
ACE inhibitors	Renal failure, oligohydramnios
Aminoglycosides	Ototoxicity
Androgenic steroids	Masculinize female fetus
Antibiotics	
Erythromycin estolate	Maternal hepatotoxicity Fetal cartilage abnormality Fetal cranial nerve VIII damage Fetal midline facial defects (1st trimester)
Fluoroquinolones	
Kanamycin	
Metronidazole	
Streptomycin	Fetal cranial nerve VIII damage Fetal hemolysis, neonatal kernicterus (near term)
Sulfonamides	
Tetracyclines	Fetal teeth and bone abnormalities
Trimethoprim	Folate antagonist (1st trimester)
Anticonvulsants	Dysmorphic syndrome, anomalies
Antithyroid agents	Fetal goiter
Aspirin	Bleeding, antepartum and postpartum
Cytotoxic agents, i.e., methotrexate	Multiple anomalies
Isotretinoin	Hydrocephalus, deafness, anomalies
Lithium	Congenital heart disease (Ebstein anomaly)
Misoprostol	Anomalies
Nonsteroidal anti-inflammatory drugs (prolonged use after 32 weeks)	Oligohydramnios, constriction of fetal ductus arteriosus
Thalidomide	Phocomelia
Warfarin	Embryopathy—nasal hypoplasia, optic atrophy

LAB

WBC(白血球計數)	16.50 10^3/uL [4.80-10.80]
RBC(紅血球計數)	4.07 10^6/uL [4.20-5.40]
HGB(血色素)	11.8 g/dL [12.0-16.0]
HCT(血比容)	34.8 % [37.0-47.0]
MCV(平均血球容積)	85.6 fL [80.0-99.0]
MCH(平均紅血球血紅素量)	28.9 pg [27.0-34.0]
MCHC(平均紅血球血紅素濃度)	33.7 g/dL [31.0-37.0]
PLT(血小板計數)	350 x10^3 /uL [130-400]
NEUT(嗜中性白血球)	80.2 % [40.0-74.0]
LYM(淋巴球)	11.9 % [19.0-48.0]
MONO(單核球)	6.5 % [3.4-9.0]
EOS(嗜酸性白血球)	1.0 % [0.0-7.0]
BASO(嗜鹼性白血球)	0.4 % [0.0-1.5]

PT(凝血酶原時間試驗)	9.9 sec [8.0-12.0]
PT INR	0.94 [0.85-1.15]
MNPT	10.0 sec
APTT(部分凝血活酶時間測定)	26.5 sec [23.9-35.5]
D-Dimer (D-D雙合試驗)	1.36 mg/L FEU [<0.55]

LAB

BUN (尿素氮)	12.0 mg/dL [6.0-20.0]
Creatinine(肌酸酐)	0.57 mg/dL [0.40-1.30]
GOT(麩醯胺草酸轉氨基酵素)	24 IU/L [5-40]
Lipase (解脂酵素)	27 U/L [22-51]
Na(鈉)	139 mmol/L [135-148]
K (鉀)	4.0 mmol/L [3.6-5.2]
Glucose(Random)(葡萄糖)	102 mg/dL [80-140]
Troponin-I(心肌肌鈣蛋白)	0.010 ng/mL [<0.5]

www

Question
孕婦的哪些實驗室檢查不一樣?

- Hct decrease 12% at 26-30 week
- WBC increase 8%(neutrophil)
- Platelet as usual
- Sugar decrease at first trimester
- B12<50%
- Na/K mild decreased
- BUN/Cr decrease in first 3 months
- PH: 7.4-> 7.44(呼吸鹼),PCO2 decrease
- Fribin/FDP/d-dimer increase

- 接下來呢?
- 病人還是很痛 先後打了12mg 的morphine

Question 病人問

- 電腦斷層不是有輻射 我應該不能做吧?
- 有沒有其他檢查或會診?
- 做的話會有什麼風險?

TABLE 105-3 Radiation Exposure to the Uterus/Fetus

Dosage, rad	Procedure
0.00005	Chest radiography (two views) with shielding of the maternal abdomen.
0.686—1.398	Intravenous pyelogram full series; in the case of a suspected stone a one-shot pyelogram should be used when a renal ultrasound is inconclusive or unavailable
.1	Kidney, ureter, bladder—single abdominal film
0.51-0.126	Lumbar spine series (three films)
0.168-0.359	Lumbosacral spine series (three films)
0.007-0.02	Mammography—diagnostic for suspected breast cancers
0.01	Cerebral angiography
0.056	Upper gastrointestinal series
1.9-3.9	Barium enema
<0.1	Head computed tomography (CT)
<1	Chest CT
3.5	Abdominal CT
3.5	Lumbar spine CT
0.25	Pelvimetry CT
3.6	IVP

Image Study

TTE?

- Sensitivity and specificity of TTE <CT,
- TEE In three large series, the sensitivity of TEE was 97~99 %
- The specificity of TEE alone <77~85%
- NEEDS SKILLFUL OPERATOR AND SEDATION!
- May induce rupture

Image Study

- CT scan Contrast media is required
- Sensitivity: 98%, Specificity: 100% [*The diagnosis of thoracic aortic dissection by noninvasive imaging procedures. N Engl J Med. 1993;328(1):1.*]
- MRI
- Sensitivity: 98%, Specificity: 98%
- Sensitivity for identification of the site of entry: 85%
- The patient has to be hemodynamic stable ;Less available at ED

Exposure Dose

- At doses less than 0.05 Gy (=5 rad=5000 mrad),

->no evidence of an increased risk of fetal anomalies, intellectual disability, growthrestriction, or pregnancy loss from ionizing radiation

- There may be a small increased risk of childhood cancer

Exposure Dose

- During the first 14 days after fertilization, intact survival or death are the most likely outcomes of radiation exposure above 0.05 Gy (termed the "all or none" phenomenon)
- Radiation-induced teratogenesis, growth restriction, or carcinogenesis are NOT observed during this stage of development
- After the first 14 days, radiation exposure over 0.5 Gy may be associated with an increased risk of congenital malformations, growth restriction, and intellectual disability.

Diagnostic Image During Pregnancy

- Missed or delayed diagnosis can pose a greater risk than any with ionizing radiation
- Perception of fetal risk is higher than the actual risk
- Effects of ionizing radiation are the same whether or not she is pregnant

Teratogenesis After Exposure to Ionizing Radiation

- *Teratogenesis is not a major concern after diagnostic CT studies of the pelvis in pregnancy, -> the radiation dose is generally too low to cause such effects.*
- Organogenesis between 2-15 weeks gestation.
- Microcephaly, mental retardation, growth retardation, behavioral defects, cataracts

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Carcinogenesis After Exposure to Ionizing Radiation

- *CT of the fetus should be avoided in all trimesters of pregnancy, because it may cause up to a doubling of the risk of fatal childhood cancer.*
- 1 in 2000 (baseline) to 2 in 2000 after 5 rads

End-point	Risk
Baseline risk of childhood cancer	19/10,000
Baseline risk of fatal childhood (0-15 yrs) cancer [2]	5/10,000
Excess risk of fatal childhood cancer per rad of fetal whole body dose [3]	4.5/10,000
Excess risk of childhood cancer per rad of fetal whole body dose [4]	6.4/10,000
Excess risk of childhood cancer per rad of fetal whole body dose [5]	6/10,000
Relative risk of childhood cancer after fetal radiation exposure of 5 rad [6]	2

Managing Pregnant Patients Who Are Irradiated

- Termination should only be considered if a radiation dose >5 rad occurs between 2 - 15 weeks ,probably indicated >15 rad
- *In practice, it is exceptionally unlikely that any single diagnostic radiological study would deliver a radiation dose sufficient to justify termination.*

Procedure	Conceptus radiation dose (rads*)
Abdominal radiograph	0.25
Intravenous pyelogram	0.8
Barium enema	0.8
Lumbar spine radiographs	0.6
CT pelvis	1-10

Note: 1 rad = 1 cGy = 10 mGy = 10,000 uGy

Iodinated Contrast Media in Pregnancy

- Potential to produce neonatal hypothyroidism
- Non-ionic contrast media has been reported : effect on neonatal thyroid function
- *Despite in vitro concerns, iodinated contrast seems safe to use in pregnancy*

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Risks From MRI During Pregnancy

- *Most studies evaluating MRI safety during pregnancy show no ill effects*
- Teratogenic effects of MRI exposure in early pregnancy-> high rate of spontaneous abortion
- Potential risk of acoustic damage to the fetus
- *Intravenous gadolinium is contra-indicated in pregnancy, should only be used if absolutely essential*
- Breast feeding *can be continued* after using iodinated contrast or gadolinium to a lactating p't

CT:

7am

Consult CVS for aortic dissection

SICU admission

Dellivery with aortic stent replacement after 2 days

BP control

Final diagnosis: aortic dissection in pregnancy

女性懷孕很危險低…

BOX 18-1 Risk Factors Associated with Potentially Catastrophic Causes of Chest Pain

Acute coronary syndromes
- Past or family history of coronary artery disease
- Age
  - Men >33 years
  - Women >40 years
- Diabetes mellitus
- Hypertension
- Cigarette use/possible passive exposure
- Elevated cholesterol (LDL)/triglycerides
- Sedentary lifestyle
- Obesity
- Postmenopausal
- Left ventricular hypertrophy
- Cocaine abuse

Pulmonary embolism
- Prolonged immobilization
- Surgery >30 minutes in last 3 mo
- Prior deep vein thrombosis or pulmonary embolus
- Pregnancy or recent pregnancy
- Pelvic or lower extremity trauma
- Oral contraceptives with cigarette smoking
- Congestive heart failure
- Chronic obstructive pulmonary disease
- Obesity
- Past medical or family history of hypercoagulability

Aortic dissection
- Hypertension
- Congenital disease of the aorta or aortic valve
- Inflammatory aortic disease
- Connective tissue disease
- Pregnancy
- Arteriosclerosis
- Cigarette use

Pericarditis or myocarditis
- Infection
- Autoimmune disease (e.g., systemic lupus erythematosus)
- Acute rheumatic fever
- Recent myocardial infarction or cardiac surgery
- Malignancy
- Radiation therapy to mediastinum
- Uremia
- Drugs
- Prior pericarditis

Pneumothorax
- Prior pneumothorax
- Valsalva's maneuver
- Chronic lung disease
- Cigarette use

懷孕婦女常出現的症狀

Table 176-3 Differential Diagnosis of Common Symptoms in Pregnancy

DIAGNOSIS	GESTATIONAL AGE	COMMENTS
Vaginal Bleeding		
Miscarriage	<20 wk	Usually no fetal heart activity at 8 weeks; decreasing hCG
Ectopic pregnancy	<14 wk	Evaluate with ultrasonography
Molar pregnancy	12–24 wk	No fetal heart tones; characteristic sonogram
Cervical lesions	Throughout	Perineal and vaginal inspection
Vaginitis/cervicitis	Throughout	White blood cells on wet mount, with culture
Placenta previa	>16 wk	Ultrasonography to localize placenta
Abruptio placentae	>16 wk	Ultrasonography to exclude previa; fetal distress, tenderness
Seizure		
Eclampsia	>24 wk	Blood pressure >140/90 mm Hg; usually history of PIH, edema, proteinuria
Amniotic fluid embolus	>12 wk	Hypotension, respiratory distress, DIC
Epilepsy	Throughout	History; lack of PIH findings
Dyspnea		
Pulmonary embolus	Especially 6 wk prepartum and postpartum	Usual diagnostic studies
Dyspnea of pregnancy	>24 wk	Exclude other causes
Pulmonary infection	Throughout	Examination; roentgenography
Amniotic fluid embolus	>12 wk	Uterine manipulation, bleeding diathesis, hypotension
Jaundice		
Cholestasis of pregnancy	>24 wk	Well patient; itching and jaundice
Hepatitis	Throughout	Abnormal liver function tests
Acute fatty liver	>24 wk	Rapid liver failure, coma, seizures, hypoglycemia
Bleeding Diathesis		
Eclampsia	>24 wk	Blood pressure > 140/90 mm Hg; proteinuria, edema, HELLP syndrome
Amniotic fluid embolus	>12 wk	Respiratory distress, cardiovascular collapse
Abruptio placentae	>20 wk	Uterine tenderness; vaginal bleeding; fetal distress

DIC, disseminated intravascular coagulation; hCG, human chorionic gonadotropin; HELLP, hemolysis, elevated liver enzymes, low platelets; PIH, pregnancy-

Question

- 第三懷孕產程的婦女還要注意哪些其他急症?

血栓

高血壓

DVT or pul embolism

- High risk in pregnancy
- D-dimer?
- V/Q scan?

Table 104-1 Risk Factors for Thromboembolic Disease in Pregnancy

Black race
Heart disease
Diabetes
Lupus erythematosus
Smoking
Obesity
Advanced maternal age
Assisted reproduction with ovarian hyperstimulation
Multiparity
Hypercoagulable states
Antiphospholipid syndrome
Factor V Leiden mutation,
Antithrombin deficiency
Protein C deficiency
Protein S deficiency

HELLP syndrome

- Abnormal liver function acronym for *h*emolysis, *e*levated *l*iver enzymes, and *l*ow *p*latelets
- Multigravid patient
- Similar as preeclampsia
- Liver hematoma

Table 104-7 Laboratory Evaluation for HELLP Syndrome

Test	Findings
Complete blood count and test of peripheral smear	Schistocytes
Platelet count	<100,000/microliter but suspicious if <150,000/microliter
Liver function tests (alanine aminotransferase, aspartate aminotransferase levels)	Elevated but below levels usually seen in viral hepatitis (<500 IU/L)
Renal function tests	Normal or elevated blood urea nitrogen and creatinine levels
Coagulation profile	Abnormal

Preeclampsia

RUQ pain, CNS manifestations (headache, scotomata,blurred vision, mental status change), HELLP syndrome

- >20 weeks
- BP > 140/90 before 20 wks gestation or prior to pregnancy(chronic)

Table 104-3 Diagnostic Criteria for Preeclampsia
Systolic blood pressure ≥140 mm Hg
or
Diastolic blood pressure ≥90 mm Hg
and
Proteinuria >0.3 gram in a 24-h collection
and
20-wk gestation

Danger Signs of Severe Preeclampsia

- Headache
- Right upper quadrant abdominal pain
- Visual disturbance, blindness
- Decreased urine output
- Hx of convulsion
- Respiratory pul edema (dyspnea, chest pain, cough)
- Nausea/ vomiting

Table 104-4 Risk Factors for Development of Preeclampsia
Nulliparity
Pregestational diabetes
Gestational trophoblastic disease
Multifetal gestation
Chronic hypertension
Obesity
Prior pregnancy affected by preeclampsia
Family history of preeclampsia or eclampsia
Antiphospholipid antibody syndrome
Inherited thrombophilia
Nephropathy
Connective tissue disease

Tx in Severe Preeclampsia

- **Definitive treatment of preeclampsia is delivery of the fetus**
- **BP control**

Table 104-6 Antihypertensive Drugs for Treatment of Acute Severe Hypertension in Preeclampsia and Eclampsia

Generic Name	Trade Name	Mechanism of Action	Dosage	Comment
Hydralazine	Apresazide	Arterial vasodilator	5 milligrams IV/10 milligrams IM, repeat at 20-min intervals; consider other drug if no response at maximum of 20 milligrams IV/30 milligrams IM	Maternal hypotension, fetal distress; must wait 20 min for response between IV doses.
Labetalol	Normodyne	Selective α and nonselective β antagonist	20 milligrams IV, then 40–80 milligrams IV every 10 min (maximum, 220 milligrams); IV infusion 1–2 milligrams/min titrated	Less hypotension and reflex tachycardia than hydralazine.
	Trandate			Considered second-line therapy.
Nifedipine	Adalat	Calcium channel antagonist	10 milligrams PO, repeat in 30 min as often as necessary	Food and Drug Administration does not approve short-acting nifedipine for treatment of hypertension.
	Procardia			
Sodium nitroprusside	Nipride	Vasodilator	0.25 microgram/kg/min infusion to maximum dose of 5 micrograms/kg/min	Potential fetal and maternal cyanide toxicity, especially if used >4 h.
	Nitropress			Use as last resort.

Placental Abruption

- Failure of invading spiral arteries to transform from muscular arterioles into low-resistance vessels => ischemia => predisposing vessels rupture or thrombosis => hematoma with placental separation => bleeding occur due to tearing of attachment
- Risk factor: previous abruption Hx (10X)

Thanks for listening

考題

- 1.HELLP syndrome以下何者錯誤 (1.)Hemolysis: abnormal PB smear, bil > 1.2 mg/dL,(2.) LDH > 600(3.)Elevated liver enzymes: 2x normal(4.)Low platelets: < 500000
- 2.孕婦高血壓不可以用下列何者藥物: (1)trandate (2) ACEI (3) hydralazine (4) MgSO4
- 3.下列針對孕婦正常的生理何者錯誤 (1)心跳加快 (2)呼吸淺快 (3)tidal volume&residual volume增加 (4)二氧化碳濃度下降
- 4.以下是否正確? MRI在懷孕早期使用是安全的 (1)是 (2)否
- 5.當懷孕病患有DVT的情形時下列何者藥物不可使用?
- (1) coumadin (2) heparin (3) clexane

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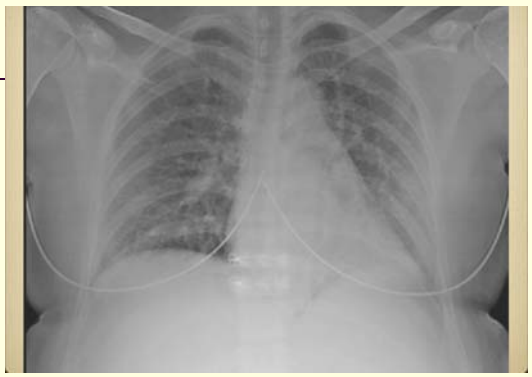

- 4 limbs BP: RA 138/73 LA 118/53
  RL 129/86 LL 116/72