

IM Consult: Acute Medical Issues in Pregnancy

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THIS CONCEPT

CONFUSES ME

memegenerator.net

Goals & Objectives

- Recall normal hormonal & physiologic changes of pregnancy
- Review assessment and management of the following conditions in pregnant patients
 - Hypertension (HTN)
 - Hepatobiliary disorders
 - Urinary tract infections (UTIs)
- Identify resources for further information

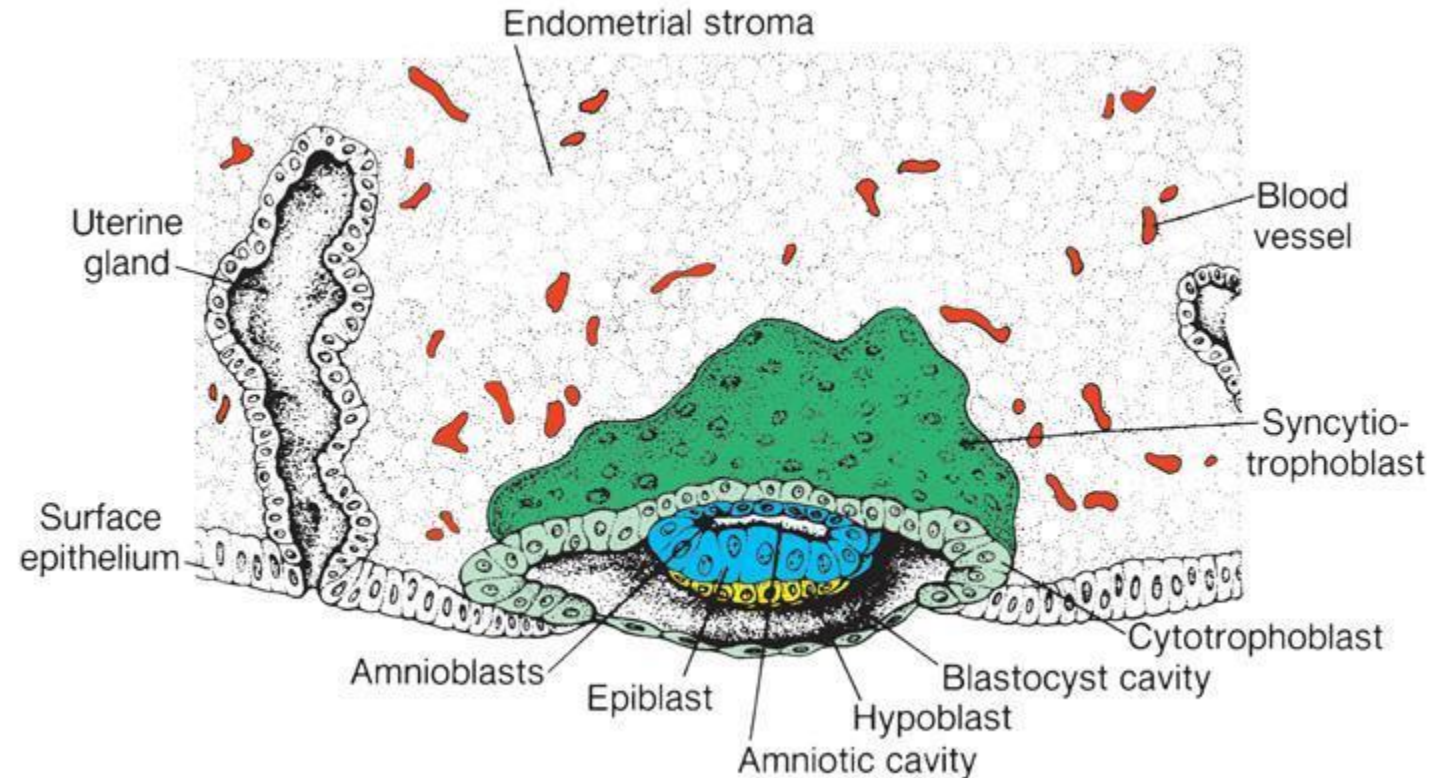
Human Chorionic Gonadotropin (HCG)

Source: placenta

Function: **maintains corpus luteum**
angiogenesis
trophoblast invasion
immunotolerance

Other Effects:
N/V of pregnancy

Also seen in:
gestational trophoblastic disease



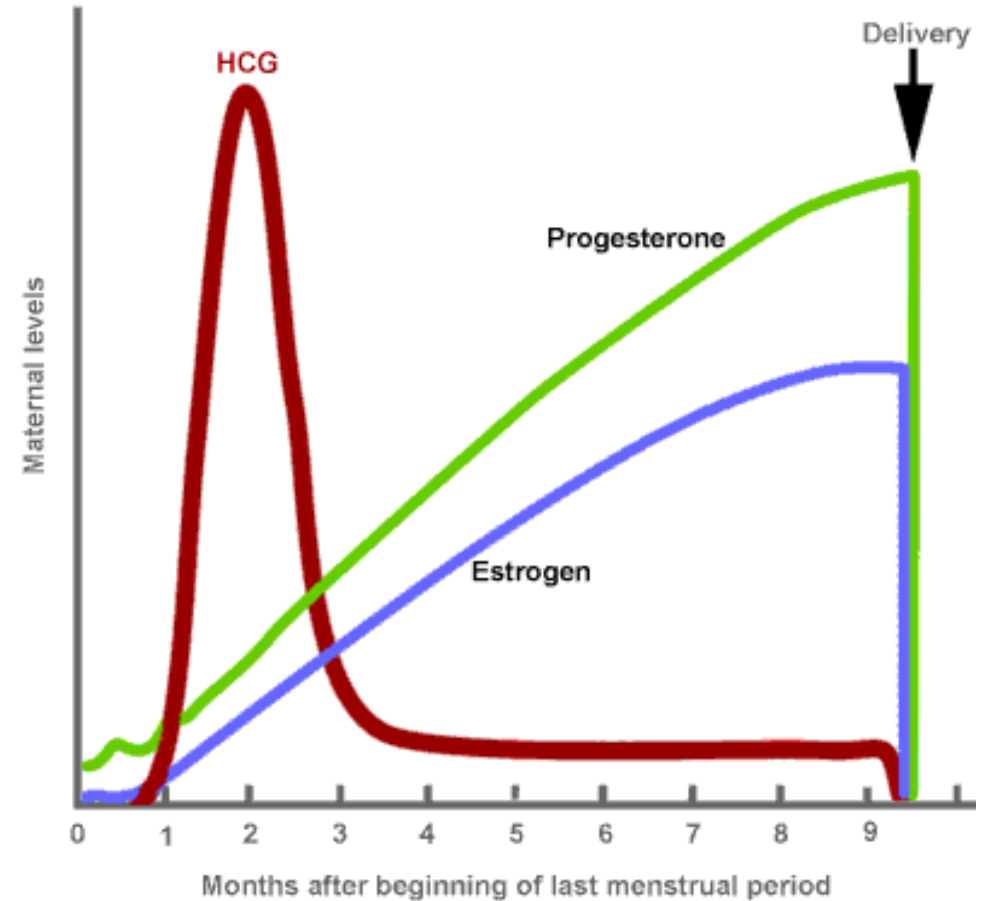
Copyright © 2007 Lippincott Williams & Wilkins.

Progesterone

Source: corpus luteum (1-8 weeks)
placenta (9+ weeks)

Function: maintains endometrium
↓ uterine muscle contractility
mammary gland proliferation

Other effects:
vasodilation
decreased smooth muscle tone

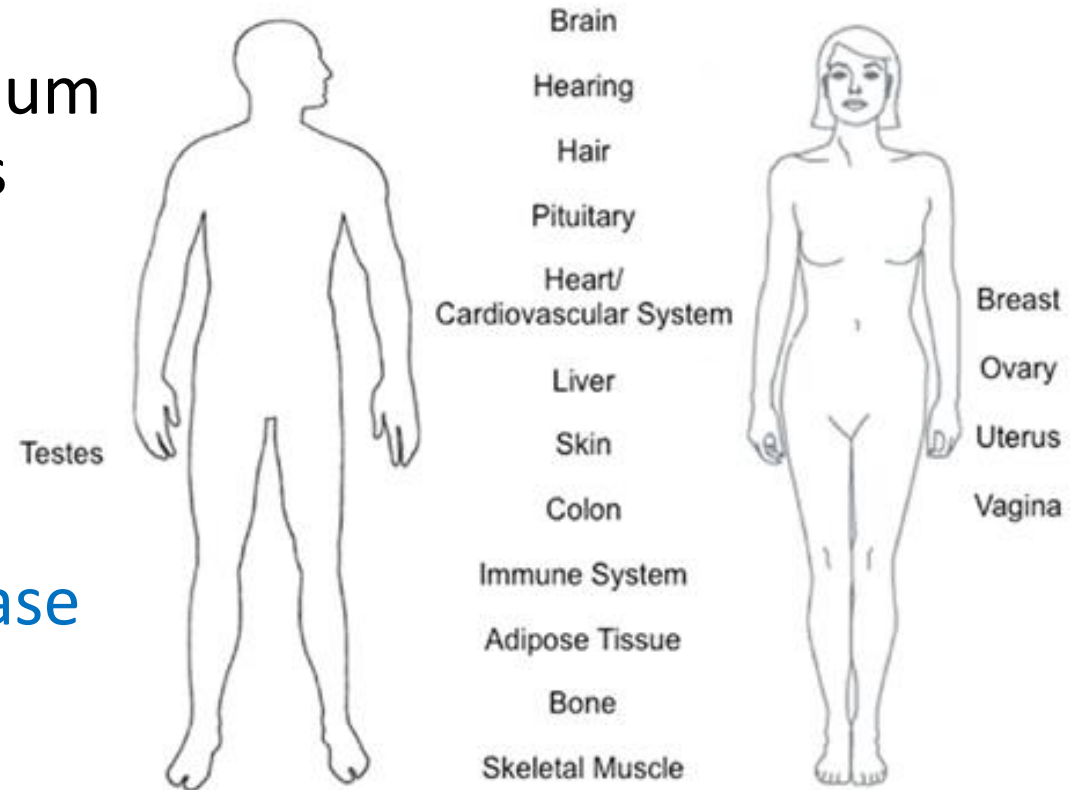


Estrogen

Source: ovarian follicle; placenta
Function: proliferation of endometrium
regulation of angiogenesis

Other effects: vasodilation
pro-thrombotic

Also seen in: bone health
cardiovascular disease
breast cancer
VTE



Cardiovascular Changes in Pregnancy

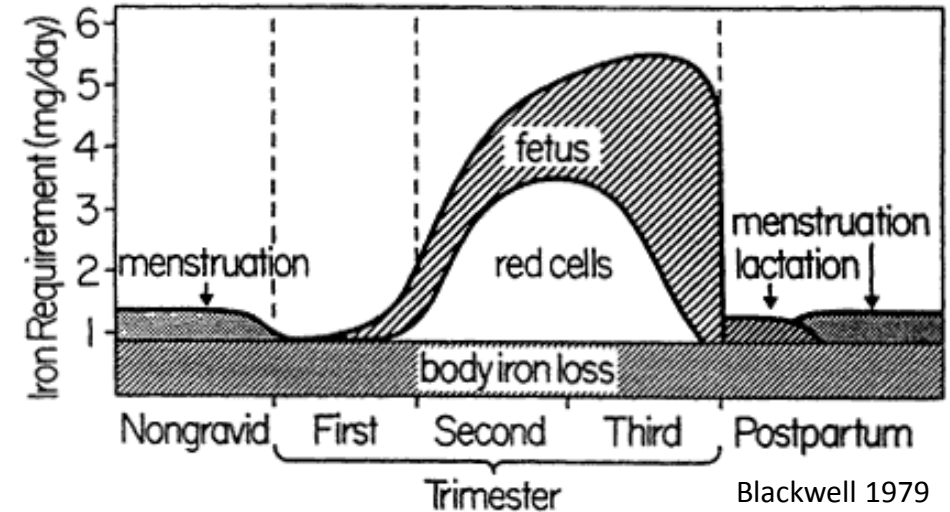
- ↑ Cardiac output (CO) 30-50%
 - 15-20% increase in HR
 - 20-30% increase in stroke volume
- ↓ systemic vascular resistance (SVR)
- ↓ blood pressure by 5-10 mmHg
- ↑ circulating volume
 - intravascular fluid expansion by 1000 – 1500 mL
- LVEF remains unchanged, and remains an accurate measure of cardiac function in pregnancy



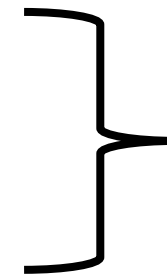
The Daily Mail 5/16/2013

Hematologic Changes in Pregnancy

- ↑ EPO levels --> ↑ red blood cell mass
- ↑ in blood volume by 30-50%
- ↓ hematocrit: range 28-40%
- ↓ blood viscosity



- ↑ in coagulation factors II, X and XII
- Resistance to activated protein C
- Venous stasis and compression by gravid uterus



Risk of VTE:
0.5-1 in 1000

Urinary Tract Changes in Pregnancy

- \uparrow renal blood flow = \downarrow creatinine; 0.4 – 0.8 mg/dL in normal pregnancy
- Physiologic hyponatremia; Na levels \downarrow by 4 – 5 mmol/L
- \downarrow peristalsis and tone of ureters and bladder
 - Urinary stasis, hydroureter and hydronephrosis
 - Increased risk of pyelonephritis while pregnant
- \uparrow urinary frequency; + nocturia

Case 1

A 33yo woman with a history of migraine with aura presents to her internist's office with intractable headache x 24 hours. Her headache is dull, global, and unrelieved by acetaminophen, caffeine and rest. She reports some vision changes (flashes) over the last four hours and asks what she can take to relieve her migraine. She is 35 weeks pregnant.

T 37.1 HR 84 BP 155/85 RR 14 98% room air

HEENT: PERRL, EOMI, clear OP

CV: RRR no m/r/g

Lungs CTAB

Abd nontender, gravid uterus

Ext wwp no edema

Neuro: alert and oriented x 4, no focal deficits

Case 1

What is your recommendation?

- A. Tylenol + codeine
- B. Sumatriptan
- C. Butalbital-acetaminophen-caffeine
- D. Call EMS and transport to the nearest emergency department

HTN and Pregnancy: Definitions

- Gestational HTN: new onset HTN $\geq 140/90$ after 20w gestation
- Preeclampsia: HTN + proteinuria, or
HTN + end organ damage (EOD)
after 20w gestation in previously normotensive woman
- Eclampsia: HTN + (proteinuria or EOD) + seizures
- Chronic HTN: predates pregnancy, or presents at $< 20w$ gestation, or persists for > 12 weeks postpartum

Preeclampsia: Presentation

- Most present ≥ 34 weeks gestation
- 5% are diagnosed post-partum, usually within 48h of delivery
- Important to recognize signs of severe disease:
 - Persistent or severe headache
 - RUQ or epigastric pain
 - Pulmonary edema
 - Vision changes (blurred vision, scotomata, flashing or sparks)
 - Plts $< 100,000$
 - Transaminases $> 2x$ ULN
 - Severe HTN $> 160/110$
 - Renal insufficiency: Cr > 1.1 mg/dL or doubling from baseline

Treatment of HTN in Pregnancy

- **Always treat if $\geq 160/110$** to reduce risk of maternal stroke!
- Goal BP: “it depends” but generally 130-150/80-100 considered safe for mother & fetus
- No significant benefit seen for tighter BP control
- Controlling BP does not prevent progression/development of preeclampsia

Urgent Treatment of HTN in Pregnancy

Indications for IV Therapy

Persistent or severe headache

Pulmonary edema / heart failure

Vision changes (blurred vision, scotomata, flashing or sparks)

Altered mental status

Renal insufficiency: Cr >1.1 mg/dL or doubling from baseline

Drug	Dose	Considerations
IV labetalol	10-20 mg IV, then 20-80 mg every 20-30 minutes (max 300mg); Continuous infusion 1-2mg/min	Caution in asthma, CHF
IV hydralazine	5 mg IV or IM, then 5-10 mg IV every 20-40 m Continuous infusion 0.5-10 mg/h	Headaches, maternal hypotension
PO nifedipine	10-20 mg PO, then 10-20 every 2-6 h	Reflex tachycardia and headache

Oral Medications for HTN in Pregnancy

Drug	Dose	Considerations
Methyldopa	0.5-3 g daily in 2-3 divided doses	Decades of safety data
Nifedipine	30-120 mg / day	Avoid immediate release
Labetalol	200-2400 mg/day in 2-3 divided doses	Caution with asthma
Thiazide diuretics	Varies	Monitor electrolytes

Agents to Avoid	Effects
ACEIs/ARBs	Fetal renal failure, oligohydramnios, IUGR
Nitroprusside	Fetal cyanide toxicity
Mineralocorticoid receptor antagonists (spironolactone)	Anti-androgen effects on fetus

Case 2

- A 29yo patient presents to the emergency department with nausea and vomiting for ten days. She has lost 8 lbs. Her urine pregnancy test is positive (this is news to her). LMP was 7 weeks ago. Since she is <20 weeks gestation, she is admitted to Internal Medicine for observation (IVF and PO trial).

T 37.2 HR 108 BP 95/60 RR 16 97% room air wt: 135lbs

Gen: appears tired, no distress

HEENT: dry mucous membranes

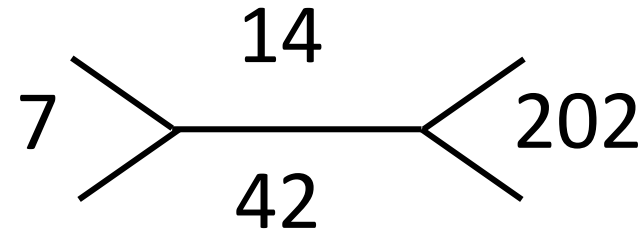
CV: tachycardic

Abd: soft, NTND, NABS no HSM

Laboratory Studies

136	105	18
2.8	22	0.9

Glucose 72
AST 125
ALT 173
total bilirubin 1.3
Alkaline phosphatase 98
INR 1.1



UA: 1.042
trace ketones

Case 2

The patient is given 2L of IVF with K + dextrose added and starts to feel better. She is able to eat some soup and crackers after getting a dose of ondansetron.

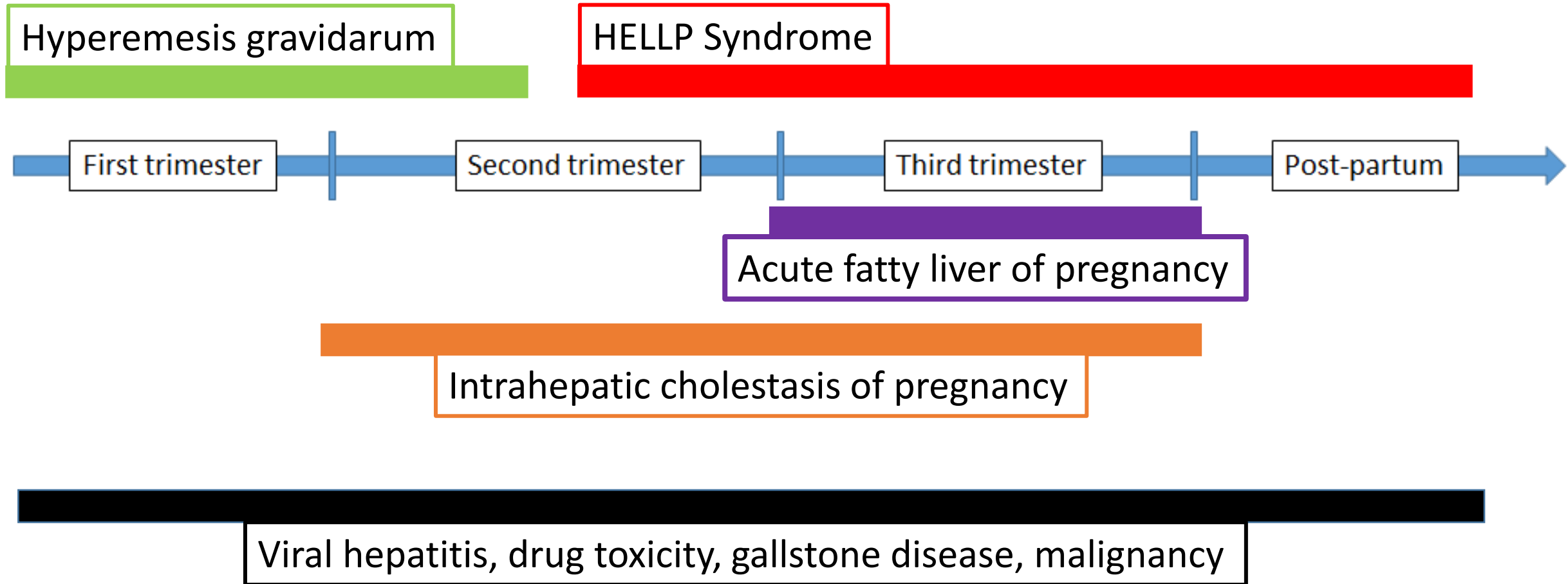
What is the most likely diagnosis?

- A. Acute viral hepatitis
- B. Cholelithiasis
- C. Hyperemesis gravidarum
- D. Acute fatty liver of pregnancy

Pregnancy-Related Liver Disease

- May present with N/V, abdominal pain, abnormal labs
 - AST, ALT, bilirubin: no change
 - Alkaline phosphatase ↑ in 3rd trimester (placenta)
 - Albumin ↓ (hemodilution)
- Spectrum of disease from self-limiting and harmless to life-threatening to mother & fetus
- Gestational age at presentation is key to making diagnosis
- Liver biopsy is rarely indicated
- **Beware the pregnant patient with onset of N/V after 10 weeks!**

Pregnancy-Related Liver Disease: Time of Presentation



Hyperemesis Gravidarum

Presentation

- Severe N/V in first trimester
- ↑AST, ALT (usually < 200)

Differential Diagnosis

- Drugs/toxins
- Viral hepatitis
- Autoimmune hepatitis
- Gallstone disease

Evaluation

- Medication history (incl. herbs)
- RUQ ultrasound + obstet US
- CBC, CMP, INR, viral hep studies

Treatment & Prognosis

- B6 + doxylamine, hydration
- Low birth weight if poor weight gain by mother
- Watch for depressed mood

HELLP Syndrome

(Hemolysis, Elevated Liver Enzymes, Low Platelets)

Presentation

- RUQ or epigastric pain + N/V
- HTN and/or proteinuria in 85%
- Onset > 20w **OR post partum**
- DIC in severe cases
- Hepatic hematoma or rupture

Diagnostic Criteria

- MAHA
- Plts < 100,000
- T bili > 1.2 and AST > 2x ULN

Differential Diagnosis

- Acute fatty liver of pregnancy
- Pre-eclampsia
- Immune thrombocytopenia
- Viral hepatitis
- TTP/HUS

Treatment & Prognosis

- Consult with MFM +/- hematologist
- Plt transfusion if bleeding or < 20K
- Maternal risks include hemorrhage, renal failure, placental abruption
- Gestational age dictates outcome for baby

Intrahepatic Cholestasis of Pregnancy

Presentation

- Severe pruritis (palms & soles)
- Pruritis worse at night
- Second or third trimester

Labs & Imaging

- ↑ Serum total bile acids
- ↑AST, ALT (100s-1000s)
- ↑ alk phos
- Bilirubin rarely > 6
- RUQ sono: normal

Evaluation

- **Viral hep studies** if ↑AST, ALT
- Weekly bile acids if first set negative

Treatment & Prognosis

- Ursodeoxycholic acid (ursodiol)
- Hydroxyzine
- **Watch for fat soluble vitamin deficiencies**
- Prognosis favorable for mom
- Fetal demise, prematurity, resp distress are risks to fetus

Acute Fatty Liver of Pregnancy

Presentation

- N/V (75%), malaise, jaundice
- Epigastric or RUQ pain
- Third trimester

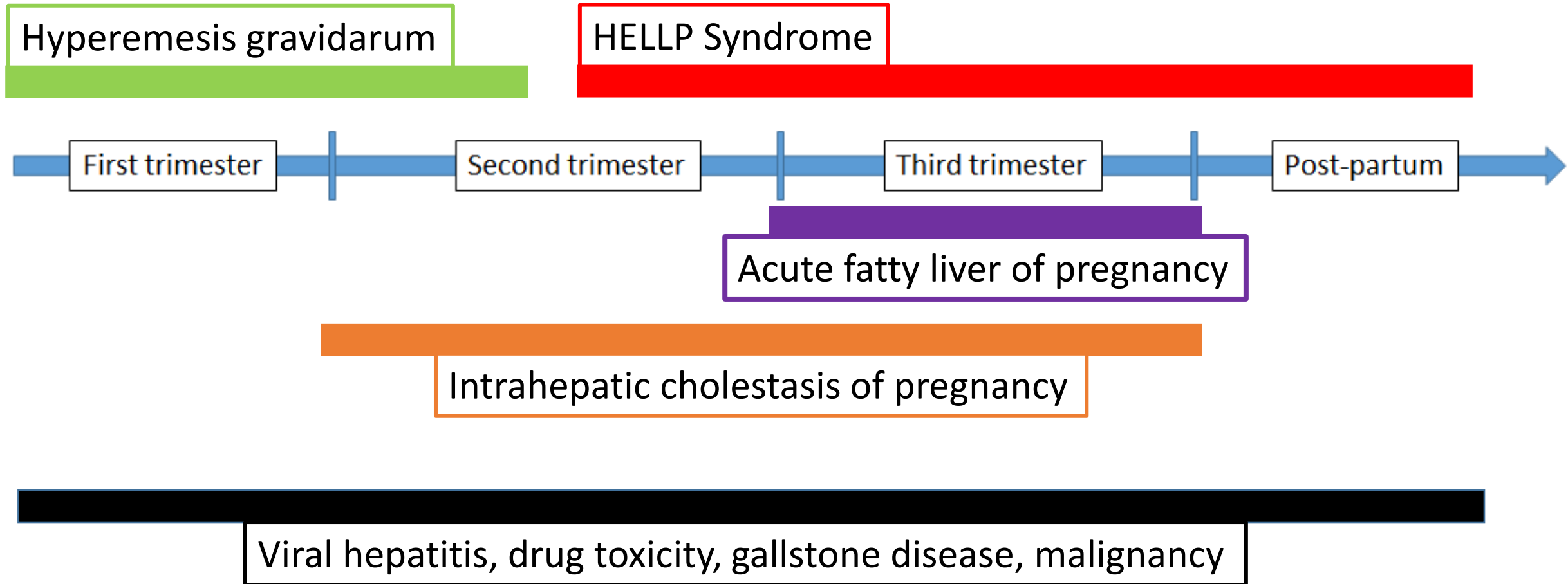
Labs & Imaging Findings

- ↑AST, ALT (100s-500s)
- ↑bilirubin
- +/- DIC
- ↑NH₃, ↓glucose, ↑INR in severe cases
- US or CT to r/o hepatic bleed
- Liver biopsy is diagnostic

Treatment & Prognosis

- Supportive care + delivery regardless of gestational age
- Resolution of disease after delivery with normalization of labs within days
- Genetics referral for LCHAD testing
- May recur in future pregnancies
- Mothers recover without permanent hepatic injury

Pregnancy-Related Liver Disease: Time of Presentation



Case 3

- A 26yo woman with sickle cell disease presents to the emergency department with acute pain crisis. Pain is located in her back and legs and is typical of her usual sickle cell pain. She denies fevers, chills, dysuria, frequency, abd pain, cough, recent travel, or sick contacts. She is 16 weeks pregnant.

T 37 HR 95 BP 105/70 RR 22 98% room air

Gen: uncomfortable appearing

HEENT: mild scleral icterus present

CV: tachycardic, flow murmur appreciated

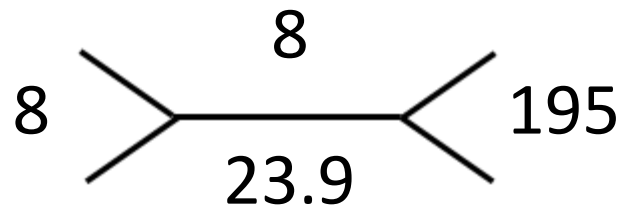
Lungs: clear

Abd: soft NTND NABS

Ext: wwp no c/c/e. No joint swelling or tenderness

Laboratory Studies & Imaging

137	109	16
4	24	0.7



AST 23

ALT 15

Alk phos 85

T bili 4.1 (3.1 indirect)

UA: 1.032

neg nitrites

> 50 bacteria

17 WBCs

2 squams

0 RBCs

Case 3

The patient is admitted to Internal Medicine given she is < 20 weeks gestation. She is treated with fluids and opiate pain medications for her uncomplicated pain crisis. On HD 2 her urine culture is positive for *Escherichia coli* (100,000 CFU).

What is the next best step?

- A. Ignore – without symptoms this is not a UTI
- B. Treat – this is a urinary tract infection
- C. Treat – this is asymptomatic bacteriuria in a pregnant patient
- D. In & out cath to repeat the culture – this is a contaminant

Asymptomatic Bacteriuria in Pregnancy

Definition: growth on urine culture of $> 100,000$ CFU in a patient without signs and symptoms of UTI

- Progesterone + relaxin \rightarrow decreased smooth muscle tone in ureters, bladder
- Increased urine stasis \rightarrow bacterial overgrowth
- if untreated: \uparrow risk of pyelonephritis, preterm delivery, low birth weight

Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults

Lindsay E. Nicolle,¹ Suzanne Bradley,² Richard Colgan,³ James C. Rice,⁴ Anthony Schaeffer,⁵ and Thomas M. Hooton⁶

- Screen pregnant women once at 12-16 weeks; treat if positive (IA)
- Treatment duration: 3-7 days (IIIA)
- Screen for recurrent bacteriuria after treatment (IIIA)
- Suppressive therapy can be considered if 2+ episodes despite treatment (nitrofurantoin 50-100mg PO daily) (not IDSA guideline)

Antibiotic Safety and Pregnancy

- Generally safe across pregnancy: penicillins, cephalosporins, fosfomycin
- **Avoid in first trimester:** trimethoprim-sulfamethoxazole (folate antagonist), nitrofurantoin
- **Avoid near delivery:** trimethoprim-sulfamethoxazole (kernicterus), nitrofurantoin (neonatal hemolysis)
- **Avoid in pregnancy: fluoroquinolones & aminoglycosides**
- **Nitrofurantoin and fosfomycin do not concentrate in the kidney so should NOT be used for pyelonephritis!**

UTI in Pregnancy: Treatment Options

Treatment duration: 3 to 7 days as long as no signs of pyelonephritis

- Amoxicillin 500mg q8h or 875mg q12h
- Amox-clavulanic acid 500mg q8 or 875mg q12h
- Cephalexin 500mg q6h
- Cefpodoxime 100mg q12h
- Fosfomycin 3g PO x 1 dose (not for pyelonephritis)
- Nitrofurantoin 100mg PO BID (not for pyelonephritis) (7d duration)

Pyelonephritis in Pregnancy

- Hospital admission is indicated for IV abx Mild-mod disease: ceftriaxone, cefepime, ampicillin + gentamycin*
 - Aztreonam if PCN allergic
- Severe disease: piperacillin-tazobactam, meropenem
- PO agent selected based on sensitivities from urine cultures
- **Nitrofurantoin and fosfomycin are not recommended** due to low tissue levels in the kidney
- Total treatment duration 10-14d
- Follow up urine culture 1 week after treatment for test of cure

*Only if alternatives not available or tolerated; risk of fetal ototoxicity

Pregnancy Risk Categories: Out with the Old

A: No risk in controlled human studies

folic acid, levothyroxine

B: No risk in other (nonhuman) studies

amoxicillin, metformin

C: Risk not ruled out (but benefits may warrant use)

amlodipine, trazodone

D: Positive evidence of risk (but benefits may warrant use)

warfarin, lisinopril

X: Contraindicated in pregnancy: “risks clearly outweigh benefits”

methotrexate, thalidomide

New FDA Requirements for Drug Labeling

- **Pregnancy:** Information relevant to the use of the drug in pregnant women (eg, dosing, fetal risks) and information about whether there is a registry that collects and maintains data on how pregnant women are affected
- **Lactation:** Information about using the drug while breastfeeding (eg, the amount of drug in breast milk, potential effects on the breastfed child)
- **Females and males of reproductive potential:** Information about pregnancy testing, contraception, and infertility as it relates to the drug

8.1 Pregnancy	Pregnancy Exposure Registry (if applicable)	<ul style="list-style-type: none"> • Information (including contact information) regarding a pregnancy exposure registry that monitors pregnancy outcomes
	Risk Summary	<ul style="list-style-type: none"> • Statement that the drug is contraindicated during pregnancy (if applicable) • Risk statement based on human data • Risk statement based on animal data • Risk statement based on pharmacology (if applicable) • Background birth defects and miscarriage rates
	Clinical Considerations (if applicable)	<ul style="list-style-type: none"> • Disease-associated maternal and/or embryo–fetal risk • Dose adjustments during pregnancy and the postpartum period • Maternal adverse reactions • Fetal/neonatal adverse reactions • Labor or delivery
	Data (if applicable)	<ul style="list-style-type: none"> • Data on which the Risk Summary and Clinical Considerations are based

Information on Drug Safety in Pregnancy

- <http://dailymed.nlm.nih.gov/>
- <https://toxnet.nlm.nih.gov/newtoxnet/lactmed.htm> aka “LactMed”
 - Medication safety data for lactating women
 - Highlights the evidence for safety: excretion into breastmilk, effect on infants, affect on milk supply and lactation, alternatives to consider + references

ALL DRUGS

HUMAN DRUGS

ANIMAL DRUGS

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Enter drug, NDC code, drug class, or Set ID



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HELP

LABEL: LOSARTAN- losartan potassium tablet, film coated

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NDC Code(s): 58657-610-10, 58657-610-30, 58657-610-50, 58657-610-90, [view more](#)
Packager: Method Pharmaceuticals, LLC

Category: HUMAN PRESCRIPTION DRUG LABEL

DEA Schedule: None

Marketing Status: Abbreviated New Drug Application

DRUG LABEL INFORMATION

Updated September 27, 2016

 If you are a consumer or patient please visit [this version](#).

 DOWNLOAD DRUG LABEL INFO: [PDF](#) | [XML](#) 

 OFFICIAL LABEL (PRINTER FRIENDLY) 

VIEW ALL SECTIONS

 + **BOXED WARNING** [\(WHAT IS THIS?\)](#)

 + **HIGHLIGHTS OF PRESCRIBING INFORMATION**

These highlights do not include all the information needed to use LOSARTAN POTASSIUM TABLETS safely and effectively. See full prescribing information for LOSARTAN POTASSIUM TABLETS ...

 + **FULL PRESCRIBING INFORMATION: CONTENTS***

Table of Contents

 + **1 INDICATIONS AND USAGE**

1.1 Hypertension - Losartan potassium tablets are indicated for the treatment of hypertension in adults and pediatric patients 6 years of age and older, to lower ...

 + **2 DOSAGE AND ADMINISTRATION**

1.1 Hypertension - Losartan potassium tablets are indicated for the treatment of hypertension in adults and pediatric patients 6 years of age and older, to lower ...

 + **2 DOSAGE AND ADMINISTRATION**

2.1 Hypertension - Adult Hypertension The usual starting dose of losartan potassium tablets is 50 mg once daily. The dosage can be increased ...

 + **3 DOSAGE FORMS AND STRENGTHS**

Losartan potassium tablets USP, 25 mg are white, round, biconvex film-coated tablets debossed with "II" on one side and plain on other side. Losartan potassium tablets USP, 50 mg ...

 + **4 CONTRAINDICATIONS**

Losartan potassium is contraindicated: In patients who are hypersensitive to any component of this product. For coadministration with aliskiren in patients with diabetes ...

 + **5 WARNINGS AND PRECAUTIONS**

5.1 Fetal Toxicity - Use of drugs that act on the renin-angiotensin system during the second and third trimesters of pregnancy reduces fetal renal function and ...

 + **6 ADVERSE REACTIONS**

6.1 Clinical Trials Experience - Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a ...

 + **7 DRUG INTERACTIONS**

7.1 Agents Increasing Serum Potassium - Coadministration of losartan with other drugs that raise serum potassium levels may result in hyperkalemia. Monitor serum ...

 + **8 USE IN SPECIFIC POPULATIONS**

8.1 Pregnancy - Pregnancy Category D Use of drugs that act on the renin-angiotensin system during the second and third trimesters of ...

 + **10 OVERDOSAGE**

Significant lethality was observed in mice and rats after oral administration of 1000 mg/kg and 2000 mg/kg, respectively, about 44 and 170 times the maximum recommended human dose on a ...

 + **11 DESCRIPTION**

Losartan potassium, USP is an angiotensin II receptor blocker acting on the AT1 receptor subtype. Losartan potassium, a non-peptide molecule, is chemically described as ...

 + **12 CLINICAL PHARMACOLOGY**

12.1 Mechanism of Action - Angiotensin II [formed from angiotensin I in a reaction catalyzed by angiotensin converting enzyme (ACE, kininase II)] is a potent ...

 + **13 NONCLINICAL TOXICOLOGY**

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility - Losartan potassium was not carcinogenic when administered at maximally tolerated dosages to rats and mice

SAFETY

[Boxed Warnings](#)
[Report Adverse Events](#)
[FDA Safety Recalls](#)
[Presence in Breast Milk](#)

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[+ PubMed](#)
[Biochemical Data Summary](#)

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[Administrative Information](#)

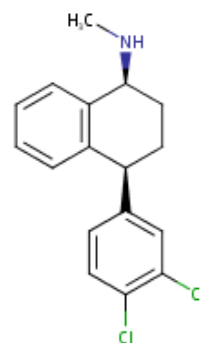
Show Selected Items

Clear

CLICK TO HIDE

Sertraline

CASRN: 79617-96-2



FULL RECORD DISPLAY

Displays all fields in the record.

For other data, click on the Table of Contents

Drug Levels and Effects:

Summary of Use during Lactation:

Because of the low levels of **sertraline** in breastmilk, amounts ingested by the infant are small and is usually not detected in the serum of the infant, although the weakly active metabolite norsesertraline (desmethylsertraline) is often detectable in low levels in infant serum. Rarely, preterm infants with impaired metabolic activity might accumulate the drug and demonstrate symptoms similar to neonatal abstinence. Most authoritative reviewers consider **sertraline** one of the preferred antidepressants during breastfeeding.[1][2][3][4][5][6] Mothers taking an SSRI during pregnancy and postpartum may have more difficulty breastfeeding and may need additional breastfeeding support. Breastfed infants exposed to an SSRI during the third trimester of pregnancy have a lower risk of poor neonatal adaptation than formula-fed infants.

References

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- <http://dailymed.nlm.nih.gov/>
- <https://toxnet.nlm.nih.gov/newtoxnet/lactmed.htm>