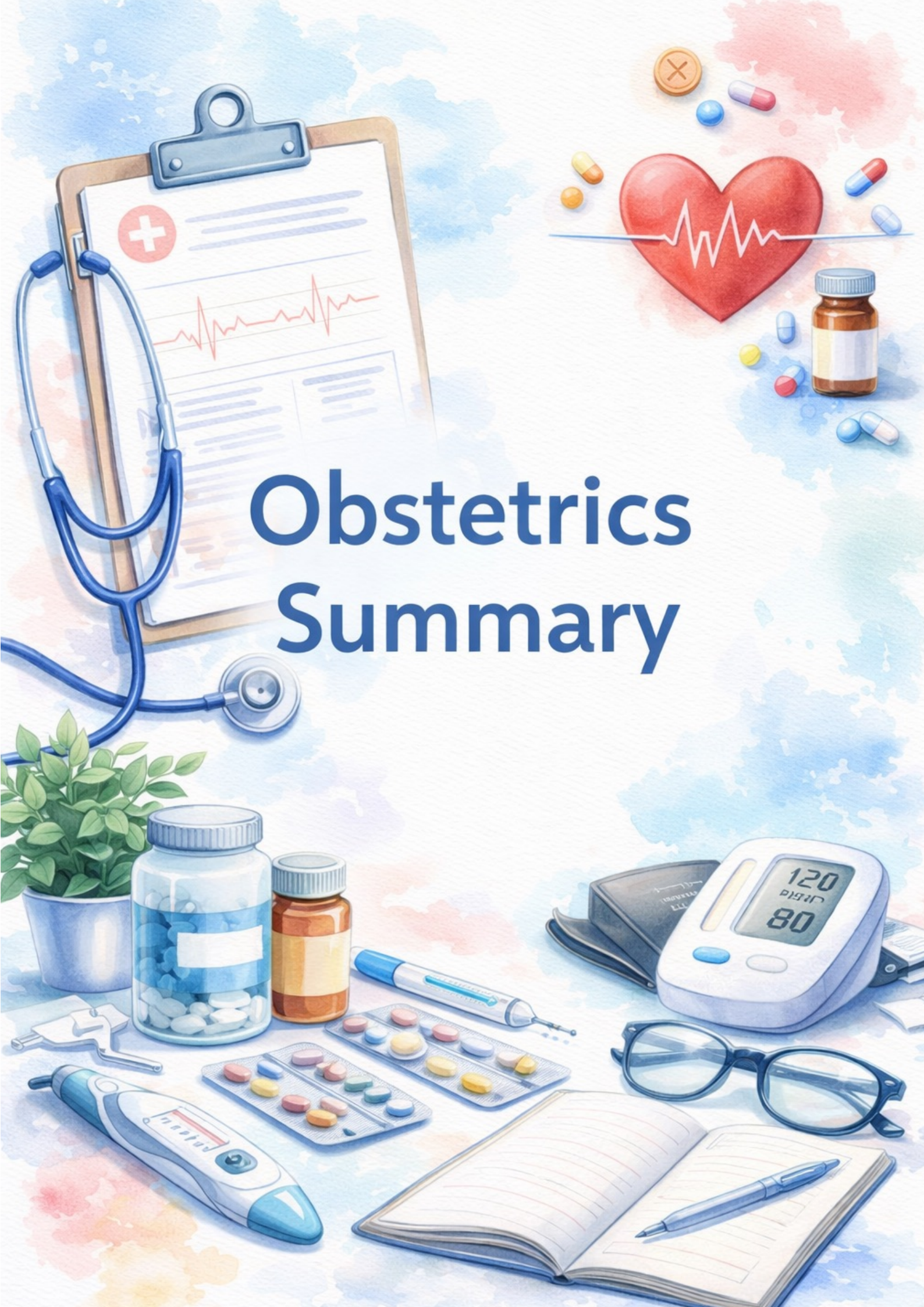


Obstetrics Summary

اسال الله ان يجعل هذا الملف صدقة جارية لزميلتنا روضة و اسال الله ان يتقبلها و يكون في ميزان حسناتها، لا تنسوها من صالح دعائكم فان اكثر ما يصل للميت من العبادات الدعاء

اللهم اغفر لها، وارحمها، وعافها, واعف عنها, وأكرم نزلها, ووسع مدخلها, واغسلها بالماء والثلج والبرد, ونقها من الخطايا كما ينقى الثوب الأبيض من الدنس, اللهم أبدلها دارًا خيرًا من دارها, وأهلًا خيرًا من أهله

1. Physiologic Changes in Pregnancy 📘

Cardiovascular Changes

- Cardiac output ↑ 30–50% (↑ stroke volume early, ↑ heart rate later ~10–20 bpm), peak 28–32 weeks
- Systemic vascular resistance ↓ due to progesterone, nitric oxide, prostacyclin
- Total peripheral resistance ↓ → uteroplacental perfusion ↑

Blood pressure pattern:

Trimester	BP
1st	slight decrease
2nd	lowest level
3rd	returns toward baseline

❌ BP progressively increases during pregnancy

✔️ BP decreases in the 2nd trimester

Supine Hypotensive Syndrome

- Cause : Compression of inferior vena cava by gravid uterus when lying supine
- Pathophysiology : ↓ venous return → ↓ cardiac output → maternal hypotension → ↓ uteroplacental perfusion
- Symptoms : dizziness, nausea, hypotension, fetal distress
- Management : left lateral maternal position (relieves vena cava compression)

ECG Changes in Pregnancy

- Normal findings : left axis deviation , Q waves in lead III , inverted T waves in lead II
- Cause: diaphragm elevation and cardiac displacement

❌ ST elevation is normal in pregnancy

✔️ ST elevation is always pathological

Respiratory Changes

- Maternal oxygen demand increases during pregnancy.

Ventilation changes:

Parameter	Change
Tidal volume	↑
Minute ventilation	↑
Functional residual capacity	↓
Residual volume	↓
Total lung capacity	slightly ↓

- Mechanism : progesterone stimulates respiratory center

❌ Respiratory rate increases during pregnancy

✔️ Respiratory rate remains unchanged

Renal Changes

• Renal blood flow ↑

- GFR ↑ up to 50%
- Consequences : ↓ serum creatinine , ↓ BUN , physiologic trace glucosuria
- Cause: increased filtration capacity.

Hematologic Changes

Blood volume changes:

Parameter	Change
Plasma volume	↑ 40–50%
RBC mass	↑ 20–30%

- Result: physiologic anemia of pregnancy
- White blood cells : leukocytosis common, may reach 25,000 during labor
- Platelets : platelet count ↓ about 10% at term , (Cause : gestational thrombocytopenia)
- About 75% of thrombocytopenia in pregnancy = benign gestational thrombocytopenia

Coagulation system

- Pregnancy is hypercoagulable
- Increased : fibrinogen , factors VII, VIII, IX, X
- Decreased : factor XI
- Purpose: reduce bleeding during delivery.

Liver & Gastrointestinal Changes

Liver enzymes:

Test	Change
Alkaline phosphatase	↑ (placental origin)
AST	↓
ALT	↓
Albumin	↓

GI changes (progesterone effect):

• smooth muscle relaxation → reflux, constipation

• delayed gastric emptying

Endocrine Changes

Progesterone effects :

- smooth muscle relaxation , decreased uterine contractions , decreased GI motility

Hormone production:

• early pregnancy → corpus luteum produces progesterone

• after ≈10 weeks → placenta becomes main progesterone source

Fetal Circulation

Umbilical vessels:

Vessel	Blood type
Umbilical artery	deoxygenated blood
Umbilical vein	oxygenated blood

Ductus venosus : carries oxygenated blood to inferior vena cava

Amniotic Fluid

- Composition : ≈98% water, fetal cells, electrolytes, proteins, antimicrobial factors
- Functions : protects fetus from trauma , allows fetal movement , prevents umbilical cord compression , maintains fetal temperature

❌ Amniotic fluid is a nutrient reservoir

✔ It is not a major nutritional source

Exam Pearls

• Cardiac output ↑ 30–50%

• GFR ↑ ≈50%

• Pregnancy = hypercoagulable state

• Platelets slightly ↓

• Respiratory rate unchanged

• ALP ↑ from placenta

• Amniotic fluid ≈ 98% water

2. Obstetric Examination 📘

- Purpose : assess maternal health, fetal wellbeing, gestational age, fetal lie/presentation/position, labor progress.
- Components : history, general exam, abdominal exam, pelvic exam.

Important Obstetric Definitions

Term	Definition	Key Point
Lie	Relationship between long axis of fetus and long axis of uterus	Most common = longitudinal
Presentation	Fetal part overlying pelvic inlet	Most common = cephalic
Presenting part	Specific fetal structure felt on vaginal exam	Example: occiput
Attitude	Relationship of fetal parts to each other	Normal = general flexion
Position	Relationship of presenting part to maternal pelvis	Example: occiput anterior
Denominator	Landmark used to describe fetal position	Occiput in vertex , Mentum in face
Engagement	Biparietal diameter passes pelvic inlet	Corresponds to station 0
Station	Relation of presenting part to ischial spines	+ below spines, − above
Effacement	Cervical shortening/thinning	Expressed as %
Dilatation	Cervical opening during labor	Full dilation = 10 cm
Show	Blood-stained mucus due to cervical dilation	Early labor sign
Quickening	First maternal perception of fetal movement	~18–20 weeks
Viability	Gestational age fetus may survive outside uterus	~24 weeks

Abdominal Examination

- Sequence : inspection, palpation (Leopold maneuvers), fundal height measurement, fetal heart auscultation.

Fundal Height

- Definition : distance from symphysis pubis → uterine fundus.
- Clinical rule : after 20 weeks, fundal height (cm) ≈ gestational age (weeks).
- Uses : assess fetal growth , detect IUGR or macrosomia.

Leopold Maneuvers

- Purpose : determine lie, presentation, position, engagement.

Maneuver	What it assesses
1st (Fundal grip)	Fetal pole in fundus
2nd (Lateral grip)	Fetal back and limbs
3rd (Pawlik's grip)	Presenting part
4th (Pelvic grip)	Engagement of head

Fetal Heart Rate

- Normal fetal heart rate : 110–160 bpm
- Methods : Doppler ultrasound , fetoscope (after ~20 weeks).

Pelvic Examination

Performed when indicated in labor , Evaluates :

• cervical dilation , effacement , fetal station , presenting part , membrane status.

❌ Digital vaginal exam safe in placenta previa

✔️ Contraindicated until previa excluded

Engagement

- Occurs when biparietal diameter passes pelvic inlet
- Clinical landmark : station 0 (ischial spines).
- More common : primigravida before labor , multigravida during labor.

Fetal Skull Diameters

Diameter	Size	Situation
Suboccipito-bregmatic	9.5 cm	fully flexed vertex
Occipito-frontal	11.5 cm	deflexed head
Mentovertex	13.5 cm	brow presentation

❌ Vaginal delivery possible with mentum posterior

✔ Mentum posterior incompatible with spontaneous delivery

Exam Pearls

• Most common fetal lie = longitudinal

• Most common presentation = cephalic

• Engagement = station 0

• Normal FHR = 110–160 bpm

• Fundal height ≈ gestational age after 20 weeks

3. Obstetric Ultrasound 📘

- Purpose : confirm pregnancy, determine gestational age, detect fetal anomalies, assess fetal growth, placental location, amniotic fluid volume, multiple pregnancy.

Types

• Transvaginal ultrasound – early pregnancy

• Transabdominal ultrasound – later pregnancy

⭐ Transvaginal ultrasound is more sensitive in early pregnancy.

Dating the Pregnancy

1) The Mean Sac Diameter Measurement (MSD) : when no fetal pole visible

2) The Crown Rump Length (CRL) : fetal pole < 14 weeks

Crown–Rump Length (CRL)

- Best parameter for pregnancy dating.
- Timing : 7–13 weeks
- Accuracy : ±3–5 days

⭐ First trimester ultrasound is the most accurate method for dating pregnancy.

First Trimester Ultrasound

Main purposes

• confirm intrauterine pregnancy

• determine gestational age

• assess fetal viability

• detect multiple pregnancy

Early Ultrasound Findings

Structure	Gestational Age
Gestational sac	~5 weeks
Yolk sac	~5–5.5 weeks
Fetal pole	~6 weeks
Cardiac activity	~6 weeks

⭐ Fetal cardiac activity = most reliable sign of viable pregnancy

Nuchal Translucency (NT)

- Timing : 11–13+6 weeks
- Purpose : screening for chromosomal abnormalities
- Associated conditions : Down syndrome (Trisomy 21) , Turner syndrome , congenital heart defects.

Second Trimester Ultrasound

- Timing : 18–22 weeks (anomaly scan)
- Evaluates : fetal brain , spine , heart , kidneys , limbs , abdominal wall defects.
- Used to detect : neural tube defects , congenital anomalies , growth abnormalities.

Third Trimester Ultrasound

- Uses : fetal growth assessment , placental localization , fetal presentation , amniotic fluid assessment.

Amniotic Fluid Assessment

- Measured using Amniotic Fluid Index (AFI).
- Method : uterus divided into four quadrants, deepest vertical pocket measured in each.

AFI	Interpretation
<5 cm	oligohydramnios
5–24 cm	normal
>24	Polyhydraminos

Other Important Ultrasound Uses

• detect placenta previa

• assess fetal growth restriction (IUGR)

• assess multiple pregnancy and chorionicity

• evaluate fetal wellbeing with Doppler studies

Doppler Ultrasound

Evaluates fetal blood flow in : umbilical artery , middle cerebral artery , ductus venosus.

Example : increased MCA velocity → fetal anemia.

Ultrasound in Ectopic Pregnancy

Findings suggesting ectopic pregnancy:

• positive pregnancy test with no intrauterine gestational sac

• adnexal mass

• free fluid in pelvis.

Exam Pearls

• earliest structure seen = gestational sac (~5 weeks)

• most accurate dating method = CRL in 1st trimester

• anomaly scan performed 18–22 weeks

• AFI <5 cm = oligohydramnios

• AFI >24 cm = polyhydramnios

4. Miscarriage (Spontaneous Abortion) 📘

Definition

- Spontaneous loss of a pregnancy at or before 24 weeks

Clinical Presentation

- Vaginal bleeding
- Abdominal pain
- ± passage of tissue

Causes

Category	Causes
Fetal (most common)	Chromosomal abnormalities (~50%), trisomy, monosomy X, triploidy
Maternal – Structural	Septate uterus, bicornuate uterus, fibroids, intrauterine adhesions
Maternal – Cervical	Cervical incompetence (2nd trimester miscarriage)
Maternal – Endocrine	Diabetes, thyroid disease, PCOS
Maternal – Immunologic	Antiphospholipid syndrome (APS), thrombophilias
Infections	Rubella, varicella, bacterial vaginosis
Drugs / Toxins	Smoking, alcohol, drugs, MTX, antiepileptics, radiation

Risk Factors

- Advanced maternal age, previous miscarriage, smoking, obesity, diabetes, antiphospholipid syndrome, uterine anomalies, cervical incompetence

Types of Miscarriage

Type	Cervix	Products of conception	Key Feature	Management
Threatened	Closed	Inside uterus	Vaginal bleeding, viable fetus	Observation
Inevitable	Open	Not expelled	Heavy bleeding	Evacuation

Incomplete	Open	Partially expelled	Retained tissue (>15 mm)	Evacuation
Complete	Closed	Fully expelled	Empty uterus / <15 mm	Observation
Missed	Closed	Retained dead fetus	No cardiac activity	Expectant / medical / surgical
Septic	Open	Infected	Fever, foul discharge	Antibiotics + evacuation

Diagnosis

History

- LMP , Bleeding, pain , Passage of tissue
- Risk factors

Examination

- Closed cervix → threatened / missed
- Open cervix → inevitable / incomplete

Investigations

Ultrasound

Week	Finding
5	Gestational sac
6	Yolk sac
6	Embryo
7	Amnion

Missed miscarriage criteria

- CRL >7 mm with no cardiac activity
- Sac >25 mm with no embryo

β-hCG

Pattern	Interpretation
Increase ≥63% in 48 hours	Normal pregnancy
Decrease or slow rise	Miscarriage / ectopic

hCG ratio	Interpretation
<0.8	Failing pregnancy
0.8–1.66	Ectopic / PUL
>1.66	Viable pregnancy

Management

Approach	When	Key Points
Expectant	Stable, no infection	Spontaneous resolution (best for incomplete)
Medical	Stable, wants faster, missed/incomplete	Misoprostol ± mifepristone
Surgical (ERPC)	Heavy bleeding, unstable, infection, failed others	Suction evacuation
Septic	Infection	IV antibiotics first, then evacuation
Anti-D	Rh-negative	>12 weeks give, <12 weeks depends on instrumentation

Recurrent Miscarriage

Definition

- Three or more consecutive pregnancy losses

Causes

Category	Causes
Genetic	Parental balanced translocation
Immunologic	APS
Structural	Uterine anomalies
Cervical	Cervical incompetence
Endocrine	Diabetes, thyroid disease, PCOS
Others	Infection, obesity, age

Management

- APS → Aspirin + LMWH

- Cervical incompetence → Cerclage
- Uterine anomaly → Hysteroscopic correction
- Genetic → Counseling ± IVF/PGD

Exam Pearls

- Most common cause is chromosomal abnormality
- Threatened miscarriage → cervix closed
- Inevitable miscarriage → cervix open
- Incomplete → retained products
- Missed → no fetal cardiac activity
- APS is treatable
- Cervical incompetence → second trimester loss

5. Ectopic Pregnancy 📘

Definition

- Implantation of fertilized ovum outside uterine cavity

Incidence

- ~1% natural, 2–3% with ART
- Usually presents at 6–8 weeks

Sites

Site	Note
Fallopian tube	Most common
Ampulla	Most common site
Isthmus	Less common
Ovary / Abdomen	Rare

Risk Factors

- Previous ectopic, PID, tubal surgery, ART, smoking, IUD, infertility, age >35

Clinical Presentation

Feature	Details
Classic triad	Amenorrhea + pain + bleeding
Other	Shoulder pain, dizziness, syncope

Examination

- Abdominal tenderness
- Adnexal tenderness/mass
- Cervical motion tenderness

Diagnosis

Tool	Finding
β-hCG	Positive
Ultrasound	No intrauterine pregnancy
Discriminatory zone	1500–2000 IU/L (no IUP → ectopic)

Complications

- Rupture , Hemorrhage , Shock

Management

Approach	Indications	Key
Expectant	Stable, low and falling β-hCG	Observe
Medical	Stable, unruptured	Methotrexate
Surgical	Unstable / rupture / failed medical	Salpingostomy / salpingectomy

Methotrexate

Criteria	Contraindications
Stable, no rupture	Unstable
No fetal cardiac activity	Cardiac activity present
Mass ≤4 cm	Mass >4 cm
β-hCG <5000	High β-hCG
Follow-up possible	Liver/renal disease

Exam Pearls

- Most common site = ampulla
- Classic triad = amenorrhea + pain + bleeding
- Drug = methotrexate
- Must treat (cannot continue normally)

6. Gestational Trophoblastic Disease (GTD) 📘

Definition

- Group of disorders caused by abnormal proliferation of trophoblastic tissue
- Includes : Hydatidiform mole (complete, partial) , Invasive mole , Choriocarcinoma

Hydatidiform Mole

Definition

- Abnormal pregnancy with hydropic swelling of chorionic villi + trophoblastic proliferation

Complete vs Partial Mole

Feature	Complete Mole	Partial Mole
Genetics	46XX (paternal, empty ovum)	Triploid (69XXX/XXY)
Mechanism	Fertilization of empty ovum	Dispermic fertilization
Fetal tissue	Absent	Present
Villi	Diffuse hydropic	Focal hydropic
Trophoblast	Diffuse proliferation	Focal proliferation
β-hCG	Very high	Moderately elevated
Fetus	Absent	May be present

Clinical Features

- Vaginal bleeding
- Uterus larger than gestational age
- Severe nausea/vomiting
- Early-onset preeclampsia (<20 weeks)
- Rare: hyperthyroidism, theca lutein cysts

Diagnosis

Tool	Findings
Ultrasound	Snowstorm appearance (complete)
Partial mole	Abnormal placenta + fetal tissue
β-hCG	Markedly elevated
Definitive	Histopathology

Complications

- Persistent trophoblastic disease
- Invasive mole
- Choriocarcinoma

Management

Step	Details
Initial	Suction evacuation
Follow-up	Serial β-hCG
Purpose	Detect persistent disease

Follow-up & Contraception

- Serial β-hCG every 2 weeks until normal
- Avoid pregnancy for 6–12 months

Choriocarcinoma

- Definition : Malignant trophoblastic tumor
- Features : Highly vascular , Early hematogenous spread
- Metastasis : Lungs , Brain , Liver
- Treatment : Chemotherapy

Exam Pearls

- Complete mole → no fetus
- Partial mole → fetal tissue present
- Snowstorm appearance
- Treatment → suction evacuation
- β-hCG follow-up essential
- Hematogenous spread in choriocarcinoma
- Most common sign of molar pregnancy : Vaginal bleeding

7. Rh Isoimmunisation 📘

Definition

- Maternal immune response against Rh-positive fetal red blood cells, occurs when Rh-negative mother carries Rh-positive fetus

Pathophysiology

- Fetomaternal hemorrhage, fetal RBCs enter maternal circulation, maternal immune system produces anti-D IgG antibodies, antibodies cross placenta, destruction of fetal RBCs, hemolysis

Sensitization Events

- Delivery, miscarriage, ectopic pregnancy, invasive procedures
- Abdominal trauma, fetomaternal hemorrhage

Fetal Effects

Condition	Outcome
Fetal anemia	Due to RBC destruction
HDFN	Hemolysis of fetal RBCs
Hydrops fetalis	Severe anemia leading to edema and heart failure

Screening

- Blood group at first visit, indirect Coombs test for antibodies

Diagnosis

- Positive indirect Coombs test, identification of anti-D antibodies

Prevention

Category	Details
Mechanism	Prevents maternal sensitization to Rh-positive RBCs

When to give	After delivery, miscarriage, ectopic pregnancy, invasive procedures, trauma, bleeding
Routine prophylaxis	28 weeks single dose, or 28 and 34 weeks
Dose	300 mcg standard, 50 mcg for small exposure
Not indicated	Father Rh-negative, fetus confirmed Rh-negative

Special Point

- ABO incompatibility reduces risk of sensitization

Management

- Monitor antibody levels, assess fetus with MCA Doppler
- Intrauterine transfusion for severe anemia, delivery if near term

Exam Pearls

- Rh-negative mother with Rh-positive fetus
- Screening test is indirect Coombs
- Prevention is Anti-D immunoglobulin
- Hydrops fetalis is a severe complication
- MCA Doppler is used to assess fetal anemia

8. Polyhydramnios & Oligohydramnios 📘

- Amniotic fluid is essential for fetal development, movement, lung maturation, and protection of the fetus.
- Normal amniotic fluid volume changes with gestational age and is assessed by ultrasound.
- Composition : ~98% water, fetal cells, electrolytes, proteins, antimicrobial factors.

Assessment of Amniotic Fluid

Two main ultrasound methods:

Method	Measurement
Amniotic Fluid Index (AFI)	sum of deepest vertical pocket in 4 quadrants
Single Deepest Pocket (SDP)	measurement of largest vertical pocket

AFI Interpretation

AFI value	Interpretation
<5 cm	oligohydramnios
5–24 cm	normal
>24	Polyhydraminos

Single Deepest Pocket (SDP)

SDP value	Interpretation
<2 cm	oligohydramnios
2–8 cm	normal
>8 cm	polyhydramnios

⭐ Both AFI and single deepest pocket are accepted diagnostic methods.

Oligohydramnios

- Definition : decreased amniotic fluid volume.
- Diagnostic criteria : AFI <5 cm or single deepest pocket <2 cm.

Causes

- Maternal : uteroplacental insufficiency , preeclampsia , dehydration.
- Fetal : renal agenesis , urinary tract obstruction , intrauterine growth restriction (IUGR).
- Placental : placental insufficiency.
- Other : premature rupture of membranes (PROM).

Complications

- fetal growth restriction , pulmonary hypoplasia , cord compression , fetal distress.

Polyhydramnios

- Definition : excessive amniotic fluid volume.
- Diagnostic criteria : AFI >24 cm or single deepest pocket >8 cm.

Causes

- Idiopathic : most cases
- Maternal : diabetes mellitus.
- Fetal : gastrointestinal obstruction (e.g., esophageal atresia) , anencephaly , fetal anemia.
- Multiple pregnancy : twin-to-twin transfusion syndrome.

Complications

- preterm labor , malpresentation , cord prolapse , postpartum hemorrhage.

Exam Pearls ⭐

- AFI <5 cm → oligohydramnios
- AFI >24 cm → polyhydramnios
- SDP <2 cm → oligohydramnios
- SDP >8 cm → polyhydramnios
- Most common cause polyhydramnios = maternal diabetes

9. Fetal Compromise (Fetal Distress) 📘

Definition

- Poor fetal growth, increased perinatal morbidity and mortality, associated with hypoxia and acidaemia
- Fetal compromise refers to inadequate oxygenation, commonly due to placental insufficiency or during labor

SGA vs FGR

Condition	Definition
SGA	Fetus <10th centile, may be normal
FGR	Failure to reach growth potential due to placental insufficiency

Types of FGR

- Symmetrical: early onset, head and abdomen equally affected, due to early insult
- Asymmetrical: late onset, abdomen small with head sparing, due to placental insufficiency

Causes

Category	Causes
Maternal	Smoking, malnutrition, chronic disease, hypertension, diabetes, hypotension, hypoxia
Fetal	Chromosomal abnormalities, infections, congenital anomalies
Placental	Placental insufficiency, abnormal placentation, placental abruption
Cord	Cord compression, cord prolapse

Pathophysiology

- Placental insufficiency, reduced blood flow, decreased oxygen and nutrients
- Chronic hypoxia, fetal acidaemia, reduced growth velocity
- Leads to fetal compromise and neurological injury

Clinical Assessment

- Maternal weight gain, fundal height measurement
- Ultrasound biometry, liquor volume
- CTG, biophysical profile, Doppler studies

Diagnosis

Tool	Key Point
Ultrasound biometry	Most sensitive
AC	Most accurate predictor
Serial measurements	Best for growth velocity
Doppler	Detect placental insufficiency

Doppler Findings

Vessel	Finding	Meaning
Umbilical artery	Increased resistance	Placental insufficiency
	Absent end-diastolic flow	Severe compromise
	Reversed flow	Critical condition
MCA	Low resistance	Brain sparing
Ductus venosus	Abnormal flow	Fetal decompensation

Clinical Indicators of Fetal Compromise

- Abnormal CTG, decreased fetal movements
- Meconium-stained amniotic fluid

CTG Findings

Finding	Significance
Late decelerations	Uteroplacental insufficiency
Reduced variability	Fetal hypoxia

Prolonged bradycardia	Severe compromise

Decelerations

Type	Cause	Significance
Early	Head compression	Normal
Late	Uteroplacental insufficiency	Pathological
Variable	Cord compression	Variable
Sinusoidal	Severe fetal anemia	Very serious

Fetal Surveillance

Method	Key Point
CTG (NST)	Two accelerations in 30 min
Biophysical profile	Score <8 abnormal
AF assessment	Reduced in FGR
Doppler	Most important monitoring tool

Management

Step	Action
Initial	Left lateral position, oxygen, IV fluids, stop oxytocin
Ongoing	Serial ultrasound, Doppler monitoring
If <34 weeks	Give steroids
If compromise persists	Urgent delivery

Delivery Options

- Operative vaginal delivery
- Cesarean section

Indications for Delivery

- Abnormal Doppler
- Reduced growth velocity
- Reduced liquor
- Evidence of fetal compromise

Exam Pearls

- FGR = failure to reach growth potential
- Most accurate parameter is abdominal circumference
- Doppler is key investigation
- Brain sparing = low resistance in MCA
- Reversed umbilical flow = severe fetal compromise
- Late deceleration indicates uteroplacental insufficiency
- Variable deceleration indicates cord compression
- Sinusoidal pattern indicates severe fetal anemia
- Reduced variability indicates hypoxia
- Persistent bradycardia indicates severe compromise

10. Gestational Hypertension & Preeclampsia 📘

Classification

Disorder	Definition
Chronic HTN	Before pregnancy or <20 weeks
Gestational HTN	≥140/90 after 20 weeks, no proteinuria
Preeclampsia	HTN + proteinuria or organ dysfunction
Eclampsia	Preeclampsia + seizures

PREECLAMPSIA

Definition

- New-onset hypertension after 20 weeks, plus proteinuria or end-organ dysfunction

Diagnostic Criteria

Component	Criteria
Hypertension	≥140/90, severe ≥160/110
Proteinuria	≥300 mg/24h, PCR ≥0.3, dipstick ≥2+

Diagnosis without proteinuria

- Platelets <100,000, creatinine >1.1 or doubled
- Elevated liver enzymes, pulmonary edema
- CNS symptoms

Severe Features

- BP ≥160/110, platelets <100,000, creatinine >1.1
- Elevated LFTs + RUQ pain, pulmonary edema, CNS symptoms

Pathophysiology

- Abnormal trophoblastic invasion, failure of spiral artery remodeling
- Placental ischemia, endothelial dysfunction
- Vasospasm, reduced organ perfusion

Risk Factors

- Nulliparity, previous preeclampsia, chronic hypertension
- Diabetes, SLE or APS, multiple pregnancy
- Obesity, age ≥35

Clinical Presentation

- Headache, visual disturbance
- Epigastric or RUQ pain
- Edema, dyspnea
- Nausea, vomiting

Complications

Maternal	Fetal
Eclampsia, stroke, HELLP Renal failure, pulmonary edema DIC, placental abruption	FGR, hypoxia Stillbirth, prematurity

Management

Situation	Management
No severe features <37w	Expectant
No severe features ≥37w	Deliver
Severe features	Admit + treat + plan delivery

Blood Pressure Control

- Labetalol , Nifedipine , Hydralazine

Magnesium Sulfate

Aspect	Detail
Use	Seizure prevention and treatment
Dose	4 g loading → infusion
Toxicity	Loss of reflexes (earliest sign), respiratory depression
Antidote	Calcium gluconate

ECLAMPSIA

Item	Detail
Definition	Seizures in preeclampsia
Management	Stabilize, $MgSO_4$, control BP, deliver

⚠️ Most common cause of death due to eclampsia is cerebrovascular stroke and hemorrhage

HELLP SYNDROME

Component	Meaning
H	Hemolysis
EL	Elevated liver enzymes
LP	Low platelets

- May occur without HTN or proteinuria
- High maternal mortality

Prevention

Method	Note
Aspirin from 12 weeks	High-yield
Calcium	If low intake

- Not Effective : Bed rest, salt restriction, vitamins

Screening

- Maternal risk factors, MAP
- Uterine artery Doppler, PlGF

Key Concepts

- HTN after 20 weeks + proteinuria or organ dysfunction = preeclampsia
- Seizures = eclampsia
- HELLP = hemolysis + ↑LFT + ↓platelets
- ACE inhibitors contraindicated

Exam Pearls

- Occurs after 20 weeks
- Severe BP ≥160/110
- $MgSO_4$ is first-line for seizures
- Loss of reflexes = earliest toxicity
- Definitive treatment = delivery
- Most common cause of death = stroke

11. Gestational Diabetes Mellitus (GDM) 📘

Definition

- Glucose intolerance first recognized during pregnancy
- Due to pregnancy-induced insulin resistance caused by placental hormones

Pathophysiology

- Placental hormones cause insulin resistance, increased gluconeogenesis
- Human placental lactogen, progesterone, estrogen, cortisol
- Maternal hyperglycemia, fetal hyperinsulinemia
- Increased fetal glucose, increased insulin, accelerated growth and fat deposition

Risk Factors

- Obesity, family history of diabetes, previous GDM, previous macrosomic baby
- PCOS, advanced maternal age

Screening

- 24–28 weeks, earlier if high risk

Step 1: OGCT

Feature	Detail
Dose	50 g glucose
Fasting	Not required
Measurement	1 hour glucose

Result	Interpretation
<140 mg/dL	Normal
≥140 mg/dL	Do OGTT

Step 2: OGTT

Feature	Detail
Type	Diagnostic test
Fasting	Required

Diagnostic Values

Time	75 g OGTT	100 g OGTT
Fasting	≥92	≥95
1 hour	≥180	≥180
2 hours	≥153	≥155
3 hours	—	≥140

Diagnosis

- 75 g: one abnormal value
- 100 g: two abnormal values

Complications

Maternal

- Preeclampsia, polyhydramnios, increased cesarean delivery
- Future type 2 diabetes

Fetal

- Macrosomia, increased fat deposition
- Delayed lung maturation, increased metabolic demand

Neonatal

- Hypoglycemia, polycythemia
- Respiratory distress syndrome, birth trauma

Management

Step	Approach
First-line	Diet, exercise
If uncontrolled	Insulin
Alternatives	Metformin, glyburide

Glycemic Targets

- Fasting <95 mg/dL
- 1-hour postprandial <140 mg/dL

Delivery Considerations

- Macrosomia increases risk of shoulder dystocia, birth trauma
- Cesarean if very large fetus

Key Concepts

- Maternal hyperglycemia leads to fetal hyperinsulinemia
- Insulin resistance due to placental hormones
- OGCT is screening, OGTT is diagnostic

Exam Pearls

- Screening at 24–28 weeks
- OGCT uses 50 g and no fasting
- OGTT is diagnostic test
- Most common fetal complication is macrosomia
- Neonatal hypoglycemia is common
- Insulin is gold standard treatment

12. Thyroid Disorders in Pregnancy 📘

Physiological Changes

- hCG stimulates TSH receptors, increases thyroid activity
- Increased TBG due to estrogen, increased total T3 and T4
- Free T3 and T4 remain normal, best indicators in pregnancy

Key Physiology Points

- Only T4 crosses placenta in early pregnancy
- Fetal brain converts T4 to T3
- Fetal thyroid becomes functional after 12 weeks

HYPOTHYROIDISM

Definition

- Decreased thyroid hormone levels during pregnancy

Causes

- Hashimoto thyroiditis most common, iodine deficiency
- Previous thyroid surgery

Diagnosis

Parameter	Finding
TSH	Increased
Free T4	Decreased

Complications

Maternal	Fetal
Miscarriage, preeclampsia, anemia	Impaired neurodevelopment, low birth weight

Management

Item	Detail
Drug	Levothyroxine
Goal	Maintain normal TSH

HYPERTHYROIDISM

Cause

- Graves disease most common

Clinical Features

- Weight loss, tachycardia, tremor , Heat intolerance

Complications

Maternal	Fetal
Preeclampsia, heart failure	FGR, fetal tachycardia

Management

Trimester	Drug
First	PTU
Second and third	Methimazole

Important Notes

- Radioactive iodine is contraindicated in pregnancy
- hCG can cause transient hyperthyroidism in early pregnancy
- Do not rely on total T3/T4, use free levels
- Tachycardia >100 suggests thyrotoxicosis

- TSH receptor antibodies can cross placenta and affect fetus
- Monitor thyroid function regularly during pregnancy

Exam Pearls

- Most common cause of hyperthyroidism is Graves disease
- Hypothyroidism is treated with levothyroxine
- PTU is used in first trimester
- Methimazole is used after first trimester
- Free T3 and T4 are best indicators
- Only T4 crosses placenta early
- Radioactive iodine is contraindicated

13. Anemia in Pregnancy 📘

Definition

- Hemoglobin <11 g/dL in pregnancy
- <10.5 g/dL in 2nd and 3rd trimester

Physiologic Anemia

- Plasma volume increases more than RBC mass, hemodilution
- MCV and MCHC remain normal
- Increased requirements for iron, folate, vitamin B12

Types of Anemia

Type	Cause
Iron deficiency	Most common
Folate deficiency	Nutritional
Vitamin B12 deficiency	Malabsorption
Hemolytic anemia	Hemoglobinopathies

IRON DEFICIENCY ANEMIA

Importance

- Most common anemia in pregnancy

Causes

- Increased iron requirement, poor dietary intake
- Multiple pregnancy, blood loss, malabsorption

Symptoms

- Fatigue, pallor, dizziness
- Dyspnea, palpitations
- Pica in severe cases

Diagnosis

Parameter	Finding
Hemoglobin	Low
Ferritin	Low
RBC	Microcytic hypochromic
MCV/MCH	Decreased

Complications

Maternal

- Recurrent infections, postpartum hemorrhage
- Need for transfusion, postpartum depression

Fetal

- Preterm birth, low birth weight
- Fetal growth restriction
- Long-term neurodevelopmental effects

Management

Step	Approach
First-line	Oral iron
If intolerant	IV iron
Severe anemia	Blood transfusion

Important Notes

- Iron absorption increased with vitamin C and meat
- Decreased by tea, coffee, calcium
- Continue treatment for months after Hb normalizes

Prevention

- Routine iron supplementation
- Iron 60 mg/day + folic acid 400 mcg/day

FOLATE DEFICIENCY

Key Points

- Second most common cause
- Causes megaloblastic anemia

Importance

- Required for neural tube closure early in pregnancy

Prevention

- Folic acid 400 mcg/day before pregnancy and early pregnancy
- High-risk patients need higher dose

HEMOGLOBINOPATHIES

Types

- Thalassemia, sickle cell disease

Key Points

- Genetic disorders, diagnosed by Hb electrophoresis
- Increased maternal and fetal complications

Exam Pearls

- Most common anemia = iron deficiency
- Physiologic anemia due to hemodilution
- Microcytic hypochromic = iron deficiency
- Ferritin is best indicator of iron stores
- First-line treatment = oral iron
- Folate prevents neural tube defects

14. Labor 📘

Definition

- Regular painful uterine contractions causing cervical effacement and dilation leading to delivery of fetus and placenta

Signs of Labor

- Regular painful contractions, cervical dilation and effacement
- Show, rupture of membranes

Stages of Labor

Stage	Description
Stage 1	Onset → full cervical dilation
Stage 2	Full dilation → delivery of fetus
Stage 3	Delivery of fetus → placenta
Stage 4	1–2 hours postpartum observation

STAGE 1

- From onset of labor to full dilation (10 cm)

Phases

Phase	Cervical dilation
Latent	0–6 cm
Active	≥6 cm

- Active labor begins at 6 cm

Key Points

- Latent phase slow and variable
- Active phase dilation ~1 cm/hour
- Membranes usually rupture after labor onset144

STAGE 2

- Full dilation → delivery of baby

Phases

- Passive phase, no urge to push
- Active phase, strong urge to push

Duration

- Nullipara ≤2 hours, multipara ≤1 hour
- Prolonged increases maternal and fetal morbidity

Associations

- Chorioamnionitis, induced labor
- High parity shortens second stage

STAGE 3

- Delivery of placenta
- Mechanism : Uterine contraction reduces placental site

Signs of Placental Separation

- Cord lengthening, gush of blood
- Rising fundus, firm uterus

Management (Active)

Step	Action
Uterotonic	Oxytocin
Cord	Early or delayed clamping

Delivery	Controlled cord traction

STAGE 4

- First 1–2 hours postpartum observation

MECHANISM OF LABOR

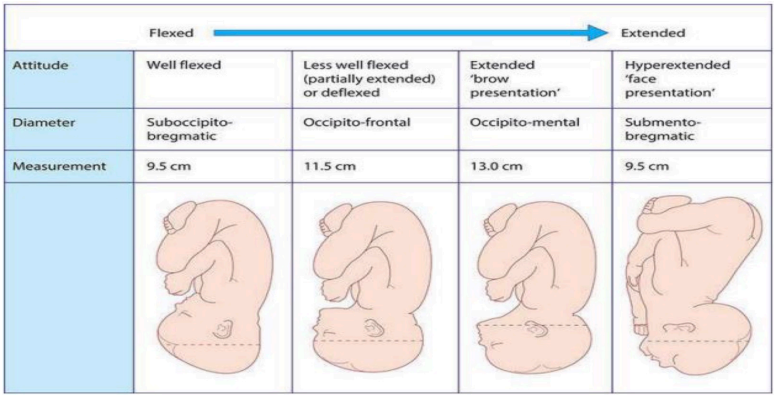
Cardinal Movements

- Engagement, descent, flexion
- Internal rotation, extension
- External rotation, expulsion

Key Concept

- Head enters transverse, rotates to AP for delivery

FETAL SKULL DIAMETERS



- Smallest diameter = suboccipito-bregmatic

BISHOP SCORE

Components

- Dilation, effacement, station
- Consistency, position
- Dilation most important predictor ⚠️

INDUCTION OF LABOR

- Artificial initiation of labor
- Indications : Post-term pregnancy, preeclampsia , Fetal growth restriction

Methods

Type	Method
Pharmacologic	Prostaglandins
Mechanical	Foley catheter
Others	Oxytocin, amniotomy

KEY LABOR CONCEPTS

Three Ps

- Power, passage, passenger

Pelvis

- Inlet widest transverse
- Outlet widest AP
- Ischial spines = station 0

Position

- Occipito-anterior most favorable
- OP or transverse may cause prolonged labor

Abnormal Labor

- Prolonged labor >12 h nullipara, >8 h multipara
- Precipitous labor <3 hours

Exam Pearls

- Active labor starts at 6 cm
- Stage 2 = delivery of fetus
- Stage 3 = delivery of placenta
- Smallest head diameter = 9.5 cm
- OA position most favorable
- Station 0 at ischial spines
- High parity shortens second stage
- Mentum posterior not compatible with vaginal delivery
- Most favorable pelvic type for normal delivery : Gynaecoid
- ⚠️ Previous myomectomy is not a risk factor for breech presentation

15. Preterm Labor 📘

Definition

- Labor before 37 weeks
- Contractions + cervical dilation and effacement

Classification

- Moderate 33–36 weeks, very <32, extreme <28

Risk Factors

- Previous preterm birth, multiple pregnancy, infection
- Cervical incompetence, uterine anomalies, polyhydramnios
- Smoking, low BMI, age <15 or >35

Causes

Category	Causes
Maternal	Infection, chronic disease
Placental	Abruption
Fetal	Multiple pregnancy

Diagnosis

- Contractions ≥4 in 20 min, cervical dilation ≥2 cm, effacement >80%

Investigations

Test	Key Point
Cervical length	Short = high risk
Fetal fibronectin	Positive = risk

Complications

- RDS, IVH, neonatal mortality

Management

Step	Action
Goal	Delay labor
Tocolytics	Nifedipine, indomethacin
Steroids	Betamethasone <34 weeks
$MgSO_4$	Neuroprotection

Tocolytics Key Points

- Nifedipine first-line
- Indomethacin → ductus closure, oligohydramnios
- $MgSO_4$ for neuroprotection

Contraindications to Tocolysis

Absolute	Relative
Fetal death, infection Need delivery	IUGR Preeclampsia Cervix >4 cm

PROM / PPROM

- PPROM = rupture before 37 weeks

Management

GA	Plan
<34 weeks	Expectant + steroids
>34 weeks	Deliver

Key Concepts

- Infection = major trigger
- Multiple pregnancy = strongest risk factor
- Prematurity = main cause of neonatal death

Exam Pearls

- <37 weeks defines preterm labor
- Diagnosis = contractions + cervical change
- ≥4 contractions in 20 min
- Cervix ≥2 cm supports diagnosis
- Steroids before 34 weeks
- $MgSO_4$ reduces cerebral palsy
- Indomethacin closes ductus arteriosus
- fFN predicts risk

16. Intrapartum Fetal Monitoring & CTG 📘

Purpose

- Assess fetal wellbeing during labor, detect fetal hypoxia early

CTG Components

- Fetal heart rate, uterine contractions

How to Read CTG

- Contractions, baseline FHR, variability
- Accelerations, decelerations
- Final classification

BASELINE FHR

- Normal : 110–160 bpm

Abnormal

Type	Definition	Causes
Tachycardia	>160 bpm	Infection, hypoxia, drugs, anemia
Bradycardia	<110 bpm	Hypotension, hypoxia, heart block

VARIABILITY (MOST IMPORTANT)

- Fluctuation around baseline , Normal : 5–25 bpm

Abnormal

Type	Value	Significance
Minimal	<5 bpm	Hypoxia or sleep
Marked	>25 bpm	Stress
Absent	None	Severe hypoxia

- Reduced variability = most important sign of fetal compromise
- Causes of Reduced Variability : Fetal sleep, hypoxia, drugs, prematurity

ACCELERATIONS

- ↑ FHR >15 bpm for >15 sec
- Significance : Reassuring, indicates good oxygenation
- Abscence : Not of clinical significance

DECELERATIONS

Types

Type	Cause	Pattern	Significance
Early	Head compression	Mirrors contraction	Normal
Variable	Cord compression	Abrupt, V-shape	Variable
Late	Uteroplacental insufficiency	After contraction	Pathological
Sinusoidal	Severe anemia	Smooth wave	Very serious
Prolonged	>3 min	Sustained drop	Acute hypoxia

Key Patterns

- Late deceleration → hypoxia
- Variable with shoulders → compensating fetus
- Persistent severe variable → dangerous
- Sinusoidal → fetal anemia

CONTRACTIONS

Assessment

- Number in 10 minutes

Important

- 5 contractions / 10 min = hyperstimulation
- Causes fetal hypoxia and abnormal CTG

MANAGEMENT OF ABNORMAL CTG

Initial

- Left lateral position, oxygen, IV fluids , Stop oxytocin

Further

- Treat cause, consider tocolysis
- Fetal scalp pH if available
- Urgent delivery if persistent

CTG CLASSIFICATION

Category	Meaning	Action
Normal	Reassuring	Continue
Suspicious	Intermediate	Observe + correct cause
Pathological	Abnormal	Urgent action

KEY CONCEPTS

- Baseline and variability are most important
- CTG must be interpreted with clinical context
- Uterine hyperstimulation common cause of abnormal CTG
- Fetus preserves heart first, brain affected earlier

Exam Pearls

- Normal FHR = 110–160 bpm , Variability 5–25 bpm is normal
- Reduced variability = hypoxia
- Accelerations = reassuring
- Late deceleration = uteroplacental insufficiency , Variable deceleration = cord compression
- Sinusoidal pattern = fetal anemia
- 5 contractions in 10 min = hyperstimulation
- Most important CTG features = baseline + variability
- ⚠️ Scar dehiscence is not a cause of fetal bradycardia

17. Intrapartum Maternal Monitoring 📘

Purpose

- Ensure maternal safety during labor, detect complications early

Parameters Monitored

- Blood pressure, pulse, temperature
- Urine output, uterine contractions

MATERNAL VITALS

Blood Pressure

- Detect preeclampsia or hypotension
- Monitored regularly during labor

Pulse

- Detect maternal distress or infection

Temperature

- Detect infection (chorioamnionitis)

Urine Monitoring

- Urine output, hydration status
- Urine analysis: protein, glucose, ketones

UTERINE CONTRACTIONS

Parameters

- Frequency, duration, intensity

Key Point

- Excess contractions → fetal hypoxia

PARTOGRAM

- Graphical tool to monitor labor progress

Purpose

- Detect prolonged or obstructed labor early
- Used for all women in labor

What It Records

Category	Parameters
Labor progress	Cervical dilation, descent
Fetal	FHR, liquor, moulding
Maternal	BP, pulse, temperature, urine
Contractions	Frequency, duration

Key Concepts

- Dilation plotted as X, descent as O
- Normal progress stays left of alert line
- Crossing action line → intervention required

LABOR PROGRESS

Normal Requirements (3 Ps)

- Power (contractions), passage (pelvis), passenger (fetus)

Abnormal Labor Indicators

Finding	Definition
Prolonged latent	>20 h nullipara, >14 h multipara
Prolonged second stage	>2 h nullipara, >1 h multipara
Protracted dilation	<1.2 cm/h
Protracted descent	<1 cm/h

Dystocia

- Difficult or slow labor
- Causes: poor contractions, CPD, malposition

Active Phase Arrest

- No dilation after 4 h (adequate contractions)
- Or 6 h (inadequate despite oxytocin)

COMPLICATIONS OF ABNORMAL LABOR

- Infection, operative delivery
- Postpartum hemorrhage
- Fetal distress, low Apgar, NICU admission

OBSTRUCTED LABOR

Clinical Features

- Prolonged labor, maternal exhaustion
- Tachycardia, dehydration
- Edematous cervix, moulding, caput
- Bandl's ring

Bandl's Ring

- Pathological retraction ring
- Seen in prolonged/obstructed labor

KEY CONCEPTS

- Maternal + fetal monitoring together
- Partogram is essential tool
- Early detection prevents complications

Exam Pearls

- Monitor BP → detect preeclampsia
- Temperature → detect infection
- Urine → renal function + proteinuria
- Partogram detects prolonged labor
- Crossing action line → intervene
- 3 Ps determine labor progress
- Dystocia = failure to progress

18. Operative Vaginal Delivery 📘

- Assisted vaginal delivery using instruments to help deliver the fetus

Main Instruments

- Forceps, vacuum extractor

Indications

- Prolonged second stage of labor, fetal distress in second stage, maternal exhaustion
- Maternal conditions where pushing should be minimized

Prerequisites

- Cervix fully dilated, membranes ruptured, fetal head engaged
- Fetal position known, pelvis adequate, bladder empty
- Experienced operator available
- Cervix must be fully dilated

Types of Instruments

Instrument	Characteristics
Forceps	Metal blades applied around fetal head
Vacuum	Suction cup attached to fetal scalp

FORCEPS

- Functions : Traction to assist delivery, rotation of fetal head
- Advantages : Higher success rate

Complications

Maternal	Fetal
Vaginal tears, perineal trauma	Facial injuries, skull trauma

VACUUM

- Suction cup placed on fetal scalp, traction applied during contractions
- Advantages : Less maternal trauma
- Contraindications : Prematurity, face presentation
- Complications : Scalp injury, cephalohematoma

Cephalohematoma

- Subperiosteal hemorrhage, does not cross suture lines

Exam Pearls

- Forceps success rate higher than vacuum
- Vacuum contraindicated in prematurity and face presentation

19. Cesarean Section 📘

- Surgical delivery of fetus, placenta, and membranes through abdominal and uterine incisions

Indications

- Maternal: cephalopelvic disproportion, previous uterine surgery, placenta previa or accreta
- Fetal: fetal distress, malpresentation
- Other: failed induction, prolonged labor, multiple pregnancy

Types of Uterine Incisions

Type	Key Point
Lower segment transverse (LUSCS)	most common, safest
Classical (upper vertical)	rare, high rupture risk

LUSCS vs Classical

Feature	LUSCS	Classical
Site	lower segment	upper uterus
Bleeding	less	more
Future rupture	low	very high

Complications

- Maternal: hemorrhage, infection, thromboembolism, bladder or bowel injury
- Fetal: transient tachypnea, low Apgar, surgical injury

VBAC (Vaginal Birth After Cesarean)

- Trial of labor after previous cesarean aiming for vaginal delivery

When VBAC is ALLOWED

- Previous one lower segment transverse cesarean (LUSCS)
- Singleton pregnancy, cephalic presentation
- No contraindication to vaginal delivery
- Clinically adequate pelvis
- No history of uterine rupture
- Facility capable of immediate emergency cesarean section

👉 Core idea: safe scar (LUSCS) → VBAC possible

When VBAC is NOT ALLOWED

Situation	Reason
Previous classical cesarean	very high rupture risk
Previous uterine rupture	recurrence risk
Placenta previa	requires cesarean
Unknown scar	assume unsafe
Multiple previous cesareans	higher rupture risk

Key Clarification

- Not every woman with previous cesarean can do VBAC
- The type of previous uterine incision is the most important factor
- If the scar is lower segment transverse → VBAC is generally safe
- If the scar is upper segment (classical) → VBAC is contraindicated
- Must always be done in a hospital ready for urgent cesarean

Success Factors

- Previous vaginal delivery (strongest predictor)
- Previous cesarean for non-recurrent reason (e.g., breech)
- Favorable cervix

Risks

Risk	Key Point
Uterine rupture	most serious complication
Emergency cesarean	if labor fails

- Risk of rupture ≈ 0.5–1%

Benefits

- Avoid surgery, faster recovery
- Less bleeding, infection, thrombosis
- Fewer complications in future pregnancies

Exam Pearls

- Most common cesarean type = LUSCS
- Classical cesarean → highest rupture risk
- VBAC only allowed with previous LUSCS
- Best predictor of success = previous vaginal delivery
- Most dangerous complication = uterine rupture

20. Episiotomy 📘

- Surgical incision of perineum and posterior vaginal wall during second stage to enlarge vaginal opening
- Done at crowning of the head

Indications

- Instrumental delivery, fetal distress needing rapid delivery, shoulder dystocia, rigid perineum
- Macrosomia, breech delivery, occiput posterior or face presentation, previous perineal surgery

Types

Type	Description
Mediolateral	incision directed laterally (most common)
Midline	incision toward anus
Others	lateral, J-shaped (less used)

Midline vs Mediolateral

Feature	Midline	Mediolateral
Repair	easier	more difficult
Pain	less	more
Blood loss	less	more
Extension risk	higher (to anal sphincter)	lower

Timing

- Performed at crowning of fetal head

Benefits

- Easier repair than irregular tear, shortens second stage, reduces severe tears
- May reduce pelvic floor trauma and fetal injury (especially breech)

Complications

- Early : Bleeding, extension to anal sphincter or rectum, hematoma, infection, wound breakdown
- Late : Dyspareunia, rectovaginal fistula, rare necrotizing fasciitis, scar endometriosis

Key Concept

- ❌ Routine episiotomy
- ✔️ Only when indicated

Exam Pearls

- Done at crowning
- Most common type = mediolateral
- Main risk = extension → anal sphincter injury
- Indication classic = instrumental delivery

21. Postpartum Care (Puerperium) 📘

- Period after delivery → return to non-pregnant state, lasts 6–8 weeks

PHYSIOLOGICAL CHANGES

Uterine Involution

- Fundus at umbilicus within 24 h, descends ~1 cm/day
- Midway by 1 week, not palpable by 12 days
- Normal size by 6–8 weeks
- Firm uterus prevents hemorrhage, soft = atony

Lochia

- Rubra 3–4 days red, serosa up to ~2 weeks pink/brown
- Alba later white/yellow
- Total 200–500 mL, lasts ~4 weeks

Cervix

- Soft, 2–3 cm initially, <1 cm at 1 week
- External os becomes slit-like, does not return to original

Vagina / Vulva

- Lax then contracts, rugae return by week 3
- Pelvic muscle relaxation may persist

Abdominal Wall

- Lax, regains tone gradually
- Diastasis recti may persist

Hormones

- ↓ estrogen, progesterone, hCG normal in 2–4 weeks
- Ovulation returns 45–90 days if not breastfeeding
- Breastfeeding delays ovulation

LACTATION

- Hormones : Prolactin milk production, oxytocin milk ejection
- Colostrum : First milk, rich in IgA, immunity

OTHER NORMAL CHANGES

Skin / Hair

- Striae fade, chloasma resolves
- Hair loss 1–5 months then recovers

Weight Loss

- ~6 kg after delivery + 2–7 kg later (fluid + involution)

POSTPARTUM MONITORING

- BP, pulse, temperature, respiratory rate
- Uterine tone, vaginal bleeding
- Bladder distension, urine output
- Signs of hemorrhage, infection, PE

POSTPARTUM CARE

Perineal Care

- Hygiene, stool softeners, pelvic exercises

Lab Testing

- Hb if anemia or bleeding
- WBC not reliable

Thrombosis

- Highest risk first 2 weeks
- More after cesarean
- Give prophylaxis if high risk

Immunization

- Give missed vaccines
- Anti-D if Rh-negative mother

COMMON POSTPARTUM PROBLEMS

Pain

- Afterpains ↑ with multiparity and breastfeeding
- NSAIDs effective

Breast Engorgement

- Early 24–72 h, breast tender
- Treat with support, cold packs

Urinary Retention

- No void within 6 h
- Risk: epidural, instrumental delivery
- Treat support or catheter

Hemorrhoids

- Common, due to traumatic delivery

COMPLICATIONS

Major

- Postpartum hemorrhage, infection, depression

Mastitis

- Staph aureus, pain + fever
- Continue breastfeeding + antibiotics

Postpartum Fever

- ≥38°C
- Causes: UTI, mastitis, endometritis

Others

- Uterine inversion, postpartum preeclampsia
- Pulmonary embolism

Bleeding

- Early <24 h or late up to 12 weeks
- Causes: retained tissue, infection

Episiotomy Breakdown

- Infection, wound opening
- Treat with drainage ± resuture

Exam Pearls

- Puerperium = 6–8 weeks
- Uterus descends 1 cm/day
- Fundus at umbilicus initially
- Lochia rubra → serosa → alba
- Breastfeeding delays ovulation
- VTE highest risk first 2 weeks
- Most dangerous complication = postpartum hemorrhage

22. Postpartum Hemorrhage & Maternal Injuries 📘

Definition

- Blood loss ≥500 mL vaginal, ≥1000 mL cesarean
- Or any blood loss causing hemodynamic instability

Classification

Type	Timing
Primary	<24 h
Secondary	24 h – 6 weeks

Causes ⭐ (4 Ts)

Cause	Mechanism
Tone	Uterine atony
Tissue	Retained placenta / clots
Trauma	Lacerations, rupture, inversion
Thrombin	Coagulopathy

- Most common cause = uterine atony
- Most common secondary cause = infection

Causes of Primary PPH

- Atonic PPH (90%), overdistended uterus, APH
- Prolonged labor, multiparity, precipitate labor
- Retained placenta/clots, uterine inversion , Trauma, bleeding disorders

Causes of Secondary PPH

- Retained placental tissue, subinvolution
- Endometritis (most common), blood clot
- Uterine myoma, choriocarcinoma

Risk Factors

- Prolonged labor, multiple pregnancy, polyhydramnios
- Macrosomia, previous PPH
- Operative delivery, induction, chorioamnionitis

Important Clinical Point

- Examine uterus:
  - Contracted → trauma (cervix/vagina)
  - Relaxed → uterine atony

MANAGEMENT

Initial (ABC)

- Call for help, ABC stabilization
- Two large IV lines, fluids, cross-match
- Foley catheter, monitor vitals

Immediate Obstetric

- Assess fundus, empty bladder
- Uterine massage (bimanual)
- Remove retained tissue/clots
- Explore uterus (rule out rupture/inversion)

Uterotonics

Drug	Notes
Oxytocin	First-line
Ergometrine	Avoid in HTN
Prostaglandins	Strong contraction
Misoprostol	Rectal 800–1000 mcg

- Carboprost contraindicated in asthma
- ⚠️ PGE2 is not used for treatment

If Uterus Contracted (Bleeding persists)

- Inspect cervix, vagina
- Repair lacerations
- Consider packing

If Bleeding Continues

- Correct coagulopathy (FFP, platelets)
- Consider embolization
- Prepare for surgery

Mechanical

- Uterine balloon tamponade

Surgical

- Uterine artery ligation
- Internal iliac ligation
- Hysterectomy (life-saving)

COMPLICATIONS

- Renal failure, chronic anemia
- Sheehan syndrome → amenorrhea, failure to lactate, hypothyroidism

MATERNAL BIRTH INJURIES

Perineal Tears

Degree	Injury
1st	Mucosa
2nd	Muscles
3rd	Anal sphincter
4th	Rectal mucosa

Cervical Lacerations

- Small tears no repair, deep tears need repair
- Causes: instrumental delivery, precipitate labor

Episiotomy

- Incision to enlarge outlet
- Types: midline, mediolateral
- Complications: infection, hematoma, dyspareunia

Uterine Rupture

- Full thickness tear
- Risk Factors : Previous CS, obstructed labor, oxytocin
- Features : Pain, fetal distress, bleeding, shock
- Management : Emergency surgery
- Most consistent sign of: Abnormal CTG

Uterine Inversion

- Uterus turns inside out
- Risk Factors : Excess cord traction, fundal pressure
- Features : Severe hemorrhage, shock
- Management : Immediate reposition “last out, first in” , Then uterotonics

Hematoma

- Perineal painful → small observe, large drain
- Paravaginal dangerous → massive bleeding

Exam Pearls

- Most common cause PPH = uterine atony
- Most common secondary cause = infection

- Soft uterus = atony, firm uterus = trauma
- First step = ABC + uterine massage
- Oxytocin = first-line
- Carboprost contraindicated in asthma
- Ergometrine contraindicated in HTN
- Sheehan → failure to lactate
- Uterine rupture risk ↑ with previous CS

Which of the following is wrong about oxytocin?
A) Consists of 9 amino acid
B) Used in treating PPH
C) Cause hypertension and hypernatremia
D) Cause nausea and vomiting
E) Produced in hypothalamus and released from posterior pituitary
Answer: C

23. Antepartum Hemorrhage (APH) 📘

- Bleeding from the genital tract after 20–24 weeks and before delivery, and it complicates 3–5% of pregnancies.

Causes

- Placenta previa : causes painless vaginal bleeding.
- Placental abruption : causes painful vaginal bleeding.
- Vasa previa : results from rupture of fetal vessels.
- Placenta accreta spectrum : causes abnormal placental adherence and may lead to severe bleeding.

Other Causes

- Bloody show can mimic APH.
- Uterine rupture is a serious cause of bleeding.
- Cervical causes include cervicitis, polyps, and cancer.
- Vaginal trauma or neoplasms may cause bleeding.
- Urinary or gastrointestinal bleeding can mimic APH.
- Bleeding disorders such as DIC or von Willebrand disease may present with bleeding.

PLACENTA PREVIA

- Placenta lies partially or completely in the lower uterine segment near or over the cervical os.

Risk Factors

- Previous cesarean section increases the risk.
- Multiparity and advanced maternal age are important factors.
- Uterine scarring, curettage, fibroids, or endometritis contribute to risk.
- Multiple pregnancy, smoking, and IVF are also associated.

Clinical Features

- Vaginal bleeding is painless and often recurrent after 30 weeks.
- The uterus remains soft and non-tender.
- Fetal heart is usually normal.
- Malpresentation and a high presenting part are common.

Diagnosis

- Ultrasound is the investigation of choice, especially transvaginal ultrasound.
- Digital vaginal examination is contraindicated.

Complications

- Preterm delivery, PROM, and IUGR may occur.
- Malpresentation is common.
- Postpartum hemorrhage occurs because the lower segment does not contract well.
- Placenta accreta spectrum is an important associated complication.

PLACENTA ACCRETA SPECTRUM

- Placenta abnormally adheres to the uterine wall due to defective decidua.

Types

- Placenta accreta attaches to the myometrium.
- Placenta increta invades into the myometrium.
- Placenta percreta penetrates through the uterus and may involve the bladder.

Risk Factors

- Placenta previa with previous cesarean section is the most important risk factor.
- Multiple cesarean sections increase risk further.
- Previous uterine surgery such as D&C or myomectomy contributes.
- Multiparity is also a risk factor.

Clinical Clues

- APH in a patient with previous cesarean and placenta previa suggests accreta.
- Placenta fails to separate after delivery.
- Severe postpartum hemorrhage may occur.

Diagnosis

- Ultrasound shows placental lacunae.
- MRI is used if diagnosis is unclear.

Management

- Planned cesarean section with hysterectomy is the standard management.
- Placenta should not be removed manually.
- Blood products should be prepared in advance.

PLACENTAL ABRUPTION

- Premature separation of a normally implanted placenta.

Risk Factors

- Hypertension and preeclampsia are major causes.
- Trauma, smoking, and cocaine use increase risk.
- Previous abruption is an important predictor.
- Polyhydramnios, infection, and PROM are associated.
- Thrombophilia and folate deficiency may contribute.

Clinical Features

- Vaginal bleeding is painful.
- The uterus is tender and hypertonic.
- Frequent contractions occur.
- Fetal distress or intrauterine fetal death may develop.

Diagnosis

- Diagnosis is mainly clinical.
- Ultrasound is used mainly to exclude placenta previa.

Complications

- Maternal complications include shock, anemia, DIC, renal failure, and PPH.
- Fetal complications include hypoxia, growth restriction, prematurity, and death.

VASA PREVIA

- Fetal vessels run across the internal cervical os without protection.

Features

- Bleeding occurs after rupture of membranes.
- There is sudden fetal distress.

Diagnosis

- Ultrasound with Doppler confirms the diagnosis.
- Apt test differentiates fetal from maternal blood.

Management

- Emergency cesarean section is required.
- Elective cesarean at 35–36 weeks if diagnosed antenatally.
- Steroids and close monitoring are needed.

GENERAL ASSESSMENT & MANAGEMENT

Initial Assessment

- Assess severity of bleeding, maternal condition, and fetal status.
- Maternal stabilization is always the priority.

Investigations

- CBC, blood group, and coagulation profile are essential.
- Ultrasound and CTG assess fetal condition.
- Speculum examination may be performed safely.

Management Principles

- Mild bleeding may allow discharge after assessment.
- Ongoing or moderate bleeding requires admission.
- Corticosteroids are given between 24–34 weeks.
- Tocolysis is contraindicated in major APH or abruption.
- Anti-D should be given to Rh-negative patients.

Delivery

- Immediate delivery is required if fetal compromise occurs.
- Placenta previa requires cesarean delivery.
- Placental abruption is usually managed vaginally unless unstable.
- Delivery is considered at or after 37 weeks.

DIFFERENTIATION

- Placenta previa presents with painless bleeding and a soft uterus.
- Placental abruption presents with painful bleeding and a tender uterus.
- Vasa previa presents with bleeding after membrane rupture and fetal distress.
- Placenta accreta should be suspected with placenta previa and previous cesarean.

Exam Pearls

- Painless bleeding suggests placenta previa.
- Painful bleeding suggests placental abruption.
- Bleeding with fetal distress after rupture of membranes suggests vasa previa.
- Vaginal examination is contraindicated in placenta previa.

- Placental abruption is diagnosed clinically.
- The most common causes of APH are placenta previa and abruption.
- The most dangerous condition for the fetus is vasa previa.
- Placenta previa with previous cesarean suggests accreta.
- Placenta accreta is managed with cesarean hysterectomy.

24. Multiple Pregnancy 📘

• Pregnancy with more than one fetus, most commonly twins

Types of Twins

Type	Description
Dizygotic	two separate ova
Monozygotic	division of single fertilized ovum

• Dizygotic twins = always dichorionic diamniotic

• Monozygotic depends on timing of division

Chorionicity ⭐

Determined by timing of embryo division

Timing	Type
0–3 days	dichorionic diamniotic
4–8 days	monochorionic diamniotic
8–13 days	monochorionic monoamniotic
>13 days	conjoined twins

• Most important determinant of outcome = chorionicity

Diagnosis

• Ultrasound identifies number of fetuses and chorionicity

• Multiple sacs at 5 weeks, cardiac activity at 6 weeks

• Assess chorionicity at 10–13 weeks

Ultrasound Signs

• Lambda sign → dichorionic

• T sign → monochorionic

Risk Factors

• Assisted reproduction (IVF) , Increased maternal age , Multiparity , Family history , High BMI

Maternal Complications

• anemia, preeclampsia, gestational diabetes, postpartum hemorrhage

• preterm labor, PROM, HELLP

• increased operative delivery, maternal mortality

Fetal Complications

• preterm birth, growth restriction, congenital anomalies

• stillbirth, ↑ neonatal mortality

• long-term neurodevelopmental issues

• higher anomalies risk than singleton

Twin-to-Twin Transfusion Syndrome (TTTS)

- Occurs in monochorionic twins
- Mechanism : placental vascular connections → unequal blood flow

Effects

Twin	Effect
Donor twin	anemia, oligohydramnios, IUGR
Recipient twin	polycythemia, polyhydramnios, cardiac overload

Key Points

• Occurs in ~15% of monochorionic twins

• Usually appears in 2nd trimester

• Cause = unbalanced placental blood flow

Diagnosis (US Criteria)

• single placenta , growth discordance (>20%)

• oligohydramnios + polyhydramnios

• abnormal Doppler , possible hydrops

Management

• serial amnioreduction

• fetoscopic laser photocoagulation (best treatment)

Preterm Birth

• >50% in twins, >75% in triplets

• Cervical length <20 mm → high risk

Delivery

• DCDA → 37–38 weeks

• MCDA → 36–37 weeks

• MCMA → 32–34 weeks + cesarean

• Cesarean if first twin not cephalic or complications

Exam Pearls

• Most common twin type = dizygotic

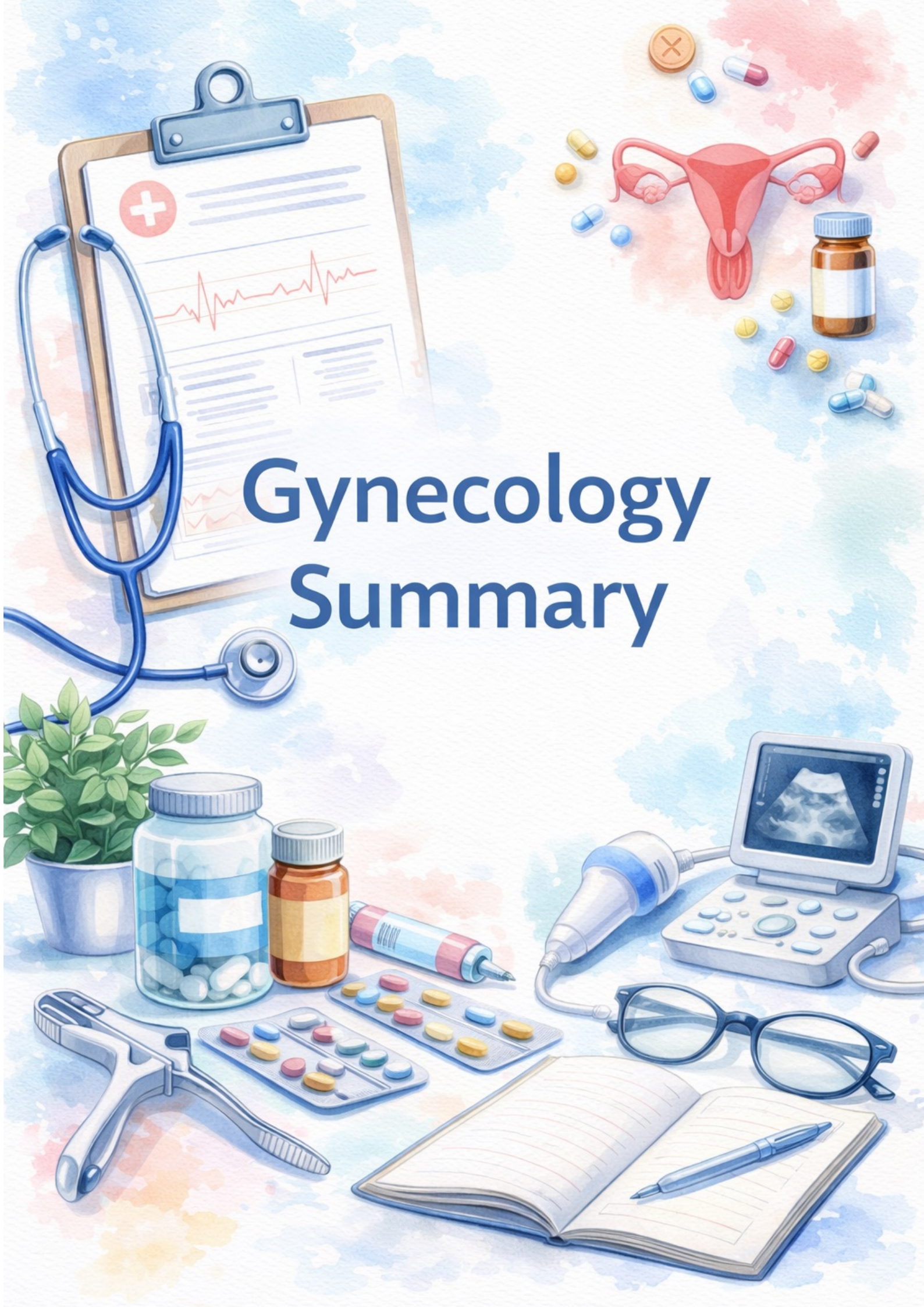
• Most important prognostic factor = chorionicity

• TTTS occurs in monochorionic twins

• Lambda sign = dichorionic

• T sign = monochorionic

• Preterm birth very common in twins



Gynecology Summary

1. Gynecological Examination 📘

Purpose

- evaluate female reproductive organs, detect gynecologic disease, assess symptoms such as abnormal bleeding, discharge, pelvic pain, infertility.

Components

- history, general examination, abdominal examination, pelvic examination.

History Taking

Important points :

- age , menstrual history (cycle length, duration, dysmenorrhea) , obstetric history (gravidity, parity)
- contraceptive use , sexual history
- symptoms (bleeding, pain, discharge).

General Examination

- Assess : vital signs , body mass index , signs of anemia , endocrine signs (hirsutism, acne, thyroid disease)

Abdominal Examination

- Assess : abdominal masses , tenderness , organ enlargement.

Pelvic Examination

- Includes : external genital examination , speculum examination , bimanual examination.

External Genital Examination

- Inspect : vulva , labia , clitoris , urethral opening , vaginal discharge , lesions or ulcers.

Speculum Examination

- Purpose : visualize vagina and cervix
- Allows : Pap smear collection , evaluation of cervical lesions , assessment of vaginal discharge.

Bimanual Examination

- Method : one hand in vagina, other hand on abdomen.
- Assesses : uterus size , uterine position , adnexal masses , tenderness.

Pap Smear

- Purpose : screening test for cervical cancer
- Sample obtained from transformation zone of cervix

Exam Pearls

• Pap smear screens for cervical cancer

• Bimanual exam evaluates uterus and adnexa

2. Puberty 📘

- Period when secondary sexual characteristics develop + reproductive capacity achieved
- Due to activation of HPO axis (hypothalamus–pituitary–ovary)

Hormonal Activation

- First: DHEA, DHEAS ↑ (age 6–8)
- Then: FSH, LH ↑ (pulsatile GnRH starts ~8–9 yrs)
- Ovaries → estrogen production → physical changes

Sequence of Puberty

• Thelarche (breast development)

• Pubarche (pubic hair)

• Growth spurt

• Menarche (last)

Physical Changes

- Breast development , Pubic/axillary hair , Growth spurt , Onset of menstruation

Tanner Staging

Stage	Development
I	prepubertal
II	breast buds appear
III	rapid breast enlargement
IV	secondary mound
V	mature breast

⭐ Maximum growth velocity = Stage III

Menarche

- First menstrual period
- Age: 12–13 years
- Occurs 2–3 years after thelarche
- Initially irregular, anovulatory cycles

Precocious Puberty

- Puberty <8 yrs (girls)
- Most common cause: idiopathic
- Types: central (GnRH dependent), peripheral
- Treatment: GnRH analogues

Delayed Puberty

• No secondary sexual characteristics by 14 yrs

Causes of Delayed Puberty

Category	Causes
Hypogonadotropic (central)	Constitutional delay, anorexia, excessive exercise, chronic illness, pituitary tumors, Kallmann syndrome
Hypergonadotropic (ovarian failure)	Premature ovarian failure, autoimmune, chemotherapy/radiotherapy, Turner syndrome, gonadal dysgenesis

Exam Pearls

• First hormone ↑ = DHEA/DHEAS

• Puberty starts with pulsatile GnRH

• Menarche = last event

• Max growth = Tanner stage III

• Precocious puberty <8 yrs

• Delayed puberty = no development by 14 yrs

3. Amenorrhea 📘

• Amenorrhea = absence of menstruation

Types

Type	Definition
Primary amenorrhea	No menstruation by age 15 with normal secondary sexual characteristics or 13 without secondary sexual characteristics
Secondary amenorrhea	Absence of menses ≥3 months in previously menstruating woman

Most Important Causes

• Most common cause of primary amenorrhea → Gonadal dysgenesis (Turner syndrome)

• Second most common cause → Müllerian agenesis (MRKH)

• Most common cause of secondary amenorrhea → Pregnancy

• Most common cause of anovulation → PCOS

• Most common cause of adult-onset anovulation → Primary ovarian insufficiency

• Most common pathologic cause in adolescents → Anorexia nervosa

Causes of Amenorrhea

Type	Hormones	Causes
Hypogonadotropic hypogonadism	↓ GnRH, ↓ FSH/LH	constitutional delay, anorexia nervosa, excessive exercise, chronic illness, pituitary tumors, Kallmann syndrome
Hypergonadotropic hypogonadism	↑ FSH/LH	premature ovarian failure, autoimmune ovarian failure, chemotherapy/radiotherapy, Turner syndrome, gonadal dysgenesis

Structural / Anatomical Causes

• Müllerian agenesis (MRKH) , imperforate hymen , vaginal agenesis

⭐ Most common Müllerian duct anomaly → imperforate hymen

Important Syndromes

🔷 Turner Syndrome

- Most common cause of gonadal dysgenesis
- Karyotype : 45 XO
- Features : short stature, webbed neck, widely spaced nipples, cubitus valgus, cardiac anomalies, renal abnormalities, autoimmune hypothyroidism
- Ovaries : streak gonads
- Hormones : ↑ FSH, ↑ LH
- Treatment : low-dose estrogen to induce puberty, cyclic estrogen + progesterone for maintenance
- Fertility : egg donation

🔷 Mayer-Rokitansky-Küster-Hauser Syndrome (MRKH)

- Also called Müllerian agenesis
- Karyotype : 46 XX
- Features : normal secondary sexual characteristics, normal ovaries, absent uterus, short blind-ending vagina, normal external genitalia
- Associated anomalies : renal abnormalities, skeletal anomalies
- Treatment : creation of functional vagina for sexual function

🔷 Androgen Insensitivity Syndrome (AIS)

- Karyotype : 46 XY
- Mechanism : androgen receptor mutation → no androgen action
- Hormones : testes produce testosterone, AMH
- Effects : Müllerian structures regress (AMH present), external genitalia follow female pattern
- Features : normal breast development, absent pubic/axillary hair, short blind vagina, testes often intra-abdominal
- Management : gonadectomy after puberty
- Important rule : AIS is exception to early removal of Y-chromosome gonads

🔷 Swyer Syndrome

- Definition : 46 XY pure gonadal dysgenesis
- Features : female phenotype, streak gonads, normal uterus and vagina
- Cause : mutation of SRY gene (10–15%)
- Important clue : pubic hair present (normal adrenarche)
- Management : early gonadectomy due to malignancy risk

🔷 Kallmann Syndrome

- Cause : congenital GnRH deficiency
- Features : delayed puberty, anosmia or hyposmia, possible cranial anomalies
- Gene : KAL gene mutation
- Hormones : ↓ GnRH, ↓ FSH/LH

Congenital Adrenal Hyperplasia (CAH)

- Most common enzyme deficiency
- 21-hydroxylase deficiency

🔷 21-Hydroxylase Deficiency

- Classic form : ambiguous genitalia, salt wasting, hyponatremia
- Non-classic form : oligomenorrhea, amenorrhea, hirsutism

🔷 17-Alpha Hydroxylase Deficiency

- Hormonal effects : ↓ sex steroids, ↓ cortisol, ↑ mineralocorticoids
- Clinical findings : delayed puberty, primary amenorrhea, hypertension, hypernatremia, hypokalemia

Primary Ovarian Insufficiency (POI)

- ovarian failure before age 40
- Clinical features : amenorrhea, infertility
- Physical signs : atrophic genitalia, loss of vaginal rugosity

Female Athlete Triad

- Triad : disordered eating, amenorrhea, osteoporosis

Approach to Primary Amenorrhea

If secondary sexual characteristics present

- Think : Müllerian agenesis, androgen insensitivity

If secondary sexual characteristics absent

- Think : gonadal dysgenesis, hypothalamic or pituitary disorders

High-Yield Comparison

Condition	Karyotype	Uterus	Pubic Hair
Turner syndrome	45 XO	present	normal
MRKH	46 XX	absent	normal
AIS	46 XY	absent	absent
Swyer syndrome	46 XY	present	normal

Feature	AIS	MRKH
Karyotype	46 XY	46 XX
Pubic hair	absent	normal
Gonads	testes	ovaries

Secondary Amenorrhea

Absence of menstruation :

- ≥6 months after regular cycles
- ≥12 months after oligomenorrhea

⭐ Most common cause → pregnancy

Initial Evaluation

First tests : β-hCG, FSH, LH , Prolactin, TSH , Testosterone , Pelvic ultrasound

Interpretation

Finding	Suggests
↑ FSH	Primary ovarian insufficiency
↓ / normal FSH	hypothalamic / pituitary cause
Normal FSH	PCOS or uterine cause
↑ Testosterone	CAH, Cushing, androgen tumor

Causes of Secondary Amenorrhea

Category	Causes
Hypothalamic	stress, excessive exercise, eating disorders, malnutrition, chronic illness, Kallmann syndrome, infections (TB, meningitis), tumors
Pituitary	prolactinoma, Sheehan syndrome, pituitary tumors / hemorrhage
Ovarian	PCOS, primary ovarian insufficiency, Turner syndrome, chemotherapy / radiation, Fragile X
Uterine	Asherman syndrome (intrauterine adhesions after D&C)
Drugs	antipsychotics, antidepressants, metoclopramide, opiates, methyldopa

Important Conditions

🔷 **Sheehan Syndrome**

- Postpartum hemorrhage → pituitary infarction
- Clue : failure of lactation + amenorrhea

🔷 **Asherman Syndrome**

- Cause : D&C / uterine trauma
- Symptoms : amenorrhea, infertility
- Diagnosis : hysteroscopy

Exam Pearls

- Most common cause → pregnancy
- Most common endocrine cause → PCOS
- High FSH → ovarian failure
- Low FSH → hypothalamic/pituitary cause
- Postpartum hemorrhage + failure of lactation → Sheehan syndrome

4. Dysmenorrhea 📘

- Painful menstruation caused by uterine contractions during menstruation.
- Main symptom : cramping lower abdominal pain during menses

Types of Dysmenorrhea

Feature	Primary Dysmenorrhea	Secondary Dysmenorrhea
Cause	prostaglandin excess	pelvic pathology
Age of onset	adolescents	later reproductive life
Relation to menarche	starts 6–12 months after menarche	develops years later
Pelvic exam	normal	abnormal
Common causes	prostaglandins	endometriosis, adenomyosis, fibroids , PID

Primary Dysmenorrhea

- Painful menstruation without underlying pelvic pathology.
- Most common type.
- Occurs mainly in adolescents and young women
- Usually begins 6–12 months after menarche (when ovulation starts).
- Relived by pregnancy and childbirth

Pathophysiology

- During menstruation endometrium releases prostaglandin F2α
- Effects : strong uterine contractions , uterine ischemia , menstrual pain.

Clinical Features

- Pain characteristics : cramping lower abdominal pain , begins just before or at onset of menstruation , lasts 8–72 hours
- Associated symptoms : nausea , vomiting , diarrhea , headache , fatigue.

Diagnosis

- Primary dysmenorrhea is diagnosed when : history typical , pelvic examination normal
- Investigations usually not required.

Treatment

- First-line Treatment : NSAIDs (ibuprofen, naproxen) , Mechanism : inhibit prostaglandin synthesis.
- Hormonal Treatment (combined oral contraceptives) , Effect : suppress ovulation , reduce prostaglandin production.

Secondary Dysmenorrhea

- Painful menstruation due to underlying pelvic pathology.
- Usually occurs in older reproductive-age women.

Clinical Clues

- • Suggest secondary dysmenorrhea when : pain begins years after menarche , pain progressively worsens , abnormal pelvic examination , associated infertility.
- Pain often begins before menstruation and lasts longer.

Causes

Cause	Notes
Endometriosis	most common cause
Adenomyosis	heavy painful menstruation
Pelvic inflammatory disease	pelvic infection
Uterine fibroids	heavy bleeding
Intrauterine device	may cause pain

Diagnosis

- Investigations depend on suspected cause.
- Common investigations : pelvic ultrasound , laparoscopy (gold standard for endometriosis).

Treatment

Treatment targets the underlying cause

Examples

- endometriosis → hormonal therapy or surgery
- fibroids → medical or surgical management
- PID → antibiotics.

Exam Pearls

- Primary dysmenorrhea = prostaglandin excess
- NSAIDs are first-line treatment
- Endometriosis is the most common cause of secondary dysmenorrhea

5. Dysfunctional Uterine Bleeding (DUB) 📘

Abnormal Uterine Bleeding (AUB)

- Any uterine bleeding abnormal in frequency, regularity, duration, or volume and not related to pregnancy
- Includes all structural and non-structural causes.
- Examples : heavy menstrual bleeding , irregular cycles , intermenstrual bleeding , prolonged bleeding.

Dysfunctional Uterine Bleeding (DUB)

- Abnormal uterine bleeding with no identifiable structural pathology
- Usually caused by ovulatory dysfunction (anovulation).
- Important note : DUB is a subtype of AUB

Normal Menstrual Cycle

Parameter	Normal
Cycle interval	21–35 days
Duration	2–7 days
Blood loss	<80 mL

Bleeding outside these limits → AUB

Causes of AUB

PALM–COEIN classification

Structural Causes (PALM)

Cause	Description
Polyp	endometrial polyps
Adenomyosis	endometrial tissue within myometrium
Leiomyoma	uterine fibroids
Malignancy / hyperplasia	endometrial carcinoma or hyperplasia

Non-Structural Causes (COEIN)

Cause	Description
Coagulopathy	bleeding disorders
Ovulatory dysfunction	anovulation
Endometrial	primary endometrial disorders
Iatrogenic	medications / hormones
Not yet classified	rare causes

Clinical Presentation

Patients may present with :

• menorrhagia → heavy bleeding

• metrorrhagia → bleeding between periods

• polymenorrhea → cycles <21 days

• oligomenorrhea → cycles >35 days.

Evaluation of AUB

• First Step : pregnancy test (Always rule out pregnancy.)

Basic Investigations

• CBC → anemia

• thyroid function tests

• pelvic ultrasound.

Endometrial Sampling

Indications :

• age ≥45 years

• persistent abnormal bleeding

• risk factors for endometrial cancer.

Ovulatory Dysfunction (DUB)

- Most common cause of AUB in adolescents & perimenopausal women
- Mechanism : Anovulation → no corpus luteum → no progesterone
- Result : unopposed estrogen stimulation , excessive endometrial proliferation , irregular shedding → abnormal bleeding.
- Causes of Ovulatory Dysfunction : PCOS (most common) , thyroid disorders , hyperprolactinemia , stress / weight change , immature hypothalamic axis (adolescents).

Endometrial Hyperplasia

- Cause : chronic unopposed estrogen
- Risk factors : obesity , PCOS , estrogen therapy , chronic anovulation.
- Complication : may progress to endometrial carcinoma

Management of AUB (General Approach)

- Treatment depends on : cause , age , severity , fertility wishes

Medical Treatment (First-line)

• combined oral contraceptives , progestins , NSAIDs , tranexamic acid.

Surgical Treatment

• If medical therapy fails

- endometrial ablation , dilation & curettage , hysterectomy.

Age-Specific Causes

Age Group	Most Common Cause
Adolescents	anovulatory cycles
Reproductive age	PCOS
Perimenopause	anovulation / hyperplasia

Important Associations

Condition	Bleeding Pattern
PCOS	irregular bleeding
Fibroids	heavy bleeding
Adenomyosis	heavy painful bleeding
Endometrial cancer	postmenopausal bleeding

Exam Pearls

• Most common cause of AUB in adolescents → anovulation

• Most common cause of anovulation → PCOS

6. Polycystic Ovary Syndrome (PCOS) 📘

- endocrine disorder characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovaries.

Pathophysiology

• increased LH secretion

• insulin resistance

• excess androgen production from ovaries.

Diagnostic Criteria (Rotterdam Criteria)

Diagnosis requires 2 of the following 3:

Feature	Description
Oligo/anovulation	irregular or absent ovulation
Hyperandrogenism	clinical or biochemical
Polycystic ovaries	ultrasound finding

Clinical Features

• irregular menstruation , infertility , hirsutism , acne , obesity.

Complications

• infertility , endometrial hyperplasia , endometrial cancer , metabolic syndrome , type 2 diabetes.

Diagnosis

- Investigations : hormone profile (LH, FSH, testosterone) , pelvic ultrasound.
- Ultrasound findings : multiple small ovarian follicles (12 small antral follicles are seen in per ovary measuring 2 to 9 mm in diameter or an ovary that has a volume of greater than 10 mL)
- Ultrasound is not reliable in the diagnosis of polycystic ovaries in adolescent and young women , Up to 70% of young women may have polycystic ovaries on ultrasound

Management

Lifestyle modification

• weight reduction

• exercise.

Medical Treatment

Menstrual regulation

- combined oral contraceptives : effective in achieving menstrual cycle regularity and also provides contraception if this is required
- intermittent progestin : may be used every 3 months in women with oligo/amenorrhoea to induce a withdrawal bleed and protect the endometrium from hyperplasia.
- clomiphene citrate : Ovulation induction
- Metformin : Insulin resistance treatment

Surgical Treatment

• Laparoscopic ovarian drilling

Ovulation induction in PCOS

- 1st line: Letrozole , superior to clomiphene citrate
- 2nd line: gonadotrophins

Exam Pearls

• Most common cause of anovulation = PCOS

❌ PCOS causes osteoporosis

✔️ PCOS is an estrogen-dominant state and does not cause osteoporosis

7. Endometriosis & Adenomyosis 📘

🔷 Endometriosis

- Presence of endometrial glands and stroma outside the uterus that behave like endometrial tissue.
- Most common in reproductive age (30s–40s).
- Estrogen-dependent disease.

Etiology / Theories

1) Implantation theory (Sampson) — most accepted : Retrograde menstruation → endometrial tissue implants in pelvis.
2) Coelomic metaplasia : Peritoneal cells transform into endometrial tissue.
3) Lymphatic / vascular spread : Endometrial cells spread through blood or lymphatics.

Risk Factors

- age (most common in 4th decade)
- family history (↑ risk in first-degree relatives)
- possible autoimmune association.

Pathology

Macroscopic Appearance ⭐

- Typical lesions : powder burn lesions (small black spots) , chocolate cysts (ovarian endometriomas)
- Other appearances : dark brown nodules , flame-like lesions , red vesicular lesions , white scars or plaques
- Advanced disease : frozen pelvis due to adhesions

Microscopy

Contains : endometrial glands , endometrial stroma , hemorrhage signs.

Common Sites

Site	Frequency
Ovary	most common
Uterosacral ligaments	common
Pelvic peritoneum	common
Rectovaginal septum	possible
Fallopian tubes	possible

Clinical Features

- Classic triad : dysmenorrhea , dyspareunia , infertility
- Other symptoms : chronic pelvic pain , cyclic pelvic pain , painful defecation (rectal involvement) , dysuria or cyclic hematuria (bladder involvement).

Physical Examination

- pelvic tenderness , fixed retroverted uterus , tender uterosacral ligaments , enlarged ovaries , nodules in pouch of Douglas.

Endometriosis and Infertility

- 15% of infertile women have endometriosis
- 40–60% of women with endometriosis are infertile
- Mechanisms : adhesions , tubal damage , prostaglandin excess , impaired follicle development , luteal phase defects.

Diagnosis

- Gold standard : laparoscopy with biopsy
- Notes: histology confirms diagnosis , negative biopsy does not exclude disease
- CA-125 may be elevated , not useful for diagnosis , useful for follow-up.

Treatment

- Depends on : severity , age , fertility desire.

Medical Treatment

• Goal → suppress ovarian estrogen production

Methods:

- Pseudopregnancy therapy : COCP , progestins.
- Pseudomenopause therapy : GnRH agonists
- Other drugs : danazol , gestrinone , aromatase inhibitors.

Danazol

- Mechanism : suppresses FSH & LH , increases androgen levels.
- Side effects : weight gain , acne , hirsutism , deep voice , mood changes , lipid changes.
- Contraindications : pregnancy , liver disease , thromboembolism , androgen-dependent tumors.

Surgical Treatment

- Conservative surgery : remove adhesions , cystectomy for endometriomas , best for women wanting fertility.
- Radical surgery : TAH + BSO , Used in severe disease and completed family.

🔷 Adenomyosis

- Presence of endometrial glands and stroma within the myometrium.
- Sometimes called internal endometriosis.

Epidemiology

More common in : multiparous women , late reproductive age

Pathology

- Endometrial tissue invades myometrium.
- Features : diffuse or localized disease , no capsule

Clinical Features

- menorrhagia , dysmenorrhea
- Characteristic finding : symmetrically enlarged uterus (Uterus feel soft and boggy)

Diagnosis

- transvaginal ultrasound
- MRI helps differentiate from fibroids.
- Important note : laparoscopy has no role

Treatment

- Definitive treatment : total abdominal hysterectomy
- Symptom control : hormonal therapy (OCPs).

Key Differences

Feature	Endometriosis	Adenomyosis
Location	outside uterus	inside myometrium
Age group	reproductive age (30–40)	late reproductive age
Uterine size	usually normal	enlarged uterus
Pain	severe dysmenorrhea, dyspareunia	dysmenorrhea
Bleeding	usually normal	menorrhagia
Infertility	common	less common
Uterus feel	normal or tender	soft boggy uterus
Diagnosis	laparoscopy (gold standard)	US/MRI
Treatment	hormonal or surgery	hysterectomy

Exam pearls

- Endometriosis → infertility + dyspareunia
- Adenomyosis → menorrhagia + enlarged uterus

8. Subfertility (Infertility) 📘

- Failure to conceive after 12 months of regular unprotected intercourse.
- If woman ≥35 years evaluation after 6 months

Fecundability

• Chance of pregnancy per cycle ≈ 20%

• 85% conceive within 1 year , 95% within 2 years

Types

Type	Definition
Primary infertility	never conceived
Secondary infertility	previous pregnancy occurred

Causes of Infertility

Category	Causes
Female	ovulatory disorders, tubal disease, endometriosis, uterine abnormalities
Male	abnormal sperm parameters
Unexplained	no identifiable cause

⭐ Distribution: 1/3 male – 1/3 female – 1/3 unexplained

Female Causes

Ovulatory Disorders

- Most common female cause.
- PCOS (most common) , hypothalamic dysfunction , hyperprolactinemia , thyroid disorders

Tubal Factors

• pelvic inflammatory disease , endometriosis , previous pelvic surgery

Uterine Factors

- fibroids (especially submucosal) , congenital uterine anomalies , intrauterine adhesions (Asherman syndrome)

Male Causes

- low sperm count , poor sperm motility , abnormal sperm morphology , obstructive causes (vas deferens / epididymis)

Evaluation of the Couple

• evaluate both partners

• history + physical examination

• regular menstrual cycles → ovulation likely

Female Evaluation

Test	Purpose
Luteal phase progesterone	confirms ovulation
Pelvic ultrasound	uterine & ovarian pathology
HSG	tubal patency
AMH / antral follicle count	ovarian reserve
TSH, prolactin	endocrine causes

Ovulation Assessment

• serum progesterone in mid-luteal phase

Tubal Patency Testing

Test	Purpose
Hysterosalpingography (HSG)	evaluate fallopian tubes
Laparoscopy	direct visualization

Male Evaluation

Semen Analysis (First Test)

Assesses : sperm count , motility , morphology

Parameter	Normal Reference Range	What It Means
Volume	≥1.5 ml	Overall semen production
Concentration	≥15 million /ml	Number of sperm per millilitre
Total Count	≥39 million	Total sperm per ejaculate
Motility	≥40%	Movement quality
Progressive Motility	≥32%	Forward movement efficien
Morphology	≥4%	Normal-shaped sperm
pH	7.2–8.0	Semen balance

Management

Depends on cause.

Ovulation Induction

• clomiphene citrate

• letrozole

Assisted Reproductive Techniques

• IUI (intrauterine insemination)

• IVF (in vitro fertilization)

• ICSI for severe male factor

Exam Pearls

• Most common cause of female infertility → ovulatory dysfunction (PCOS)

• Regular menses = ovulation likely

• HSG = test for tubal patency

• AMH = ovarian reserve marker

• IVF = treatment for tubal infertility

• patient came to the infertility clinic with a hysterosalpingogram result of bilateral tube obstruction. What is the best treatment ? : Laparoscopic hysteroscopy

• Day 16 of the cycle : high chance of pregnancy

9. Menopause 📘

- Permanent cessation of menstruation due to loss of ovarian function / follicle depletion
- Diagnosed after 12 months amenorrhea

Age

- Average ≈ 50 years
- Premature menopause: <40 yrs

Terminology

- Perimenopause → before + 1 year after menopause
- Postmenopause → after menopause
- Induced menopause → surgery / chemotherapy

Pathophysiology

- ↓ ovarian follicles , ↓ estrogen, ↓ inhibin → ↑ FSH → anovulation, irregular cycles, infertility

❌ inhibin increases

✔️ inhibin decreases → ↑ FSH

Symptoms

- Short term (vasomotor) : Hot flashes, night sweats , Mood changes, ↓ concentration, ↓ libido
- Intermediate : Vaginal dryness, dyspareunia , Urinary symptoms, recurrent UTIs
- Long term : Osteoporosis , Cardiovascular disease , Dementia

Diagnosis

- Usually clinical
- Lab: FSH >30 IU/L (confirm twice)

Management

• May not need treatment

• HRT = main treatment

• Lifestyle: exercise, diet, stop smoking

HRT

Type	Indication
Estrogen only	hysterectomized
Combined (E+P)	uterus present

HRT Benefits

• ↓ vasomotor symptoms , ↓ urogenital symptoms , ↓ osteoporosis risk

HRT Risks

• Breast cancer , VTE , Endometrial cancer

Contraindications

• Breast or endometrial cancer , VTE , Liver disease , Pregnancy

Exam Pearls

• Menopause = 12 months amenorrhea

• FSH high due to ↓ inhibin

• Most common symptoms = hot flashes

• HRT only if symptomatic

10. Contraception 📘

• Contraception: methods used to prevent pregnancy.

Types of Contraception

Type	Examples
Hormonal	Oral pills, injections, implants
Barrier	Condoms, diaphragm
Intrauterine devices	Copper IUD, hormonal IUD
Natural methods	Fertility awareness
Permanent	Sterilization

Advantages

Benefit	Examples
Prevent unintended pregnancy	↓ abortions
Maternal & social benefits	Family planning
Psychological	↓ postpartum depression
Therapeutic	↓ heavy menses, ↓ dysmenorrhea, ↓ acne, ↓ endometriosis
Cancer protection	↓ ovarian, ↓ endometrial, ↓ colorectal cancer

1. Natural Methods

Method	Mechanism	Effectiveness	Notes
Periodic abstinence	Avoid intercourse during fertile window	50–80%	Uses LH surge, basal body temperature, cervical mucus
Coitus interruptus	Withdrawal before ejaculation	High failure	Requires strong self-control
Lactational amenorrhea	Prolactin suppresses GnRH → ↓ ovulation	Effective if exclusive breastfeeding <6 months	No cost

2. Barrier Methods

Method	Effectiveness	Advantages	Disadvantages
Male condom	85–90%	Cheap, STI protection	↓ sensation, rupture
Female condom	~80%	STI protection	More difficult use
Diaphragm	~80%	Reusable	Needs clinician fitting
Cervical cap	~80%	Covers cervix	Needs fitting
Spermicides	Lower	Kill sperm	Usually combined with barrier

Key point:

Barrier methods are the only contraceptives that protect against STIs.

3. Intrauterine Devices (IUD)

Type	Mechanism
Copper IUD	Copper has spermicidal effect + inflammatory reaction preventing fertilization
Hormonal IUD	Releases progestin → thick cervical mucus + endometrial suppression

Feature	Copper IUD	Hormonal IUD
Effectiveness	~99%	~99%
Duration	~10 years	~5 years
Period effect	Heavy bleeding, cramps	Lighter periods / amenorrhea

- Advantages : Long-acting reversible contraception , Highly effective , Cost-effective
- Risks : Expulsion , Infection , Uterine perforation , Ectopic pregnancy if failure occurs

4. Surgical Sterilization (Permanent)

Method	Procedure	Key Points
Tubal ligation	Fallopian tubes blocked/ cut	Permanent, immediate effect
Vasectomy	Vas deferens ligation	Not immediately effective (need semen analysis after ~6–8 weeks)

5. Hormonal Contraceptives

Mechanism

Effect	Result
Suppression of FSH & LH	Inhibits ovulation
Thick cervical mucus	Prevents sperm entry
Thin endometrium	Prevents implantation

Combined Oral Contraceptive Pills (COCP)

Feature	Details
Composition	Estrogen + progestin
Effectiveness	~99.8%
Regimen	21 days pills + 7-day break
Main mechanism	Inhibits ovulation by suppressing FSH and LH
Other effects	Thick cervical mucus, thin endometrium
Benefits	Effective contraception, ↓ dysmenorrhea, ↓ ovarian cancer, ↓ endometrial cancer, ↓ colorectal cancer
Cancer risk increase	↑ breast cancer, ↑ cervical cancer
Side effects	Nausea, breast tenderness, headache, fluid retention, breakthrough bleeding
Contraindications	History of thromboembolism, breast cancer, severe liver disease, smoking in women >35 years, migraine with aura, severe hypertension, undiagnosed vaginal bleeding

Progestin-Only Contraception

Method	Duration / Use	Notes
Progestin-only pills	Daily	No estrogen
Depot medroxyprogesterone injection	Every 3 months	May cause amenorrhea
Implant (etonogestrel)	~3 years	Very effective

- Advantage : Safe for breastfeeding women.

Emergency Contraception

Method	Timing
Progesterone receptor modulator	≤5 days after intercourse
Progesterone pill	≤3 days
Copper IUD	≤5 days

Exam Pearls

- COCP works mainly by inhibiting ovulation.
- Barrier methods protect against STIs.
- Most effective reversible contraception: IUD.
- Preferred during breastfeeding: progestin-only methods.

11. Lower Genital Infections 📘

• Infections affecting vulva, vagina, cervix

• Causes: bacteria, fungi, protozoa

Normal Basics

• Normal pH 4–4.5 (acidic, protective)

• Lactobacillus maintains acidity

• ↑ pH → suggests infection

Common Vaginal Infections

🔷 **Bacterial Vaginosis (MOST COMMON)**

• Cause: ↓ lactobacilli, ↑ anaerobes

• Discharge: thin gray/white, fishy odor

• pH >4.5

• Diagnosis: clue cells, +whiff test

• Treatment: metronidazole

• Complications: preterm labor, PROM

🔷 **Vulvovaginal Candidiasis**

• Cause: Candida albicans

• Risk factors: pregnancy, diabetes, antibiotics

• Symptoms: intense itching, thick white discharge

• pH normal (<4.5)

• Diagnosis: pseudohyphae/yeast

• Treatment: fluconazole or topical azoles

• ✔️ Less common during menses (pH change)

Trichomoniasis

• Cause: Trichomonas vaginalis

• STD

• Discharge: frothy yellow-green, foul smell

• Sign: strawberry cervix

• pH >5

• Treatment: metronidazole + treat partner

Key Comparison

Feature	BV	Candida	Trichomonas
pH	>4.5	normal	>5
Discharge	thin gray, fishy	thick white	frothy green
Itching	mild	severe	moderate
Key sign	clue cells	pseudohyphae	strawberry cervix
Treatment	metronidazole	azoles	metronidazole (+partner)

Cervicitis

• Causes: Chlamydia, Gonorrhea

• Symptoms: discharge, postcoital bleeding, dyspareunia

• Sign: purulent endocervical discharge

Gonorrhea

• Cause: Neisseria gonorrhoeae

• Often asymptomatic (~50%)

• Symptoms: vaginal discharge, dysuria, abnormal bleeding

• Diagnosis: NAAT or culture (Thayer-Martin)

• Treatment: ceftriaxone (single IM dose)

Chlamydia

• Cause: Chlamydia trachomatis

• Often asymptomatic (~75%)

• Symptoms: discharge, dysuria, spotting, postcoital bleeding

• Diagnosis: NAAT

• Treatment: azithromycin or doxycycline

Genital Warts (HPV)

• Cause: HPV 6,11

• Painless warty lesions

• Treatment: removal only (no cure)

Genital Herpes

• Cause: HSV-1, HSV-2

• Painful vesicles → ulcers

• Treatment: acyclovir

• Pregnancy: C-section if active lesions

Exam Pearls

• Most common vaginitis = BV

• Most common STI = Chlamydia

• pH normal → Candida

• Fishy odor → BV

• Thick white → Candida

• Strawberry cervix → Trichomonas

• Treat partner in Trichomonas

12. Pelvic Inflammatory Disease (PID) 📘

• PID: infection of the upper female genital tract including:

- uterus , fallopian tubes , ovaries , sometimes adjacent pelvic organs
- It may result in endometritis, salpingitis, oophoritis, peritonitis, or tubo-ovarian abscess.

Etiology

- Common causative organisms : Neisseria gonorrhoeae , Chlamydia trachomatis
- Other organisms : Anaerobic bacteria , Vaginal flora organisms , Enteric bacteria (e.g. E. coli, especially in older women)
- PID is usually polymicrobial.

Risk Factors

- Multiple sexual partners , Unprotected intercourse , Previous STI or PID , Age <25 years , Partner with STI , Cervical instrumentation (e.g. D&C, IUD insertion)
- Barrier contraception reduces risk.

Clinical Features

- Lower abdominal / pelvic pain (most important)
- Fever , Abnormal vaginal discharge , Dyspareunia , Abnormal uterine bleeding , Urinary frequency
- Pain may start during or shortly after menstruation.

Physical Examination Findings

Finding	Significance
Cervical motion tenderness	Classic sign of PID
Uterine tenderness	Diagnostic criterion
Adnexal tenderness	Suggests tubal/ovarian involvement
Purulent cervical discharge	common finding

- Pelvic organ tenderness on bimanual exam is the defining feature.

Laboratory & Imaging

- Laboratory tests : Leukocytosis (may occur) , ↑ ESR , ↑ CRP , NAAT for Chlamydia and Gonorrhea , Pregnancy test to rule out ectopic pregnancy

Imaging :

- Pelvic ultrasound : used to detect complications (e.g. tubo-ovarian abscess)
- Diagnosis is mainly clinical.

Complications

Complication	Mechanism
Infertility	tubal damage and adhesions
Ectopic pregnancy	tubal scarring
Chronic pelvic pain	persistent inflammation
Tubo-ovarian abscess	inflammatory pelvic mass

Other complication :

- Fitz-Hugh-Curtis syndrome (perihepatitis) → Right upper quadrant pain due to inflammation of the liver capsule.

Treatment

- PID requires broad-spectrum antibiotics covering : Gonorrhea , Chlamydia , Anaerobes
- Example Regimen : Ceftriaxone , Doxycycline , ± Metronidazole
- Treatment duration typically 14 days.

Hospitalization indications

- Pregnancy
- Severe illness
- Suspected tubo-ovarian abscess
- Failure of outpatient therapy

Exam Pearls

- Most common pathogens: Chlamydia and Gonorrhea
- Most important symptom: lower abdominal pain
- Key diagnostic sign: cervical motion tenderness
- PID is polymicrobial → treat with broad antibiotics
- RUQ pain in PID → think Fitz-Hugh-Curtis syndrome
- Major long-term complication: infertility

13. Fibroids (Uterine Leiomyoma) 📘

- Benign tumors of uterine smooth muscle.
- Most common benign uterine tumor.
- Growth is estrogen-dependent.
- Incidence increases during reproductive age.

Types of Fibroids

Type	Location
Intramural	Within uterine wall
Submucosal	Beneath endometrium (projects into uterine cavity)
Subserosal	Beneath outer uterine surface
Pedunculated	Attached to uterus by a stalk

(Submucosal fibroids are most associated with bleeding and infertility.)

Risk Factors

- Reproductive age , Obesity , Family history , Early menarche , Hypertension

Protective factors:

- Pregnancy / multiparity , Long-term contraceptive use.

Clinical Features

- Many patients are asymptomatic.
- Common Symptoms : Heavy menstrual bleeding (menorrhagia) – most common , Pelvic pressure or pelvic pain , Urinary frequency / bowel symptoms (mass effect) , Infertility or miscarriage.

Complications

- Iron deficiency anemia (due to heavy bleeding) , Infertility ,Pregnancy complications , Degeneration pain , Tubal or uterine distortion.

Diagnosis

1. Pelvic Examination : Enlarged irregular uterus on bimanual exam.

2. Imaging :

Test	Role
Ultrasound	First-line investigation
Sonohysterography	Detect submucosal fibroids
MRI	Most accurate for number, size, location

Ultrasound is the most commonly used diagnostic method.

Management

- Treatment depends on : Symptoms , Fibroid size and location , Patient age , Desire for fertility.

Treatment Options

Category	Examples	Purpose
Expectant management	Observation & follow-up	For asymptomatic fibroids
Medical treatment	Hormonal therapy, OCPs, progestins, NSAIDs, tranexamic acid, GnRH agonists	Reduce bleeding and shrink fibroids
Non-surgical procedures	Uterine artery embolization, endometrial ablation, MR-guided focused ultrasound	Reduce fibroid size without surgery
Surgical treatment	Myomectomy (fertility preservation), Hysterectomy (definitive treatment)	Remove fibroids or uterus

Exam Pearls

- Fibroids = estrogen-dependent tumors
- Most common benign uterine tumor
- Most common symptom = menorrhagia (heavy menstrual bleeding)
- Ultrasound = first-line diagnosis
- Myomectomy → preserves fertility
- Hysterectomy → definitive treatment

14. Pelvic Organ Prolapse 📘

- Pelvic organ prolapse: descent of pelvic organs due to weakness of pelvic floor muscles and connective tissue support structures.
- Organs that may prolapse: uterus, bladder, rectum, small bowel.
- Normal pelvic support depends on pelvic floor muscles (levator ani), connective tissue ligaments such as uterosacral and cardinal ligaments.

Types of Pelvic Organ Prolapse

Type	Organ involved
Cystocele	bladder prolapse
Rectocele	rectum prolapse
Uterine prolapse	uterus descends into vagina
Enterocele	small bowel prolapse
Vault prolapse	vaginal apex prolapse after hysterectomy

• Most common prolapse = cystocele.

Risk Factors

- Multiparity (most important), Vaginal childbirth, aging, menopause, obesity, chronic increased intra-abdominal pressure such as chronic cough and constipation.
- Other contributing factors include heavy lifting, connective tissue weakness, previous hysterectomy.

Clinical Features

- Sensation of vaginal bulge, pelvic pressure or heaviness, dragging sensation, backache, vaginal dryness or irritation, dyspareunia.
- Urinary symptoms: stress urinary incontinence, urinary frequency, urgency, voiding dysfunction, recurrent urinary tract infections.
- Rectal symptoms (rectocele): constipation, incomplete bowel emptying, obstructed defecation, need to manually reduce prolapse to pass stool.

Diagnosis

• Pelvic examination while the patient strains or coughs.

Grading System

Stage	Description
1st degree	prolapse halfway to the hymen
2nd degree	prolapse reaches the hymen
3rd degree	prolapse protrudes outside the hymen

• Modern standardized staging: POP-Q system, which measures prolapse relative to the hymen.

Management

• Conservative Treatment : Pelvic floor exercises (Kegel exercises), vaginal pessary.

• Surgical Treatment : Repair of pelvic support structures, hysterectomy in severe uterine prolapse.

Exam Pearls

• Most common prolapse = cystocele.

• Multiparity is the strongest risk factor.

• Cystocele → bladder prolapse, rectocele → rectal prolapse, enterocele → small bowel prolapse.

• Vault prolapse occurs after hysterectomy.

15. Urinary Incontinence 📘

• Urinary incontinence: involuntary leakage of urine.

Types of Urinary Incontinence

Type	Definition	Main Cause / Pathophysiology	Key Features / Notes
Stress incontinence	involuntary urine loss during coughing, sneezing, laughing, exercise	pelvic floor weakness, urethral hypermobility, intrinsic sphincter deficiency	leakage occurs with ↑ intra-abdominal pressure, most common in women, common risk factors: multiparity, vaginal delivery, obesity, menopause
Urge incontinence	involuntary urine loss associated with sudden strong urge to void	detrusor overactivity	urgency, frequency, inability to delay urination
Mixed incontinence	combination of stress and urge incontinence	both pelvic floor weakness and detrusor overactivity	symptoms of both stress and urge incontinence
Overflow incontinence	involuntary leakage when bladder becomes overfilled and cannot empty completely	bladder outlet obstruction or impaired detrusor contractility	continuous dribbling, incomplete bladder emptying, seen with obstruction or severe cystocele
Continuous incontinence	continuous leakage of urine	severe sphincter damage or urinary fistula	constant urine leakage independent of activity

Overactive Bladder (OAB)

• Symptom-based condition: urgency, increased urinary frequency, ± urge incontinence.

• Caused by detrusor overactivity.

• Normal bladder capacity ≈ 400–500 mL.

Evaluation

- History : leakage type, frequency, nocturia, urgency, leakage with cough/exercise, severity, pad use, rule out UTI.
- Examination : pelvic exam, urethral mobility, prolapse, stress test, post-void residual urine.
- Investigations : urine analysis and culture, ultrasound, voiding diary, urodynamic study, KUB imaging.

Management

Conservative

• pelvic floor exercises (Kegel) — first line for stress incontinence

• bladder training / timed voiding , weight reduction , reduce caffeine intake.

Medical Treatment

- Antimuscarinic drugs for overactive bladder: oxybutynin, tolterodine, solifenacin, darifenacin, trospium, fesoterodine.
- Mechanism : ↓ detrusor contractions, ↑ bladder capacity, ↑ volume threshold for urination.
- Side effects : dry mouth, constipation, blurred vision, somnolence.

Surgical Treatment (Stress Incontinence)

Procedure	Purpose
Burch colposuspension	support urethra
Sling procedures (TVT, TOT)	mid-urethral support
Urethral bulking agents	increase urethral closure

TVT success rate ≈ 80% cure.

Exam Pearls

• Most common type in women = stress urinary incontinence

• First-line treatment for SUI = pelvic floor exercises

• Urgency + frequency ± urge incontinence = overactive bladder

• Antimuscarinics = main drugs for OAB

• TVT sling = common surgery for SUI

16. Benign Ovarian Tumors 📘

Functional (Physiological) Ovarian Cysts ⭐

Type	Key Features	Notes
Corpus luteum cyst	corpus luteum fails to regress after ovulation	common pelvic mass in 1st trimester, size usually 2–10 cm, may rupture or bleed
Follicular cyst	follicle fails to ovulate	thin-walled, unilocular, usually >3 cm, regress spontaneously
Theca lutein cyst	overstimulation by high hCG	bilateral enlarged ovaries, seen in GTD, multiple pregnancy, ovarian hyperstimulation
Pregnancy luteoma	lutein cell hyperplasia during pregnancy	may cause maternal or fetal virilization, regresses after delivery

• Functional cysts usually occur in childbearing age and often resolve spontaneously.

Complications of Ovarian Cysts

• Rupture , Hemorrhage , Ovarian torsion , Malignant transformation.

Ovarian Torsion

- Twisting of ovary around infundibulopelvic and utero-ovarian ligaments → ↓ blood supply → possible ovarian necrosis.
- Risk factors : ovarian cysts , pregnancy , ovulation induction , previous pelvic surgery
- Clinical presentation : sudden severe pelvic pain + nausea/vomiting + adnexal mass
- Diagnosis : ultrasound showing ovarian edema, absent Doppler flow
- Treatment : laparoscopic detorsion + cystectomy, oophorectomy if necrotic.

Classification of Ovarian Tumors

Origin	Percentage	Examples
Surface epithelial tumors	60–65% (most common)	serous, mucinous
Germ cell tumors	~30%	teratoma
Sex-cord stromal tumors	~8%	fibroma, thecoma

• Tumors may be benign, borderline, or malignant.

Benign Ovarian Neoplasms

1️⃣ Epithelial Tumors

Tumor	Key Features
Serous cystadenoma	most common benign ovarian neoplasm, thin-walled cyst containing clear watery fluid, usually unilocular or multilocular, bilateral in 20–25%, psammoma bodies present in ~30% , peak age 40–50 yrs
Mucinous cystadenoma	second most common epithelial tumor, large multiloculated cyst, filled with mucinous jelly-like fluid, usually unilateral, tends to reach very large size
Endometrioid cystadenoma	rare benign tumor, may be associated with endometriosis
Brenner tumor	rare, mostly benign, solid tumor, transitional epithelial cells with coffee-bean nuclei

2️⃣ Germ Cell Tumors

Tumor	Key Features
Mature cystic teratoma (Dermoid cyst)	most common ovarian tumor in reproductive age, contains tissues from ectoderm, mesoderm, endoderm
Mature solid teratoma	rare solid benign teratoma
Monodermal teratomas	e.g., struma ovarii, carcinoid

Mature Cystic Teratoma (Dermoid Cyst)

- Most common ovarian tumor in reproductive age.
- Contents : hair , teeth , bone , fat
- Ultrasound signs : Dermoid plug (Rokitansky nodule) , Tip of the iceberg sign
- Other features : accounts for 70% of benign ovarian masses in reproductive age , usually <10 cm, bilateral in 10–15%
- Complications : torsion (3–16%) , rupture → chemical peritonitis

⚠️ Dermoid cyst + acute pelvic pain = torsion until proven otherwise

- Treatment : ovarian cystectomy , conservative follow-up if <6 cm
- Malignant transformation : rare (0.2–2%) , most commonly squamous cell carcinoma

3️⃣ Sex-Cord Stromal Tumors

Tumor	Key Features
Fibroma	most common stromal tumor, solid tumor
Thecoma	tumor derived from theca cells, estrogen-producing tumor, may cause abnormal uterine bleeding

Meigs Syndrome

• Triad : ovarian fibroma , ascites , right pleural effusion

• Symptoms resolve after tumor removal.

Clinical Presentation of Benign Ovarian Tumors

• Often asymptomatic

• Lower abdominal pain, pelvic mass

• Dyspareunia

• Pressure symptoms → urinary or GI symptoms

• Acute abdomen if torsion, rupture, hemorrhage.

Exam Pearls

• Most common ovarian tumor in reproductive age → dermoid cyst (mature teratoma)

• Most common benign ovarian neoplasm → serous cystadenoma

• Most common sex-cord stromal tumor → fibroma

• Meigs syndrome = fibroma + ascites + pleural effusion

• Dermoid cyst + pain → suspect torsion

17. Malignant Ovarian Tumors 📘

Epidemiology

- Second most common gynecologic malignancy in developed countries, 5th leading cause of cancer death in women, incidence 9.4/100,000, mortality 5.1/100,000.
- ~50% of cases occur in women >65 years, overall 5-year survival ≈49%.
- Epithelial tumors ≈90–95% of ovarian cancers.

Origin of Ovarian Cancer

Type	Origin
Epithelial tumors	ovarian surface epithelium
Germ cell tumors	germ cells
Sex-cord stromal tumors	ovarian stroma

⭐ Most common malignant ovarian tumor = epithelial tumor

Risk Factors

- increasing age, family history of ovarian or breast cancer, BRCA1/BRCA2 mutations, Lynch syndrome, nulliparity, infertility, early menarche, late menopause, endometriosis, obesity, pelvic radiation, menopausal hormone therapy, Caucasian race.
- Genetic risk : BRCA1 lifetime risk 35–46%, BRCA2 13–23%.

Protective Factors

- oral contraceptive use, multiparity, pregnancy, breastfeeding, tubal ligation, hysterectomy, bilateral salpingo-oophorectomy, IUD use.

Clinical Features

- Early disease : often asymptomatic.
- Later symptoms : abdominal distension, pelvic pain, early satiety, weight loss, abdominal swelling or pressure, bloating, nausea, vomiting, constipation, urinary or rectal pressure, ascites, shortness of breath, fatigue, vaginal bleeding.

Diagnosis

- pelvic examination, transvaginal ultrasound (most useful initial imaging), tumor markers, CT scan or MRI abdomen/pelvis, chest X-ray, ascitic tap if present.
- Ultrasound features suggesting malignancy : thick irregular wall, poorly defined margins, thick septations, solid areas, multilocular mass >10 cm, increased Doppler blood flow, papillary projections, ascites.

Tumor Markers

Tumor marker	Tumor type
CA-125	epithelial ovarian cancer
AFP	yolk sac tumor
LDH	dysgerminoma
Inhibin	granulosa cell tumor
CEA	mucinous tumors
CA19-9	GI or mucinous tumors
HE4	epithelial ovarian cancer

CA-125

- normal 0–35 U/mL, elevated in >80% epithelial ovarian cancers, low sensitivity in early disease (~50%), used mainly for monitoring treatment and recurrence.
- CA-125 also elevated in benign conditions : menstruation, pregnancy, endometriosis, adenomyosis, uterine fibroids, PID, benign ovarian cysts, liver disease, peritonitis, pancreatitis.

Types of Ovarian Cancer

Category	Examples
Epithelial tumors	serous, mucinous, endometrioid, clear cell
Germ cell tumors	dysgerminoma, yolk sac tumor, immature teratoma
Sex-cord stromal tumors	granulosa cell tumor, Sertoli-Leydig tumor

Major Epithelial Ovarian Carcinomas

Tumor	Frequency	Features
High-grade serous carcinoma	70–80%	most common, aggressive
Endometrioid carcinoma	~10%	associated with endometriosis
Clear cell carcinoma	5–10%	thrombotic risk
Mucinous carcinoma	3–4%	large unilateral tumors
Low-grade serous carcinoma	<5%	slow growing

Ovarian Cancer Staging (FIGO)

Stage	Description
Stage I	tumor confined to ovary
Stage II	spread to pelvic organs
Stage III	peritoneal or retroperitoneal lymph node metastasis
Stage IV	distant metastasis

Examples

• Stage IVA → pleural effusion, Stage IVB → distant organ metastasis (e.g., liver).

Treatment

- Surgical staging and tumor removal, cytoreductive surgery, hysterectomy, bilateral salpingo-oophorectomy, omentectomy, lymph node dissection, peritoneal biopsies.
- Chemotherapy : platinum (carboplatin) + taxane (paclitaxel) standard regimen.
- Neoadjuvant chemotherapy : given before surgery to reduce tumor size.

Prognostic Factors

- Younger age, low residual disease after cytoreductive surgery, good performance status, tumor histology, stage of disease.
- Most important factor : amount of residual tumor after surgery.

Special Tumors

🔷 Krukenberg Tumor

- Metastatic ovarian tumor, signet-ring cells, usually bilateral ovarian enlargement, primary site usually stomach, also colon or GI tract.

Exam Pearls

- Most common malignant ovarian tumor = epithelial tumor
- Most common subtype = high-grade serous carcinoma
- Most important tumor marker = CA-125
- Best initial imaging = transvaginal ultrasound
- Most important prognostic factor = residual tumor after surgery
- Krukenberg tumor = metastatic gastric cancer to ovary

18. Endometrial Cancer 📘

- Malignancy arising from endometrial lining of uterus, most common gynecologic cancer in developed countries.

Epidemiology

- Most common malignancy of female genital tract, most common gynecologic cancer in developed countries, second most common in developing countries after cervical cancer.
- Lifetime risk 2–3%, mean age ≈60 years, majority between 50–59 years, 75% occur >50 years.
- 3–20% of women with postmenopausal bleeding have endometrial cancer, 5–15% have endometrial hyperplasia.
- Key concept : Unopposed estrogen exposure → endometrial hyperplasia → carcinoma.

Risk Factors

- Unopposed estrogen exposure, obesity, nulliparity, infertility, early menarche, late menopause, diabetes mellitus, tamoxifen therapy, atypical endometrial hyperplasia, Lynch syndrome (HNPCC), chronic anovulation.

Mechanism

- ↑ body fat → ↓ circulating progesterone, ↓ SHBG, ↑ endogenous estradiol → excessive endometrial proliferation and malignancy.

Protective Factors

• multiparity, progesterone exposure, oral contraceptive use, pregnancy, breastfeeding.

Pathophysiology

- Estrogen stimulates excessive endometrial proliferation without progesterone opposition, prolonged proliferation → endometrial hyperplasia → carcinoma.

Endometrial Hyperplasia

- proliferation of endometrial glands with gland-to-stroma ratio >50%, glands vary in size and shape, possible cytologic atypia.

Types :

Type	Features
Simple hyperplasia	mildly crowded glands, cystic dilation
Complex hyperplasia	crowded glands, irregular architecture
Atypical hyperplasia	nuclear atypia, premalignant lesion

Key point : Atypical hyperplasia → high risk of carcinoma.

Types of Endometrial Cancer

Type	Features
Type I (endometrioid)	estrogen dependent, younger age, preceded by hyperplasia, better prognosis ≈80%, estrogen sensitive, 5-year survival ≈85%
Type II (non-endometrioid)	not estrogen related, older women, high grade, poor prognosis ≈20%, arises from atrophic endometrium, average age ≈67 years, worse prognosis.

Clinical Presentation

- Most common symptom : postmenopausal bleeding.
- Other symptoms : abnormal uterine bleeding, intermenstrual bleeding, heavy prolonged bleeding in perimenopausal women, abnormal bleeding in anovulatory premenopausal women, pelvic pain in late disease, sometimes asymptomatic.
- Important rule : Postmenopausal bleeding = endometrial cancer until proven otherwise.

Causes of Postmenopausal Bleeding

Cause	Frequency
Endometrial atrophy	60–80%
Exogenous estrogen	15–25%

Endometrial cancer	15–20%
Endometrial or cervical polyps	2–12%
Endometrial hyperplasia	5–10%

Diagnosis

- Pelvic examination, endometrial biopsy (gold standard), transvaginal ultrasound, D&C, hysteroscopy, CT or MRI for staging.
- Endometrial thickness : ≤4 mm in postmenopausal women → consistent with atrophy, thicker endometrium raises suspicion.
- Pap smear : unreliable, abnormal in 30–50% of cases.

Spread of Disease

• direct spread, transtubal spread, lymphatic spread, hematogenous spread.

Staging (FIGO)

Stage	Description
Stage I	tumor confined to uterus
Stage II	cervical stromal invasion
Stage III	regional spread
Stage IV	bladder/bowel invasion or distant metastasis

Examples

• Stage IA → <50% myometrial invasion, Stage IB → ≥50% myometrial invasion.

Treatment

- Hysterectomy with bilateral salpingo-oophorectomy (TAH + BSO), pelvic lymphadenectomy, surgical staging, adjuvant radiation therapy, chemotherapy, hormonal therapy depending on stage.
- Advanced disease : cytoreductive surgery ± chemotherapy ± radiotherapy.

Prognostic Factors

- Stage (most important), age, tumor grade, histologic type, depth of myometrial invasion, vascular invasion, tumor size, hormone receptor status, DNA ploidy.

Survival

Stage	5-Year Survival
Stage I	~90%
Stage II	~75%
Stage III	~55%
Stage IV	~15%

Overall survival ≈ 75%.

Exam Pearls

- Most common gynecologic malignancy = endometrial cancer
- most common symptom = postmenopausal bleeding
- most important risk factor = unopposed estrogen
- best diagnostic test = endometrial biopsy
- main treatment = TAH + BSO
- most important prognostic factor = stage of disease.

19. Benign and Malignant Conditions of Vulva and Vagina

Vulvar Anatomy

- Vulva = external genitalia between mons pubis anteriorly, anus posteriorly, genitocrural folds laterally
- Labia majora – outer hair-bearing folds
- Labia minora – inner folds, hairless
- Clitoris – erectile structure
- Vestibule – space between labia minora, contains urethral opening, vaginal opening
- Bartholin glands – posterolateral vestibule, 4 & 8 o'clock, lubrication
- Skene glands – paraurethral glands

Non-neoplastic Epithelial Disorders

Disease	Key Points	Treatment
Lichen simplex chronicus	chronic scratching → epithelial hyperplasia, itching, thickened leathery plaques	topical steroids
Lichen sclerosus	severe pruritus, dyspareunia, thin white "tissue-paper" skin, scarring, loss of labia minora	high-potency steroids
Lichen planus	autoimmune, vulva/vagina/mouth involvement, burning, erosions with white striae	topical/systemic steroids

- Lichen sclerosus → risk factor for vulvar SCC

Vulvar Masses

Lesion	Key Features	Management
Epidermal inclusion cyst	slow growing, mobile, painless, obstructed hair follicle	observation
Bartholin cyst	vestibule 4 or 8 o'clock, duct obstruction	marsupialization / I&D
Skene cyst	paraurethral, may cause urinary obstruction	treat if symptomatic
Genital warts	HPV 6,11, posterior fourchette/lateral vulva	excision

- Bartholin cyst infected → abscess
- Excision if recurrent, suspicious, older patient

Dermatologic Vulvar Diseases

• Psoriasis, Behçet syndrome, Crohn disease, Acanthosis nigricans, eczema

Vulvar Intraepithelial Neoplasia (VIN)

• Precancerous epithelial lesion

Types :

• Squamous VIN → Bowen disease

• Non-squamous VIN → Paget disease, melanoma in situ

Bowen vs Paget Disease

Feature	Bowen Disease	Paget Disease
Pathology	SCC in situ	Adenocarcinoma in situ
Age	~45 yrs	elderly postmenopausal
Symptoms	itching, often asymptomatic	itching, tenderness
Lesion	red/white/brown plaque, sometimes warty	well-demarcated eczematous plaque
Association	local lesion	20% adenocarcinoma
Treatment	excision (5 mm margin)	excision after biopsy

Vulvar Cancer

• 5% of gynecologic cancers

• Types: SCC (90%), melanoma, adenocarcinoma, sarcoma

• Spread: vagina, urethra, anus, inguinal lymph nodes (~30%)

Etiologic Types

Type	Patient	Cause
Classic	older women	chronic lichen sclerosus
HPV related	younger women	HPV + VIN

Squamous Cell Carcinoma

• 90% of vulvar cancers

• Symptoms: vulvar lump, ulcer, chronic pruritus

• Signs: raised, ulcerated, pigmented or warty lesion

• Most common site: labia majora/minora

• Multifocal lesions ~5%

FIGO Staging (Simplified)

Stage	Description
I	confined to vulva
II	>2 cm but still confined
III	adjacent spread or lymph nodes
IV	bladder/rectum invasion or distant metastasis

Management

Stage	Treatment
IA	radical local excision
IB–II	excision + inguinal/femoral LN dissection
III	radical vulvectomy + bilateral LN dissection
Advanced	radiation / chemoradiation

• Most important prognostic factor → lymph node status

• Node negative → ~90% survival

• Node positive → ~50% survival

Vulvar Malignant Melanoma

• 2nd most common vulvar cancer

• Sites: labia minora, clitoris

• Occurs mainly in postmenopausal women

• Early metastasis

• Diagnosis: excisional biopsy

Depth	Treatment
superficial	excision (1 cm margin)
≥1 mm	excision + LN dissection

• 5-year survival ≈ 30%

Vaginal Diseases

🔷 **Vaginal infections**

• Bacterial vaginosis, Candida, Trichomonas, cause discharge and inflammation

• Associated with PROM, preterm labor

🔷 **Vaginal Intraepithelial Neoplasia (VAIN)**

• Often extension of CIN

• Usually asymptomatic

• Treatment: cauterization, excision, radiotherapy, observation

🔷 **Vaginal Cancer**

Feature	Notes
Frequency	rare
Early stage	asymptomatic
Symptoms	bleeding, discharge, pelvic pain
Diagnosis	vaginal biopsy
Treatment	radiotherapy ± chemotherapy

• Often presents late

20. Cervical Cancer 📘

• Malignant tumor arising from cervical epithelium

Cause

• Persistent HPV infection (MOST IMPORTANT)

• High-risk types: HPV 16, 18

Risk Factors

• Early sexual activity, multiple partners

• Smoking, immunosuppression

• High parity, early pregnancy

Pathogenesis

• HPV infection → dysplasia → CIN → invasive cancer

• Origin: transformation zone

Screening

Test	Purpose
Pap smear	detects precancerous lesions

• Screening only, NOT diagnostic

KEY RULE ⚠️

• Normal Pap ≠ no cancer

• Symptomatic patient → biopsy directly

• Diagnosis = biopsy

Symptoms

• Early: asymptomatic

• Late: postcoital bleeding (classic), abnormal bleeding, discharge, pelvic pain

Types

Type	Note
SCC	~85% (most common)
Adenocarcinoma	less common

Staging (very simplified)

Stage	Description
I	cervix only
II	beyond uterus
III	pelvic wall / LN
IV	bladder/rectum or distant

Treatment

Stage	Management
Early	radical hysterectomy
Fertility needed	trachelectomy
Advanced	chemoradiation
Metastatic	palliative

Complications (surgery)

• Most common → urinary dysfunction

• Most serious → ureterovaginal fistula

Prognosis

Stage	Survival
I	~90%
II	~75%
III	~50%
IV	~25%

Exam Pearls

• Most important risk factor = HPV

• Transformation zone = site of origin

• Postcoital bleeding = red flag

• Pap smear = screening, NOT diagnosis

• Biopsy = only definitive diagnosis

6th Year OBS/GYN Seminars

1. Mental health during pregnancy 📘

- Around 1 in 5 women develop mental health disorders during pregnancy or postpartum
- Depression and anxiety are most common; psychosis is most severe
- Stigma and underreporting are major issues
- Higher prevalence in developing countries (~20% postpartum depression)

Risk Factors

- Poverty, migration, violence, conflict, disasters
- Low social support , History of psychiatric illness , Stressful life events

Consequences of Untreated Illness

- Maternal: poor self-care, suicide risk, obstetric complications
- Fetal: preterm birth, low birth weight

Pathophysiology

- Hormonal changes :
  - Increased estrogen affects serotonin and dopamine
  - Progesterone causes sedation but also mood swings
  - Increased cortisol leads to anxiety and sleep disturbance
- Neurotransmitters:
  - ↓ Serotonin → depression, anxiety
  - ↓ Dopamine → anhedonia
  - ↓ GABA → anxiety, irritability

Antenatal Disorders

- Antenatal depression (10–15%)
- Anxiety disorders (GAD, panic, OCD)
- Bipolar disorder (risk of relapse if meds stopped)
- Psychosis (rare but severe)
- Substance use disorders

Management (Antenatal)

Non-pharmacological	Pharmacological
Psychoeducation, reassurance CBT, interpersonal therapy Social support	SSRIs (sertraline preferred) Avoid paroxetine (teratogenic risk) Always weigh risks vs benefits Psychiatric consultation

Postpartum Mental Health

- Up to 80% experience emotional disturbance
- Spectrum: baby blues → depression → psychosis

Baby Blues

- Very common (~85%)
- Onset day 3–5, resolves by day 10
- Symptoms: mood swings, tearfulness, insomnia, irritability
- Management: reassurance only

Postpartum Depression (PPD)

Key Features

- Onset within 6 weeks (can occur up to 1 year)
- Symptoms: sadness, guilt, anhedonia, poor sleep, bonding issues

Risk Factors

- History of depression/anxiety
- Poor support, stress
- Birth complications, NICU
- Breastfeeding difficulties

Management

- First-line: CBT, interpersonal therapy, bonding therapy
- Moderate–severe: SSRIs (sertraline safe in breastfeeding)
- Involve family and screen partner

Postpartum Anxiety

- Generalized anxiety about baby
- Panic attacks, OCD (intrusive thoughts)
- Often coexists with depression
- Treatment: CBT, SSRIs

Postpartum Psychosis (Emergency)

Features

- Onset within first 2 weeks
- Delusions, hallucinations
- Mania or severe depression
- Disorganized behavior, insomnia

Risks

- High suicide risk , Risk of infanticide

Risk Factors

- Bipolar disorder , Previous postpartum psychosis

Management

- Immediate hospitalization
- Antipsychotics, mood stabilizers
- Mother–baby unit if available

2. VTE during pregnancy 📘

- VTE is a leading cause of maternal death (~1 in 100,000)
- 50% occur antenatally (evenly across trimesters)
- Postpartum risk increases 4–6 times
- Failures: poor risk identification, delayed diagnosis, inadequate treatment

Pathophysiology (Virchow's Triad)

- Blood stasis: venous flow ↓ 50% by 29 weeks, persists postpartum
- Hypercoagulability: ↑ factor VIII, fibrinogen; ↓ protein S; ↓ fibrinolysis
- Vessel wall damage: occurs during delivery

DVT in Pregnancy

- 90% occur in left leg (vs 55% non-pregnant)
- Cause: left iliac vein compression by right iliac artery
- 70% iliofemoral → higher PE risk
- <10% of suspected DVT confirmed (symptoms overlap with pregnancy)

Diagnosis of DVT

- First-line: compression duplex ultrasound
- If negative but high suspicion: continue anticoagulation, repeat in 1 week
- If iliac thrombosis suspected: Doppler / MR venography / contrast venography
- D-dimer NOT useful in pregnancy (false positives and negatives)

Investigation of PE

- First-line (stable): chest X-ray + ECG

Imaging comparison

Modality	Advantages	Disadvantages
CTPA	Quick, diagnostic, finds other causes, less fetal radiation	↑ maternal breast cancer risk, not ideal in young
V/Q scan	Less maternal breast radiation, very low fetal risk	Cannot use if CXR abnormal, no alternative diagnosis

- If DVT confirmed → no further imaging needed (treatment same)

Treatment (LMWH)

- LMWH is treatment of choice → start immediately on suspicion
- Does NOT cross placenta
- No routine monitoring required
- Lower risk of HIT and osteoporosis than UFH

Dosing

- Based on early pregnancy weight
- Once daily dosing sufficient
- Anti-Xa only if : Weight <50 kg or >90 kg , Renal impairment

Avoid

- Warfarin → crosses placenta, causes embryopathy
- DOACs → safety unknown

When to Use UFH

- If rapid reversal needed (high bleeding risk, severe renal failure)

LMWH Around Delivery

- Stop LMWH at onset of labour or bleeding
- No regional anesthesia : 24h after therapeutic dose , 12h after prophylactic dose
- Epidural : Do not remove catheter within 12h of LMWH , Restart LMWH ≥4h after removal
- Postpartum : Restart 4–6h if no bleeding , Prophylactic → therapeutic after 12h

Duration

- Continue throughout pregnancy + ≥6 weeks postpartum
- Minimum total duration = 3 months

Acute Life-Threatening PE

- Medical emergency (MDT approach)
- Features: shock, hypoxia, RV dysfunction, instability

Management

- IV UFH (not LMWH)
- Do echo ± urgent CTPA

Thrombolysis Indications

- Massive PE with cardiovascular compromise
- Limb-threatening DVT
- If failure → surgical embolectomy

Antenatal VTE Risk

- High risk : Previous VTE → antenatal LMWH
- Intermediate : Surgery, thrombophilia, comorbidities → consider LMWH
- Low risk :
    - BMI >30, age >35, parity ≥3, smoker, etc.
    - ≥4 factors → LMWH from 1st trimester
    - ≥3 → LMWH from 28 weeks
    - <3 → no drugs, mobilize

Postnatal VTE Risk

- High risk : Previous VTE, thrombophilia → LMWH ≥6 weeks
- Intermediate : C-section in labour, BMI >40 → LMWH ≥10 days
- Low risk:
    - ≥2 factors → LMWH 10 days
    - <2 → mobilization only

Prevention (Thromboprophylaxis)

- 2/3 of PE cases have identifiable risk factors
- Risk assess : Early pregnancy , On admission , During/after birth , With new problems
- High-risk women:
    - Start LMWH as soon as pregnancy confirmed
    - Switch from warfarin to LMWH
    - Start postpartum prophylaxis early if safe

Exam pearls

- VTE is a major cause of maternal mortality
- Pregnancy is a hypercoagulable state (Virchow's triad)
- D-dimer is NOT useful
- LMWH is first-line and started on suspicion
- Continue treatment ≥ pregnancy + 6 weeks postpartum
- Always risk assess every pregnant woman

3. Ovarian Hyperstimulation Syndrome 📘

- OHSS = complication of ovarian stimulation (especially IVF)
- Characterized by ovarian enlargement + fluid shift to third space
- Caused by ↑ capillary permeability triggered by hCG

Pathophysiology

- hCG stimulates ovaries → ↑ VEGF production
- VEGF → ↑ vascular permeability → fluid leakage
- Results in : Ascites , Pleural effusion , Hemoconcentration

Risk Factors

- Previous OHSS , Young age , History of exaggerated response to gonadotropins , PCOS
- Other secondary risk factors

Clinical Features

- Hypotension and/or hypovolemia , Hypercoagulable state , Electrolyte imbalance , Acute renal failure , Dyspnea

Abdominal Features

- Abdominal pain, nausea, vomiting , Ascites and abdominal distension , Acute abdomen , Peritonitis

Classification

Grade	Features
Grade 1	Abdominal distension + discomfort
Grade 2	+ N/V/D + ovarian size 5–12 cm
Grade 3	+ ascites (US)
Grade 4	+ ascites/hydrothorax + dyspnea
Grade 5	+ hemoconcentration, coagulopathy, renal impairment

Ultrasound Findings

- Bilateral enlarged ovaries (>12 cm)
- Multiple cysts → "spoke-wheel" appearance
- Ascites ± pleural / pericardial effusion

Prevention

- Reduce gonadotropin exposure , Use GnRH antagonist protocols
- Avoid hCG trigger when possible , In-vitro maturation
- Dopamine agonists , Insulin-sensitizing agents , Low-dose aspirin

Management

Mild

- Conservative (observation, supportive care)

Moderate

- Bed rest + fluids
- Monitor : Electrolytes , Hematocrit , Creatinine , Fluid balance
- Watch for worsening symptoms

Severe

- Hospital admission , Close monitoring (vitals, weight, abdominal girth, I/O)
- IV fluids (NS or D5NS) , Thromboprophylaxis (heparin + mobilization)
- Paracentesis for ascites

Critical OHSS

Complications

- Thromboembolism , Renal failure , Liver dysfunction , Pulmonary complications , Severe electrolyte imbalance

Course

- Fluid re-enters circulation after several days
- Diuresis occurs
- Resolution usually within 10–14 days

Surgical Indications

- Rare , Only if : Ovarian torsion , Cyst rupture , Internal bleeding

Prognosis

- Mild–moderate: excellent
- Severe: good with proper management

Exam Pearls

- OHSS is due to VEGF-mediated capillary leak
- Most common after IVF and hCG exposure
- Main danger = third spacing + thrombosis
- Treatment is mainly supportive
- Severe cases require admission and monitoring

4. Cervical Screening 📘

1. Natural History & Pathology

- HPV infection is necessary for almost all cervical cancers, especially high-risk types 16 and 18
- Most infections clear within 1–2 years
- Persistence (not infection itself) → main risk factor for cancer
- Disease progression : persistent HPV → transformation zone infection → CIN → invasive cancer
- Transformation zone = most important site for neoplasia → must be sampled properly

Histopathology

Lesion	Meaning	Management
LSIL / CIN1	Mild dysplasia, transient HPV infection	Observe
CIN2	Moderate dysplasia (precancer)	Observe or treat
CIN3	Severe dysplasia / CIS	Treat
AIS	Glandular precancer	Excision

Cytology (Bethesda System)

Result	Meaning	Risk
NILM	Normal	Low
ASC-US	Unclear atypia	Low–intermediate
LSIL	HPV-related	Variable
ASC-H	Cannot exclude HSIL	High
HSIL	High-grade lesion	High
AGC	Glandular abnormality	High

- ASC-H, HSIL, AGC → always high risk → colposcopy

2. Screening Strategy

- Primary HPV testing = most sensitive (preferred)
- Cytology = less sensitive but still used
- Co-testing = ↑ detection but ↑ unnecessary colposcopy

Screening Schedule

Age	Screening
<21	No screening
21–24	Cytology every 3 years
25–65	HPV every 5 years (preferred)
>65	Stop if adequate prior screening

- Stop only if : no CIN2+ in last 25 years , adequate negative screening

Key Concepts

- Negative HPV = very low risk → long interval (5 yrs)
- Must sample transformation zone
- HPV test detects oncogenic DNA

3. Triage After HPV Positive

Primary HPV Screening Algorithm

Result	Next Step	Colposcopy
HPV negative	Routine	No
HPV 16/18 +	Immediate colposcopy	Yes
HPV + (other types)	Reflex cytology	Depends

If HPV+ (non-16/18) + Cytology

Cytology	Action
ASC-US or worse	Colposcopy
NILM	Repeat in 1 year

Key Rule

- HPV 16/18 → colposcopy even if cytology normal
- Persistent HPV → colposcopy

4. Risk-Based Management (ASCCP)

Core Concept

- Management based on risk of CIN3+

Risk Level	Action
Low	Routine screening
Intermediate	Repeat in 1 year
High	Colposcopy
Very high	Expedited treatment

High-Yield Patterns

- HPV negative → routine
- HPV 16/18 → colposcopy
- HPV + NILM → repeat in 1 year
- HPV + ASC-US/LSIL → colposcopy
- ASC-H / HSIL / AGC → colposcopy

Co-testing Results

Result	Action
HPV- + NILM	Routine
HPV+ + NILM	Repeat in 1 year
HPV+ + ASC-US/ LSIL	Colposcopy
HSIL	Colposcopy ± treatment

5. Post-Colposcopy Management

Biopsy Results

Result	Management
Normal / CIN1	Follow-up (1 year)
CIN2	Observe or treat
CIN3	Treat (LEEP)
AIS	Excision
Cancer suspected	Urgent referral

Key Concepts

- CIN1 → usually regresses → no overtreatment
- CIN2 → borderline lesion
- CIN3 → high progression risk

Follow-Up

Result	Action
HPV negative	Return to routine
Persistent HPV	Colposcopy
Worsening cytology	Colposcopy

Post-Treatment Follow-Up

- HPV testing at 6 months
- Then annual until negative repeatedly
- Then every 3 years for 25 years
- Persistent HPV → suspect recurrence

6. Special Populations

Immunocompromised

- Higher risk → earlier + frequent screening
- Lower threshold for colposcopy

Pregnancy

- Screening allowed
- Colposcopy safe
- No endocervical curettage
- Treatment delayed unless cancer suspected

Post-Hysterectomy

Situation	Screening
No cervix + no CIN2+	No screening
Prior CIN2+	Continue
Cervix remains	Continue routine

HPV Vaccinated

- Still require screening

Exam Pearls

- Immediate Colposcopy : HPV 16/18 positive , HSIL , ASC-H , AGC , Persistent HPV
- Repeat in 1 Year : HPV positive + NILM , Low-risk abnormalities
- Treat : CIN3 , Selected CIN2 , Very high-risk HSIL cases

- HPV negative → routine
- HPV 16/18 → colposcopy
- HPV + other → cytology
    - abnormal → colposcopy
    - normal → repeat 1 year
- Persistent HPV → colposcopy

- ASC-US + HPV+ → colposcopy
- HPV16 + NILM → colposcopy
- HPV+ (non-16/18) + NILM → repeat 1 year
- HSIL → colposcopy ± treatment

- HPV persistence = key driver
- HPV testing > cytology
- HPV16/18 = automatic high risk
- Most low-risk cases → follow-up, not treatment
- Colposcopy is diagnostic, not screening

5. Cardiac disease in pregnancy 📘

Normal Cardiovascular Changes in Pregnancy

- Heart rate ↑ by 10–15 bpm
- Cardiac output ↑ ~40% (↑ SV + HR), peaks at ~30 weeks
- Plasma volume ↑ 40–50%
- Oxygen consumption ↑ ~50%
- Heart displaced upward and to the left

Heart Sounds & ECG Changes

- S1: exaggerated splitting , S3: loud (physiological) , S2: unchanged
- ECG : Slight left axis deviation , Premature atrial/ventricular beats , Lead III: Q wave, ST depression, T inversion

Mechanisms of CV Changes

- Estrogen → vasodilation (↑ nitric oxide)
- Prostacyclin → vasodilation + ↓ platelet aggregation
- ↓ Angiotensin sensitivity → prevents hypertension

Cardiac Disease in Pregnancy

- Occurs in ~1% of pregnancies
- Maternal mortality ~0.5%
- Causes:
    - Developing countries: rheumatic heart disease
    - Developed countries: congenital (ASD, VSD, repaired TOF)
- Symptoms peak in mid-2nd trimester
- Pregnancy ↑ CO → worsens underlying disease

Maternal & Fetal Risks

- Maternal : Heart failure , Increased mortality
- Fetal : Prematurity , SGA

Based on Disease Type

- Non-cyanotic → generally good outcomes
- Cyanotic → ↑ IUGR, abortion
- Coarctation of aorta → fetal loss + IUGR

Disease Severity (NYHA Classification)

Class	Description
I	Symptoms with strenuous activity
II	Symptoms with ordinary activity
III	Symptoms with minimal activity
IV	Symptoms at rest

- Class III–IV = high risk
- Pregnancy usually worsens by one NYHA class
- Class IV → overt heart failure

Key Pathophysiology Point

- Pregnancy ↑ CO and ↓ SVR to maintain placental flow
- Diseased heart cannot tolerate this → decompensation

Antenatal Management

- Pre-pregnancy counseling , Multidisciplinary care (OB + cardiology + anesthesia)
- Avoid supine position (IVC compression) , Monitor : Dyspnea , Cough
- Prevent anemia , Treat infections , Ensure dental care

Endocarditis Prophylaxis (Indications)

- Prosthetic valves
- Previous infective endocarditis
- Repaired congenital defects (<6 months or residual defects)
- Unrepaired cyanotic heart disease

Postpartum Management

- Highest risk period for maternal death

Why?

- Sudden ↑ circulating blood after placental delivery → cardiac overload

Major Complications

- Heart failure , Pulmonary edema

Postpartum Care

- Uterine massage + slow IV oxytocin (<2 U/min)
- Prevent VTE : Early mobilization , Compression stockings
- Heparin:
    - Only in high-risk patients
    - Use cautiously (risk of hemorrhage in cyanotic patients)
    - Required in prosthetic valves

Indications for Termination

- Pulmonary edema
- Worsening cyanosis
- Uncontrolled arrhythmias
- NYHA class IV

Exam pearls

- Pregnancy significantly stresses the cardiovascular system
- CO ↑ 40% is the main burden
- NYHA class is the most important predictor of outcome
- Postpartum period is the most dangerous
- Multidisciplinary care is essential

6. Maternal Collapse 📘

- Maternal collapse = acute cardiorespiratory / neurological event → ↓ or loss of consciousness ± death
- Occurs during pregnancy or up to 6 weeks postpartum

Causes of Maternal Collapse

1. Hemorrhage

- Causes : PPH, placenta previa/accreta, placental abruption, uterine rupture, ectopic pregnancy
- Concealed : post-CS bleeding, ruptured ectopic, splenic artery rupture, hepatic rupture
- Key point : blood loss often underestimated, fit women compensate well

Management

- Control bleeding, resuscitation
- Deliver fetus + placenta if APH
- CS even if fetus dead in severe abruption

2. Thromboembolism

- Most common cause of direct maternal death
- Prevention: proper risk assessment, thromboprophylaxis

3. Amniotic Fluid Embolism (AFE)

- Timing: labour, delivery, or within 30 min postpartum
- Features: hypotension, hypoxia, respiratory distress, seizures, cardiac arrest

Progression

- Pulmonary HTN → LV failure , coagulopathy → massive PPH
- Fetal distress if before delivery

Management

- Supportive only

4. Cardiac Causes

- Rare (~1/30,000), often preceded by symptoms
- Causes: aortic dissection, coronary artery dissection, LV failure, endocarditis, pulmonary edema
- Red Flags : Chest pain, interscapular pain , wide pulse pressure, new murmur

Management

- Post-resuscitation → cardiology team
- Similar to non-pregnant management , delivery may be needed
- Thrombolysis if needed (bleeding risk) , PCI preferred

5. Sepsis

- Rapid progression → septic shock
- Common organisms: Strep A/B/D, pneumococcus, E. coli

Management (Sepsis Bundle)

- Lactate measurement , blood cultures before antibiotics
- Broad-spectrum antibiotics within 1 hour
- Fluids: ≥20 ml/kg
- If hypotension → vasopressors (norepinephrine/epinephrine) , inotropes (dobutamine)

6. Drug Toxicity / Overdose

- Causes: $MgSO_4$ (renal impairment), local anesthetic toxicity, illicit drugs

Features

- Early: dizziness, sedation, circumoral paresthesia, twitching
- Severe: seizures, bradycardia, arrhythmias, cardiac arrest

Management

- Mg toxicity → 10 ml 10% calcium gluconate IV

7. Eclampsia

- Usually known preeclampsia + witnessed seizure
- Always consider epilepsy in differential

8. Intracranial Hemorrhage

- Causes: severe HTN, aneurysm rupture, AVM
- Often preceded by severe headache

Management

- Urgent imaging (neuroradiology)
- Same as non-pregnant , may require delivery

9. Anaphylaxis

- Diagnostic Criteria : Sudden onset , airway/breathing/circulation compromise , skin/mucosal changes
- Features : Hypotension, bronchospasm, angioedema , ↓ cardiac output
- Triggers : Drugs, latex, foods, allergens
- Management : Remove trigger , ABCDE approach

10. Other Causes

- Hypoglycemia, electrolyte imbalance , hypoxia (aspiration/foreign body)
- Air embolism, tension pneumothorax , cardiac tamponade, hypothermia

Review Table

Category	Key Examples
Hemorrhage	PPH, abruption, previa/accreta, rupture
Thromboembolism	PE, DVT
AFE	Sudden collapse in labour/postpartum
Cardiac	Dissection, HF, arrhythmia
Sepsis	Strep, E. coli
Drugs	Mg toxicity, local anesthetic
Neuro	Eclampsia, intracranial bleed
Anaphylaxis	Drugs, latex
Others	Hypoglycemia, pneumothorax

7. Endometrial Hyperplasia 📘

- Endometrial hyperplasia = abnormal proliferation of endometrial glands due to unopposed estrogen
- Spectrum: benign → premalignant → endometrial carcinoma

Pathophysiology

- Estrogen stimulates endometrial growth , progesterone opposes it
- Unopposed estrogen → continuous proliferation → glandular crowding
- Leads to : Hyperplasia ± atypia , Possible progression to cancer

Causes (Unopposed Estrogen)

- Endogenous: obesity, PCOS, anovulation , estrogen-secreting tumors
- Exogenous: estrogen therapy without progesterone
- Others: tamoxifen use

Risk Factors

- Obesity , chronic anovulation (PCOS), nulliparity
- Early menarche , late menopause , Diabetes , hypertension
- Family history of endometrial cancer

Classification

Type	Features	Cancer Risk
Hyperplasia without atypia	gland proliferation, no atypia	low
Atypical hyperplasia (EIN)	cellular atypia present	high (precancerous)

Clinical Presentation

- Abnormal uterine bleeding (most common)
- Menorrhagia , intermenstrual bleeding
- Postmenopausal bleeding (red flag)
- May be asymptomatic

Diagnosis

Initial Evaluation

- Transvaginal ultrasound :
  - Thickened endometrium
  - Postmenopause >4 mm = suspicious

Definitive Diagnosis

- Endometrial biopsy (gold standard)
- Hysteroscopy ± directed biopsy

Management

Without Atypia

- First-line: progestins : Oral progesterone , LNG-IUS
- Treat underlying cause (e.g. weight loss, PCOS)
- Follow-up with repeat biopsy

With Atypia (EIN)

Patient	Management
Completed family	total hysterectomy
Fertility desired	high-dose progestin + close follow-up

Indications for Surgery

- Atypical hyperplasia
- Failure of medical therapy
- Progression or persistent disease

Complications

- Progression to endometrial carcinoma
- Recurrence if risk factors persist

Follow-Up

- Regular endometrial surveillance
- Repeat biopsy every 3–6 months (if conservative management)

Exam Pearls

- Unopposed estrogen = core mechanism
- Most important symptom = abnormal uterine bleeding
- Biopsy is diagnostic
- Atypia = precancer → treat aggressively
- Progestin therapy is first-line for non-atypical cases