thers.com, for detailed information on obstetrics & gynecology books, visit our website www.jaypeebrothers.com, for detailed information on obstetrics & gynecology books

Look Inside the Book

Online Resources
250 MCQs
15 Videos (around 4.5 hrs)
Table Viva
(Instruments, Specimen, Drugs, Ultrasound Images)

CLINICAL CASES IN OBSTETRICS & GYNECOLOGY WITH VIDEOS

FOR UNDERGRADUATES



Highlights

- 15 clinical cases in obstetrics
- 10 clinical cases in gynecology
- 15 videos including animation videos
- An hour-long video on clinical examination

Richa Saxena

JAYPEE

CONTENTS

SECTION 1: CASES IN OBSTETRICS

Chapter 1: History Taking and Examination in an Antenatal Case **3**

1: Clinical Examination: Normal Obstetric Case

2: Administration and Repair of an Episiotomy

3: Fetal Monitoring Using CTG

4: Mechanism of Labor: The Journey

5: Maternal Pelvis: The Passage

6: Fetal Skull: The Passenger

Chapter 2: Normal Puerperium **31**

Chapter 3: Anemia in Pregnancy **45**

Chapter 4: Pregnancy-induced Hypertension **61**

Chapter 5: Heart Disease in Pregnancy **77**

Chapter 6: Previous Lower Segment Cesarean Section **91**

7: Cesarean Section

Chapter 7: Bad Obstetric History **102**

Chapter 8: Intrauterine Growth Restriction **113**

Chapter 9: Multifetal or Twin Gestation **125**

Chapter 10: Malpresentation **140**

8: Breech Presentation

Chapter 11: Antepartum Hemorrhage **155**

Chapter 12: Molar Pregnancy **169**

Chapter 13: Postdated Pregnancy **179**

Chapter 14: Gestational Diabetes **186**

9: Pathogenesis of Gestational Diabetes

10: Management of Shoulder Dystocia

Chapter 15: Rh Isoimmunization **196**

11: Pathogenesis of Rh Isoimmunization

SECTION 2: CASES IN GYNECOLOGY

Chapter 16: Gynecological History Taking and Examination **211**

12: Gynecological Examination

Chapter 17: Fibroid Uterus **228**

JAYPEE BROTHERS

Chapter 18: Ovarian Mass **239**
Chapter 19: Infertility **254**
Chapter 20: Prolapse Uterus **272**
Chapter 21: Abnormal Uterine Bleeding **287**
13A: Screening for Cervical Malignancy
13B: Taking a Pap Smear
Chapter 22: Abnormal Vaginal Discharge **303**
Chapter 23: Urinary Incontinence **313**
Chapter 24: Amenorrhea **319**
Chapter 25: Postmenopausal Bleeding **334**
Appendices *341*
Index *349*

SECTION 3: TABLE VIVA (E-CHAPTERS)

Chapter 26: Instruments in Obstetrics and Gynecology
Chapter 27: Vaginal Instrumental Delivery
14: Forceps Delivery
Chapter 28: Specimen in Obstetrics and Gynecology
Chapter 29: Imaging Modalities in Obstetrics and Gynecology
Chapter 30: Drugs in Obstetrics

JAYPEE BROTHERS

CHAPTER

1 History Taking and Examination in an Antenatal Case

INTRODUCTION

- The duration of pregnancy has been traditionally considered to be 10 lunar months or 40 weeks.
- It is customary to divide the entire period of gestation into three trimesters:
  - First trimester (until 14 weeks)
  - Second trimester (15–28 weeks)
  - Third trimester (29–42 weeks).
- The gestational age is usually calculated from the first day of last menstrual period (LMP).
- During the antenatal period, planned antenatal care is the care given to a pregnant woman in order to ensure good maternal and neonatal outcome.

History taking and clinical examination are extremely important from point of view of an undergraduate examination. Both, history taking and clinical examination in a normal antenatal patient, have been described in details in this chapter. Students are also requested to go through **Video 1** which explains clinical examination in details.

HISTORY

History taking in a normal antenatal case involves gathering information related to the following personal details:

- Full name
- Husband's name
- Age **(extremes of age** is **an obstetric risk factor)**.

Risks in pregnancy associated with extremes of age:

Teenage pregnancy	*Elderly primi (>40 years of age)*
• Increased risk of maternal and neonatal mortality • Low birthweight babies • Premature birth, preterm delivery • Anemia • Preeclampsia • Cephalopelvic disproportion	• Increased risk of Down syndrome • Prolonged labor • Increased requirement for cesarean delivery, instrumental delivery and induction of labor • Increased risk of malpresentation, gestational diabetes and preeclampsia

- Address
- Age of marriage
- Gravida and parity
- Occupation of the patient (gives idea about her physical activity, stress, and occupational hazard).

Socioeconomic condition

(Grading based on modified **Kuppuswamy's socioeconomic status scale**) (*refer* **Appendix I**). This is important because complications such as **anemia, prematurity, intrauterine growth restriction (IUGR),** etc. may be **related to low socioeconomic status.** On the other hand, complications such as **hypertension, diabetes, obesity, macrosomia,** etc. may be related to the **higher socioeconomic groups**.

Period of gestation

Ask about the first day of the last normal menstrual period (LMP) and assign the

JAYPEE BROTHERS

expected date of delivery (EDD) and also inquire about the past menstrual cycles.

Habits

Smoking or chewing tobacco, alcohol, etc. and other addictions (frequency and quantity).

- *Complaints*: Bleeding or spotting since becoming aware of being pregnant, pain in abdomen, nausea, vomiting, sleep, appetite, bowel habit, etc.
- *History of present pregnancy*: Trimester wise complaints or complications noted.
  - Medications, supplements, immunization, and number of previous antenatal visits (booking status) noted.

During exams the above history needs to be told to the examiner as follows:

Mrs ....., aged ...., resident of ....., married since, ..., ... by occupation, G (Gravida) ... Para (para) ..... A (abortion) ..... L (live birth) ..... has presented with amenorrhea since past ..... months. Her LMP is ..... Based on this, her EDD is ..... Her presenting complaints are.....

Calculating the EDD

The average duration of human pregnancy is 280 days from the first day of the LMP until delivery and the EDD is calculated using the following:

- *Naegele's rule* (assumes an average cycle length of 28 days):
  - *EDD* = Addition of 9 calendar months and 7 days to the first day of the LMP (28-day cycle).
  - For in vitro fertilization (IVF) pregnancies, date of LMP is 14 days prior to the date of embryo transfers.
- *Parikh's formula* (considers cycle duration): *EDD* = Addition of 9 months to a woman's LMP, then adding the length of her average cycle, then subtracting 21 days.
- *Ultrasonographic dating*: This is based on the estimation of gestational age in accordance with her first trimester ultrasound (most accurate from 7 to 11 weeks of pregnancy).

History of Presenting Complaints

Ask for presenting complaints such as:

- Pain per abdomen
- Leaking or bleeding per vaginum (LPV or BPV) or any discharge per vaginum
- Backache
- Burning micturition
- Pedal edema
- When did she experience quickening?
- History of reduced fetal movements.

History of presenting complaints must be **noted in a chronological order**. The following details about the presenting complaints must be elicited from the patient:

- Onset
- Duration
- Severity
- Presence of any relieving or aggravating factors.

Please note that if the patient has presented for a **normal antenatal check-up**, there may be **no presenting complaints**.

History of Present Pregnancy

- When and how was the pregnancy confirmed?
- Any ultrasound scans done?
- Number of antenatal visits
- Whether booked or not?
- Immunization received or not?
- Any complaint/specific investigation during each of the trimesters (details related to the complaints, if any)

First trimester	*Second trimester*	*Third trimester*
• Dating scan (if done and available) Morning sickness/ hyperemesis • Fever with rash • Intake of any drugs • History of irradiation • Bleeding/pain per abdomen	• Time at which quickening was observed • Glucose challenge test (if done) and its result • Intake of supplements (iron and calcium) • Time of anomaly scan and its results	• Time of perception of fetal movements • Excessive or reduced fetal movements • Any complaints of LPV or BPV • History of pain per abdomen • Swelling in the feet or legs • Results of growth scan (if done)

Whether prescribed iron, calcium or folic acid?

- Normal pregnancy-related symptoms **(Table 1.1)**.

JAYPEE BROTHERS

TABLE 1.1: Normal symptoms in the pregnant women present during each trimester of pregnancy.

Symptom	*First trimester of pregnancy*	*Second trimester of pregnancy*	*Third trimester of pregnancy*
Cessation of menstruation	**First most frequent symptom** of pregnancy	Present	Present
Nausea and vomiting	Also known as **morning sickness**, these symptoms appear **1 or 2 weeks after the period** is missed and last until 10–12th week. Its **severity** may **vary** from **mild nausea** to **persistent vomiting,** e.g., hyperemesis gravidarum	**Disappearance of subjective symptoms,** such as nausea and vomiting	Absent
Urinary symptoms	**Increased frequency** of urination during the early months of pregnancy is due to **relaxant effect** of **progesterone** on the bladder	**Disappearance** of the **increased frequency** of micturition, which had occurred in the first trimester	There is an **increased frequency** of micturition, which had previously disappeared in the second trimester. This is due to the **pressure exerted** by the **gradually enlarged uterus** on the bladder
Mastodynia	It may be present in early pregnancy and **ranges in severity** from a **tingling** sensation to **frank pain** in the breasts	Absent	Absent
Abdominal enlargement	**Uterus** remains a **pelvic organ** until **12 weeks of gestation**, following which it may be just felt per abdomen as a suprapubic bulge	Progressive enlargement of the lower abdomen occurs due to the growing uterus. Palpation of fetal body parts: The **fetal body** can usually be **palpated** by the **18–20 weeks of gestation** unless the patient is obese; there is abdominal tenderness or there is an excessive amount of amniotic fluid	• There occurs **progressive enlargement** of the **abdomen**, which can result in development of **symptoms of mechanical discomfort** such as palpitations and dyspnea • **Lightening** is another phenomenon, which occurs at approximately **38 weeks of gestation** especially in the **primigravida**. This results in a **slight reduction** in **fundal height**, which provides relief against pressure symptoms. **Braxton Hicks contractions** become **more evident** Fetal lie, presentation, and period of gestation can be determined
Fetal movements	Embryonic movements can be observed by an ultrasound at 7 weeks of gestation	• **Fetal movements** can be perceived by the student as well as the woman herself generally **after 18–20th week of gestation** • *Quickening*: Fetal movements (quickening) can usually be **seen or heard between 16 and 18 weeks of gestation** in a **multigravida** and **approximately 2 weeks later** in a **primigravida**, i.e., 18–20 weeks	Fetal movements become more pronounced

Contd…

JAYPEE BROTHERS

Contd…

Symptom	*First trimester of pregnancy*	*Second trimester of pregnancy*	*Third trimester of pregnancy*
Fetal heart sounds	Fetal heart rate can be detected with the help of **transabdominal sonography** by **6 weeks of gestation** and with help of **transvaginal sonography** by **5 weeks of gestation**	This is the **most definitive clinical sign** of **pregnancy** and can be detected with help of an ordinary stethoscope or a **hand-held Doppler device** between **18 and 20 weeks** of gestation. The sounds resemble the ticking of a watch kept under a pillow. The rate usually varies from 110 to 160 beats/min	Present
Cervical mucus	Presence of **progesterone** during pregnancy helps in **lowering** the **concentration of NaCl** in cervical mucus, which **prevents** the **formation of ferning pattern**; instead the cervical mucus shows **fragmentation or crystallization** (beading)		
Skin changes		There is **appearance of pigmentation** over the **forehead** and **cheeks** by 24th week of gestation. There is appearance of **linea nigra** (**Fig. 1.1**) and **stria gravidarum** (**Fig. 1.2**) over the abdomen	



FIG. 1.1: Linea nigra.
(*For color version, see Plate 1*)

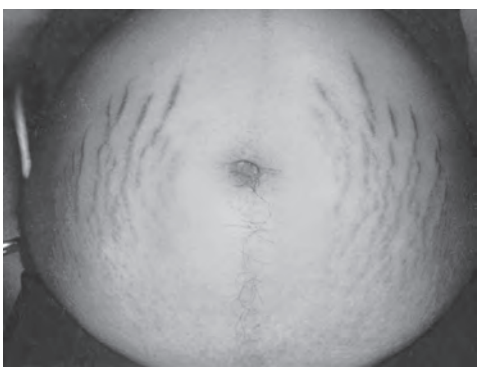


FIG. 1.2: Stria gravidarum.
(*For color version, see Plate 1*)

A full history comprising of the following needs to be elicited:

- Menstrual history
- Past obstetric history
- Past medical or surgical history
- Treatment history
- Family history
- Social history
- Personal history.

Menstrual History

- Age of attaining menarche
- Duration of cycles
- Regular or irregular

JAYPEE BROTHERS

- Duration or amount of menstrual flow (scanty, moderate or profuse)
- Associated problems (e.g., pain or passage of clots, etc.) and their time of occurrence
- LMP.

Marital History

- For how many years has she been married?
- How many years after marriage did she conceive?
- Was the conception spontaneous or had she taken any treatment?
- Did she use any form of contraception?

Past Obstetric History

- The woman's past obstetric history must be denoted by the acronym GPAL, where G stands for gravid; P for parity; A for number of abortions; and L for number of live births.
- *Each pregnancy including the present one:*
  - Number and type of previous pregnancies (miscarriage, tubal pregnancy, vesicular mole, preterm delivery)
  - When and how was the pregnancy confirmed?
  - Number of antenatal visits
  - Whether booked or not?
  - Immunization received or not?
  - Any complaint during each of the trimesters or at the time of labor?
  - Whether prescribed iron, calcium or folic acid?
  - Type of delivery (home or hospital)
  - If home delivery, whether was taken by a trained or untrained midwife (dai)?
  - If hospital delivery, name of the hospital
  - History of receiving Rh immune globulins during her previous pregnancies.
- *Antenatal, intrapartum and postpartum periods of the previous pregnancies:*
  - Period of gestation at the time of delivery: Was the birth preterm, term or post-term?
  - Place of delivery: Was the delivery conducted at home or hospital?

- *Gravida*: **Number of pregnancies**, including the present pregnancy, the woman has ever had. This is **irrespective of** the fact whether the pregnancies were **viable** at the time of birth or not
  Nulligravida: A woman who has **never been pregnant**
  Primigravida: A woman who **is pregnant for the first time** (Gravida 1)
  Multigravida: This stands for a woman who has had **at least one previous pregnancy**, irrespective of whether it was viable or not. Depending on the number of previous pregnancies, she could be gravida 2, 3, or more. For example, a woman has had three previous pregnancies and is now pregnant for the fourth time will be gravida 4
  Grand multigravida: Woman who has been **pregnant at least 5 or more times** previously.
- *Abortions*: Number of the pregnancies, which have **terminated before reaching the point of viability (20 weeks)**. The student must give their exact gestational period and also mention whether they were spontaneous or induced abortions; the reason for the induced abortion also needs to be asked
  Vesicular mole and ectopic pregnancy are counted as abortion
- *Viability*: This refers to the ability of the fetus to **live outside the uterus** after birth
- *Parity*: This refers to the **number of previous viable pregnancies** (including infants who were either stillborn or born alive). Parity is determined by the number of viable pregnancies and not by the number of fetuses delivered. Thus parity does not change even if twins or triplets are born instead of a singleton fetus. Previous multiple viable pregnancies are shown as twins +1, triplets +2, etc. For example, if one of the viable pregnancies of this female produced twins, alive or stillborn, she will be gravida 4, para 2+1. If the first viable pregnancy produced twins and the second viable pregnancy produced quadruplet, she will be gravida 4 para 2+1+3
  Nullipara: A women who has **never carried a previous pregnancy** to a point of viability (para 0)
  ***Primipara*: Woman who has had one** previous viable pregnancy (para 1). For example, if the woman is gravida 4 and only two of the previous pregnancies of this woman were viable, she would be gravida 4, para 2
  Multipara: Woman who has had two or more previous viable pregnancies (para 2, 3, or more)
  Grand multipara: Woman who has had **5 or more previous viable pregnancies** (para 5, 6 or more)
  A woman is considered as a high-risk mother, if she is either a primigravida or nullipara over the age of 30 years or if she is a young teenaged primigravida or if she is a grand multipara
- *Parturient*: A woman in **labor**
- *Puerpera*: A woman who has **just given birth**

JAYPEE BROTHERS

- Individual conducting the delivery: Whether the delivery was conducted by a dai, midwife or a doctor?
- Complications: Any complications in the antepartum, intrapartum or postpartum period?
- Type of previous deliveries: Whether normal vaginal delivery or instrumental delivery or cesarean delivery and any complication or procedure related to the previous deliveries (forceps or vacuum extraction, manual removal of the placenta, etc.).

◆ *Details of labor*:
- In case of a normal delivery, the following need to be enquired:
  - Onset of labor pains: Whether the onset of labor pains was spontaneous or induced with a gel (*prostaglandin E2 gel*), tablet (*misoprostol*) or intravenous drip (*oxytocin*).
  - If the labor was induced, was artificial rupture of membranes done or not?
  - Whether an episiotomy was given or not? Details related to episiotomy administration and repair are described in **Video 2**.
  - Any complication in the postpartum period [e.g., postpartum hemorrhage (PPH), requirement for blood transfusion, etc.]
- Duration of labor: An unusually prolonged duration of labor could be indicative of obstructed labor, malpresentation, malposition, etc.

◆ *Details of cesarean section:* In case of cesarean delivery, the following need to be enquired: Indication of the cesarean, elective or emergency, kind of scar given, any complications encountered during the postoperative period (e.g., history of blood transfusion, abdominal distension, wound infection, repeated urinary tract infection, resuturing of wounds, fever, etc.). If the hospital discharge notes are available, they may be able to provide some information.

◆ *Outcome of each pregnancy:*
- Date (month, year) and outcome of each event (livebirth, stillbirth, intrauterine death, abortion, ectopic, twins, hydatidiform mole, child with any congenital abnormality, neonatal and infant death, etc.)
- Whether the child is alive and healthy at present and his or her age and sex
- Birthweight of each live birth (average size or large size)
- Did the baby cry immediately after birth?
- Was the baby roomed in with the mother or sent to the nursery?

◆ *Breastfeeding*: History of breastfeeding in relation to previous pregnancies needs to be elicited. The following questions need to be asked:
- Was the baby breast fed (if yes how many hours after birth)?
- Was colostrum administered?
- For how many months was the baby exclusively breast fed?
- For how much time was breastfeeding continued?
- History of sore nipple, retracted nipple, breast abscess, etc.

◆ *Postpartum period*: The following need to be enquired:
- Any complications encountered in the postpartum period (e.g., PPH, pyrexia, infection, pain in the calf, etc.)
- When did she start having periods after delivery? When did her cycles regularize after delivery?
- Did she start using any form of contraception after child birth? If yes what form of contraception was used?
- When did she resume normal activities or returned to work after delivery?

◆ *Previous history of miscarriage:* In case of previous history of abortion, the following need to be enquired from the patient:
- Gestational age at the time of miscarriage

JAYPEE BROTHERS

- Was it spontaneous or induced?
- Was it certified by a doctor?
- If induced, was it induced medically or surgically (was curettage done)?
- Had an ultrasound examination been done prior to the miscarriage?
  - If yes, was a heartbeat/cardiac activity present?
- History of any complications in the postabortal period (e.g., fever, requirement of blood transfusion, infection, etc.)
- Any history of recurrent miscarriages?
- In case of Rh-negative pregnancy, any administration of anti-D immunoglobulins?

Past Medical and Surgical History

- The woman must be asked about the previous medical history of diabetes, epilepsy, hypertension, renal disease, rheumatic disease, heart valve disease, epilepsy, asthma, tuberculosis, malaria, thyroid disorders, psychiatric illness, hepatic and other liver diseases, or any other significant illness she may have had in the past.
- Previous history of any gynecological surgery (including dilation and curettage and cesarean delivery), blood transfusion, etc. also needs to be enquired.

Treatment History

- *Current use of medicines:* History of taking any medicines in the present needs to be enquired. History of **any allergies** (specifically allergy to penicillin) must also be enquired.
- *Evaluation of exposure to medications:* This must evaluate exposure to **over-the-counter** and **prescribed drugs** (such as teratogenic drugs, e.g., isotretinoin, warfarin, etc.).

Family History

Family history of tuberculosis, cardiovascular disease, hypertension, diabetes mellitus, twins, any hereditary disease or congenital anomaly needs to be enquired.

Personal History

Maternal use of alcohol, tobacco, and other mood-altering substances must be enquired. History of exposure to sexually transmitted diseases also needs to be taken.

Nutritional History

- The body mass index (BMI), which is defined as [weight in kg/(height in meters)^2] is the preferred indicator of nutritional status. This needs to be calculated.
- Detailed nutritional history needs to be elicited.
- Total nutritional intake (in calories) also needs to be calculated.
- The **total caloric intake** during a normal singleton pregnancy should increase by approximately **300 kcal/day**.
- Energy requirements vary significantly depending on a woman's age, BMI, and activity level.
- Calorie requirement in a nonpregnant woman depending on their level of activity is described in **Appendix II**.
- The **daily protein requirement** increases from **0.8 g of protein/kg/day** in the **nonpregnant state** to **1.1 g of protein/kg/day** during **pregnancy**.
- Carbohydrates should comprise 45–65% and total fat intake should comprise 20–35% of daily calories, similar to nonpregnant women.
- Caloric value of common food items has been described in **Appendix III** and recommended daily dietary allowances of various vitamins and minerals for pregnant women have been described in **Appendix IV**.

Socioeconomic History

Identification of social, financial, and psychological issues that could affect pregnancy planning must be done. The woman's socioeconomic class should be calculated on

JAYPEE BROTHERS

the basis of Kuppuswamy's socioeconomic scale (described in **Appendix I**).

CLINICAL EXAMINATION

For detailed information regarding clinical examination refer **Video 1**.

General Physical Examinaion

- *Build*: Obese or average or thin based on BMI.

Body mass index	*Classification*
<18.5	Underweight
18.5–25.0	Normal
25.0–29.9	Overweight
30.0–34.9	Obesity (class I)

- *Nutrition*: Good/average/poor
- *Height*:
  - Patient **height less than 5 feet** (152 cm) may be associated with an increased risk of **cephalopelvic disproportion** and an **increased requirement for cesarean delivery**
  - **Short stature (<145 cm)** could be associated with **Turner syndrome**.
- Weight (in kilograms) for setting a baseline for further monitoring of appropriate weight gain during pregnancy
- Causes of abnormal weight gain during pregnancy:

Reduced weight gain during pregnancy	*Increased weight gain during pregnancy*
• Fetal growth restriction • Anemia • Malnutrition • Oligohydramnios	• Multifetal gestation • Polyhydramnios • Gestational diabetes with macrosomia • Obesity

- Assessment of patient's vital signs (pulse, BP, and temperature):
  - While taking BP, the student must remember that **disappearance of sounds (Korotkoff's 5)** rather than muffling of sounds (Korotkoff's 4) is the best representative of diastolic blood pressure during pregnancy. Diastolic blood pressure could be increased in cases of preeclampsia.
- Signs of anemia (pale complexion, clubbing of fingernails, pallor in lower palpebral conjunctiva, oral mucosa, dorsum of tongue, palms of hands and nail beds, and shortness of breath)
- Jaundice (yellowness of sclera, undersurface of tongue, hard palate, and skin)
- Glossitis, stomatitis
- *Neck*: Lymph nodes, neck veins, and thyroid enlargement
- *Edema feet* ***(Flowchart 1.1)***: Examine legs, medial malleolus, and anterior surface of the lower one-third of tibia. The affected area must be pressed for at least 5 seconds. For details related to grading of anemia, *refer* **Table 4.1**, Chapter 4.
- Pulse and blood pressure for detecting hypertension
- Chest and heart auscultation for detecting underlying cardiovascular and respiratory diseases: A detailed examination of the cardiovascular system and respiratory system is not required in all the antenatal cases. It, however may be required in cases of heart disease or respiratory disease, respectively.

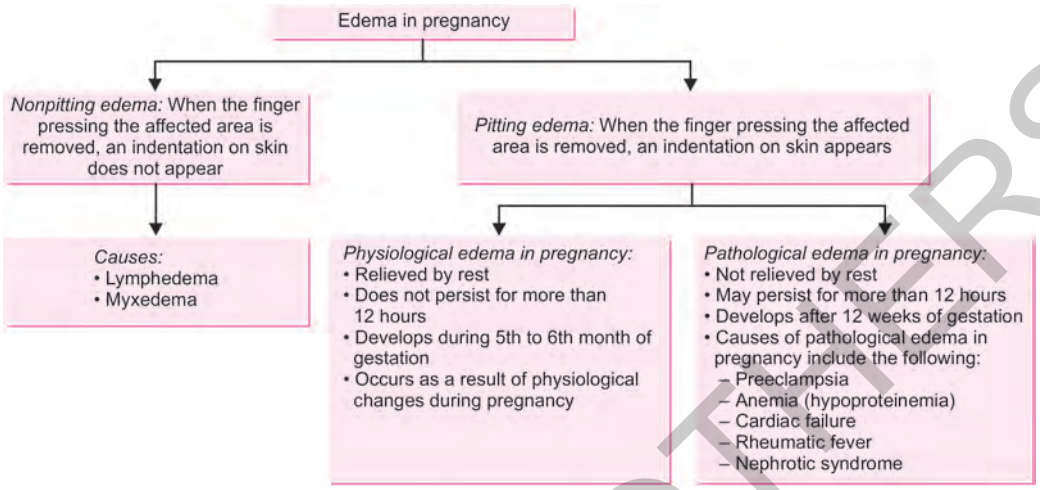
Specific Systemic Examination

Breast Examination

- *Observation of the normal pregnancy-related changes*: Pronounced pigmentation of the primary areola and nipple; appearance of secondary areola, development of Montgomery tubercles, and increased vascularity
- Presence of cracked or inverted nipples (require correction to ensure normal lactation and suckling by the infant). Use of breast pump or other suction devices (e.g., hospital grade electric pump) immediately prior to breastfeeding may help in correcting the inverted nipples. Use of nipple shield may also prove useful in some cases. Techniques such as Hoffman's maneuver (gentle stretching exercises in which the woman pulls the skin back and away from the nipple with help of her

JAYPEE BROTHERS

FLOWCHART 1.1: Causes of edema during pregnancy.



fingers) and use of breast shells are largely discouraged nowadays.

Abdominal Examination

Prerequisites: The following must be taken into consideration before undertaking an abdominal examination:

- Before starting the examination, the doctor must take verbal consent from the woman.
- The woman must be asked to empty her bladder and lie in dorsal position with her thighs slightly flexed.
- Her abdomen should be fully exposed.
- In case of a male doctor examining the patient, presence of a chaperone must be ensured. Chaperone may be even present when a female doctor is examining the patient.
- While examining the woman, the student must stand on the right side of the patient.

The abdominal examination must comprise of the following:

- *Inspection:*
  - *Abdominal enlargement:* Longitudinal or transverse enlargement of the uterine ovoid. Look for excessive or reduced abdominal enlargement.
  - *Abdominal or uterine contour:* Fundal notching, convex or flattened anterior uterine wall. Spherical or cylindrical uterine contour.
  - *Condition of abdominal skin:* Presence of any infection (ringworm, scabies, etc.), presence of previous scars over the abdomen, presence of dilated veins or stretch marks (stria gravidarum), linea nigra, etc. over the abdomen.
  - **Stria gravidarum** is present due to the **mechanical stretching of the skin**, which causes rupture of the elastic fibers.
  - Other causes of stretch marks besides pregnancy:
    - Obesity
    - Cushing's syndrome
    - Marfan syndrome
    - Ehlers–Danlos syndrome
  - **Linea nigra** is produced as a result of **increased aldosterone production** and **increased production of MSH** (melanocyte-stimulating hormone) from the anterior pituitary.
  - *Hernial orifices*: Free or not.
- *Palpation*:
  - *Estimation of the height of uterine fundus* **(Fig. 1.3)**. Based on fundal

JAYPEE BROTHERS



FIG. 1.3: Estimation of the height of uterine fundus.

height, the period of gestation (in weeks) can be calculated.

- Prior to the estimation of fundal height, the student **must centralize** the uterus **if deviated**.
- Uterus is commonly **dextrorotated to right side** due to the presence of sigmoid colon on the left side.
- Ulnar border of the student's left hand must be placed on the upper most level of fundus. Period of gestation (in weeks) can be estimated from the fundal height as follows:
  - *16 weeks*: Fundal height is midway between the symphysis pubis and umbilicus
  - *24 weeks*: Fundal height is at the level of umbilicus.

  The distance between the umbilicus and the ensiform cartilage is divided into three equal parts.
  - *28 weeks*: Fundal height corresponds to the junction of the lower third and upper two-thirds of the distance between the umbilicus and ensiform cartilage.
  - *32 weeks*: The fundal height corresponds to the junction of the upper and middle third.
  - *36–38 weeks*: Fundal height corresponds to the level of ensiform cartilage.
  - *40 weeks*: Fundal height comes down to 32–34 weeks level due to the engagement of the presenting part.
  - While the fundal height would be more or less similar at both 32 weeks and 40 weeks, the differentiating feature is that the fetal **head is free-floating at 32 weeks,** whereas it is **engaged at 40 weeks of gestation**.
- *Symphysis-fundal height (SFH)*: It can also be measured with help of a tape **(Fig. 1.4)**. Distance between the upper border of pubic symphysis and the upper most level of the fundus is measured. **After 24 weeks of gestation,** the **SFH measured in cm corresponds** to the **number of weeks up to 36 weeks.** Conditions where uterine height is not as per the period of gestation are enumerated in **Table 1.2**.
- *Leopold's maneuvers:* Four Leopold's maneuvers **(Figs. 1.5A to D)** for estimation of fetal lie, presentation, position, and assessment of engagement need to be done. Leopold's maneuvers are extremely important from the view of professional exams and therefore would be described in details later in the text. Based on the findings at the time of Leopold's maneuvers, the following need to be evaluated during the third trimester:

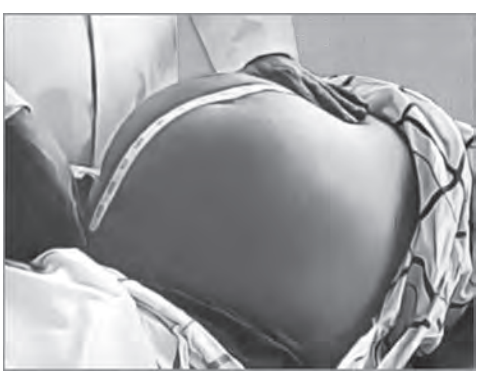


FIG. 1.4: Measurement of symphysis fundal height.

JAYPEE BROTHERS

- *Fetal lie:* The fetal lie may be longitudinal, transverse or oblique **(Fig. 1.6)**.
- *Fetal presentation:* This may be cephalic, podalic (breech) or shoulder **(Fig. 1.6)**.

TABLE 1.2: Conditions where uterine height is not as per the period of gestation (POG).

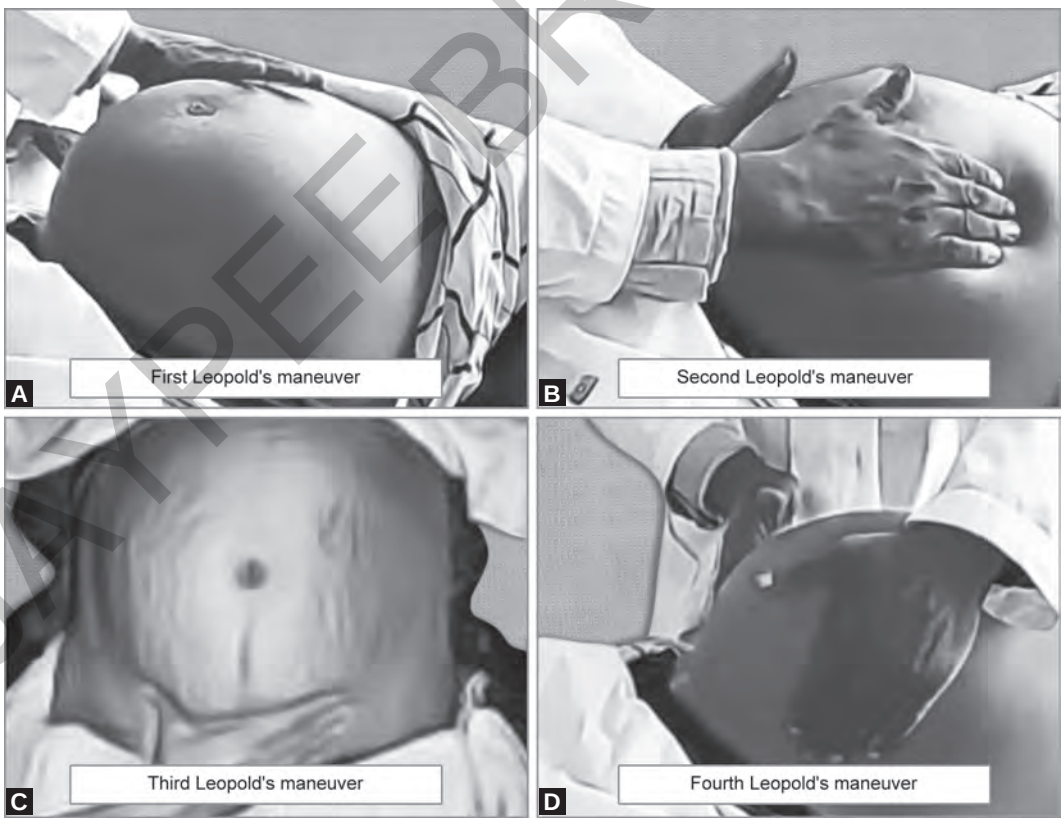
Uterine height is more than the POG	*Uterine height is less than the POG*
• Wrong dates • Twins • Polyhydramnios • Macrosomia (big baby) • Concealed accidental hemorrhage • Pelvic tumor (uterine or ovarian) • Hydatidiform mole	• Wrong dates • Oligohydramnios • Fetal growth restriction • Intrauterine uterine death

- *Estimation of fetal descent:* Assessing the engagement of fetal presenting part by feeling how many fifths of the head are palpable above the brim of the pelvis **(Figs. 1.7A and B)**.

– *Uterine contractions:* The uterus appears to be hard during the strong uterine contractions at the time of labor and it may be difficult to palpate the fetal parts.

– *Abdominal girth:* Measurement of abdominal girth **(Fig. 1.8)** and assessment of fetal growth pattern and liquor volume also need to be done. Abdominal girth less than 95 cm in the second trimester is indicative of low birthweight baby.

– *Estimation of fetal weight:* Fetal weight in case of cephalic presentation is most



FIGS. 1.5A TO D: Leopold's maneuvers.

JAYPEE BROTHERS

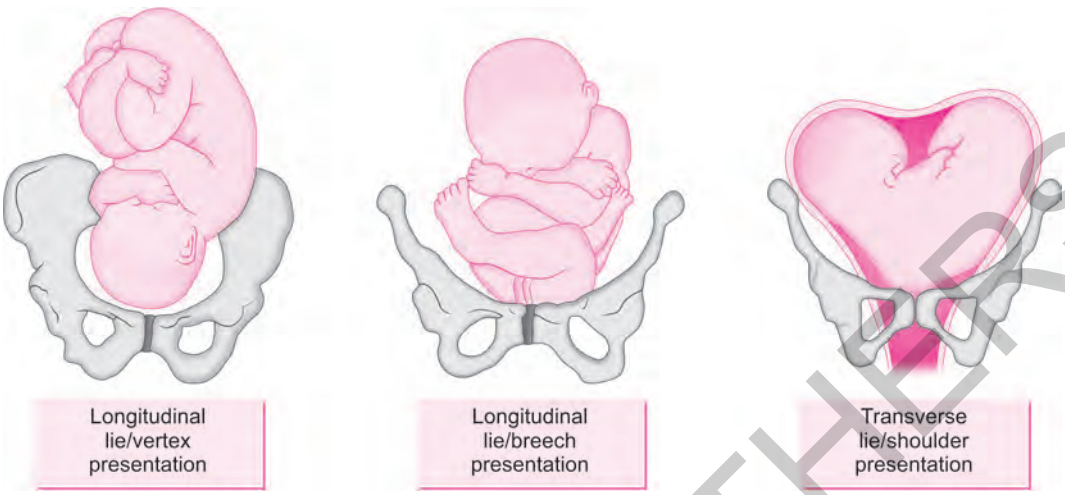
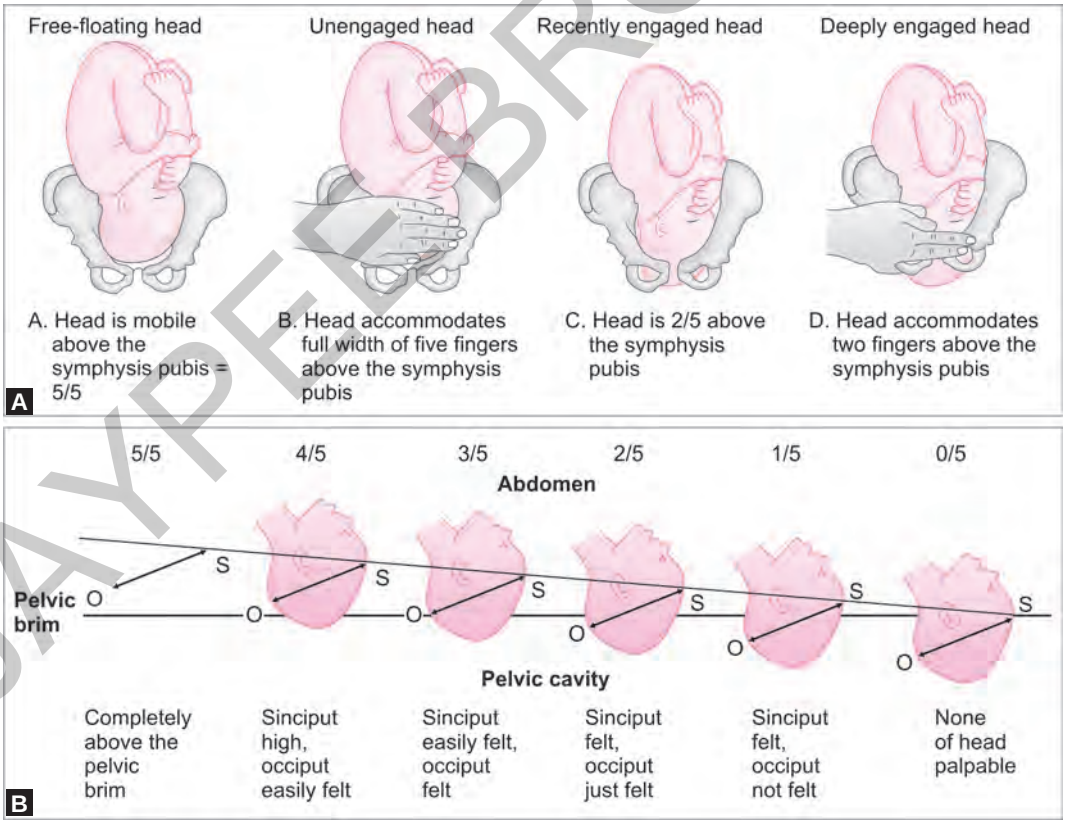


FIG. 1.6: Different types of fetal lies and presentation.



FIGS. 1.7A AND B: Estimation of fetal descent through abdominal examination.

JAYPEE BROTHERS



FIG. 1.8: Measurement of abdominal girth.



FIG. 1.9: Auscultation of fetal heart rate with help of hand held Doppler device.

commonly estimated using **Johnson's formula**, which is as follows:

Fetal weight in gram
= (fH in cm – n) × 155

Where, fH = fundal height and n = 12, when vertex is at the level of ischial spines (zero station); n = 13, when vertex is above the level of ischial spine (minus station); and n = 11, when vertex is below the level of ischial spines (plus station).
If a patient weighs more than 91 kg, 1 cm is subtracted from the fundal height.

- *External genitalia*: External genitalia must be inspected for the presence of vaginal discharge
- Pap smear may be taken.

- *Percussion*: Fluid thrill may be felt on percussion in case of polyhydramnios.
- *Auscultation*:
  - *Auscultation of fetal heart*: **Fetal heart sounds** (FHSs) can be heard with a **stethoscope or a hand-held Doppler** from **20 weeks onward**.
  - The fetal heart rate, rhythm, and regularity need to be noted.
  - **Normal fetal heart rate** varies between **110 and 160 beats/min.**
  - Fetal heart sound is most commonly **located below the umbilicus in the middle of spinoumbilical** line in case of **cephalic position (Fig. 1.9)**.
  - In case of **breech presentation**, maximum intensity of the FHS is **around the umbilicus**.

Leopold's Maneuvers

- Leopold's maneuvers basically include four steps and must be performed while the woman is lying comfortably on her back.
- The student **looks towards the patient's face** for the **first three maneuvers** and **faces her feet** for the **fourth**.
- Obstetric grips must be conducted when the uterus is relaxed and not when the woman is experiencing contractions **(Figs. 1.5A to D)**.
- The mother should be comfortable lying in supine position and her abdomen is to be bared.
- She should be asked to semiflex her thighs in order to relax the abdominal muscles.
- The following obstetric grips or Leopold's maneuvers are carried out:
  - *Fundal grip (Leopold's first maneuver)*:
    - This is conducted while facing the patient's face.
    - This grip helps the student to identify which of the fetal poles (head or breech) is present at the fundus.
    - The fundal area is palpated by placing both the hands over the fundal area.

JAYPEE BROTHERS

- Palpation of broad, soft, irregular mass is suggestive of fetal legs and/or buttocks at the fundus, thereby pointing toward head presentation.
- Palpation of a smooth, hard, globular, ballotable mass at the fundus is suggestive of fetal head and points towards a breech presentation.
- In case of transverse lie, neither of these structures can be palpated at the fundus.

– *Lateral grip (Leopold's second maneuver):*

- This grip is also conducted while facing the patient's face.
- The hands are placed flat over the abdomen on the either side of the umbilicus.
- Lateral grip helps the student in identifying the position of fetal back, limbs, and shoulder in case of vertex or breech presentation.
- The orientation of the fetus can be determined by noting whether the back is directed vertically (anteriorly, posteriorly) or transversely.
- In case of transverse lie, hard round globular mass suggestive of fetal head can be identified horizontally across the maternal abdomen.
- The fetal back can be identified as a smooth curved structure with a resistant feel. The position of the fetal back on the left or right side of the uterus would help in determining the position of the presenting part.
- The fetal limbs would be present on the side opposite to the fetal back and present as small, round, knob like structures.
- After identifying the back, the student should try to identify the anterior shoulder, which forms a well-marked prominence just above the fetal head.

– *Second pelvic grip (Pawlik's grip) or Leopold's third maneuver:*

- This examination is done while facing the patient's face. The student places the outstretched thumb and index finger of the right hand keeping the ulnar border of the palm on the upper border of the patient's pubic symphysis.
- If a hard globular mass is gripped, it implies vertex presentation.
- A soft broad part is suggestive of fetal breech.
- If the presenting part is not engaged, it would be freely ballotable between the two fingers. If the presenting part is deeply engaged, the findings of this maneuver simply indicate that the lower fetal pole is in the pelvis.
- Further details would be revealed by the next maneuver.
- In case of transverse presentation, the pelvic grip is empty.
- Normally the size of head in a baby at term would fit in the hand of the examining student.

– *First pelvic grip (Leopold's fourth maneuver):*

- The objective of this step is to determine the amount of head palpable above the pelvic brim in case of a cephalic presentation.
- First pelvic grip is performed while facing the patient's feet.
- Tips of three fingers of each hand are placed on the either side of the midline in downward and backward direction in order to deeply palpate the fetal parts present in the lower pole of the uterus.
- The fingers of both the hands should be placed parallel to the

JAYPEE BROTHERS

inguinal ligaments and the thumbs should be pointing toward the umbilicus on both the sides.
- In case of vertex presentation a hard smooth globular mass suggestive of fetal head can be palpated on pelvic grip.
- In case of breech presentation broad soft, irregular mass is palpated.

Per Speculum Examination

- Per speculum examination is required in cases where there is a history of leaking or bleeding per vaginum.
- In such cases, it is important to note the amount and nature of discharge. Such cases are unlikely to be asked in the exams.
- The examiner must never perform an internal examination in a suspected case of placenta previa. A case of actively bleeding placenta previa is unlikely to be given in exams.

Vaginal Examination

- During the antenatal period, even in the third trimester, the internal cervical os largely remains closed. Therefore, it may not be possible for the examiner to accurately assess the presentation and the position of fetus via vaginal examination.
- Therefore, this is **not required during the antenatal period** when the woman is **not in labor**. This is also not required during the exams.
- However, during labor the cervical os starts dilating and effacing. This allows palpation of the sutures and fontanels of fetal skull, thereby allowing the examiner to determine the exact position of the fetus.
- This is usually done in the later months of pregnancy beyond 37 weeks.

DIAGNOSIS

On the basis of the findings of history and clinical examination, the diagnosis needs to be mentioned to the examiner in the following format:

A .... years old, G .... P ... A ... L .... woman with, LMP ...., EDD ... corresponding to .... months .... weeks of gestation, with a singleton/multiple, alive fetus in cephalic/podalic/shoulder presentation having FHS of ..... beats/min, with or without associated complications has presented for an antenatal check-up.

INVESTIGATIONS

The following tests need to be performed during every antenatal visit:
- Blood group typing (ABO and Rh)
- Hemoglobin estimation
- Urine test for protein and glucose (to be done at every visit)
- Serological screening test for syphilis
- Rapid HIV screening test (after pretest counseling and written consent)
- Microscopic examination of wet smear of any symptomatic vaginal discharge (i.e., associated with itching, burning or foul smell)
- Hepatitis B virus surface antigen
- Pap smear is routinely performed at many clinics.

Repetition of Investigations

- Hemoglobin estimation should be repeated at **28 weeks** and **36 weeks**
- Blood sugars fasting and postprandial at **26–28 weeks**
- Checking of urine for sugars and proteins at every antenatal visit.

Special Investigations

Special investigations which need to be done in selective cases include:

Ultrasound examination: Ultrasound should be selectively used rather than as a routine.
- One first trimester scan either trans-abdominal ultrasonography (TAS) or transvaginal ultrasonography (TVS) helps

JAYPEE BROTHERS

in accurate dating as well as confirming the diagnosis of pregnancy.

- **Crown-rump length (CRL)** is the most **accurate parameter** for assessing the gestational age **prior to 12 weeks of gestation**.
- **If gestational age is to be determined after 12 weeks,** it is calculated using **biparietal diameter.**
- Parameters, such as **abdominal circumference (AC), femur length (FL), and head circumference (HC) are** useful for determination of **fetal growth restriction.**
- **Second trimester ultrasound** is usually done at **18–20 weeks** and helps in the evaluation of **congenital anomalies**.
  - Third trimester ultrasound may be done based on the patient's requirements. Parameters assessed on the ultrasound examination done in each of the three trimesters are respectively described in **Boxes 1.1 to 1.3.**

BOX 1.1: Parameters to be noted on first trimester ultrasound.

- ❑ Viability of pregnancy
- ❑ Whether pregnancy is intrauterine or extrauterine?
- ❑ Accurate pregnancy dating up to 12 weeks using crown-rump length measurement
- ❑ Number of viable fetuses
- ❑ Presence of any uterine or adnexal pathology
- ❑ Determination of nuchal translucency at 11–13 weeks of gestation

BOX 1.2: Parameters to be noted on the second trimester ultrasound.

- ❑ Anomaly or malformation scan at 18–20 weeks of gestation (detection of anomalies such as anencephaly, spina bifida, etc.)
- ❑ Measurement of fetal parameters such as biparietal diameter, femur length, abdominal circumference, and head circumference

BOX 1.3: Parameters to be noted on the third trimester ultrasound.

- ❑ Monitoring fetal growth (serial ultrasound measurements)
- ❑ Assessment of the amount of amniotic fluid (measurement of liquor pockets)
- ❑ Placenta (position, presence of retroplacental clots, and placental grading)
- ❑ Assessment of scar integrity in cases of previous LSCS (herniation of the decidual tissues through the scar can be observed in cases of weak scar)

VIVA QUESTIONS

Q. What are the changes in genital organs occurring during pregnancy?

Ans. Following changes occur in the genital organs during pregnancy:

- *Vagina:*
  - *Chadwick's or Jacquemier's sign:* The vaginal walls show a bluish discoloration as the pelvic blood vessels become congested, resulting in **bluish discoloration beneath the squamous epithelium of portio vaginalis (Fig. 1.10).** This sign can be observed by **8–10 weeks of gestation.**
  - *Osiander's sign:* There is **increased pulsation in the vagina** felt through the **lateral fornix** at **8 weeks of gestation**.

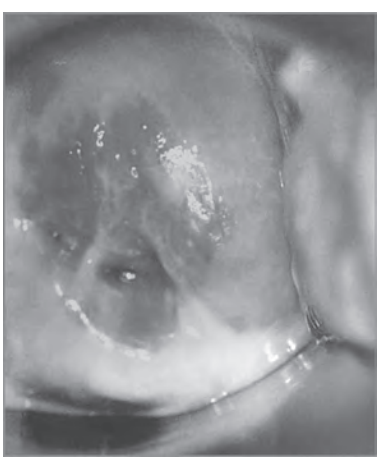


FIG. 1.10: Jacquemier's sign.
(For color version, see Plate 1)

JAYPEE BROTHERS

- *Uterus:*
  - *Uterine enlargement:* Enlargement of the uterus occurs due to hypertrophy and hyperplasia of the individual muscle fibers under the influence of hormones such as estrogen and progestogens. Uterine enlargement is more marked in the fundus. For the first few weeks of pregnancy, the uterus maintains its original pear shape, but becomes almost **spherical** by **12 weeks of gestation**. Thereafter, it increases more rapidly in length, than in width becoming ovoid in shape. **Until 12 weeks,** the uterus **remains a pelvic organ** after which it can be palpated per abdominally.
  - *Weight:* The uterus increases in weight from prepregnant 70 g to approximately 1,100 g at term.
  - *Hegar's sign:* At **6–8 weeks of gestation,** the cervix is firm in contrast to the soft isthmus and fundus. Due to the marked softness of uterine isthmus, cervix and body of uterus may appear as separate organs. As a result, the isthmus of the uterus can be compressed between the fingers palpating vagina and abdomen, which is known as Hegar's sign **(Fig. 1.11).**
  - *Palmer's sign:* Regular rhythmic uterine contractions which can be elicited during the bimanual examination can be felt as early as **4–8 weeks of gestation**.

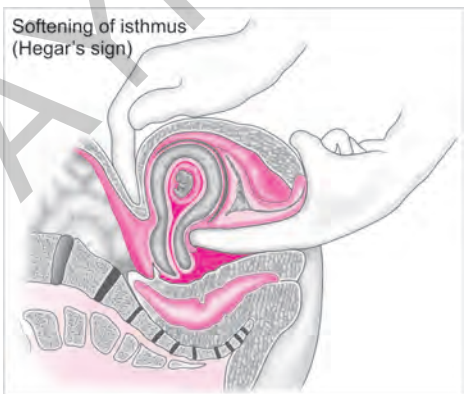


FIG. 1.11: Hegar's sign.

  - *Braxton Hicks contractions:* In the early months of pregnancy, uterus undergoes contractions known as **Braxton Hicks contractions,** which may be **irregular, infrequent, and painless without any** effect on the **cervical dilatation and effacement**. Toward the last weeks of pregnancy, these contractions increase in intensity, thereby resulting in pain and discomfort for the patient and may occur after every 10–20 minutes, thereby assuming some form of rhythmicity. Eventually, these contractions merge with the contractions of labor.
  - *Uterine isthmus:* There is **hypertrophy of the uterine isthmus** to about three times its original size during the **first trimester** of pregnancy. After 12 weeks of pregnancy, the uterine isthmus unfolds from above downward to get incorporated into the uterine cavity and also **takes part** in the **formation of lower uterine segment.**
  - *Blood flow:* There is an increase in **the uteroplacental blood flow** ranging between **450 mL/min and 650 mL/min near term**. This increase is principally due to **vasodilatation**
  - *Uterine soufflé:* This is a soft blowing sound **synchronous** with the **maternal pulse**. It is caused by rush of blood through the **dilated vessels of the uterus**. On the other hand, **fetal soufflé** is a sharp whistling sound **synchronous** with the **fetal pulse**. It is caused by the rush of blood through **umbilical arteries**.
- *Cervix:*
  - *Goodell's sign:* There occurs hypertrophy and hyperplasia of the elastic and connective tissue fibers and increase in vascularity within the cervical stroma. This is likely to result in **cervical softening** (known as **Goodell's sign**), which becomes evident by **6 weeks** of pregnancy.

JAYPEE BROTHERS

- *Cervical mucus plug formation:* With the advancement of pregnancy, there is marked proliferation of endocervical mucosa with downward extension of the squamocolumnar junction. There is copious production of cervical secretions resulting in the formation of a thick mucus plug which seals the cervical canal. This mucus plug is rich in cytokines and immunoglobulins, and acts as an immunological barrier to protect the uterine contents against infection from the vagina.

Q. How is the diagnosis of pregnancy established?

Ans. Pregnancy can be diagnosed by performing the following tests:

- *Pregnancy test:* The laboratory test for pregnancy is based on the identification of β-**human chorionic gonadotropin (hCG)**, which can be **detected** as early as **7–9 days after fertilization** by highly sensitive techniques **(Fig. 1.12)**. The samples may be blood or urine. Currently, the following four main types of hCG assays are used:
  - Radioimmunoassay
  - Immunoradiometric assay
  - Enzyme-linked immunosorbent assay (ELISA)
  - Fluoroimmunoassay.

  Most current urine pregnancy tests have **sensitivity** to detect hCG levels of approximately **25 mIU/mL** and involve the use of antibodies which are highly specific for β-subunit of hCG.

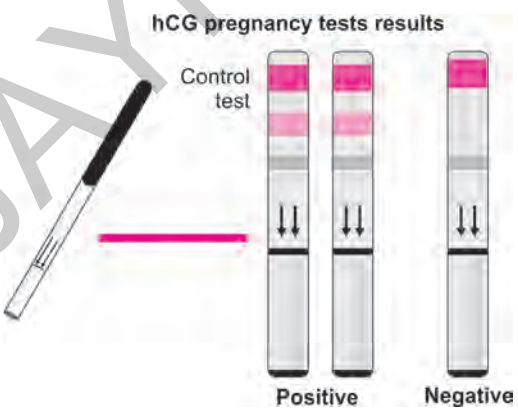


FIG. 1.12: Urine pregnancy test.

- *Ultrasonography:* **Transvaginal ultrasonography** may demonstrate the **gestational sac** (GS) by **4–5 weeks of gestation**.
  - **Transabdominal ultrasonography** is able to detect GS by **5–6 weeks of gestation**.
  - By 35 days of gestation, a normal sac is visible in all women and by **6 weeks, fetal cardiac activity** can be visualized.
  - Up to **12 weeks,** the **CRL is predictive of gestational age within 5 days.**
  - The **yolk sac** can normally be recognized by **5–6 weeks gestation** and is seen until approximately 10 weeks' gestation.
  - With the advent of **TVS,** the **diagnosis of pregnancy** can be made **even earlier** than is possible with TAS.

Q. What are the aims and objectives of antenatal check-up?

Ans. Antenatal check-up is provided with the following aims and objectives:

- Achieving a normal pregnancy with a healthy mother and a healthy baby: This involves promoting and protecting the health of women and the unborn fetus during pregnancy by giving following advice to the pregnant woman:
  - *Nutritional advice*: Supplementation with iron, folate, and calcium.
  - *Treatment of medical disorders:* Treatment of conditions, such as malaria, tuberculosis, HIV, etc., which are likely to affect both mother and fetus.
  - *Immunization:* Tetanus toxoid immunization.
  - *HIV testing and counseling:* Provision of voluntary testing and counseling for HIV.
- Reducing maternal and perinatal mortality and morbidity
- Screening the high-risk cases
- Prevention and/or treatment of any complication which appears during pregnancy

JAYPEE BROTHERS

for detailed information on obstetrics & gynecology books, visit our website www.jaypeebrothers.com, for detailed information on obstetrics & gynecology books, visit our w

CLINICAL CASES IN OBSTETRICS & GYNECOLOGY WITH VIDEOS FOR UNDERGRADUATES

The book, *Clinical Cases in Obstetrics and Gynecology With Videos for Undergraduates*, containing 15 clinical cases in obstetrics and 10 clinical cases in gynecology would serve as a useful accompaniment to the standard textbook for the undergraduate students. All these cases are important from the point of view of an undergraduate examination and would empower the students with the exact amount of knowledge they require to clear the undergraduate practical examination in obstetrics and gynecology. The size of the book has been designed in such a way that it remains handy and can be easily carried by the students during their ward rounds. Each clinical case has been illustrated with the help of flowcharts and numerous illustrations to enable easy understanding of the text.

Another important feature of this book is the addition of online components, which include 250 MCQs, 15 videos, and resources for table viva. MCQs have been presented in an interactive manner which would enable the students to attempt the question and find out whether their answer is correct or not? 15 videos have been added to enable the students understand the performance of procedures such as Pap smear, episiotomy, etc. Difficult clinical concepts, such as pathogenesis of gestational diabetes and Rh isoimmunization, have been explained with the help of animation videos. Besides these, there is also an hour-long video discussing the clinical examination in both obstetrics and gynecology. This would prove extremely useful for the undergraduate students appearing for the practical examination in obstetrics and gynecology.

Richa Saxena MBBS MD (Obs & Gyne) PG Diploma in Clinical Research, successfully completed her graduation from the prestigious Maulana Azad Medical College, New Delhi, India. Following this, she pursued her postgraduation in obstetrics and gynecology from Delhi University. She was also involved in the WHO-sponsored multicentric research study at the eminent All India Institute of Medical Sciences (AIIMS), New Delhi, India. To further enhance her knowledge in the field of obstetrics and gynecology, she went to UK to pursue MRCOG. She is the recipient of the Rotary Vocational Excellence Award (2018) for her exemplary academic contribution in the field of obstetrics and gynecology.

She has been mentoring and directing "cracking MRCOG" an online e-learning platform by Jaypee Brothers Medical Publishers (P) Ltd. for all MRCOG aspirants (inclusive of the three parts), since past 5 years. She has also authored bestselling books for all the three parts of the examination.

She has a profound passion for writing. Other than authoring books for three parts of the MRCOG examination, she has authored several medical books related to obstetrics and gynecology both for undergraduates and postgraduates. She is a coauthor of *Jeffcoate's Principles of Gynaecology* (9th edition), considered as the bible of gynecology for the postgraduates. Besides academic writing, she also has a passion for creative writing and has authored a few biographies as well as a fictional novel. More details about the author and her works can be found at her website, www.drrichasaxena.com.

Printed in India

Available at all medical bookstores or buy online at www.jaypeebrothers.com

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road, Daryaganj, New Delhi - 110 002, INDIA
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

Shelving Recommendation
OBSTETRICS & GYNECOLOGY

ISBN 978-93-90595-33-4