AOGD BULLETIN

"Women's wellness-From tiny heartbeats to timeless strength"

THEME: OBSTETRIC EMERGENCIES:DECISION-MAKING DYNAMICS

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AOGD Bulletin

From the President's desk

Dear AOGD members,

Greetings from Team AOGD, LHMC

Spring season is going on, which offers a pleasant climate. This season is also known as king of seasons. It brings bloomy flowers, new leaves and moderate temperature bridging between cold winter and hot summer. I hope everybody is enjoying this weather. This month is also observed as cancer awareness month. A number of activities of cancer awareness has been conducted by our members and a few more are lined up. We at hardinge also conducted a public awareness programme for cancer cervix and breast cancer awareness. Present issues focuses on Obstetrics Emergencies. During antenatal, intrapartum and postpartum period, at times there are unforeseen challenges that demand immediate and precise approach in managing the situation. Topics included are must know for every obstetrician. I hope this issue will be very helpful for all practicing obstetricians. I congratulate Dr Vidhi Chaudhary and Dr Manisha for editing this issue on such a relevant theme.

Happy reading

President AOGD

From the Secretarial Desk

Dr Ratna Biswas
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Greetings from the AOGD Secretariat!

Congratulations to the AICOG team at the grand success of the 68th All India Congress of Obstetrics & Gynecology! We are extremely proud of team Delhi were pulling off the event with great precision and perfection.

AOGD congratulates our distinguished and esteemed ex-President Dr Alka Kriplani ma'am for having been bestowed upon with the prestigious FOGSI Lifetime Achievement Award.

We are also extremely proud of our star performers for winning numerous prizes in all categories of paper and poster competitions.

Amongst the chief events organised in January by AOGD was an Awareness Session on Cyber Security and Public Health conducted by Community Health and public awareness Sub Committee in association with Delhi Paramedical & Management Institute (DPMI). The Oncology subcommittee celebrated the cervical cancer awareness month by hosting public forum and educational events.

The AOGD secretariat at Lady Hardinge Medical College organized a 4 day Workshop on Robotics Training on Simulator and Suturing & Knotting Techniques. The event saw enthusiastic participation from both the youngsters and the senior members.

This month's Bulletin features topics on "Obstetric Emergencies" which is extremely important for all obstetricians. I congratulate the Editorial team led by Dr Manisha & Dr Vidhi Chaudhary for bringing forth this useful issue and wish her all the success.

AOGD Secretariat

From the Editor's Desk

Dr Pikee Saxena

Dr Manisha Kumar

Dr Vidhi Chaudhary

Dr Shilpi Nain

Dr Apoorva Kulshreshtha

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Co-editor

Obstetric emergencies are among the most formidable challenges in maternity care, accounting for a significant proportion of maternal and perinatal morbidity and mortality. Conditions such as obstetric haemorrhage, severe preeclampsia and eclampsia, postpartum collapse, amniotic fluid embolism, and cardiac failure demand immediate recognition and decisive action. Emergencies affecting the foetus such as shoulder dystocia can be equally catastrophic if not managed promptly.

These situations unfold rapidly and unpredictably during pregnancy, labour or the postpartum period, often within minutes, requiring a well-coordinated sequence of interventions. Optimal outcomes depend on the preparedness of the obstetrician and the healthcare team, familiarity with standardized protocols and effective multidisciplinary collaboration.

This special issue of the AOGD Journal on "Obstetric Emergencies" aims to strengthen clinical readiness by emphasizing early recognition, evidence-based management, simulation training, and system-level preparedness to prevent adverse outcomes such as preterm birth, stillbirth and long-term maternal and neonatal morbidity.

In an era where reducing maternal mortality and severe maternal morbidity remains a global priority, seamless teamwork, rapid response algorithms, and continuous audit form the cornerstone of safe obstetric practice.

We hope this issue serves as a practical resource for clinicians and training programs, advancing the shared goal of safer motherhood and improved perinatal outcomes. The Editorial Board sincerely thanks all contributors and reviewers for their invaluable expertise.

The Editorial Team

Cord Prolapse: Identification and Immediate Clinical Interventions

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Introduction

Umbilical cord prolapse is one of the most dramatic and life-threatening emergencies encountered in obstetric practice. Although relatively uncommon, its sudden onset and rapid progression can lead to severe fetal hypoxia, neurological damage, or intrauterine fetal death if prompt recognition and immediate intervention are not instituted. The reported incidence ranges from **0.1% to 0.6% of deliveries**, with higher rates seen in preterm births, malpresentations, and multiple pregnancies.[1] Cord prolapse represents a situation in which the umbilical cord descends through the cervix and lies alongside or below the presenting part of the fetus after rupture of the membranes, making it vulnerable to compression during uterine contractions or by the presenting fetal part.

The umbilical cord serves as the lifeline between the mother and fetus, providing oxygen and nutrients while removing waste products. Any interruption in umbilical blood flow, even for a short duration, can have catastrophic consequences for the fetus. Therefore, early identification and rapid clinical response are essential to improve perinatal outcomes. Advances in intrapartum fetal monitoring and emergency obstetric care have reduced mortality rates, yet cord prolapse remains an important cause of preventable perinatal morbidity and mortality worldwide.

Definition

Umbilical cord prolapse is defined as the **descent of the umbilical cord through the cervix after rupture of membranes, such that the cord lies below or alongside the presenting part of the fetus**, and is therefore subject to compression(2). The condition may be visible at the vulva or detected on vaginal examination, or may be concealed and suspected only through fetal heart rate abnormalities.

Classification of Cord Prolapse

Cord prolapse is classified into three main types based on clinical presentation:

1. Overt Cord Prolapse

Overt cord prolapse occurs when the umbilical cord slips past the presenting part and becomes **palpable in the vagina or visible at the vulva** following rupture of membranes. This is the most obvious and dangerous form, as the cord is directly compressed during contractions. Fetal compromise occurs rapidly unless immediate action is taken.

2. Occult Cord Prolapse

In occult cord prolapse, the cord lies **alongside the presenting part but does not protrude through the cervix**. It cannot be seen or felt during routine examination. This type is often diagnosed indirectly by **sudden fetal heart rate abnormalities**, particularly variable or prolonged decelerations on cardiotocography. Occult prolapse is more difficult to identify and requires a high index of suspicion.

3. Funic Presentation

Funic presentation refers to the presence of the umbilical cord **between the presenting part and the intact membranes** before rupture. Although not an emergency by itself, it carries a high-risk of progressing to overt cord prolapse once the membranes rupture, either spontaneously or artificially Fig 1.[2]

Incidence and Epidemiology

The reported incidence of cord prolapse ranges from **0.1% to 0.6% of all deliveries**. The incidence is higher in preterm births, malpresentations, and multiple pregnancies. Despite its rarity, cord prolapse accounts for a disproportionate share of perinatal deaths, particularly in settings where access to rapid operative delivery is limited.

Etiology and Risk Factors

Cord prolapse occurs when the presenting part does not adequately occupy the pelvic inlet, allowing the umbilical cord to slip past it. Several maternal, fetal, and iatrogenic factors increase the risk.

Table 1: Risk factors for cord prolapse

Maternal Risk Factors	Fetal Risk Factors	Iatrogenic Risk Factors

• Multiparity with lax uterine and abdominal muscles
• Preterm labor
• Polyhydramnios, leading to sudden gush of liquor
• Pelvic tumors or uterine abnormalities
• Placenta previa (rare association)
	• Malpresentations:
	  o Breech presentation, especially footling breech
	  o Transverse lie
	  o Oblique lie
	• Low birth weight or growth-restricted fetus
	• Multiple pregnancy, particularly the second twin
		• Artificial rupture of membranes when the presenting part is high
		• External cephalic version
		• Internal podalic version
		• Placement of fetal scalp electrodes
		• Amnioinfusion

Pathophysiology

The fundamental problem in cord prolapse is **compression of the umbilical cord**, which compromises fetal circulation. Compression first affects the **thin-walled umbilical vein**, reducing venous return to the fetus and leading to hypotension. Continued pressure then compromises the **umbilical arteries**, causing reduced oxygen delivery and accumulation of carbon dioxide and metabolic acids.

Prolonged or severe cord compression results in:

- Fetal hypoxia
- Metabolic acidosis
- Bradycardia
- Hypoxic-ischemic encephalopathy
- Intrauterine fetal death

The severity of fetal injury depends on the **duration of compression, gestational age, and speed of intervention**.

Identification of Cord Prolapse

Early identification is crucial to prevent fetal compromise.

Clinical Identification

1. Fetal Heart Rate Abnormalities

The most common initial sign of cord prolapse is a **sudden change in fetal heart rate**, typically occurring after rupture of membranes. These include:

- Sudden onset fetal bradycardia
- Recurrent or severe variable decelerations
- Prolonged decelerations

Any unexplained fetal heart rate abnormality following membrane rupture should prompt immediate evaluation for cord prolapse.[3]

2. Vaginal Examination

On vaginal examination, the examiner may feel a **soft, pulsating, tubular structure** distinct from the presenting part. Care should be taken to minimize handling of the cord to prevent vasospasm.

3. Visual Inspection

In overt prolapse, the umbilical cord may be **seen protruding from the vagina**, appearing bluish and glistening. Absence of pulsation suggests fetal compromise but does not alter the urgency of management.

4. Cardiotocography

Continuous fetal monitoring may show persistent abnormalities consistent with acute cord compression, particularly in occult prolapse.
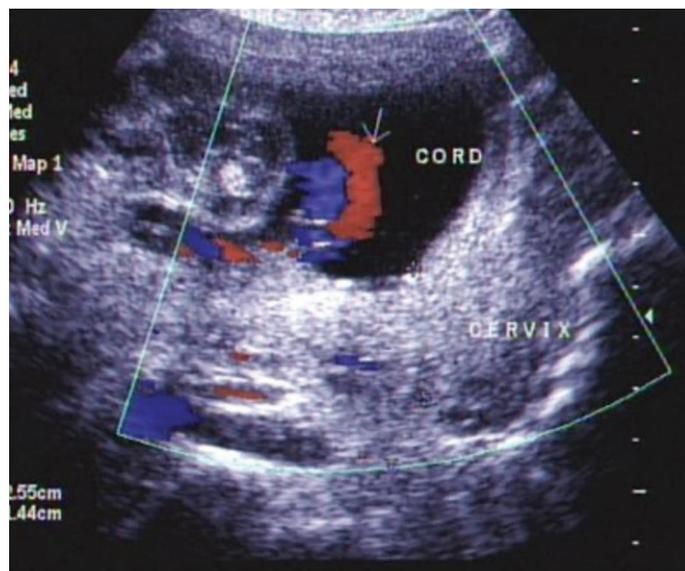
Fig 1 Ultrasound image of Cord Presentation

Differential diagnosis

Fetal heart rate abnormalities can also be caused by a fall in maternal blood pressure, tachysystole, placental abruption, uterine rupture, or vasa previa.

Intrapartum – Intrapartum cord prolapse should be suspected in patients with abrupt onset of severe, prolonged fetal bradycardia or moderate to severe variable decelerations after a previously normal tracing. The diagnosis of overt umbilical cord prolapse is based on visualization or palpation of the umbilical cord ahead of the presenting part. Nonovert prolapse may or may not be confirmed at cesarean birth.

Antepartum – Antepartum ultrasound examination may show the umbilical cord interposed between the presenting part of the fetus and the internal cervical os. Color flow Doppler studies help in confirming diagnosis. Transvaginal imaging may be for further clarity.

Fetal bradycardia following injection of a neuraxial anesthetic suggests a fall in maternal blood pressure as the cause. This diagnosis is supported by normalization of the fetal heart rate in response to maternal intravenous fluid infusion and phenylephrine or ephedrine administration.

Placental abruption, uterine rupture, and vasa previa are usually accompanied by vaginal bleeding, and abruption and rupture are often painful which distinguishes these disorders from nonovert (occult) prolapse, which is painless.

Tachysystole is defined by the presence of more than 5 contractions in 10 minutes.

Immediate Clinical Interventions

Cord prolapse is a **time-critical emergency**, and management must begin immediately upon diagnosis(4).

Principles of Emergency Management(Algorithm1)

The primary objectives are:

1. **Relieve compression of the umbilical cord**
2. **Improve fetal oxygenation**
3. **Expedite delivery**

Initial Emergency Measures

1. Call for Help

Immediate activation of the obstetric emergency team is essential, including:

- Senior obstetrician
- Anaesthetist
- Neonatologist
- Nursing and operating theatre staff

Clear communication and teamwork are vital.

2. Maternal Positioning

Positioning helps reduce pressure on the cord using gravity.

- •**Knee-chest position**: The woman kneels with her chest and face downwards, allowing the fetus to move away from the pelvis.
- **Trendelenburg position**: The woman lies supine with the head down and legs elevated if knee-chest is not feasible (15 to 30 degrees).

3. Manual Elevation of the Presenting Part

A gloved hand is inserted into the vagina to **gently elevate the presenting part away from the cord**. This manoeuvre should be maintained continuously until delivery. The cord should **never be pushed back into the uterus**, as this can cause vasospasm and worsen hypoxia(5).

4. Care of the Prolapsed Cord

If the cord is exposed:

- Avoid excessive handling
- Cover it with warm saline-soaked sterile gauze
- Prevent drying and temperature-induced vasoconstriction

5. Bladder Filling (Vago's Method)

Instillation of **500–700 mL saline** via Foley catheter may be used if immediate delivery is delayed. The distended bladder elevates the presenting part, thereby reducing pressure on the prolapsed cord. Bladder filling is particularly useful when manual elevation cannot be continuously maintained or when prolonged transfer times are anticipated. However, it should be viewed strictly as a temporary intervention and must not delay definitive delivery.[6]

6. Oxygen Therapy

High-flow oxygen via face mask improves maternal oxygen saturation and enhances fetal oxygen delivery.

7. Discontinuation of Uterotonic Agents

Oxytocin or prostaglandins should be stopped immediately to reduce uterine contractions and minimize further cord compression.

8. Tocolysis

Short-acting tocolytics such as beta-agonists may be used when immediate delivery is not possible, particularly during transfer, to suppress uterine activity temporarily.

Definitive Management: Mode of Delivery

Emergency Cesarean Section

Emergency cesarean section is the **preferred and most common mode of delivery**, especially when:

- Cervix is not fully dilated
- Vaginal delivery is not imminent
- Fetal heart rate abnormalities persist
- The goal is to achieve a decision-to-delivery interval of less than 30 minutes, ideally much shorter.
- Vaginal Delivery

Vaginal delivery may be considered if:

- Cervix is fully dilated
- Presenting part is low
- Delivery can be achieved immediately
- Methods include forceps delivery, vacuum extraction, or breech extraction by an experienced obstetrician.

Management Based on Fetal Status

Live Fetus

Aggressive resuscitative measures and immediate delivery are mandatory.

Intrauterine Fetal Demise

Emergency intervention to relieve cord compression is unnecessary. Vaginal delivery may be allowed unless contraindicated.

Post-Delivery Care

Neonatal Care

- Immediate neonatal resuscitation
- Assessment of Apgar scores and cord blood gases

- Admission to neonatal intensive care unit if required

Maternal Care

- Monitoring for postpartum hemorrhage
- Emotional support and counseling
- Detailed documentation and debriefing

Prevention of Cord Prolapse

Preventive strategies include:

- Avoiding artificial rupture of membranes when the presenting part is high
- Confirming engagement before amniotomy
- Controlled rupture of membranes
- Hospital delivery for high-risk pregnancies
- Continuous fetal monitoring during labor

Prognosis

Perinatal mortality associated with cord prolapse ranges from **5% to 15%**, depending on gestational age, speed of diagnosis, and access to emergency obstetric services. Rapid identification and intervention significantly improve outcomes.

Conclusion

Umbilical cord prolapse is a rare but devastating obstetric emergency requiring **immediate recognition and decisive management**. Identification relies on vigilance, especially following rupture of membranes, and prompt response to fetal heart rate abnormalities. Immediate interventions aim to relieve cord compression, optimize fetal oxygenation, and expedite delivery—most commonly by emergency cesarean section. With timely, coordinated multidisciplinary care, the adverse outcomes associated with cord prolapse can be significantly reduced.

CORD PROLAPSE - MANAGEMENT FLOW CHART

Rupture of membranes ↓ Sudden fetal heart rate abnormality (Bradycardia/severe variable decelerations)
Suspect cord prolapse ↓ Gentle vaginal examination Cord felt/seen →Overt prolapse Not felt + FHR abnormal →Occult prolapse
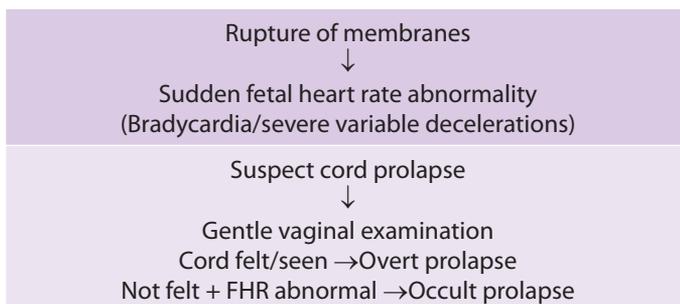
IMMEDIATE EMERGENCY ACTIONS (SIMULTANEOUS) Call for help (Obstetrician, Anesthetist, Neonatologist) Knee-chest/Trendelenburg position Manual elevation of presenting part DO NOT push cord back
Cord care (if visible) Avoid handling Cover with warm saline-soaked gauze
Supportive measures High-flow oxygen Stop oxytocin Bladder filling (500-700 mL saline) Tocolysis if delay anticipated
Assess cervical dilatation & imminence of delivery
Cervix fully dilated and delivery imminent? YES→ Immediate vaginal delivery (Forceps/Vacuum/Breech extraction) NO→Emergency cesarean section (Gold standard, D-D time < 30 min)
Delivery ↓ Post-delivery care Neonatal resuscitation NICU Maternal monitoring & counseling

References

1. gtg-50-umbilicalcordprolapse-2014.pdf [Internet]. [cited 2026 Jan 22]. Available from: https://www.rcog.org.uk/media/3wykswng/gtg-50-umbilicalcordprolapse-2014.pdf

2. Umbilical cord prolapse - UpToDate [Internet]. [cited 2026 Jan 22]. Available from: https://www.uptodate.com/contents/umbilical-cord-prolapse?search=cord%20prolapse&source=search_result&selectedTitle=1~25&usage_type=default&display_rank=1

3. ACOG Committee Opinion No. 766 Summary: Approaches to Limit Intervention During Labor and Birth. Obstet Gynecol. 2019 Feb;133(2):406–8.

4. Houri O, Walfisch A, Shilony A, Zafrir-Danieli H, Hendin N, Matot R, et al. Decision-to-delivery interval and neonatal outcomes in intrapartum umbilical cord prolapse. BMC Pregnancy Childbirth. 2023 Jun 22;23(1):463.

5. Boushra M, Stone A, Rathbun KM. Umbilical Cord Prolapse. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2026 Jan 22]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK542241/

6. Galvan JM, Van De Velde M. Obstetric emergencies: umbilical cord prolapse. BJA Educ. 2024 Jul;24(7):227–30.

Deep Transverse Arrest: Timely Diagnosis and Management

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Introduction

Deep transverse arrest (DTA) remains a clinically relevant cause of second-stage dystocia, particularly in units managing a high volume of labour with limited access to advanced operative expertise. DTA continues to contribute to operative vaginal births and second-stage caesarean sections, both of which carry increased maternal and neonatal morbidity when delayed or poorly executed. A clear understanding of the mechanisms, timely diagnosis, and evidence-based management is therefore essential for postgraduate trainees and practising obstetricians.

Definition

Deep transverse arrest is defined as failure of rotation and descent of the fetal head in the second stage of labour, with the head remaining in an occipito-transverse position at or below the level of the ischial spines despite full cervical dilatation and adequate uterine contractions.[1] The arrest typically occurs in the mid-pelvis and can reflect a mechanical mismatch between the fetal head and maternal pelvis, or can also be related to inadequate uterine contractions.

Incidence and relevance

About 20-25% patients with vertex presentation have occipito-posterior positions at the onset of labour, out of which almost 90% convert into occipito-anterior positions in the second stage of labour. <5% undergo short anterior rotation(1/8th) and end up in deep transverse arrest.[2] The exact incidence of DTA is, however, difficult to quantify and varies with diagnostic criteria and obstetric practice patterns. With increasing use of epidural analgesia and more liberal definitions of prolonged second stage, malpositions such as occipito-transverse and occipito-posterior are being recognised more frequently.[3] DTA is an important contributor to prolonged second stage, rotational operative vaginal delivery, and caesarean delivery at full dilatation.

Etiology and pathophysiology

Normal labour requires progressive descent accompanied by internal rotation of the fetal occiput from a transverse to an anterior position. In DTA, this rotational mechanism fails.

Contributing factors include:

- **Fetal factors:**
- Occipito-posterior position(with incomplete anterior rotation),
- Deflexed head – changes and increases the presenting/engaging fetal head diameters(from the smaller suboccipito-bregmatic of 9.5cm to the larger suboccipito-frontal of 10.5cm or the occipito-frontal of 9.5cm, based on the degree of deflexion), making the rotation process difficult. Alignment of the fetal and maternal spine curvatures explains the tendency to deflexion in OP position. Such increased presenting diameters may cause arrested rotation or persistence of the head in transverse diameter, ultimately resulting in deep transverse arrest.[7]
- Macrosomia

- **Maternal pelvic factors:**
- Android pelvis (heart-shaped),
- Platypelloid pelvis (flattened antero-posteriorly), both android and platypelloid pelvis can lead to inadequate space for the occiput to rotate anteriorly or posteriorly.
- Contracted mid-pelvis, even minor degrees (suspected when Interischial spinous diameter <10cm, and definitive when it measures <8cm)
- Cephalopelvic disproportion.

- **Labour-related factors:**
- inadequate maternal efforts,
- epidural analgesia reducing maternal bearing-down,
- mal-coordinated or abnormal uterine activity.

- **Iatrogenic factors:**
- delayed intervention,
- lack of operator skill in rotational techniques.

Most cases of DTA represent a combination of malposition and borderline pelvic adequacy rather than absolute pelvic contraction.[1]

Diagnosis

Clinical diagnosis

DTA is diagnosed in the second stage of labour when:
- The cervix is fully dilated.
- The fetal head is engaged at or below the ischial spines.
- The sagittal suture lies in the transverse diameter, with either or both fontanelles felt there
- There is no progressive descent or rotation despite

adequate contractions over an appropriate observation period.

Role of ultrasound

Intrapartum ultrasound, particularly transperineal ultrasound, is being increasingly used to identify fetal head position and station. Both ACOG and FIGO acknowledge its usefulness when digital examination is inconclusive, especially in obese patients or after prolonged labour, or in case caput develops.[3,5]

Specific sonographic landmarks that are used to identify fetal position include - visualisation of the fetal orbits indicating an occiput posterior position, identification of the midline cerebral echo suggesting an occiput transverse position and direct visualisation of the occiput and cervical spine which is characteristic of an occiput anterior position. For the fetal head station assessment, transperineal ultrasound is performed in the midsagittal plane. Head to Perineum Diameter is measured in a frontal transperineal scan as the shortest distance from the outer bony limit of the fetal skull to the perineum.[8]

A combined approach, including both trans-abdominal and transperineal, is recommended for accurately determining the fetal head position and station of the head.[8]

Nevertheless, ultrasound should be viewed as an adjunct rather than a replacement for clinical assessment.[3,5]
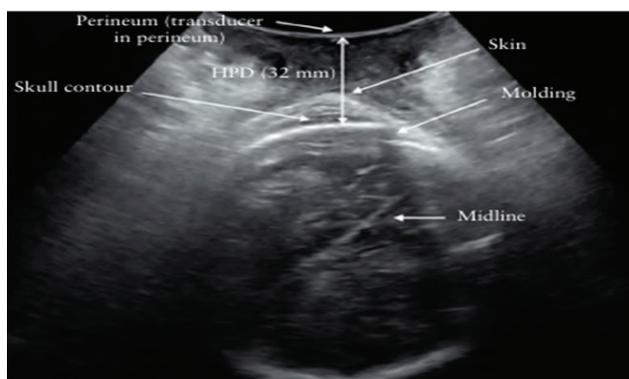
Figure 1: shows various USG parameters. Note that the head station measured by transperineal ultrasound should be along the head direction[8]

Assessment before intervention

Before labelling DTA and proceeding to intervention, the following must be systematically assessed:

- Adequacy of uterine contractions (and oxytocin augmentation if required).
- Maternal exhaustion and ability to bear down.
- Fetal well-being on continuous cardiotocography.
- Exact fetal head position and station.
- Availability of skilled personnel and facilities for operative vaginal delivery or second-stage caesarean section.

Management

Management of DTA should be individualised, timely, and guided by maternal–fetal status and operator expertise.

Expectant management

A short, closely supervised period of expectant management may be reasonable if maternal and fetal conditions are reassuring and contractions are suboptimal. Prolonged waiting without progress is discouraged, as it increases the risk of infection, exhaustion, and operative morbidity. ACOG advises against arbitrary time limits, instead emphasising ongoing assessment of progress and safety.[3]

Rotational manoeuvres

Principle: Conversion of the occiput from a transverse to an anterior position, followed by spontaneous or assisted vaginal delivery.

Requirements:

- Adequate analgesia or regional anaesthesia.
- Fully dilated cervix and ruptured membranes.
- Known fetal head position and engaged head.
- Skilled operator.

Manual method

Manual rotation is a valuable first-line intervention in appropriately selected cases. It can be performed by 2 methods:[1]

1. Digital rotation:

Rotation of the fetal head using the fingers only(usually 2 fingers), through the vagina. The palm does not enter the vagina.

The fingers are placed on the parietal bone, or in case moulding is present, they are hooked against the ridge created by the overlapping bones.

Gentle pressure is applied between contractions, and with multiple contractions, occiput is rotated anteriorly.[1]

2. Manual rotation:

Rotation of the fetal head using the entire hand introduced into the vagina.

The palm is used to cuff the fetal head.

In ROP position, the right hand is used for cupping, the fingers and thumb controlling either side of the face, and rotated clockwise to achieve a right occipito-anterior position.

In LOP position, the manoeuvre is performed with the left hand and rotation is counterclockwise.

Between contractions, the head is first flexed to reduce the presenting diameter, then gently elevated to allow adequate space for rotation, and finally rotated anteriorly to permit descent.[1]
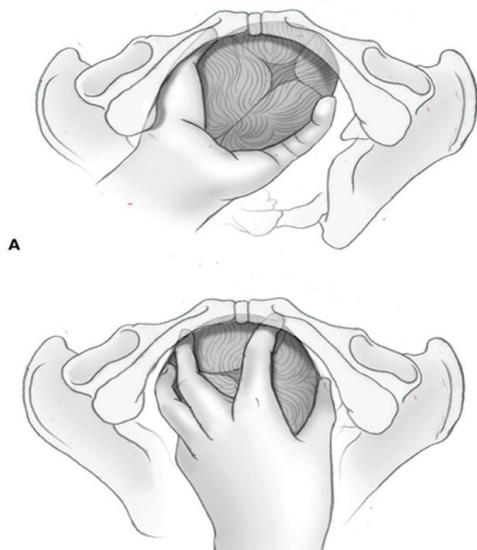
Figure 2: Manual rotation in ROP position, using the left hand[1]

A retrospective cohort study conducted by Shaffer BL et al. found that manual rotation was associated with lower rates of caesarean section and adverse maternal outcomes.[6] Forceful or repeated attempts should be avoided.

Studies by Le Ray et al. (2007, 2013) demonstrated success rates above 90% and a low incidence of complications. In a series of 796 rotations, no umbilical cord prolapse was reported, and cervical injury was rare. Although transient fetal heart rate abnormalities were observed in a minority of cases, these were not associated with an increased likelihood of caesarean delivery following successful rotation.[1]

Operative vaginal delivery

Rotational forceps

Rotational forceps (classically Kielland forceps) may be used for DTA when manual rotation fails or is not feasible, provided the operator has specific training. RCOG strongly emphasises that such procedures should only be undertaken by clinicians with documented competence due to the increased risk of maternal soft tissue trauma and neonatal injury.[3]

- **Anterior blade application (two methods) (LOT position):**

1. Wandering method:1

- o Anterior blade is first introduced into the posterior pelvis.
- o Blade is swept around the fetal face to an anterior position.

- o Handle is kept close to the maternal buttock to facilitate the sweep.
- o Posterior blade is then inserted and forceps locked. 1

2. Direct method:[1]

- o Anterior blade is introduced with the **cephalic curve directed upward**, passing beneath the symphysis pubis.
- o Blade is advanced into the upper vagina and then rotated 180° along its long axis towards the head.
- o Posterior blade is inserted and forceps locked.

- **Preparation for rotation:**
- o Gentle traction is applied to promote flexion of the fetal head.
- o Index and middle fingers of the left hand rest over the finger guards, and palm against the handles.
- o Fingers of the right hand are placed over the anterior lambdoid suture.
- o The fetal head is destationed/disimpacted.

- **Rotation technique:**
- o Rotation is achieved by supinating the left wrist while applying counterpressure over the lambdoid suture with the right hand.
- o This ensures that the head rotates with the blades and does not slip.

- **Delivery after rotation:**
- o Either traction is continued using a bimanual grip, ensuring that the handles are not elevated beyond the horizontal (to prevent injury to vaginal sulcus) once the posterior fontanel passes under the symphysis.
- o Alternatively, Kielland forceps may be removed after rotation and replaced with conventional forceps for delivery. 1
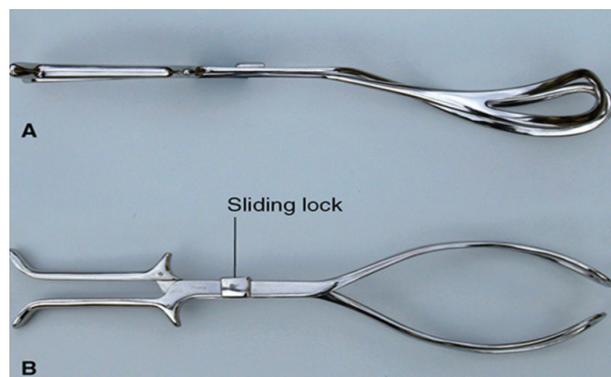
Figure 3: Kielland forceps showing minimal pelvic curvature and sliding lock[1]
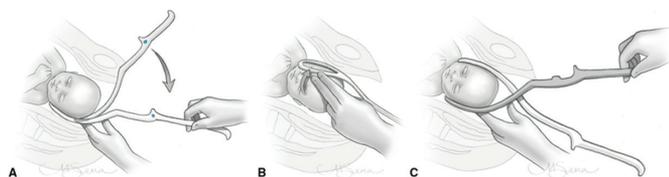
Figure 5: Application of Kielland forceps in LOT position using wandering method[1]

Vacuum extraction

Vacuum extraction alone is generally unsuitable for correcting significant malrotation. It may be used after successful manual rotation to an occipito-anterior position. Vacuum extraction is particularly suitable in multiparous women, where reduced pelvic floor muscular efficiency rather than pelvic inadequacy is the limiting factor; downward traction facilitates descent and allows autorotation in a pelvis proven by previous vaginal deliveries.[2]

Indications favouring vacuum-assisted delivery [2]

* Adequate and effective uterine contractions
* Absence of caput succedaneum and pathological moulding
* Estimated fetal weight in the average range
* No evidence of mid-cavity or outlet pelvic contraction on reassessment
* No significant soft-tissue oedema below the level of arrest
* Sufficient pelvic space permitting autorotation of the fetal head, a key advantage of vacuum over forceps
* Mother is not exhausted

Relative contraindications to operative vaginal delivery include – fetal bleeding disorders, or a predisposition to fracture.[4]

Caesarean section at full dilatation

Caesarean delivery is the treatment of choice for DTA in today's modern obstetrics.

Indications for caesarean delivery: [2]

* Prolonged mid-pelvic impaction despite effective contractions
* Marked caput succedaneum with pathological moulding
* Suspected fetal macrosomia (>3.5–4 kg)
* Evidence of mid-cavity or outlet pelvic contraction
* Soft-tissue oedema or inadequate space for rotation below the arrest

* Maternal exhaustion

Second-stage caesarean section carries higher risks of uterine incision extensions, haemorrhage, bladder injuries, postoperative fever and neonatal trauma, birth asphyxia due to an impacted fetal head. FIGO and RCOG recommend anticipation of difficulty, senior involvement, and readiness to employ specific disimpaction techniques such as vaginal push-up or reverse breech extraction, depending on operator experience.[4,5]

Maternal and neonatal outcomes

DTA is associated with increased rates of:

* Prolonged second stage
* Operative vaginal delivery
* Postpartum haemorrhage
* Perineal trauma and pelvic floor dysfunction

Neonatal risks include birth trauma and transient respiratory morbidity, particularly when delivery is delayed or sequential instruments are used. Timely, skilled intervention significantly mitigates these risks.

Prevention and training implications

Prevention of morbidity related to DTA relies heavily on systems-based approaches:

* Training residents in manual rotation and assisted vaginal birth using simulation.
* Early identification of malposition.
* Use of intrapartum ultrasound where available.
* Clear escalation pathways and senior involvement.

Both RCOG and FIGO stress the importance of maintaining operative vaginal delivery skills to reduce unnecessary second-stage caesarean sections.[4,5]

Conclusion

Deep transverse arrest represents a mechanically complex but manageable cause of second-stage dystocia. Early recognition, accurate diagnosis, and judicious use of manual rotation, operative vaginal delivery, or caesarean section—guided by current evidence and operator competence—are central to achieving optimal outcomes. For obstetricians, strengthening training in rotational techniques and adhering to guideline-based decision-making remain key to safe intrapartum care.

References

1. Cunningham FG, Leveno KJ, Bloom SL, et al. Williams Obstetrics. 26th ed. New York: McGraw-Hill; 2022.

2. Daftary SN, Chakravarti S, Pai MV, Kushtagi P. Holland and Brews Manual of Obstetrics. 4th ed. New Delhi: Elsevier India; 2016.

3. American College of Obstetricians and Gynecologists. First

and Second Stage Labor Management. Obstet Gynecol. 2024;143:e1–e28.

4. Royal College of Obstetricians and Gynaecologists. Assisted Vaginal Birth. Green-top Guideline No. 26. London: RCOG; 2020.

5. FIGO Safe Motherhood and Newborn Health Committee. Management of the second stage of labour. Int J Gynaecol Obstet. 2015;131:1–6.

6. Cornthwaite K, Bahl R. Management of impacted fetal head at caesarean birth. BJOG. 2021;128:195–202.

7. Shaffer BL, Cheng YW, Vargas JE, et al. Manual rotation to reduce caesarean delivery in persistent occiput posterior or transverse position. Obstet Gynecol. 2006;107:582–7.

8. Ghi T, Eggebø T, Lees C, Kalache K, Rozenberg P, Youssef A, et al. ISUOG Practice Guidelines: Intrapartum ultrasound. Ultrasound Obstet Gynecol. 2018;52(1):128–139.

Difficult Delivery During Cesarean Section: Challenges and Solutions

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Introduction

Cesarean section (CS) rates continue to rise globally, exceeding 50% in some regions, driven by demographic, clinical, and systemic factors.[1] While cesarean delivery is often life-saving, it is associated with increasing short- and long-term complications as the number of prior surgeries increases, including uterine rupture, placenta accreta spectrum (PAS), pelvic adhesions, and postpartum haemorrhage (PPH).[2]

Difficult delivery during CS refers to technical difficulty in fetal extraction or uterine management, often requiring additional surgical manoeuvres, alternative pelvic access, or advanced haemorrhage control techniques. These situations include:

Difficult fetal delivery during caesarean section commonly results from three major factors:

1. **Non-scarred uterus with unfavourable fetal presentation**, such as a free-floating head, preterm caesarean section, transverse lie, or deeply impacted fetal head.

2. **Scarred uterus**, most often due to previous CS or uterine surgeries, leading to adhesions with surrounding organs or the abdominal wall.

3. **Situations associated with a high risk of hemorrhage**: uterine overdistension, placenta previa, Placenta Accreta Spectrum (PAS), uterine fibroids, and an anteriorly placed placenta.

Management principles for anticipated difficult CS include:

1. Planned multidisciplinary care, preferably initiated in the antenatal period.

2. Referral to well-equipped centers when resources are limited; alternatively, ensure the availability of a general surgeon and urologist on call in low-resource settings.

3. Availability of blood products, intensive care, and neonatal support.

4. Presence of an experienced surgical assistant and access to expertise in urinary and gastrointestinal repair.

5. Preoperative assessment of clinical risk, institutional resources, and surgical team competence.

6. Deferral or referral of surgery if adequate facilities and support are not available.

7. Preoperative ultrasound evaluation—initial transabdominal imaging supplemented by transvaginal ultrasound when indicated—to identify women at risk of complex cesarean (e.g., previous cesareans, prior abdominal surgery, placenta previa or PAS) and enable timely referral to experienced surgical teams

Challenges Encountered and Management Strategies

1. Non-scarred uterus with unfavourable fetal presentation,

0.1. Impacted Fetal Head and Second-Stage Caesarean Section: Second-stage caesarean section complicated by an impacted fetal head is associated with a significantly increased risk of uterine extensions, postpartum haemorrhage, and neonatal trauma. These cases represent one of the most technically demanding scenarios in obstetric surgery. Among the available delivery techniques, reverse breech extraction has been shown to be associated with better maternal and neonatal outcomes when compared with the traditional "push" method. The choice of technique should be guided by fetal position and surgeon expertise.

The impacted fetal head may be delivered safely using the following approaches:

0.1.1. Back-anterior position: Patwardhan technique can be used safely in this condition After uterine incision, the fetal shoulders are delivered first by hooking out the anterior shoulder, followed by the posterior shoulder. The trunk and breech are then delivered, and finally the head is delivered last by gentle traction. This technique avoids pushing the impacted head upward, thereby reducing uterine extensions, blood loss, and maternal trauma.

0.1.2. Back-posterior position: Reverse breech extraction technique should be used. After uterine incision, the surgeon reaches into the uterine cavity to grasp one or both fetal feet,

delivers the breech first, followed by the trunk and shoulders, and finally delivers the head last using controlled traction and flexion. This method avoids forceful upward disimpaction of the head and helps reduce uterine extensions and maternal morbidity.

0.1.3. **Use of Fetal pillow: This** is a soft, inflatable silicone device which is inserted vaginally beneath the fetal head **before or immediately after skin incision** and inflated with saline to gently **elevate and disimpact the head**, facilitating atraumatic delivery through the uterine incision. Its use has been shown to **reduce uterine incision extensions, blood loss, and operative difficulty**, particularly in second-stage caesarean sections.[3]

0.1.4. The push method remains an option of last resort but is associated with a higher incidence of uterine extensions and traumatic delivery. When the push method is employed, the risk of uterine extension may be reduced by avoiding excessive wrist flexion during elevation of the impacted head, thereby minimizing uncontrolled lateral force on the uterine incision.[4]

0.2. Unformed Lower Uterine Segment/ Preterm CS: In preterm CS performed before the onset of labor, the lower uterine segment is often thick, poorly formed, and non-distensible. This anatomical configuration poses challenges in both fetal extraction and secure approximation of uterine incision edges during closure. Difficult extraction in these cases may lead to excessive traction, uterine trauma, and suboptimal hemostasis. Careful handling of the uterine edges, meticulous suturing, and achieving adequate haemostasis are crucial to prevent postoperative bleeding and uterine complications. Smiley incisions or vertical incisions in LUS can be given to compression and decompression injuries to fetal head. Extraction devices can be used in these cases as discussed below.

0.3. Free-Floating Fetal Head: Prior controlled drainage of excess amniotic fluid is advisable to facilitate fetal head extraction. Assistant should also fix head during this time. Controlled extraction techniques are recommended. These include:

0.3.1. Use of a single blade of an obstetric forceps as a vectis

0.3.2. Application of both blades of obstetric forceps

0.3.3. Use of vacuum devices, including traditional vacuum extractors

0.4. Fetal extraction in transverse lie during CS: Fetal extraction depends on the position of the fetal back.

0.4.1. In back anterior- introduce hand into the uterine cavity, grasps the fetal feet, and performs internal podalic version, delivering the breech first, followed by the trunk, shoulders, and head.

0.4.2. In back posterior- a hand is passed across the fetal abdomen to reach the feet, converting the lie by internal podalic version, after which breech extraction is carried out in a similar sequential manner.

This approach allows controlled delivery, minimizes uterine extensions, and reduces maternal trauma.

1. Scarred uterus and adhesions: Adhesions involving the bladder, uterus, and anterior abdominal wall are common following repeat CS. These adhesions significantly increase the risk of urinary tract injury, prolonged surgical time, difficult abdominal entry, and delayed fetal delivery.[5]

FIGO has given bundle model starting with prevention, using the best strategies for uterine closure, followed by the preparation of surgical teams and recognition of cases where there may be increased technical difficulty during cesarean, through a protocolized approach to complex caesareans.[6] Dense adhesions may obscure normal anatomical planes, making standard midline entry unsafe. Careful surgical planning, alternative abdominal entry techniques, and meticulous bladder mobilization are essential to reduce operative morbidity. A detailed, systematic approach to abdominal entry in the presence of dense adhesions is therefore critical to minimize bladder injury and uncontrolled haemorrhage.

1.1. Surgical Access in the Presence of Dense Adhesions

1.1.1. Safe Entry into the Abdomen and Pelvis: Dense adhesions, especially after previous CS, make abdominal entry hazardous. Adhesions most commonly involve the midline abdominal wall and urinary bladder, increasing the risk of bladder injury during standard midline entry. When safe midline access is not possible, alternative surgical approaches are required.

1.1.1.1. Paramedian (Preperitoneal) Pelvic Access– It is recommended when midline adhesions prevent safe entry. This approach allows access to fibrosis-free planes behind the rectus abdominis muscles. It enables safe bilateral mobilization of the bladder away from the abdominal wall.

Stepwise Description: Adhesions are usually concentrated along the midline, with the bladder being the most frequently adhered organ. A transverse suprapubic skin incision is performed. The abdominal fascia is dissected off the anterior surface of the rectus muscles. The rectus muscles are retracted laterally using Babcock forceps. Preperitoneal dissection begins at the medial

edge of each rectus muscle. Dissection proceeds laterally, between the peritoneum and the muscle, until a fibrosis-free plane is reached. During extensive lateral dissection, care must be taken to identify and preserve the inferior epigastric vessels. Once the lateral limit of peritoneal adhesions is reached, fibrotic area is carefully incised and mobilized. Adhesion edges may be retracted using Allis forceps. The adhered bladder is mobilized safely without injury. Following complete dissection, bladder is displaced away from the anterior uterine surface. This facilitates a safe uterine incision

Advantages of the Paramedian Preperitoneal Approach: it reduces the risk of bladder injury. It also avoids uncontrolled entry into adherent midline structures, provides a reproducible and consistently accessible surgical plane, facilitates bilateral release of the bladder from the abdominal wall.

1.1.2. Bladder Dissection and Mobilization in Complex Caesarean Section: Bladder injury is among the most frequent complications. FIGO emphasizes that adequate exposure of the anterior and lateral uterine surfaces is essential for safe surgery. Objectives of Bladder Mobilization is to expose the LUS to allow safe application of haemostatic sutures and vascular ligation and to reduce the risk of bladder tears during uterine compression or deep suturing. Recommended Techniques for Bladder Mobilization by FIGO are

1.1.2.1. Opening the Parametrial Space: Traction is applied to the round ligament. The anterior leaf of the broad ligament is incised. Digital dissection opens the parametrial space in a caudocephalic direction. This exposes the lateral surface of the uterus.

1.1.2.2. Retrovesical Bypass (Pelosi Maneuver): Fingers are inserted into both parametrial spaces. Fingers are advanced caudally toward the medial paravesical spaces. Fingertips are then directed medially, behind the bladder, toward the retrovesical space at cervical level.

1.1.2.3. Dissection of the Retrovesical Space The bladder is grasped with Allis clamps and pulled anterocaudally at approximately 45 degrees. The vesicouterine peritoneal fold is incised. A lateral-to-medial dissection is performed, starting from the previously developed medial paravesical space. Dissection may be performed using scissors or energy devices.

Advantages of bladder mobilization are-

1.1.2.3.1. It reduces the risk of bladder injury and uterine laceration.

1.1.2.3.2. Full exposure of the anterior surface of

the LUS enables safe execution of low uterine compression sutures (Ho-Cho, B-Lynch), Uterine artery ligation, En-bloc resection of lesions (leiomyoma, uterine dehiscence, PAS), hysterectomy, when required.

2. Situations associated with a high risk of haemorrhage like placenta praevia, overdistended uterus, PAS need good bladder mobilization and anatomy guided management of PPH.

2.1. Relationship Between Bladder Mobilization and Hemostatic Procedures

Uterine artery ligation requires secure inclusion of the **uterine artery, accompanying veins, and a portion of the myometrium** to provide adequate suture support. In the absence of proper bladder mobilization, placement of deep sutures carries a significant risk of **bladder injury**, even when sutures are placed posteriorly. This risk is **markedly increased in women with previous cesarean sections or dense pelvic adhesions**.

Lower uterine segment compression sutures, primarily indicated for haemorrhage related to **placenta previa**, rely on effective compression of the lower uterine segment, whose blood supply is predominantly derived from the **colpouterine vessels**. Commonly used techniques include the **Ho-Cho suture** and **transverse B-Lynch sutures**. These sutures **cannot be applied safely or effectively without prior bladder mobilization**.

Importance of Bladder Mobilization for Effective B-Lynch Sutures

- Suture entry and exit points can be placed several centimeters below the incision site
- A larger volume of myometrial tissue can be incorporated
- Allows stronger and more uniform compression
- Reduces tissue laceration risk
- Significantly improves the success rate of B-Lynch sutures

2.2. Postpartum Hemorrhage (PPH): Anatomically Guided Management: PPH is the most life-threatening complication of complex CS. FIGO integrates Patient Blood Management (PBM) with anatomy-based surgical strategies. The 3 pillars of PBM are

2.2.0.4. Pillar 1:optimization of erythropoiesis,

2.2.0.5. Pillar 2: reduction of blood loss and correction of coagulopathy,

2.2.0.6. Pillar 3: supportive care with restrictive transfusion strategies.

2.1.1. Surgical management primarily addresses pillar 2. FIGO describes vascular supply of uterus through arterial pedicles and sectors and suggest bleeding control according to this concept.

2.1.1.1. Vascular supply of uterus

o Uterine arteries

o Ovarian arteries

o Colpouterine (vaginal) arteries

2.1.1.2. Uterine Vascular Sectors

3.2.1.2.3. Sector S1: Uterine body and fundusàDominant supply: uterine ± ovarian arteries. Therfore effective interventions to control of this area bleeding are Uterine artery ligation, B-Lynch 1, Hayman sutures, Embolization

3.2.1.2.4. Sector S2: Lower uterine segment and cervixàDominant supply: colpouterine arteries. This is Critical in PP & PAS and uterine artery ligation is generally ineffective for S2 bleeding. Effective interventions for the control of this area bleeding are B-Lynch 2, Ho-Cho sutures, Selective pelvic devascularization. Bladder mobilization is mandatory for all S2 procedures.

3.2.1.2.4. Sector S3: Vaginal Vascular Zone à vaginal arteries from internal pudendal artery. It can cause extrauterine postpartum bleeding and control may require prevesical (Retzius space) dissection. This is generally not required

Conclusion

Difficult delivery during cesarean section represents an increasingly common and potentially catastrophic challenge in modern obstetrics. Rising cesarean rates, declining surgical exposure, and increasing placental and adhesive pathology demand a standardized, anatomy-based approach. The FIGO 2025 protocol provides a comprehensive framework emphasizing antenatal risk identification, structured pelvic access, bladder mobilization, and targeted hemorrhage control. Integration of these principles into routine obstetric practice is essential to reduce maternal morbidity and mortality associated with complex cesarean sections.

References

1. Betran AP, Ye J, Moller AB, Souza JP, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. BMJ Glob Health. 2021;6:e005671.

2. Jauniaux E, Fox KA, Einerson B, Hussein AM, Hecht JL, Silver RM. Perinatal assessment of complex cesarean delivery: beyond placenta accreta spectrum. Am J Obstet Gynecol. 2023;229:129–39.

3. Seal SL, Dey A, Barman SC, et al. *Randomized controlled trial of elevation of the fetal head with a fetal pillow during cesarean delivery at full cervical dilatation.* **Int J Gynecol Obstet** 2016;133(2):178–182.

4. Gialdini C, Chamillard M, Diaz V, et al. Evidence-based surgical procedures to optimize caesarean outcomes: an overview of systematic reviews. E Clinical Medicine 2024;72:102632

5. Lyell DJ. Adhesions and perioperative complications of repeat cesarean delivery. Am J Obstet Gynecol. 2011;205:S11–8.

6. Nieto- Calvache AJ, Ramasauskaite D, Palacios- Jaraquemada JM, et al. Complex cesarean section: Surgical approach to reduce the risks of intraoperative complications and postpartum hemorrhage. Int J Gynecol Obstet. 2025;168:987-998.

Shoulder Dystocia Drills: A Review of Manoeuvres and Systematic Simulation Training

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Introduction

Shoulder dystocia is often described as a complication of vaginal delivery. After the delivery of the fetal head, the shoulders fail to come out with gentle downward pulling. This situation often occurs when the anterior shoulder gets stuck behind the mother's pubic bone; sometimes the posterior shoulder lodges against the sacrum. A long interval between the head and body may suggest a problem, but it is not a reliable sign for diagnosis. This condition can turn a normal birth into an emergency. It is difficult to predict, as most cases happen without clear risk factors. Because of this, prevention is limited, and clinicians need to be trained and ready to act quickly.[1]

Research has found that known risk factors rarely predict shoulder dystocia. The main role of the obstetric care provider is to spot the problem right away and start the necessary manoeuvres without delay. Simulation training helps improve teamwork, documentation, and outcomes. Delays can lead to serious foetal complications, such as brain injury, Erb's palsy, or even death. Maternal injuries or fractures can occur, but they are usually less severe. Managing this situation requires technical skill, calm judgment, and teamwork for the best results.[2-5]

Epidemiology

Shoulder dystocia occurs in about 0.2–3% of vaginal deliveries. The wide variation reflects differences in maternal diabetes and fetal macrosomia, as well as the subjective nature of diagnosis. Its prevalence has increased in recent decades due to rising maternal obesity and diabetes.[6-4]

Complications of Shoulder Dystocia

Both Maternal and Neonatal Complications are associated with shoulder dystocia. They usually occur due to excessive traction and difficult manoeuvres.

Table 1: Complications of Shoulder dystocia

Maternal	Neonatal
• Severe perineal trauma (third and fourthdegree tears • Postpartum hemorrhage • Symphyseal separation (Associated with Difficult extraction and excessive traction)	• Transient brachial plexus neuropraxia - Most frequent complication; usually resolves spontaneously • Persistent brachial plexus injury -Less common ,carries significant clinical and medicolegal implications • Fractures (clavicle or humerus)- self-limiting; heal without major intervention • Hypoxia-related morbidity - Associated with prolonged entrapment and inadequate team coordination(6,3,4)

Pathogenesis

Shoulder dystocia occurs when the posterior shoulder lodges against the sacral promontory, preventing normal descent, or when the foetal anterior shoulder becomes impacted behind the mother's symphysis pubis[3]. A mismatch between the mother's pelvic dimensions and the foetal bisacromial diameter is the fundamental mechanism. No single factor reliably predicts shoulder dystocia so current guidelines stress should be on laid on universal preparedness, systematic algorithms, and simulation training that are more effective than riskbased prevention strategies. The various risk factors are given below in Table 2.

Table 2: Risk factors for Shoulder Dystocia

Maternal Risk Factors	Neonatal risk factors
• Diabetes mellitus: Associated with fetal macrosomia and disproportionate shoulder dimensions, increasing dystocia risk • Obesity: Higher maternal BMI correlates with increased fetal size and prolonged labor • Prolonged second stage of labor: Mechanical stress and altered fetal positioning contribute to shoulder impaction • Operative vaginal delivery: Use of forceps or vacuum extraction increases the likelihood of shoulder entrapment	• Macrosomia: Birthweight ≥4,000–4,500 g is the strongest predictor, though not absolute. • Postterm pregnancy: Increased fetal size and altered shoulder dimensions heighten risk • Previous shoulder dystocia: Recurrence risk is estimated at 10–15% in subsequent pregnancies3,7

Diagnosis

The clinical diagnosis of shoulder dystocia is subjective. When the foetal head retracts against the perineum after expulsion, known as the "turtle sign" due to reverse traction from the impacted shoulders at the pelvic inlet,or when the anterior shoulder cannot be delivered with mild downward traction on the foetal head ,shoulder dystocia should be suspected.

A head-to-body delivery interval > 60 seconds is the most commonly used objective diagnostic measure for diagnosis. The research supported the head-to-body interval's potential use as an objective diagnostic marker, as it correlates with higher rates of birth injury, lower one-minute Apgar scores and higher neonatal birth weight, when it is greater than 60 seconds. This criterion hasn't been thoroughly tested, and more studies are needed to prove its validity and identify the best cutoff point for predicting unfavourable neonatal outcomes[1].

The Early Recognition and Intrapartum Clues for diagnosis of shoulder dystocia are given in Table 3

Early Warning Signs	Intrapartum Clues
Prolonged head-to-body interval: If >60 seconds is often used as a warning sign, though not always diagnostic	Difficulty delivering the head: If excessive traction or resistance is encountered, this may indicate impending dystocia
Turtle sign: The fetal head retracts against the maternal perineum after delivery, a classic clinical indicator	Need for additional manoeuvres: When gentle downward traction fails to deliver the shoulders, shoulder dystocia should be suspected
Failure of restitution/ external rotation:	Problems during instrumental delivery: Difficulty delivering the head with vacuum or forceps may precede shoulder entrapment

Fundamentals of Management

In addition to avoiding maternal trauma and brachial plexus damage, the primary objective is to deliver safely before oxygen loss or brain damage occurs. Before the risk of asphyxia increases, clinicians typically have five minutes to take action.

The essential components of effective management are announcing "shoulder dystocia" right away, stepwise management using HELPERR mnemonic and avoiding practices like fundal pressure.[8,9] Following the event, debriefing, counselling and documentation are essential. The HELPERR mnemonic includes: Call for Help(H), Episiotomy evaluation(E), Legs in McRoberts position(L), Suprapubic pressure(P), Enter manoeuvres(E), Remove posterior arm(R), and (R)Roll the mother.[1-3] Safety, skill retention, and medico-legal protection are guaranteed by adhering to guideline-based algorithms.[1,4-6]

Initial Measures in Suspected Shoulder Dystocia

- Team Communication: Announce "Shoulder dystocia" aloud to activate protocols; avoid fundal pressure.
- Timekeeping: Record diagnosis time; assign one person to call out every 60 seconds.
- Maternal Effort: Ask the patient not to push to prevent worsening impaction.
- Call for Help: Ensure nursing, anaesthesia, obstetric colleagues, and neonatal staff are present.
- Positioning: Move buttocks to edge of delivery table for optimal manoeuvre access.
- Nuchal Cord Management: Slip cord over the baby's head if possible; cut only if essential after resolution.
- Cord Clamping: Avoid premature clamping, especially if considering Zavanelli manoeuvre.
- Traction Technique: Apply gentle traction along cervicothoracic axis; angle ≤ 45° below horizontal.
- Avoid Fundal Pressure: Increases risk of impaction and uterine rupture.

Practical Steps in Shoulder Dystocia

- Episiotomy: Facilitates internal manoeuvres/posterior shoulder delivery; does not release anterior shoulder.
- Empty Bladder: Drain if full to ease suprapubic pressure and reduce vaginal space occupation.
- Pause & Reassess: Wait for next contraction; spontaneous rotation often resolves dystocia.
- **While Waiting:**
  - Check and reduce nuchal cord.
  - Clear baby's mouth and nose.
  - Assess shoulder position.
  - Use Rubin manoeuvre to rotate shoulders into oblique diameter (reduces brachial plexus injury).
- Release Manoeuvres: Employ specific techniques systematically to free the impacted shoulder.
- Various Manoeuvres for impacted fetal shoulders are given below (Fig 1)

The choice of manoeuvre depends on the clinical situation, operator preference, patient factors (such as obesity), and available assistance. Importantly, no single manoeuvre has been proven superior, and all carry some risk of brachial plexus stretch. Therefore, each manoeuvre should be tried briefly and, if unsuccessful, quickly replaced by another, as success rates rise with multiple attempts but so does the risk of injury, often reflecting the severity of the dystocia rather than the manoeuvre itself .[7]

Category	Manoeuvers	Techniques	Advantages	Limitations/Risks
PRIMARY				
	The McRoberts -Recommended as the first-line technique for shoulder dystocia -It is simple, non-invasive, and effective	- The maternal thighs are flexed completely against the abdomen, which helps rotate the symphysis pubis upward and also flatten the sacrum.	- It removes obstruction and aligns the pelvic inlet with expulsion force. - The research has shown that it is helpful in 42% of cases and is safe in high-risk patients.	- Maternal complications include symphyseal separation, sacroiliac dislocation, or transient neuropathy, usually linked to excessive force or prolonged hyperflexion7.1. - May fail if severe impaction
	The McRoberts manoeuvre with suprapubic pressure	- It requires an assistant to apply firm suprapubic pressure, using the palm or fist. - The pressure is directed downward to push the shoulder below the pubic bone and laterally toward the foetal face or sternum, while the mother is in the McRoberts position. - This action adducts the shoulders or brings them into an oblique plane, which is the widest diameter of the maternal pelvis. Fig 1	– It is most effective in mild shoulder dystocia, particularly when the anterior shoulder is impacted.	
	The Rubin manoeuvres can be used after McRoberts	- Adducting the fetal shoulder and drawing it out of the anteroposterior diameter of the pelvic inlet, allows the posterior arm to descend and shoulder rotation is achieved. Fig 1b	- Simulator studies indicate that less force is required for traction while allowing a much lower degree of brachial plexus stretch than Mc Roberts	- It is, however, more invasive, technically more difficult, and generally requires anaesthesia2.
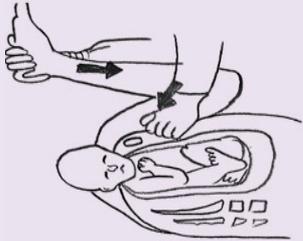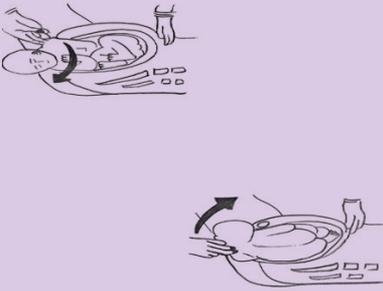
			- It increases the rotational force

	Combined Approaches5	- Involve the use of two or more manoeuvres to improve success rates5. - Combines the Rubin with the Woods screw	- Rotating one shoulder from the back and one from the front in the same direction.	- It increases the rotational force exerted on the impacted shoulder
	SECONDARY			
	Delivery of the Posterior Arm It is an effective second-line manoeuvre for shoulder dystocia	- It releases the impacted anterior shoulder and will consequently resolve a suprapubic pressure situation. - When conducted under anaesthesia, the operator inserts a hand into the vagina to the back of the posterior shoulder and arm while following the arm to the elbow. - With a flexed forearm, gentle delivery is achieved, or with an extended forearm, pressure is exerted at the antecubital fossa to flex the elbow across the chest. - If the anterior shoulder cannot be moved, the fetus can be turned and the manoeuvre repeated on the other arm. - This reduces the shoulder diameter by 2-3cm, resulting in facilitated birth.	- Humeral fracture is avoided by gentle sweeping techniques	- Humeral fracture, reported up to 20%. - Falling out of favor due to trauma potential from the forces required.
	Axillary Traction (Posterior Shoulder Delivery) -Menticoglou manoeuvre	- Particularly when the posterior arm lies above the pelvic brim and cannot be reached by the operator. - The assistant flexes the head toward the anterior shoulder while the clinician slides a finger in the posterior axilla, delivering the posterior shoulder downward along the sacral curve. - Once sufficiently low, the posterior arm is delivered. – - Alternatively, the posterior shoulder is grasped by thumb and finger, pulling it downward until it breaches the perineum, then the anterior arm is delivered.		
	Woods Screw Manoeuvre	- Woods screw parallels turning a "crossed thread" screw. - Pressure is applied to the anterior surface of the posterior shoulder, causing rotation of the fetus up to 180 degrees before the anterior shoulder releases from the symphysis. - Depending upon the fetus's position, either clockwise or counterclockwise rotation can be tried. - Care should be taken to avoid excessive twisting of the head and neck. WOOD'S CORKSCREW MANEUVER Fig 1c		Requires skill and training
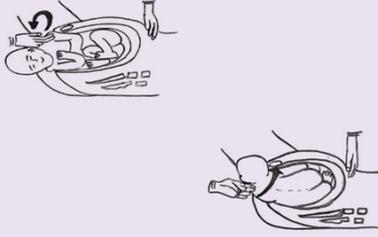
	Shoulder Shrug Manoeuvre	- It involves grasping the posterior shoulder with a pincer movement and "shrugging" the shoulder in the direction of the fetus's head	- Although limited work has been published, the technique appears safe, is predominantly utilized by experienced clinicians, and was mostly used when the posterior shoulder was already within reach.	
TERTIARY				
	Clavicular Fracture	- Subsequent shortening of the bisacromial diameter can help resolve a shoulder dystocia. - The operator applies traction on the anterior clavicle until the clavicle fractures.		- It is difficult to perform and poses a potential risk to the underlying vessels and lung, and appears less morbid than the procedure of last resort techniques.
	Gaskin All-Fours Manoeuvre	- The mother adopts the all-fours position to elevate the sacrum space and inherently use gravity to improve birth. - Traction is held in a gentle fashion on either shoulder and/or arm until the anterior shoulder begins to deliver; this is most often achieved more quickly among midwives without anaesthesia. Fig 1d	- Success rate is supported by limited published evidence, while morbidity remains low.	
	Posterior Axilla Sling Traction (PAST)	- This technique involves the passage of a catheter or loop of gauze through the posterior axilla. – - Once the posterior shoulder has been delivered, the loop is placed over the impacted shoulder to create a sling. - Traction can then be applied, or the shoulder can be rotated in an effort to achieve delivery.	- Success rates have been reported at over 70%,	- Carries a risk of Erb's palsy and fractures of up to 25%.
PROCEDURES OF LAST RESORT				

	Gunn-Zavanelli-O'Leary Manoeuvre (cephalic replacement + cesarean)	- This is where the foetal head is replaced into the pelvis by uterine relaxation, allowing the birth by caesarean section		
	Abdominal Rescue	- This entails a low transverse hysterotomy to allow transabdominal repositioning of the impacted shoulder into the oblique diameter, thus enabling vaginal delivery.		
	Symphysiotomy	- This involves surgical division of the symphysis pubis cartilage to widen the pelvic outlet.		- Risk of long-term pelvic instability

Post-Event Care

It involves three key steps:

1) Documentation and Debriefing- It should include time intervals, maneuvers attempted, personnel involved, and neonatal outcomes. A structured post-event debrief helps the team reflect, learn, and process the event. It also strengthens medico-legal documentation

2) Neonatal evaluation with immediate assessment for brachial plexus injury, fractures, and hypoxia.

3) Maternal follow-up- Monitoring for postpartum hemorrhage, perineal trauma, and pelvic injury3,6.

Simulation-Based Education in Shoulder Dystocia

Rationale

Simulation enables rapid recognition of shoulder dystocia, safe sequential manoeuvres, and a shared team mental model. It improves human factors under stress—closed-loop communication, leadership, and role clarity—critical for safe outcomes[1,2].

Types of Simulation:

- Low-fidelity: Pelvis–fetal models for McRoberts, suprapubic pressure, Rubin/Woods, posterior arm delivery.

- High-fidelity: Computerized mannequins (PROMPT, NOELLE, SimMom) with real-time feedback on traction, timing, and neonatal response.

- Team-based/hybrid: Scenario role-play with video debrief integrating technical and non-technical skills10.

Design of Effective Drills:

Use clear triggers (turtle sign, failed McRoberts), rapid first-line actions within seconds, and escalation over 2–3 minutes (rarely to Zavanelli[1,2]). Assign defined roles (accoucheur, assistant, neonatology, timekeeper, scribe) to enable non-hierarchical teamwork. Structured debriefing (PEARLS/TEAM) and regular multidisciplinary drills should be embedded into residency and CME curricula. Core goals include algorithm adherence[5,6], communication, leadership, documentation, and avoidance of fundal pressure[9].

Evidence & Challenges

Performance is assessed by time to first manoeuvre, protocol adherence, and team behavior. Stress realism improves shared mental models. While simulation improves teamwork and reduces time to delivery, definitive reduction in permanent brachial plexus injury is unproven. Barriers include cost, limited simulation access, and scheduling constraints[10].

Future Directions

Emerging modalities include VR/AR, AI-based feedback, and traction-sensing technology. Global bodies (RCOG, ACOG, WHO) advocate standardized yet resource-adaptable training. Further research is needed on long-term outcomes, skill retention, human factors, and scalable low-cost simulators.

Referances

1. Rodis JF, Caughey AB, Chakrabarti A. Shoulder dystocia: Intrapartum diagnosis, management, and outcome. UpToDate. Waltham, MA: UpToDate Inc. Updated Aug 4, 2025

2. Gurewitsch Allen E. Prescriptive and proscriptive lessons for managing shoulder dystocia: a technical and videographical tutorial. Am J Obstet Gynecol. 2024 Mar;230(3S):S1014-S1026. doi: 10.1016/j.ajog.2022.03.016. Epub 2023 Aug 15. PMID: 38462247; PMCID: PMC10925798.

3. Shoulder Dystocia 2012, Royal College of Obstetricians and Gynaecologists. Greentop Guideline No. 42: Shoulder Dystocia. London: RCOG; 2022

4. American College of Obstetricians and Gynecologists. Practice Bulletin No. 178: Shoulder Dystocia. Obstet Gynecol.

2017;129(5):e12333.

5. Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, et al. Williams Obstetrics. 26th ed. New York: McGrawHill; 2022.

6. Tsikouras, et al Complications, Prognosis, and Management. J. Pers. Med. 2024, 14, 586.

7. Michelotti F, Flatley C, Kumar S. Impact of shoulder dystocia, stratified by type of manoeuvre, on severe neonatal outcome and maternal morbidity. Aust N Z J ObstetGynaecol. 2018 Jun;58(3):298-305. doi: 10.1111/ajo.12718. Epub 2017 Sep 14. PMID: 28905356.

8. PROMPT Maternity Foundation. PROMPT Faculty Manual. Bristol: PMF; 2021.

9. Eppich W, Cheng A. Promoting excellence and reflective learning in simulation (PEARLS). Acad Med. 2015;90(3):30611

10. Marlier L, et al. Simulation training with highfidelity mannequins improves obstetric team performance. JOGNN. 2022;51(1):4554

Hypertensive Emergencies: Preventing Maternal Seizures and Cerebrovascular Haemorrhage

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Hypertensive emergencies in pregnancy can lead to various complications like stroke, seizures, end organ failure, placental abruption, or fetal compromise thus increasing the morbidity and mortality of both mother and neonate.

According to WHO estimation, eclampsia is the cause of 12 % of all maternal death globally. Eclampsia probably accounts for 50,000 maternal deaths a year worldwide. In India, reported incidence of eclampsia varies from 0.179 to 3.7 % and maternal mortality varies from 2.2 to 23 % of all eclamptic women.

Hypertensive disorders of pregnancy (HDP), including gestational hypertension, preeclampsia/eclampsia, and chronic hypertension with superimposed preeclampsia, affect ≈10% of pregnancies and increase stroke risk by up to 5-fold. Preeclampsia is associated with sympathetic nervous system overactivity and higher risk of both hemorrhagic and ischemic stroke. Concurrent infections, coagulopathies, and underlying prothrombic conditions increase stroke risk in patients with preeclampsia.

Hemorrhagic stroke including intracranial hemorrhage (ICH) and Subarachnoid hemorrhage (SAH), are more common in pregnant than in age-matched nonpregnant women. The risk is highest during the peripartum and postpartum periods, largely in association with HDP. Effective blood pressure control around the time of delivery is essential; mortality rate for pregnancy-associated hemorrhagic stroke can reach 20%.

Hypertensive emergencies in pregnancy and the postpartum period is a medical emergency requiring prompt recognition and treatment to prevent complications. Although some strokes cannot be predicted or prevented, the majority of fatal maternal strokes (usually due to ICH)) are preventable with earlier and more aggressive blood pressure control.

Hence **early detection , regular monitoring and timely treatment** of hypertension in pregnancy can prevent such complications.

Key prevention and management strategies:

Primary prevention

Though delivering the baby remains the only definitive cure for pre eclampsia, substantial progress has been made in pharmacological prevention and various screening modalities. Preventing eclampsia and stroke in pregnancy primarily involves preventing or managing its precursor, **preeclampsia**.

1. Low dose Aspirin- aspirin use prevents preeclampsia and related morbidity and mortality in high risk patients. (Table 1) Recommendations of dosage and time to start varies with different societies.

   - low-dose (81 mg/d) aspirin initiated between 12 weeks and 28 weeks of gestation (optimally before 16 weeks) and continued daily until delivery to individuals who are at high risk for preeclampsia and more than one moderate-risk factor (ACOG 2021, USPSTF 2021, SMFM)

   - 75 mg to 150 mg of aspirin daily from 12 weeks until the birth of the baby (NICE 2023)

Recent studies emphasize that high adherence (taking >90% of doses) is critical; effectiveness drops significantly if adherence falls below this threshold.

Table 1. Risk factors for preeclampsia.

High-Risk Factors (1 or more)	Moderate/Other Risk Factors (2 or more)
Prior history of preeclampsia Chronic hypertension Pre-existing type I or type II diabetes mellitus Renal disease Autoimmune disease (esp. antiphospholipid syndrome, systemic lupus erythematous) Multifetal gestation Combinations of multiple moderate-risk factors	• Nulliparity • Obesity (ie, body mass index > 30) • Family history of preeclampsia (ie, mother or sister) • Black race (as a proxy for underlying racism) • Lower income • Age 35 years or older • Personal history factors (eg, low birth weight or small for gestational age, previous adverse pregnancy outcome, >10-year pregnancy interval) • In vitro fertilization

Secondary prevention

1. Targeted Blood Pressure Control-The primary goal of antihypertensive therapy during pregnancy and in the early postpartum period (the time of greatest stroke risk) is to prevent the complications of severe hypertension and preeclampsia while balancing maternal and fetal risks and benefits.

   - Pharmacological treatment if BP remains above 140/90 mmHg, aim for BP of 135/85 mmHg or less.

     If BP ≥ 160/110 mm of Hg, repeat every 15 to 30 minutes until BP is less than 160/110 mmHg, then at least 4 times daily (NICE 2023)

   - Chronic hypertension- advice on: weight management, exercise, healthy eating, lowering the amount of salt in their diet

Start Pharmacological treatment if BP remains above 140/90 mmHg, aim for BP of 135/85 mmHg or less.

2. Anti hypertensive therapy (Table 2)

   - Parenteral antihypertensive therapy may be needed initially for acute control of blood pressure (Fig 1), oral medications can be used as expectant management is continued.

   - Observational data suggest a correlation between tighter blood pressure control in the early postpartum period and decreased rates of postpartum emergency department visits and readmissions.

   - Optimal blood pressure targets in the early postpartum period are not well defined; however a threshold of <140/90 mm Hg as in pregnancy should be aimed for.

Table 2: Antihypertensive medications in pregnancy

Medication	Starting dose	Maximum daily dose	Titration interval
First-line agents			
Labetalol	200 mg 2–3 times a day	2400 mg/d	Every 2–3 d
Nifedipine XL	30 mg daily	120 mg/d or 60 mg twice a day	Every 5–7 d
Alternative agents			
Alpha methyldopa	250 mg 2–3 times a day	3000 mg	Every 2–3 d
Clonidine	0.1 mg by mouth twice daily or 0.1-mg patch weekly	2.4 mg or two 0.3-mg patches/24 h	Every 7 d
For severe hypertension (>160/110 mm hg)			
Labetalol	10–20 mg IV, then 20–80 mg every 10–30 minutes to; or constant infusion 1–2 mg/min IV	a maxi mum cumulative dosage of 300 mg	Onset of action- 1–2 minutes Avoid in women with asthma, preexisting myocardial disease, decompensated cardiac function, and heart block and bradycardia.
Hydralazine	5 mg IV or IM, then 5–10 mg IV every 20–40 minutes; or constant infusion of 0.5–10 mg/hr - Consider using up to 500 ml crystalloid fluid before or at the same time as the first dose of intravenous hydralazine	maximum cumulative dosage of 20mg	Onset of action- 10–20 minutes Higher or frequent dosage associated with maternal hypotension, headaches, and abnormal fetal heart rate tracings
Nifedipine (immediate release)	10–20 mg orally, repeat in 20 minutes if needed; then 10–20 mg every 2–6 hours;	maximum daily dose is 180 mg	Onset of action- 5–10 minutes reflex tachycardia and headaches
Postpartum treatment of hypertension			
First-line agents			
Nifedipine XL	30 mg daily	120 mg/d or 60 mg twice daily	Every 5–7 d

Enalapril	5 mg daily	40 mg/d or 20 mg twice daily	Every 5–7 d
Amlodipine	5 mg daily	10 mg/d	Every 5–7 d
Labetalol	200 mg 2–3 times a day	2400 mg/d	Every 2–3 d
Alternative agents			
Hydrochlorothiazide	12.5 mg daily	50 mg/d	Every 3–5 d
Furosemide	10 mg daily	160 mg/d (2- or 3-times-a-day dosing)	Every 3–5 d
Hydralazine	10 mg 4 times daily	200 mg/d	Every 2–3 d

Treatment Recommendations for Sustained Systolic BP ≥ 160 mm Hg OR Diastolic BP ≥ 110 mm Hg*

*Antihypertensive treatment and magnesium sulfate should be administered simultaneously. If concurrent administration is not possible, antihypertensive treatment should be first priority.

Management Considerations — Choose any of the three agents as primary antihypertensive but consider the following:
- If no IV access initially, choose nifedipine.
- If the patient has a history of asthma **OR** is bradycardic, choose hydralazine or nifedipine as the initial agent.

Labetalol IV as Primary Antihypertensive

Initial dose: 20 mg labetalol IV over 2 minutes

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
Give 40 mg labetalol IV over 2 minutes

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
Give 80 mg labetalol IV over 2 minutes

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
Convert to hydralazine
Give hydralazine 10 mg IV over 2 minutes
Obtain emergent consultation from maternal–fetal medicine, if available, or critical care

↓ Repeat BP in 20 minutes

SBP ≥ 160 or DBP ≥ 110
While awaiting additional support, give hydralazine 10 mg IV over 2 minutes

Hydralazine IV as Primary Antihypertensive

Initial dose: 5–10 mg hydralazine IV over 2 minutes

↓ Repeat BP in 20 minutes

SBP ≥ 160 or DBP ≥ 110
Give hydralazine 10 mg IV over 2 minutes

↓ Repeat BP in 20 minutes

SBP ≥ 160 or DBP ≥ 110
Convert to labetalol
Give labetalol 20 mg IV over 2 minutes
Obtain emergent consultation from maternal–fetal medicine, if available, or critical care

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
While awaiting additional support, give labetalol 40 mg IV over 2 minutes

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
While awaiting additional support, give labetalol 80 mg IV over 2 minutes

Nifedipine PO as Primary Antihypertensive

Initial dose: nifedipine 10 mg PO immediate release (IR)

↓ Repeat BP in 20 minutes

SBP ≥ 160 or DBP ≥ 110
Give nifedipine 20 mg PO (IR)

↓ Repeat BP in 20 minutes

SBP ≥ 160 or DBP ≥ 110
Give nifedipine 20 mg PO (IR)

↓ Repeat BP in 20 minutes

SBP ≥ 160 or DBP ≥ 110
Convert to labetalol
Give labetalol 20 mg IV over 2 minutes
Obtain emergent consultation from maternal–fetal medicine, if available, or critical care

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
While awaiting additional support, give labetalol 40 mg IV over 2 minutes

↓ Repeat BP in 10 minutes

SBP ≥ 160 or DBP ≥ 110
While awaiting additional support, give labetalol 80 mg IV over 2 minutes

Target BP: 130–150/80–100 mm Hg
Once BP threshold is achieved, stop antihypertensives and monitor BP:
- Q10 minutes for 1 hour then → Q15 minutes for 1 hour then → Q30 minutes for 1 hour then → Q1 hour for 4 hours
- If at any point BP ≥ 160/110, readminister antihypertensives.

Fig 1: Algorithm for management of hypertensive emergency (ACOG tools and resources 2023)

3. Seizure Prophylaxis:

- The prevention of eclampsia is empirically based on the concept of timely delivery

- The rate of seizures in preeclampsia with severe features is four times higher than in those without severe features (4 in 200 versus 1 in 200)

- It is recommended that magnesium sulfate should be used for the prevention of seizures in women with gestational hypertension with severe features and preeclampsia with severe features (ongoing or recurring severe headaches, visual scotomata, nausea or vomiting, epigastric pain, oliguria and severe hypertension, progressive deterioration in laboratory blood tests (rising creatinine or liver transaminases or falling platelet count).

- Magnesium sulfate reduces cerebral vasospasm. In case of contraindications to MgSO4 (myasthenia gravis, hypocalcemia, moderate-to-severe renal failure, cardiac ischemia, heart block, or myocarditis) benzodiazepines and phenytoin can be used.

- Dosage- Intravenous [IV] administration of a 4–6 g loading dose over 20–30 minutes, followed by a maintenance dose of 1–2 g/hour, infusion should continue for 24 hours after delivery.

    Magnesium sulfate can be administered by intramuscular (IM) injection- 10 g initially as a loading dose (5 g IM in each buttock), followed by 5 g every 4 hours.

    It can be mixed with 1 mL of xylocaine 2% solution as the I/M administration is painful. IM regimen is associated with more adverse effects.

- If renal function is impaired- mild renal failure (serum creatinine 1.0–1.5 mg/dL) or oliguria (less than 30 mL urine output per hour for more than 4 hours)- loading dose of 4–6 g should be followed by a maintenance dose of only 1 gm/hour.

    Serum magnesium levels should be measure every 4 hours. If the serum level is more than 9.6 mg/dL (8 mEq/L), the infusion should be stopped and serum magnesium levels should be determined at 2-hour intervals.

- Monitoring should be done by Deep tendon reflex, respiratory rate, urine output every 4 hours. Deep tendon reflexes are lost at a serum magnesium level of 9 mg/dL (7 mEq/L), respiratory depression occurs at 12 mg/dL (10 mEq/L), and cardiac arrest at 30 mg/dL (25 mEq/L).

4. Timing of delivery:

- Timely termination of pregnancy is the key to avoid maternal and fetal complications.

- Preeclampsia with severe features is characterized by progressive deterioration of maternal and fetal condition. Hence, delivery is recommended at or beyond 34 0/ 7 weeks of gestation (ACOG 2020).

- Delivery irrespective of gestational age should be aimed for if following maternal indications are seen -

    • Uncontrolled severe-range blood pressures not responsive to antihypertensive medication

    • Signs of impending eclampsia

    • Signs of impending pulmonary edema

    • HELLP syndrome

    • any maternal biochemical or haematological investigations that cause concern - New or worsening renal dysfunction (serum creatinine greater than 1.1 mg/dL or twice baseline),

    • Suspected acute placental abruption or vaginal bleeding in the absence of placenta previa

5. Identifying high risk for complications-

• Consider using either the fullPIERS (Preeclampsia Integrated Estimate of Risk) or PREP-S validated risk prediction models to help guide decisions about the most appropriate place of care (such as the need for in utero transfer) and thresholds for intervention (NICE 2023)

- fullPIERS model –

    • Is a predictive tool to assess the risk of adverse maternal outcomes in women with preeclampsia.

    • It combines several clinical, laboratory, and demographic variables such as blood pressure, oxygen saturation (SPO2) levels, symptoms like headache and visual disturbances, and specific laboratory tests.

    • By integrating these factors, the fullPIERS model generates a risk score that aids clinicians in identifying high-risk patients, thereby facilitating timely intervention and management.

    • It can be used at any time during pregnancy

-PREP-S- Prediction models for Risks of complications in Early-onset

Pre-eclampsia- It can be used only upto 34 weeks of pregnancy

• Biochemical predictors of adverse outcome-

    • sFlt-1 (soluble fms-like tyrosine kinase 1) to PlGF (placental growth factor) ratio are able to increase prediction of preeclampsia and its adverse outcome- A cutoff of 85 is able to detect

the disease as well as its adverse outcomes with a high sensitivity and specificity.

Conclusion

Preventing hypertensive emergencies and subsequent cerebrovascular hemorrhages in pregnancy involves proactive risk management, strict blood pressure control, close monitoring of symptoms and laboratory parameters and the use of preventative therapies in high-risk patients.

Suggested reading

1. Hypertension in pregnancy: diagnosis and management. NICE guideline. NG133. 2023

2. Gestational hypertension and preeclampsia. ACOG Practice Bulletin No. 222. American College of Obstetricians and Gynecologists. Obstet Gynecol 2020;135:e237–60.

3. Miller.C, Bello A. Natalie, Chen R P et.al. Prevention and Treatment of Maternal Stroke in Pregnancy and Postpartum: A Scientific Statement From the American Heart Association. Stroke: Published online: 28 January 2026. https://doi.org/10.1161/STR.0000000000000514

4. Low-dose aspirin use during pregnancy. ACOG Committee Opinion No. 743. American College of Obstetricians and Gynecologists. Obstet Gynecol 2018;132:e44–52.

5. Dadelszen P von, Payne B, Li J, Ansermino JM, Pipkin FB, Côté A-M, Douglas MJ, Gruslin A, Hutcheon JA, Joseph KS, et al. Prediction of adverse maternal outcomes in pre-eclampsia: development and validation of the fullPIERS model. Lancet. 2011;377:219–227. doi: 10.1016/S0140-6736(10)61351-7

6. Thangaratinam S, Allotey J, Marlin N et al. Prediction of complications in early-onset pre-eclampsia (PREP): development and external multinational validation of prognostic models. BMC Med 2017 Mar 30;15:68. doi: 10.1186/s12916-017-0827-3

Calendar for AOGD Monthly Clinical Meeting 2025-2026

27th February 2026	UCMS & GTB Hospital
27th March 2026	LHMC & SSK Hospital
24th April 2026	Hamdard Institute of Medical Sciences and Research

Maternal Collapse and ACLS in Pregnancy: Specialized resuscitation techniques and decision-making process for perimortem caesarean section

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Maternal collapse is a life-threatening emergency that may occur even in women without any high-risk factors. It may occur in the antenatal period, during labour or in the post-partum period. It is defined as an acute event involving the cardio-respiratory and or the central nervous system, leading to reduced or absent conscious level and potentially cardiac arrest and death in any stage of pregnancy and up to 6 weeks in the post-partum period.[1] The reported incidence of this condition is about 1 per 16,000 maternities, with a survival rate of 58%.[2]

Causes of maternal collapse

Maternal collapse can be due to pregnancy-related or unrelated causes. Common causes of collapse are bleeding during pregnancy or after delivery, high blood pressure leading to complications like stroke and convulsions (eclampsia), sepsis and rarely drug reactions or anaesthesia complications.

The causes of maternal collapse in most situations are reversible, and hence the need for alacrity in the response to maternal collapse. There are some mnemonics that help us to remember the causes of maternal collapse. The first one is the ABCDEFGH, where A- anaesthesia complications, B-Bleeding, C- Cardiac, D- Drugs, E- Embolism, F-Fever (sepsis), G- general (electrolyte imbalance, hypoxia), H-hypertension.

Another way to remember is the 4H and 4T. The 4 H- hypovolemia, hypoxia, hypo-hyperkalemia, hypo-hyperthermia; the 4 Ts are- Thromboembolism, Toxicity (drug), Tension (pneumothorax), tamponade (cardiac).

Abdominal ultrasound by a skilled operator can assist in the diagnosis of the most common cause of maternal collapse, that is, haemorrhage from placenta praevia, placental abruption, uterine rupture and ectopic pregnancy. A systematic approach should be taken to identify the cause.[1]

Physiological changes in pregnancy that affect maternal resuscitation

Aortocaval compression significantly reduces cardiac output from 20 weeks of gestation onwards, and the efficacy of chest compressions during resuscitation by decreased cardiac output of 30 per cent. Changes in lung function, diaphragmatic splinting and increased oxygen consumption make pregnant women hypoxic more readily and make ventilation more difficult. Large breasts and laryngeal oedema, higher risk of regurgitation and aspiration contribute to difficult intubation. The risks can be minimised by early intubation with effective cricoid pressure, and the use of H2 antagonists and antacids prophylactically.[3-5]

Can maternal collapse be predicted?

Sometimes high-risk pregnancies like preeclampsia, multiple pregnancies, repeated cesarean sections and severe anaemia can have complications. During labour, if they are carefully monitored using obstetric-modified early warning score charts, early recognition and timely action can be taken. However, very often a normal patient with no high-risk factors can collapse without any warning signs.

What is the role of health care provider when they face such a situation?

Besides providing medical care, the role of communication and counselling of the near and dear ones is of utmost importance. The details of the condition should be periodically informed in simple language, and all treatment options should be explained.

How is maternal collapse treated?

The initial response is to resuscitate the patient using the C-A-B protocol of basic life support (BLS) and advanced cardiovascular life support (ACLS) [Fig. 1, 2]. After the patient is stabilized the definite reason for collapse is determined and targeted treatment is instituted.

Continue BLS/ACLS
- High-quality CPR
- Defibrillation when indicated
- Other ACLS interventions (eg, epinephrine)

Assemble maternal cardiac arrest team

Consider etiology of arrest

Perform maternal interventions
- Perform airway management
- Administer 100% O_2, avoid excess ventilation
- Place IV above diaphragm
- If receiving IV magnesium, stop and give calcium chloride or gluconate

Perform obstetric interventions
- Provide continuous lateral uterine displacement
- Detach fetal monitors
- Prepare for perimortem cesarean delivery

Continue BLS/ACLS
- High-quality CPR
- Defibrillation when indicated
- Other ACLS interventions (eg, epinephrine)

Perform perimortem cesarean delivery
- If no ROSC in 5 minutes, consider immediate perimortem cesarean delivery

Neonatal team to receive neonate

Maternal Cardiac Arrest
- Team planning should be done in collaboration with the obstetric, neonatal, emergency, anesthesiology, intensive care, and cardiac arrest services.
- Priorities for pregnant women in cardiac arrest should include provision of high-quality CPR and relief of aortocaval compression with lateral uterine displacement.
- The goal of perimortem cesarean delivery is to improve maternal and fetal outcomes.
- Ideally, perform perimortem cesarean delivery in 5 minutes, depending on provider resources and skill sets.

Advanced Airway
- In pregnancy, a difficult airway is common. Use the most experienced provider.
- Provide endotracheal intubation or supraglottic advanced airway.
- Perform waveform capnography or capnometry to confirm and monitor ET tube placement.
- Once advanced airway is in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.

Potential Etiology of Maternal Cardiac Arrest

A Anesthetic complications
B Bleeding
C Cardiovascular
D Drugs
E Embolic
F Fever
G General nonobstetric causes of cardiac arrest (H's and T's)
H Hypertension

Figure 1. The BLS/ACLS Protocol for Resuscitation of a pregnant woman.
Source: American Heart Association 2020[5]

Adult Cardiac Arrest Circular Algorithm
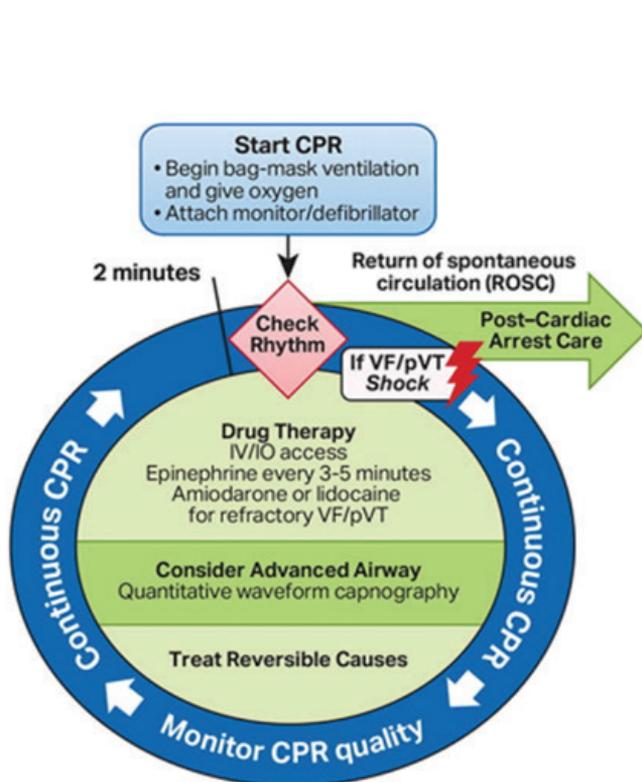
High-Quality CPR

- Push hard (at least 2 inches [5 cm]).
- Push fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- If advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.
- Continuous waveform capnography
  – If $ETCO_2$ is low or decreasing, reassess CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.

  or
- **Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Advanced Airway

- ET intubation or supraglottic advanced airway
- Continuous waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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Figure 2. ACLS algorithm for resuscitation.

Source: American Heart Association 2025[6]

Initial Response for Maternal Collapse:

1. CALL FOR HELP – Call the senior obstetrician, anesthesiologist, neonatologist, nursing staffs and extra residents immediately.

2. Assess ABCDE simultaneously as well as responsiveness by the AVPU scale. Feel for the carotid pulse for not more than 10 seconds. If the carotid is absent, start straight away with good-quality compressions.[1] If the carotid is present then place the patient in recovery position and complete the assessment.

3. Start early, high-quality CPR if the airway is clear and there is no breathing and or the carotids are not palpable.

4. Airway patency can be assessed by whether the patient is vocalising and by any loud gurgling sounds indicating a compromised airway. Early airway control and intubation in an unconscious pregnant female is warranted immediately with cuffed endotracheal tube.[1]

5. Breathing is assessed by respiratory rate and SpO2. Supplemental high flow Oxygen (10-15 litres/min) should be administered as soon as possible to avoid rapid deoxygenation. BMV or insertion of a supraglottic airway is undertaken until intubation can be achieved.[1]

6. Circulation is assessed by blood pressure. Two wide-bore canula (minimum 16 G should be secured, and if peripheral venous access is not possible, a CVP line, intraosseous access or a venous cutdown is considered.[1]

7. To relieve aortocaval compression in pregnancy ≥ 20 weeks, either a manual left uterine displacement (LUD)

of the gravid uterus by 1.5 inches from midline using an 'up, off and over' method. This is achieved by placing a hand below the uterus on the maternal right and pushing the uterus slightly upwards and to the left. or a left lateral tilt of 15-20° on a firm surface.[1]

Features of Good Quality Compressions:

- Push hard at least 2 inches and fast (100-120/min) with a 30:2 compression - ventilation ratio in the absence of advance airway and 1 breath every 6 seconds (10 compressions/min) with an advanced airway, avoiding hyperventilation.[6]

- Compression should be given at the lower half of the sternum between the nipples with the heel of the non-dominant hand & the other dominant hand on top with fingers interlocked.

- Do not bend your elbows when doing chest compressions; doing so will deliver weak, ineffective chest compressions.

- The time interval between each compression and relaxation should be approximately the same.

- If available, use a prompt and/or feedback device to help ensure high-quality chest compressions. Waveform capnography must be used to confirm and continually monitor tracheal tube placement, and may be used to monitor the quality of CPR and to provide an early indication of return of spontaneous circulation.[1]

- Do not rely on palpating carotid or femoral pulses to assess the effectiveness of chest compressions.

Other Components of Resuscitation:

Use a bag and mask to start ventilation and supplemental oxygen should be added as soon as possible. A tight seal should be formed over the nose and with one hand such that a 'C' and 'E' is formed. The other hand should be used to inflate the bag (Fig. 3). The inspiratory time should be around 1 second. Give enough volume to produce a visible rise of the chest wall. Avoid rapid or forceful breaths.

Figure 3. Technique of bag and mask ventilation; C- compresses the bag for a tight seal on the face; E- elevates the jaw

Figure 4. Biphasic Defibrillator

- As soon as a defibrillator (Fig. 4) is available, the self-adhesive pads should be applied to the chest. Do not interrupt compressions during this process. The heart rhythm will be assessed with the electrodes during a brief pause (less than 5 seconds) in compressions.[1]

- If the rhythm is ventricular fibrillation/pulseless ventricular tachycardia (VF/pVT), start defibrillation. The energy used is the same as for non-pregnant patients.[5]

- Restart chest compressions immediately. Do not delay restarting chest compressions to check the cardiac rhythm.

- If rhythm is non-shockable- asystole or pulseless electrical activity, do not defibrillate but continue CPR.[5]

- If there is no access, IV access should be established once resuscitation is underway to deliver the drugs. Injection adrenaline 1mg IV, every 3-5 minutes, if non-shockable rhythm; In case of refractory ventricular fibrillation, Inj. amiodarone, 300mg IV.[5]

- Adhesive defibrillator pads are preferable to defibrillator paddles, and the left defibrillation pad should be applied lateral to the left breast. If the woman's breasts are large or engorged, defibrillator pads may need to be placed on the anterior and posterior precordium to optimise defibrillation energy transfer.[7-9]

How is resuscitation different in a pregnant woman?

Chest compressions are performed in the same way as in a non-pregnant person, EXCEPT that if the pregnant uterus is above the umbilicus, it should be tilted towards the left side with one hand or both hands by the assisting personnel (LUD) (Fig. 5). The perimortem caesarean section now called as **resuscitative hysterotomy** is also a component of maternal resuscitation if the pregnant uterus is above the umbilicus.

Figure 5. One handed and two-handed method to achieve left uterine displacement (LUD)

If CPR is not effective, consider resuscitative hysterotomy:

- In patients who are ≥ 20 weeks of pregnancy.

- At 4 minutes after the onset of maternal cardiac arrest or resuscitative efforts (for the unwitnessed arrest) when there is no return of spontaneous circulation (ROSC).[7]

Before 20 weeks of gestation, there is no proven benefit from the delivery of the fetus and placenta. It should be considered a resuscitative procedure to be performed primarily in the interests of maternal, not foetal survival.

A resuscitative hysterotomy can be performed anywhere, with a scalpel being the only essential equipment required. Manual uterine displacement can be stopped immediately prior to incision. The operator should use the incision, which will facilitate the most rapid access. This may be a midline vertical incision or a suprapubic transverse incision. The operator should use the approach they are most comfortable with. With no circulation, blood loss is minimal, and no anaesthetic is required. If resuscitation is successful following birth, there should be prompt transfer to an appropriate environment at that point, as well as anaesthesia and sedation, to control ensuing haemorrhage and complete the operation. The doctrine of 'best interests of the patient' would apply to the conduct of this procedure being carried out without consent.[1,5]

Definitive Management of Maternal Collapse:

Targeted History

- History of past illness(anaemia and heart disease), past pregnancies, previous surgeries

- History of present pregnancy-hypertension, anaemia, breathlessness, antepartum haemorrhage, leaking, fever, excessive vomiting, headache

- History of labour and delivery

- Drug history / anaesthetics

- History of 3rd stage

- Think of 4 H (hypovolemia, hypoxia, Hyper/hypokalaemia, hypothermia) and 4 T (thrombosis, tamponade, toxins, tension pneumothorax)

- General Examination:

- Assess sensorium by AVPU scale

- Skin/ mucous membrane-pallor, sweating

- Neck veins are normal or full

- Pulse /Respiration/Temperature

- Generalized anasarca, pedal oedema

- Blood pressure

- Heart- any murmurs

- Lung- breath sounds, crepitations, ronchi

- Abdominal examination- uterine size, contractility, tenderness

- Local vulva- ongoing bleeding, clots

- Per Speculum & Vaginal Examination- cervical/vaginal lacerations, hematoma

Investigations:

- Basic investigations- CBC, LKT/KFT, Coagulation Profile, serum electrolytes, blood glucose, urine routine

- Blood group and cross match

- Pulse oximetry, ECG, cardiac monitoring,

- Arterial blood gases

- Portable chest X ray

- Point of Care Ultrasound (POCUS)

Based on the targeted history and examination and the POCUS and other investigations the targeted management is administered. Some important causes of non-hemorrhagic collapse and the management principles are shown in Table 1.

Table. 1 Key Interventions for Management of non-haemorrhagic causes of Maternal Collapse

Condition	Specific Management
Anaphylaxis	Inj. Adrenaline 0.5ml (1:1000) intramuscularly
MgSO4 Toxicity	10ml 10% Ca Gluconate iv slow
Sepsis	One hour sepsis bundle
Eclampsia	MgSO4, BP control, supportive
Pulmonary Embolism	Heparin/LMWH, supportive
Uterine Inversion	Manual reposition
Cardiac failure	Ionotropes, diuretics, ventilation
AFE	Supportive, Ventilation, vasopressors, ionotropes, FFP, Cryoppt
CVA	Multidisciplinary Mx (neurosurgery, neurology, radiology, ICU)

Key Points:

- Any pregnancy can become high risk with severe outcomes.
- Obstetricians should be trained to recognize maternal collapse promptly and initiate resuscitative measures.
- In case of maternal cardiac arrest resuscitative hysterotomy improves outcomes if performed in 4-5 minutes.
- Remember the physiological changes in pregnancy while resuscitation. LUD of uterus is imperative for effective CPR.
- It is very important to have regular drills of CPR for maternal collapse for all doctors so that no mistakes are made.

Further Reading

1. Chu J, Johnston TA, Geoghegan J, on behalf of the Royal College of Obstetricians and Gynaecologists. Maternal Collapse in Pregnancy and the Puerperium. BJOG 2020;127:e14–e52

2. Amniotic fluid embolism: diagnosis and management. American Journal of Obstetrics and Gynecology. 2016 Aug;215(2):B16–B24. doi:10.1016/j.ajog.2016.03.012.

3. Mushambi MC, Kinsella SM, Popat M, Swales H, Ramaswamy KK, Winton AL, et Obstetric Anaesthetists' Association and Difficult Airway Society guidelines for the management of difficult and failed tracheal intubation in obstetrics. Anaesthesia 2015;70:1286–306.

4. Kinsella SM, Winton AL, Mushambi MC, Ramaswamy K, Swales H, Quinn AC, et al. Failed tracheal intubation during obstetric general anaesthesia: a literature review. Int J Obstet Anesth 2015;24:356–74.

5. Panchal AR, Bartos JA, Cabañas JG, Donnino MW, Drennan IR, Hirsch KG, et al. Part 3: Adult basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2020;142(16 Suppl 2):S366–S468. doi:10.1161/CIR.0000000000000916.

6. American Heart Association guidelines Circulation Volume 152, Issue 16_suppl_2, 21 October 2025; Pages S284-S312.

7. Jeejeebhoy FM, Zelop CM, Windrim R, Carvalho JCA, Dorian P, et al. Cardiac arrest in pregnancy: a scientific statement from the American Heart Association. Circulation. 2015;132(18):1747–1773. doi:10.1161/CIR.0000000000000300.

8. Royal College of Obstetricians and Gynaecologists. Maternal collapse in pregnancy and the puerperium. Green-top Guideline No. 56. London: RCOG; 2011.

9. Soar J, Berg KM, Andersen LW, Böttiger BW, Cacciola S, et al. Adult advanced life support: 2021 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. Resuscitation. 2021;161:115–151. doi:10.1016/j.resuscitation.2021.02.013.

Forthcoming Events

Sepsis in Obstetrics: Early recognition with modified assessment score

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Introduction

Sepsis and septic shock are being increasingly recognised as the cause of maternal and perinatal morbidity and mortality worldwide. The third international consensus, 2016 defined sepsis as life-threatening organ dysfunction caused by a dysregulated host immune response to infection.[1] Septic shock is defined as persistent hypotension requiring vasopressors to maintain mean arterial pressure (MAP) ≥ 65mmHg and a serum lactate levels > 2 mmol/I despite adequate fluid resuscitation with signs of sepsis.[1]

WHO 2017 defines maternal sepsis as a life-threatening condition leading to organ dysfunction resulting from infections during antepartum, intrapartum, postpartum or postabortal period.[2] Maternal sepsis is considered as a preventable cause of death and timely recognition and management is the key to prevent its associated complications. Society for maternal-fetal medicine, 2023 recommends that sepsis and septic shock in pregnancy should be considered a medical emergency requiring prompt treatment.[3]

Sepsis screening can be done manually or by using automated electronic generated health records. Clinical variables like vital signs, signs of infection and SIRS criteria (systemic inflammatory response syndrome), can be used for screening of sepsis.

Obstetrics early warning scores or systems

SOFA (sequential organ failure assessment), qSOFA (quick sequential organ failure assessment), MEWS (modified early warning score), NEWS (national early warning score), REMS (rapid emergency medicine score) are the different scores available to identify sepsis and its severity with wide variations in sensitivity and specificity in non-pregnant patients.[4] Due to altered physiology in pregnancy, the application of many of these scores in obstetric population is not well established. So, certain scores have been obstetrically modified for the diagnosis, earlier recognition and management of maternal infection and sepsis. Modified early obstetrics warning system (MEOWS), sepsis in obstetrics score (SOS), obstetrics-modified q SOFA (om qSOFA), quick SOFA modified for pregnancy (q SOFA-P), maternal early warning trigger (MEWT), and California maternal quality care collaborative (CMQCC) 2-step process are some of the obstetrically modified scores.[5-10]

qSOFA & Obstetrically modified qSOFA (om qSOFA)

This is a bedside screening tool for screening patients with suspected infection who are likely to have poor outcome. It is a clinical criterion and does not require any investigations, hence may be easily performed repeatedly for monitoring. Abnormal qSOFA may prompt investigations to identify organ dysfunction and escalation of therapy.

Table 1: qSOFA Criteria in normal and obstetrics patients

Parameters	Standard qSOFA Criteria	Physiological Changes in Pregnancy	om qSOFA(for sepsis)
Respiratory Rate	≥ 22 breaths/min	Mild increase (up to 20/min) due to progesterone and metabolic demand	≥ 25 breaths/min
Systolic Blood Pressure (SBP)	≤ 100 mmHg	Slight fall in early–mid pregnancy due to reduced systemic vascular resistance	≤ 90 mmHg
Altered Mental Status	Glasgow Coma Scale < 15 (any new confusion, drowsiness, disorientation)	No physiological change expected	Glasgow Coma Scale < 15 (any new confusion, drowsiness, disorientation)

Modified early obstetrics warning system

Modified early obstetrics warning system has been proposed by UK Saving Mothers' Lives report. A single red score or two yellow scores should trigger a thorough evaluation of the patient. However, MEOWS is a sepsis nonspecific obstetric score which predicts maternal morbidity caused by various etiologies.

Table 2: A modified early obstetric warning system (MEOWS)

Parameter	Red 3	Amber 2	Yellow 1	White 0	Yellow 1	Amber 2	Red Trigger 3
Respiratory rate (/min)	<10			11-20	21-24	24-29	≥30
Oxygen saturation (%)	≤94%			≥95%			< 95
Temperature (℃)		<350C	350-35.90C	36-37.40C	37.5-37.90C	38-38.90C	≥39 0C
Heart rate (beats/min)		<40	40-49	50-99	100-109	110-129	≥130
Systolic BP (mmHg)	<70	71-79	80-89	90-139	140-149	150-159	≥160
Diastolic BP (mmHg)			≤49	50-89	90-99	100-109	> 110
Level of consciousness				Alert	Responds to voice	Responds to pain	Unconscious
Urine Output ml/hour	<10	<30		Not measured			

BOX 1: Interpretation of MEOWS

SCORE	FOLLOW UP
1	Repeat observation 4 hourly
2-3	Think sepsis, minimum 1 hourly monitoring
4-5	Think sepsis , continuous monitoring
≥6	Think sepsis, continuous monitoring, and consultant review.

Maternal Early Warning tool

This tool differs from MEOWS in that it helps in categorising alerts into possible diagnostic pathways such as haemorrhage, hypertensive disorders, sepsis and cardiopulmonary conditions as shown in figure 1.

Positive triggers needed to be sustained for >20 minutes.

Severe trigger (Single abnormal value)

1. Maternal heart rate (HR) >130 beats/min (bpm)
2. Respiratory rate >30/min
3. Mean arterial pressure <55 mm Hg
4. Oxygen saturation <90%

Non severe trigger (2 abnormal values)

1. Temperature >38 or <36 0C
2. Blood pressure >160/110 or <85/45 mm Hg
3. HR >110 or<50bpm
4. Respiratory rate >24 or <10/min
5. Oxygen saturation <93%
6. Fetal HR>160 bpm
7. Altered mental status or disproportionate pain.
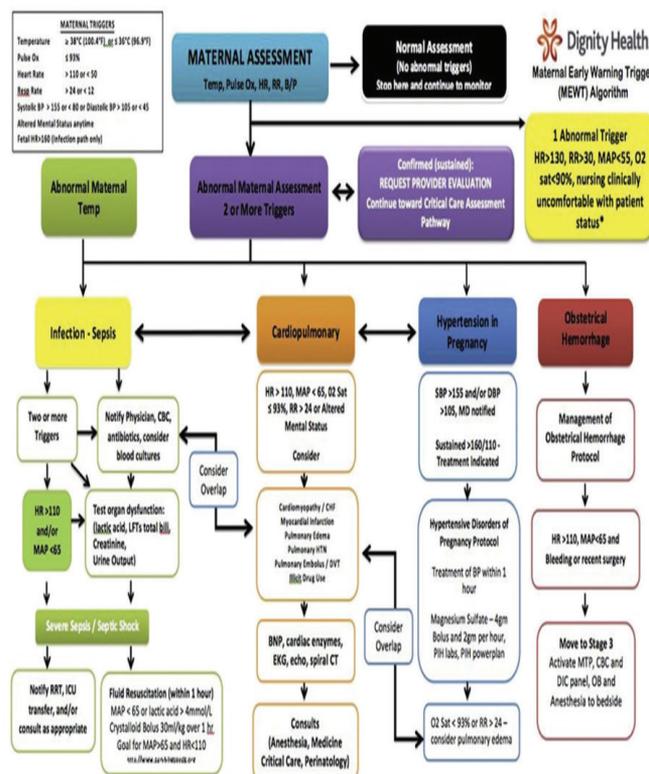
Figure 1: Flow diagram for maternal early warning trigger tool

The Sepsis in Obstetrics score (SOS)

SOS score has been developed by modifying the parameters of REMS according to the physiological changes in pregnancy. It helps in identifying the possibility for the need of critical care admission for the obstetric population especially presenting with sepsis. A significant association was observed between interventions like inotrope support, ventilator support and the need for transfusion and higher SOS scores.

Table 3: Sepsis in Obstetrics score

Score	HIGH ABNORMAL				NORMAL	LOW ABNORMAL			
	+4	+3	+2	+1	0	+1	+2	+3	+4
Temperature (°C)	>40.9	38-40.9		38.5-38.9	36-38.4	34-35.9	32-33.9	30 - 31.9	<30
Systolic BP (mmHg)					> 90		70-90		< 70
Heart rate (/min)	> 179	150–179	130–149	120–129	≤119				
Respiratory rate (/min)	> 49	35–49		25-34	12–24	10–11	6–9		≤ 5
Oxygen saturation (%)					≥ 92	90–91		85 – 89	< 85
WBC count (×10⁹/L)	> 39.9		25–39.9	17–24.9	5.7–16.9	3–5.6	1–2.9		< 1
Immature neutrophils (%)			≥10		<10				
Lactic acid (mmol/L)	—	—	≥ 4	—	< 4	—	—	—	—

BOX 2: Total SOS Score	Risk Category	Action
0–3	Low risk	Observe & repeat score
4–6	Moderate risk	Urgent review, labs, start antibiotics
≥ 7	High risk	Treat as sepsis, escalate care, ICU

California maternal quality care collaborative (CMQCC)

This is a 2-step screening and confirmation process as shown in figure 2.[8] Step 1 assigns 1 point for each abnormal vital sign parameters, which includes maternal temperature <36 °C or >38 °C, HR > 100 bpm sustained for 15 minutes, respiratory rate >24 breaths per minute and sustained for 15 minutes, and a white blood cell count >15,000 mm³ or 10% immature neutrophils. A threshold of 2 points is considered positive. If the step-1 screen is positive, step 2 involves confirmation of organ dysfunction by combining clinical evaluation at the bedside and laboratory assessment. The 2-step process is estimated to have a sensitivity of 97% and a specificity of 99%.

Figure 2: California maternal quality care collaborative (CMQCC)

Sequential organ Failure assessment (SOFA) Score

The SOFA score is considered as the gold standard for monitoring patients admitted to the critical care units. However, it is not an early warning score but a score to grade organ dysfunction. SOFA score assigns points in the range of 0 to 4 to each of the six individual organ systems, with a total score ranging from 0 to 24. SOFA score is ideally calculated in every 24 hours of ICU stay. Organ dysfunction is represented by an increase in the Sequential Organ Failure Assessment (SOFA) score of 2 points or more.

Table 4: Sequential organ Failure assessment (SOFA) score

The grading of organ dysfunction on SOFA score is as follows:

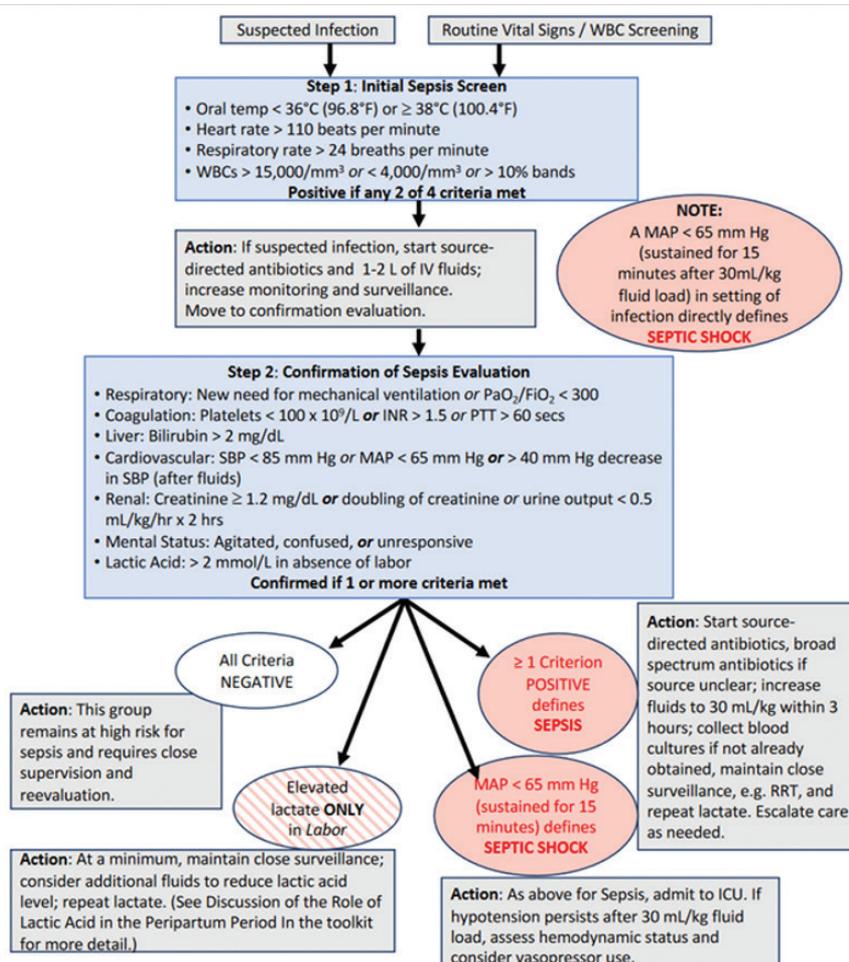|	Score				
System	0	1	2	3	4
Respiration PaO2/FiO2, mm Hg (kPa)	≥400	<400	<300	<200 with respiratory support	<100 with respiratory support
Coagulation Platelets, ×103 /µl	≥150	<150	<100	<50	<20
Liver Bilirubin, mg/dL (µmol/L)	<1.2 (20)	1.2–1.9 (20–32)	2.0–5.9 (33–101)	6.0–11.9 (102–204)	>12.0 (204)
Cardiovascular	MAP ≥70 mmHg	MAP <70 mmHg	Dopamine <5 or dobutamine (any dose)	Dopamine 5.1–15 or epinephrine ≤0.1 or norepinephrine ≤0.1	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1
Central nervous system Glasgow coma scale score	15	13–14	10–12	6–9	<6
Renal Creatinine, mg/dL (µmol/L) or Urine output, mL/d	<1.2 (110)	1.2–1.9 (110–170)	2.0–3.4 (171–299)	3.5–4.9 (300–440) or <500	>5.0 (440) or <200

FiO2: fraction of inspired oxygen; MAP: mean arterial pressure; PaO2: partial pressure of oxygen.

Catecholamine doses are given as µg/kg/min for at least 1 hour.

Glasgow coma scale scores range from 3–15; higher scores indicate better neurological function. Importance of modified assessment score

The institute or the department has to make a standard operative protocol for all the medical emergencies including maternal sepsis. The modified assessment score as discussed above if used correctly helps in identifying abnormal vital signs. The health professional, for instance, emergency room nurse, should then communicate the findings to the doctor on duty in a stipulated time frame. This ensures a quick evaluation of the patient, its management and further follow up. These scores can also be used once management is initiated to see patient's response to the treatment. Effective implementation is the key to use these assessment scores and requires training of the team involved in patient care, highlighting the role of each team member. Education should focus on emphasising the rationale and purpose for implementing an alert system to improve maternal safety and avoid adverse outcomes. As it is important to implement the application of these warning systems, once implemented their auditing is equally important to assess their effective application in clinical settings.

Table 5: Predictive accuracy of the various early warning scores[11]

Early warning system	Sensitivity	Specificity	Diagnostic Odds Ratio for severe maternal
SIRS	62.9	65.1	3.16(2.26-4.41
qSOFA	35.6	83.1	2.7(1.89-3.87)
Om qSOFA	38.0	90.4	5.79(3.12-10.74)
MEOWS	49.8	82	
MEWT	30.8	88.8	3.52(1.63-7.59)
SOS	64	84	
CMQCC	97	99	

CMQCC has very high sensitivity and specificity and maybe the tool of choice.

Management of sepsis

SSC guidelines, 2018 recommended use of one-hour or Golden hour bundle.[12] All the components of one-hour sepsis bundle aim to decrease mortality.

The "golden one-hour bundle" of care includes following components:

1. Measurement of serum lactate levels

Measurement of serum lactate levels is a point of care test and presence of elevated or normal values significantly increases or decreases the possibility of final diagnosis of sepsis in patients with possible diagnosis of sepsis. In cases of maternal sepsis, lactate levels are best interpreted when woman is not in labour. Lactate levels in normal healthy labouring woman may increase to more than 4 mmol/L. Without labour, lactate levels more than 2 mmol/L is alarming.

2. If serum lactate level is more than 2 mmol/L, then it has to be rechecked after 4 hours of resuscitation to

see the response.

3. Send appropriate culture i.e., blood, urine, respiratory, vaginal or wound before administration of antibiotics.

4. Use of broad-spectrum antibiotics.

   Early administration of broad-spectrum antibiotic is directly related to decrease in mortality. It should be initiated within 1 hour in the presence of septic shock and no later than 3 hours in patients with sepsis without shock.

5. Use of intravenous crystalloid

   - Using balanced crystalloid as first line fluid for resuscitation.
   - 30 ml/kg of intravenous fluid should be given within initial three hours of sepsis induced hypoperfusion in adult patient.
   - Dynamic measures of intravascular volume status such as serum lactate levels and capillary refill time should be used to monitor resuscitation. Pulse pressure variation, passive leg raising or echocardiography can be also be used where available. Point-of-care ultrasound where available can also efficiently guide fluid responsiveness.

6. Use of vasopressors

   In patients who are hypotensive even after fluid resuscitation, or are not fluid responsive or are not candidates for fluids as in patients with pulmonary edema, vasopressors need to be used. Vasopressors constrict the pathologically dilated systemic circulation and maintain adequate perfusion. Norepinephrine is used as the first-line vasopressor of choice. If norepinephrine is unable to maintain adequate MAP, other vasopressors like vasopressin or epinephrine can be added.

7. Infected Source removal

   Most important is to identify the source of infection. Imaging is often required in such cases. Ultrasound is the initial modality of diagnosis and if required may be upscaled to use of CT scan.

   Appropriate steps should be taken such as curettage for retained products of conception or drainage of abscess or laparotomy in case of pyoperitoneum. Signs of peritonitis are often missed in postpartum women due to lax abdominal wall.

   Ascitic fluid if present should be sent for cytology, cultures, biochemistry, adenosine deaminase (ADA). A high cellularity with predominantly neutrophils suggests bacterial peritonitis.

Paralytic ileus may also be a sign of peritonitis. In such situations, exploratory laparotomy and drainage of infected fluid/pus with peritoneal lavage may be necessary. Hysterectomy should be considered if the uterus is infected or necrotic. If infected tubo-ovarian abscess is the source of infection it should be removed.

Conclusion

Early and timely recognition of maternal sepsis with initiation of broad-spectrum antibiotics, intravenous fluid therapy, vasopressors if required and infection source control is necessary. Golden hour of sepsis is formulated with an idea to begin the treatment of sepsis in time. The modified assessment scores helps in early identification and monitoring of sepsis and thus effective treatment.

References

1. Singer M, Deutschman CS, Seymour CW, et al. The third international consensus definitions for sepsis and septic shock (sepsis-3). JAMA.2016; 315:801-10.

2. World Health Organization. WHO statement on maternal sepsis. 2017.

3. Society for Maternal-Fetal Medicine (SMFM); Shields AD, Plante LA, Pacheco LD, Louis JM; SMFM Publications Committee. Electronic address: pubs@smfm.org. Society for Maternal-Fetal Medicine Consult Series #67: Maternal sepsis. Am J Obstet Gynecol. 2023 Sep;229(3): B2-B19.

4. Evans L, Rhodes A, Alhazzani W, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. Intensive Care Med. 2021; 47:1181–247.

5. Friedman AM, Campbell ML, Kline CR, Wiesner S, D'Alton ME, Shields LE. Implementing obstetric early warning systems. AJP Rep 2018;8:e79–84.

6. Albright CM, Ali TN, Lopes V, Rouse DJ, Anderson BL. The Sepsis in Obstetrics Score: a model to identify risk of morbidity from sepsis in pregnancy. Am J Obstet Gynecol 2014; 211:39. e1–8.

7. Cagino SG, Burke AA, Letner DR, Leizer JM, Zelig CM. Quick sequential organ failure assessment: modifications for identifying maternal morbidity and mortality in obstetrical patients. Am J Perinatol 2022; 39:1–7.

8. Gibbs R, Bauer M, Olvera L, Sakowski C, Cape V, Main E. Improving diagnosis and treatment of maternal sepsis: a California Maternal Quality Care Collaborative quality improvement toolkit.

9. Shields LE, Wiesner S, Klein C, Pelletreau B, Hedriana HL. Use of Maternal Early Warning Trigger tool reduces maternal morbidity. Am J Obstet Gynecol 2016; 214:527. e1–6.

10. Bowyer L, Robinson HL, Barrett H, et al. SOMANZ guidelines for the investigation and management sepsis in pregnancy. Aust N Z J Obstet Gynaecol 2017; 57:540–51.

11. Chimwaza Y, Hunt A, Oliveira-Ciabati L, Bonnett L, Abalos E, Cuesta C, Souza JP, Bonet M, Brizuela V, Lissauer D; World Health Organization Global Maternal Sepsis Study Research Group. Early warning systems for identifying severe maternal outcomes: findings from the WHO global maternal sepsis study. EClinicalMedicine. 2024 Dec 6;79:102981.

12. Levy MM, Evans LE, Rhodes A. The surviving sepsis campaign bundle: 2018 update. Crit Care Med. 2018;46(6):997–1000.

Thromboembolism and Pulmonary Embolism: Addressing the Increased Risk in Pregnancy and Puerperium

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Introduction

Venous thromboembolism (VTE), comprising deep vein thrombosis (DVT) and pulmonary embolism (PE), is a leading cause of maternal mortality in developed countries. The risk of VTE is 5–6 times higher in pregnant women compared to the general population, with the highest risk—nearly 20-fold—occurring during the postpartum period. While DVT is more common during pregnancy (left-sided in over 85% of cases), PE is the more feared complication, contributing to 10–15% of all maternal deaths. [1] Pregnancy induces a spectrum of physiological changes that create a hypercoagulable state, increasing blood clotting potential and altering normal circulatory mechanics.

Why Risk is Increased in Pregnancy and Puerperium

Pregnancy constitutes one arm of Virchow's triad — the three principal mechanisms that lead to thrombosis:

1. Hypercoagulability:
   o Levels of several clotting factors (I, II, VII, VIII, IX, X) rise during pregnancy.
   o Natural anticoagulant activity (protein C and protein S) declines.
   o These changes help prevent bleeding at delivery but also predispose to clot formation.
2. Venous Stasis:
   o Progesterone-mediated vascular relaxation and mechanical compression of pelvic veins by the growing uterus reduce venous return from the legs.
3. Endothelial Injury:
   o Trauma during childbirth or surgical interventions (e.g., cesarean delivery) can damage vessel linings and accelerate clot formation.

Combined, these physiological adaptations though normal markedly elevate the risk of VTE relative to non-pregnant women of similar age. Estimates suggest pregnancy increases VTE risk 4–10-fold, whereas the early postpartum period may increase risk up to 35-84-fold compared with baseline.

Prevalence

Out of all cases of VTE

- 20–25% caused by PE
- 75–80% caused by DVT
- Higher frequency of iliofemoral (64%) and iliac vein involvement (17%)
- DVT more common in left lower extremity
- Proximal VTE more common in pregnant than non-pregnant population

Signs and Symptoms Of Vte [1]

Pulmonary embolism

- Dyspnea (most common symptom of PE)
- Palpitations/tachycardia
- Chest pain
- Hemoptysis
- Hypoxia/cyanosis
- Tachypnoea
- Hypotension and presyncope
- Cough
- Collapse

Deep vein thrombosis

In pregnancy, DVT is often proximal and may not present with usual features of distal DVT

- Unilateral leg pain/pitting oedema
- Increase in calf/thigh circumference particularly if 2 cm or more
  - Increased temperature
  - Flank, buttock, or back pain
- Prominent superficial veins

Risk Factors [2,3]

A combination of pregnancy-specific and non-pregnancy-specific factors influences an individual woman's risk and depending on these risk factors, a score is assigned. [Table 1] Every antenatal and postnatal woman should be assessed for the risk factors and given a score based on which thromboprophylaxis is started.

The score system is as follows-

Table 1: Showing scoring system for VTE[2]

Preexisting risk factors	Score
Previous VTE (except a single event related by major surgery)	4
Previous VTE provoked by major surgery	3
Known high risk thrombophilia	3
Medical comorbidities e.g cancer, heart failure; active systemic lupus erythematosus, inflammatory polyarthropathy or inflammatory bowel disease; nephrotic syndrome; type 1 diabetes mellitus with nephropathy; sickle cell disease; current intravenous drug user	3
Family history of unprovoked or estrogen related VTE in first degree relative	1
Known low risk thrombophilia (no VTE)	1
Age >35 years	1
Obesity	1 or 2b
Parity>= 3	1
Smoker	1
Gross varicose veins	1
Obstetrical risk factors	
Preeclampsia in current pregnancy	1
ART/IVF (antenatal only)	1
Multiple pregnancy	1
Caesarean section in labour	2
Elective caesarean section	1
Mid cavity or rotational operative delivery	1
PPH (>1 litre or transfusion)	1
Preterm birth <37 weeks in current pregnancy	1
Stillbirth in current pregnancy	1
Transient risk factors	
Any surgical procedure in pregnancy or puerperium except immediate repair of the perineum e.g appendicectomy, postpartum sterilisation	3
Hyperemesis	3
OHSS(First trimester only)	4
Current systemic infection	1
Immobility, dehydration	1

*2b BMI >/= 30 -1 score, BMI>/= 40 -2 score

Risk Assessment for venous thromboembolism

1. If total score >= 4 antenatally, consider thromboprophylaxis from the first trimester.

2. If total score 3 antenatally, consider thromboprophylaxis from 28 weeks.

3. If total score >=2 postnatally, consider thromboprophylaxis for at least 10 days.

4. If admitted to hospital antenatally consider thromboprophylaxis.

5. If prolonged admission (>3 days) or readmission to hospital within the puerperium, consider thromboprophylaxis.

Diagnostic Approaches

Prompt evaluation is crucial since delays contribute to avoidable morbidity.

Pulmonary embolism

PE is one of the leading causes of maternal mortality globally, which has been attributed to delayed recognition and investigations. The diagnosis of PE may be challenging, as symptoms and signs of PE such as dyspnea, sinus tachycardia, and lower extremity edema are often present in pregnancy due to physiological changes.

Diagnostic Pathway and Risk Assessment

Because clinical signs are unreliable, a structured diagnostic pathway is essential to avoid over-investigation (exposing the fetus to radiation) or under-diagnosis (maternal mortality).

1. Clinical Prediction Rules: Tools like the Years Algorithm [Fig.1] or modified Wells Score are used to categorize patients.

2. D-dimer Testing: In non-pregnant patients, a negative D-dimer rules out PE. In pregnancy, D-dimer levels naturally rise, making a "positive" result less useful. However, a negative D-dimer can still be used to rule out PE in low-risk patients.

3. Compression Ultrasonography (CUS): If DVT is suspected, a leg ultrasound is the first step. If positive, the patient is treated for VTE, and further chest imaging may be avoided.

When clinical suspicion remains after initial triage, imaging is required. The choice between **CTPA** and **V/Q Scanning [Table 2]** involves weighing the radiation dose to the mother's breast tissue versus the fetal thyroid and body. [4]

Table 2: Comparison of Imaging modalities for the diagnosis of PE

Modality	Maternal Considerations	Fetal Considerations
CT Pulmonary Angiography (CTPA)	Higher radiation dose to maternal breast tissue (increased lifetime cancer risk).	Very low fetal radiation dose.
Ventilation-Perfusion (V/Q) Scan	Lower breast radiation than CTPA.	Slightly higher fetal radiation dose than CTPA (though still well below safety thresholds).
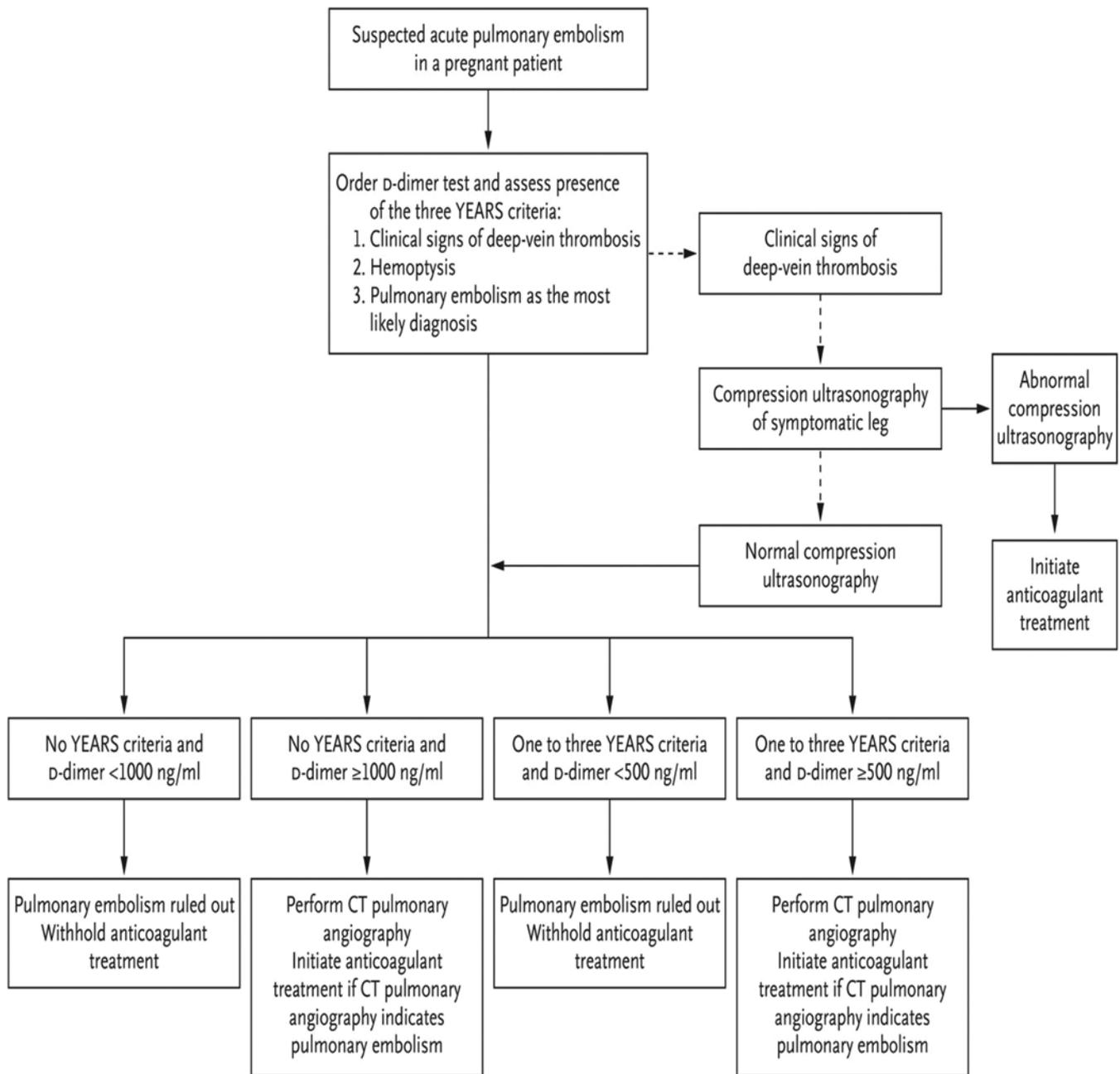
Fig.1: Diagnosis of pulmonary embolism by YEARS Algorithm [3] (Algorithm credit Queensland Clinical Guidelines 2025)

Prevention (Thromboprophylaxis)

Risk assessment should begin early in pregnancy, be revisited throughout prenatal care and before discharge after delivery. Guidelines from major professional bodies (RCOG, ASH, ACOG) vary slightly but universally recognize the importance of individualized risk-based prophylaxis.

1. Hydration and Mobilization

Requirements vary according to environmental conditions, physical activity and individual metabolism

Recommended average daily fluid intake (including plain water, milk and other drinks)

- For pregnant women is 2.3 L per day
- For breastfeeding women 2.6 L per day

When recommending exercise, consider, frequency, intensity, duration and mode of exercise as well as baseline fitness level and exercise experience. Deep tissue massage is not recommended in the presence of VTE or pharmacological thromboprophylaxis.

2. Mechanical Methods- In combination with other

prophylactic modalities, graduated compression stockings (GCS), thromboembolic deterrent stockings (TED stockings) and intermittent pneumatic compression (IPC) or sequential compression devices (SCD) have been shown to reduce the incidence of DVT in high-risk non-pregnant patients. There is limited evidence that specifically relates to pregnancy and postpartum.

3. Pharmacological methods- Heparin sodium and other LMWH commonly used in pregnancy are porcine derived.

Contraindications to their use

- o Known hypersensitivity

- o History of or current Heparin Induced Thrombocytopenia (HIT)

- o Creatinine clearance less than 15 mL/minute associated with significant platelet dysfunction[3]

Table 3: Comparing LMWH and UFH for thromboprophylaxis during pregnancy

Aspect	Low Molecular Weight Heparin (LMWH)	Unfractionated Heparin (UFH)
Recommendation	**First-line agent** for pregnancy.	Second line; used for labor/renal issues.
Fetal Impact	Safe; no placental transfer.	Safe; no placental transfer.
Bleeding Risk	Lower risk of episodes.	Higher risk; more injection site bruising.
Complications	Lower risk of HIT & Osteoporosis.	Higher risk of HIT & Osteoporosis.
Monitoring	Anti-Xa not routine for prophylaxis.	Monitor for HIT (Platelet counts).
Renal Usage	Adjust dose or avoid if impaired.	Preferred for renal dysfunction.

Table 4: Comparing oral anticoagulants for thromboprophylaxis during pregnancy

Agent Category	Placental Transfer	Fetal Safety	Breastfeeding	Main Concern
Warfarin	Yes	High Risk (Anomalies/Bleed)	Safe	Teratogenicity before 6 weeks.
DOACs (e.g., Apixaban)	Likely	Unknown / Avoid	Avoid	Lack of safety data.
Fondaparinux	Limited	Specialized use only	No data	5-day washout needed before birth.
Danaparoid	No	Specialized use only	No data	Incompatible with epidurals.
Aspirin	Yes	Safe (but ineffective)	Safe	Ineffective as sole VTE prevention.

Management and Treatment

The primary goal in treating thromboembolism in pregnancy and puerperium is to prevent clot extension and new thrombus formation, without undue harm to mother or fetus:

- Low molecular weight heparin (LMWH) is the mainstay anticoagulant because it is effective and does not cross the placenta.

- Unfractionated heparin (UFH) may be considered in specific clinical situations.

- In high-risk or life-threatening PE, systemic thrombolysis or other advanced support may be required, recognizing potential bleeding risks.

- Vitamin K Antagonists (VKA) and non-vitamin K antagonist oral anticoagulants (NOAC) cross the placenta and consequently confer a risk of fetal hemorrhage or teratogenicity and hence are not advocated as treatment options.[5]

Table 5: Comparing LMWH and UFH for the treatment of thromboembolism during pregnancy

Feature	Low Molecular Weight Heparin (LMWH)	Unfractionated Heparin (UFH)
Agents	Enoxaparin, Dalteparin	Heparin sodium
Fetal Safety	Does not cross placenta; no teratogenicity.	Does not cross placenta; no teratogenicity.
	Enoxaparin: 1 mg /kg subcutaneous twice per day	Loading: 80 units/kg iv stat
Dosing (Antenatal)	Dalteparin: 100 units/kg twice per day	Infusion:18 units/kg/hour iv infusion
Dosing (Postnatal)	Enoxaparin: 1.5 mg /kg subcutaneous daily	N/A (Standardized per hospital protocol)
Monitoring	Periodic platelets; Anti-Xa (not routine)	Baseline & serial platelets; APTT
Key Advantage	Lower risk of HIT, bleeding, and osteoporosis	Rapidly reversible; preferred for renal failure
Breastfeeding	Safe	Safe

Table 6: Comparing oral anticoagulant agents for the treatment of thromboembolism during pregnancy

Agent	Placental Transfer	Clinical Recommendation	Essential Consideration
Warfarin	Yes	Avoid (unless mechanical heart valve).	Must stop before 6 weeks gestation.
Fondaparinux	Limited	For severe heparin allergy only.	Withhold 5 days before birth.
Danaparoid	No	For HIT or heparin skin allergy.	24-hr half-life. No epidurals.
DOACs	Likely	Avoid in pregnancy/breastfeeding.	Includes Apixaban, Rivaroxaban.
Aspirin	Yes	Not recommended as sole VTE agent.	Safe but lacks evidence for VTE.

Pulmonary Embolism

Severe PE warrants more aggressive approach to remove the clot to aid survival. Early diagnosis is vital. The interval from the onset of symptoms to death is incredibly short. In patients with massive PE, 50% die within 30 min, 70% die within 1 hour, and more than 85% die within 6 hours of the onset of symptoms.[6]

Therapies used in massive PE to rapidly reverse PA obstruction include thrombolysis, catheter-directed therapies, and surgical embolectomy. These definitive therapies offer rapid reversal of PA occlusion, should reduce PVR and reduce RV pressure overload; thus, restoring normal hemodynamics. Extracorporeal membrane oxygenation ECMO is another potential option. [7]

The major risks of using thrombolytic therapy are life-threatening haemorrhage and distal embolization. The ideal thrombolytic agent would induce local pathological clot dissolution without producing systemic effects. The most used thrombolytic agent in pregnancy described in the literature is alteplase. Both the systematic and the catheter directed administered therapy have been reported.[8]

Delivery Considerations

The main goal is transition from anticoagulation to a "safe window" for delivery and neuraxial anesthesia (epidural).

- Prophylactic anticoagulant dose: Discontinue 12 hours before induction or C-section.
- Therapeutic dose: Discontinue 24 hours before delivery.
- Postpartum: Resume LMWH 6–12 hours after delivery (if no bleeding complications). LMWH and Warfarin are both safe for breastfeeding.

Conclusion

VTE is far more frequent in antepartum and postpartum women than age-matched controls, and clinical suspicion for VTE in this population should incorporate pregnancy-specific risks. Unlike many other pregnancy complications, VTE is often "silent" or mimics normal pregnancy symptoms, making it a hidden danger. Detecting Venous Thromboembolism (VTE) during pregnancy is vital because it remains one of the leading causes of maternal mortality in developed nations. Treatment of limb or life-threatening antepartum or postpartum VTE requires multispecialty coordination to optimize maternal and fetal outcomes.

References

1. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics. ACOG Practice Bulletin No. 196: Thromboembolism in Pregnancy. Obstet Gynecol. 2018 Jul;132(1):e1-e17

2. Royal College of Obstetricians and Gynaecologists. Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium. Green-top Guideline No. 37a. London: RCOG; 2015.

3. Queensland Clinical Guidelines. (2025). VTE prophylaxis in pregnancy and the puerperium (Guideline No. MN25.9-V8-R30)

4. Liselotte M. van der Pol et al, New England Journal of Medicine. March (2019);380 (12): 1139-114.

5. Konstantinides SV et al. ESC guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). Eur Heart J. (2020); 41(4):543–603.

6. Stulz P et al Decision making in the surgical treatment of massive pulmonary embolism. Eur J Cardiothoracic Surg. 1994; 8(4):188–93.

7. Wood KE. Major pulmonary embolism: review of a pathophysiologic approach to the golden hour of hemodynamically significant pulmonary embolism. Chest. 2002;121(3):877–905.

8. Martillotti G, Boehlen F, Robert-Ebadi H, Jastrow N, Righini M, Blondon M. Treatment options for severe pulmonary embolism during pregnancy and the postpartum period: a systematic review. J Thromb Haemostasis. 2017;15(10):1942–50.

Obstetric Emergency Quiz Zone

Think Fast. Match Smart. Save Lives.

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ROUND 1: One Question. One Decision. One Life."

1. **CORD UNDER PRESSURE!**

   According to RCOG/ACOG principles, the decision-to-delivery interval in cord prolapse with fetal compromise should ideally be:

   A. < 45 minutes   B. < 30 minutes

   C. < 20 minutes   D. < 10 minutes

2. **Spot the Difference**

   Cord presentation differs from cord prolapse in that cord presentation:

   A. Occurs only after membrane rupture

   B. Is diagnosed only clinically

   C. Occurs with intact membranes and is usually asymptomatic

   D. Requires immediate cesarean section

3. **Buy Time, Save Oxygen**

   Why is bladder filling with 500–700 mL saline sometimes used in cord prolapse management?

   A. To stimulate uterine contractions

   B. To facilitate vaginal delivery

   C. To elevate presenting part and reduce cord compression

   D. To prevent maternal hypotension

4. **Fluids First**

   Initial fluid resuscitation in obstetric sepsis should be:

   A. Restrictive due to risk of pulmonary edema

   B. 10 mL/kg crystalloids

   C. 30 mL/kg crystalloids

   D. Colloids preferred over crystalloids

5. **Antibiotics: How Soon Is Soon Enough?**

   In suspected obstetric sepsis, broad-spectrum antibiotics should be started:

   A. After blood culture results

   B. Within 3 hours

   C. Within 1 hour

   D. After consultant review

6. **Define the Enemy**

   Which statement best reflects the current Sepsis-3 concept as applied to obstetrics?

   A. Sepsis requires hypotension

   B. Sepsis is infection causing life-threatening organ dysfunction

   C. Septic shock requires positive cultures

   D. Sepsis cannot be diagnosed antenatally

7. **Lactate Alarm**

   In pregnancy, serum lactate is most concerning when:

   A. >2 mmol/L with hypotension

   B. >2 mmol/L even with normal BP

   C. Rising lactate after delivery

   D. Elevated lactate during labor

8. **The Riskiest Window**

   When is the highest risk period for fatal pulmonary embolism?

   A. Second trimester

   B. Third trimester

   C. Intrapartum

   D. First 6 weeks postpartum

9. **Heparin Switch**

   Unfractionated heparin is preferred over LMWH when:

   A. Obesity

   B. Renal failure or imminent delivery

   C. Previous PE

   D. Twin pregnancy

10. **Imaging Myths Busted**

    Which statement is MOST correct?

    A. CTPA is contraindicated in pregnancy

    B. V/Q scan exposes fetus to high radiation

    C. Both CTPA and V/Q are safe when indicated

    D. Imaging should wait till postpartum

11. Right Call, Right Now

The earliest recommended timing for perimortem caesarean section (PMCS) after maternal cardiac arrest is:

A. After 2 minutes

B. After 4 minutes

C. After 10 minutes

D. After return of spontaneous circulation

12. Cpr Position Matters

The best position for CPR in late pregnancy is:

A. Left lateral tilt 30°

B. Right lateral tilt

C. Supine with manual uterine displacement

D. Semi-recumbent

13. The Necessary Evil

Which ACLS drug MOST compromises uteroplacental perfusion, yet remains indicated?

A. Amiodarone

B. Lidocaine

C. Adrenaline

D. Calcium gluconate

ROUND 2: Fast decisions save lives — can you match them in under a minute?

Column A — The Situation	Column B — The Move (Jumbled)
A. Pulmonary edema in severe hypertension	1. Zavanelli manoeuvre
B. Hypertensive emergency with no IV access	2. Reverse breech extraction
C. Hypertensive crisis requiring rapid control	3. Ischial spine
D. Most common terminal event in eclampsia	4. Labetalol
E. Arrested labour at ischial spines	5. Macrosomia
F. Forceps designed for rotation	6. Nitroglycerin
G. Fixed pelvic landmark in DTA	7. McRoberts manoeuvre
H. Deeply impacted head at CS (back anterior)	8. Caesarean section
I. Occipitoposterior head with deep impaction	9. Turtle neck sign
J. First manoeuvre in shoulder dystocia	10. Kielland forceps
K. Cephalic replacement followed by CS	11. Oral nifedipine
L. Classic diagnostic sign of shoulder dystocia	12. Patwardhan technique
M. Commonest risk factor for shoulder dystocia	13. Intracranial hemorrhage

"Makes All the Difference"

In obstetrics, knowing the right move at the right moment

A—7	Nitroglycerin
B—12	Oral nifedipine
C—5	Labetalol
D—2	Intracranial hemorrhage
E—9	Caesarean section
F—11	Kielland forceps
G—4	Ischial spine
H—13	Patwardhan technique
I—3	Reverse breech extraction
J—8	McRoberts manoeuvre
K—1	Zavanelli manoeuvre
L—10	Turtle neck sign
M—6	Macrosomia

Answers (Round 2)

Answers (Round 1)

1-B, 2-C, 3-C, 4-C, 5-C, 6-B, 7-B, 8-D, 9-B, 10-C, 11-C, 12-B, 12-C,

13-C

AOGD Clinical Meet from UCMS & GTB Hospital held on 30th January 2026

A Rare Synchronus Ovarian and Endometrial Carcinoma

Gauri Myne, Kashika, L Shyam Singh

Synchronous primary malignancies of the female genital tract are rare, accounting for approximately 1% of all gynecological cancers, with synchronous endometrial and ovarian carcinoma being the most common combination. This case highlights the diagnostic and therapeutic challenges associated with this uncommon entity and emphasizes the importance of differentiating synchronous primary tumors from metastatic disease due to differing prognostic and management implications.

A 38-year-old nulliparous woman presented with complaints of dull aching, intermittent lower abdominal pain for six months. The pain was insidious in onset, mild in intensity, relieved by analgesics, and gradually progressive. There was no history of abnormal uterine bleeding, urinary or bowel symptoms, constitutional symptoms, weight loss, or loss of appetite. Her menstrual history revealed menarche at 13 years, with amenorrhea for the past two years and previously regular cycles. She had been married for 15 years with a history of infertility but had not undergone evaluation or treatment. Past history was significant for pulmonary tuberculosis treated adequately 10 years earlier. There was no personal or family history of gynecological or breast malignancy.

On examination, the patient was hemodynamically stable with a BMI of 20.5 kg/m² and ECOG performance status of 0. General and systemic examinations were unremarkable. Abdominal examination revealed a non-tender, mobile mass in the hypogastric region corresponding to a 12–14-week gravid uterus, cystic to firm in consistency, with well-defined margins. On bimanual pelvic examination, the uterus was bulky and a separate right adnexal mass measuring approximately 10 × 12 cm was felt, cystic to firm, non-tender, and mobile. Rectal examination showed no nodularity in the pouch of Douglas

Initial investigations included routine blood tests and tumor marker evaluation. Ultrasonography revealed an echogenic lesion within the endometrial cavity suggestive of an endometrial polyp and a large heterogeneous solid-cystic right adnexal mass with internal septations and vascularity, categorized as O-RADS 4. MRI pelvis further characterized the findings, showing a suspicious endometrial lesion with possible superficial myometrial invasion and a large multiloculated right adnexal mass with enhancing solid components and associated pelvic lymphadenopathy, raising suspicion of malignancy. Imaging impression favored endometrial carcinoma (stage IA) with a possible synchronous ovarian primary lesion

Endometrial biopsy revealed an endocervical mucosal polyp, while liquid-based cytology was negative for intraepithelial lesion or malignancy. In view of radiological suspicion of malignancy, the patient was planned for surgical staging. She underwent staging laparotomy with right adnexectomy, intra-operative frozen section, followed by total abdominal hysterectomy with left salpingo-oophorectomy, bilateral pelvic lymph node dissection, and infracolic omentectomy. Frozen section of the right ovarian mass was positive for malignancy, favoring endometrioid carcinoma. There was no gross peritoneal disease, ascites, or omental involvement intra-operatively.

Final histopathology confirmed endometrioid carcinoma of the right ovary and endometrioid endometrial carcinoma, FIGO grade 1. The uterine tumor measured 3 × 2 × 0.8 cm with less than 50% myometrial invasion (0.8 cm invasion in a 2.2 cm thick myometrium). There was no lymphovascular space invasion, cervical involvement, serosal involvement, or lymph node metastasis (0/12 nodes). The omentum was free of tumor. These findings supported the diagnosis of synchronous primary endometrial and ovarian carcinoma, stage IA3, rather than metastatic disease

Synchronous endometrial and ovarian cancers are often seen in younger, nulliparous women and are usually low-grade, well-differentiated tumors diagnosed at an early stage. Differentiating synchronous primaries from metastatic disease is crucial, as synchronous tumors have a significantly better prognosis and often do not require adjuvant therapy. Criteria favoring synchronous primaries include superficial myometrial invasion, low-grade histology, unilateral ovarian involvement, absence of lymphovascular invasion, and lack of widespread metastatic disease—all of which were present in this case.

In conclusion, this case illustrates a rare presentation of synchronous endometrioid carcinoma of the endometrium and ovary in a young woman. Accurate diagnosis through meticulous clinical evaluation, imaging, surgical staging, and histopathological assessment is essential, as management and prognosis differ markedly from metastatic disease. Early-stage, low-grade synchronous tumors have an excellent prognosis, and surgery alone is often sufficient treatment.

Diagnosis of Primary Fallopian Tube Carcinoma: Where Imaging Shows the Way..

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Case: Mrs. X, a 45-year-old woman, attended the Gynaecology outpatient department on 16/10/2025 with complaints of intermittent, profuse watery vaginal discharge persisting for four years, accompanied by intermittent colicky lower abdominal pain for the preceding two months. There was no improvement with symptomatic measures or the use of vaginal pessaries.

Her past medical history was suggestive of genital tuberculosis diagnosed during evaluation for secondary infertility approximately 20 years earlier, for which she had completed antitubercular therapy. Hysterosalpingography showed bilateral tubal blockage and she had undergone one unsuccessful IVF cycle. There was history of one abortion. Her prior menstrual cycles were normal. Family history was significant for pulmonary tuberculosis in her parents-in-law. There was no history of gynaecological malignancy in the family.

On examination, the patient was hemodynamically stable, with normal general and systemic findings. Speculum examination revealed watery discharge emerging from the cervical os. Bimanual pelvic examination demonstrated a bulky uterus and an approximately 8 × 8 cm cystic, fixed, and tender mass in the left fornix. The right fornix and pouch of Douglas were free.

Pelvic ultrasonography performed in September 2025 revealed a bulky uterus with a small intramural fibroid and a 10 × 4.3 cm in size. There was a solid-cystic ORADS-4 left adnexal mass associated with hydrosalpinx. Contrast-enhanced MRI in November 2025 showed a dilated left fallopian tube containing an intraluminal enhancing solid lesion, suggestive of primary fallopian tube carcinoma, corresponding to FIGO stage IIB disease.

The patient underwent staging laparotomy on 10/12/2025. Intraoperatively, the left fallopian tube was markedly dilated with an intratubal solid growth extending to the rectosigmoid serosa. Optimal cytoreduction was achieved by total abdominal hysterectomy with bilateral salpingo-oophorectomy, infracolic omentectomy, and peritoneal biopsies.

Histopathological examination confirmed high-grade serous carcinoma of the left fallopian tube with involvement of the left ovary, with the ovarian capsule remaining intact, and infiltration of the rectosigmoid serosa. All other specimens were free of tumor. The pathological stage was pT2bN0M0, and immunohistochemistry showed diffuse p53 positivity. The postoperative period was uneventful, and the patient was discharged on postoperative day eight with advice to seek medical oncology consultation for adjuvant chemotherapy.

Discussion: Primary fallopian tube carcinoma is an extremely rare gynecological malignancy, accounting for approximately 0.1–1.8% of all gynecologic cancers. It is associated with infertility, chronic salpingitis, tubal endometriosis, tuberculous salpingitis, and BRCA gene mutations. Elevated CA-125 levels are found in nearly 80% of patients. Clinical features are given by the Latzko's triad—pelvic pain, watery discharge, and an adnexal mass. This classic triad is encountered in only 15% cases. Diagnostic pathologic criteria include tumor origin from the endosalpinx, papillary histological architecture resembling tubal mucosa, demonstration of a transition from benign to malignant epithelium, and exclusion of a primary ovarian or endometrial malignancy which if concurrently present should be smaller in size than the primary tumor in the fallopian tube. Histologically, majority are serous carcinomas. Characteristic immunohistochemistry is positive for CK7 and negative for CK20.

Staging follows the FIGO system in 2013 included fallopian tube malignancies alongside ovarian and primary peritoneal malignacies recognising that all these three originate as serous tubal intraepithelial carcinomas. Compared with ovarian carcinoma, primary fallopian tube carcinoma is more often detected at an earlier stage and is associated with better progression-free survival.

Preoperative diagnosis remains challenging (only in 4%), and most cases are identified only after histopathological evaluation. In our case, The typical Latzko's triad was present and MRI findings of sausage shaped mass in the adnexa with hydrosalpinx adjacent to the papillary mass, rim enhancement were pathognomonic of primary fallopian tube malignancy. The extension to the rectosigmoid was suggested by loss of adjacent fat planes.

This case report highlights that vigilant imaging can help in pre operative diganosis and timely management of this rare gynaecological malignancy.

Trophoblast to Turbulence- Hemodynamic Instability in Rare GTD

Manisha Chandel, Durgesh, Kanika Kumari, Kamna Datta, Ashok Kumar

Case Report 1

A 26-year-old, P1L1A1with previous LSCS, presented with history of bleeding per vaginum for one week with history of suction and evacuation six weeks earlier done for missed abortion.

On examination, vitals were stable. Her per vaginum examination revealed an enlarged uterus of 6–8 weeks size and a right adnexal cystic mass of 4 × 4 cm. UPT was positive. Ultrasound showed a heterogeneous hypoechoic uterine

lesion with cystic areas, increased vascularity, and posterior myometrial thinning. Serum β-hCG levels was 179mIU/ml. Serial β-hCG showed a plateau (179–226 mIU/mL). MRI was suggestive of GTN with no evidence of metastasis.

Patient was initiated on single-agent methotrexate chemotherapy in view of low risk WHO score 2. During therapy, patient had massive vaginal hemorrhage which was not controlled by conservative method and emergency abdominal hysterectomy was done keeping a diagnosis of PSTT in mind. Cut section revealed exophytic growth 4*5cm arising from posterior myometrium with no gross myometrial invasion.

Histopathology confirmed PSTT, with immunohistochemistry showing focal positivity for inhibin and p63 and a Ki-67 index of 10–15%. The patient had an uneventful postoperative recovery and was followed up till 3 consecutive negative β-hCG levels.

Case Report 2

A 28-year-old woman, G2A1, with an IVF-conceived dichorionic diamniotic twin pregnancy at 31+5 weeks of gestation, was admitted for management of gestational hypertension. Fetal reduction was done from quadruplet gestation to twins at 12 weeks. She underwent an emergency preterm lower-segment caesarean section at 32+1 weeks for preeclampsia with severe features and pulmonary edema. Patient developed severe atonic postpartum hemorrhage two hours postoperatively for which obstetric hysterectomy was done. Histopathological confirmed PSTT. Immunohistochemistry demonstrated loss of CD34 in areas of trophoblastic invasion and a low Ki-67 index (<5%), consistent with PSTT.

Discussion

Gestational trophoblastic neoplasia is a group of malignant tumors originating from placental villous and extra-villous trophoblasts. PSTT is a type of malignant form of GTN.

The incidence of PSTT is <2% of GTN and is commonly seen in reproductive age group, during or after normal pregnancy, miscarriage, molar pregnancy. It presents-months to years after last pregnancy as irregular uterine bleeding, amenorrhea and is usually slow-growing. It can metastasize to lungs, vagina, brain in advanced stage by lymphatic spread.

Provisional diagnosis is made by clinical presentation, imaging and relatively low serum β-hCG and raised level of HPL.

Histopathology and Immunohistochemistry is crucial for diagnosis of PSTT and other GTN.

The above two cases are rare in their presentation owing to catastrophic hemorrhage leading to hysterectomy in both patients. PSTT is resistant to standard chemotherapy. Total Hysterectomy is mainstay with adjuvant chemotherapy. Follow up with β-hCG monthly for 12–24 months is crucial as it has a high incidence of recurrence-15% to 30%. PSTT can also present as massive vaginal bleeding. In an era of IVF pregnancy, multiple gestation is another risk factor for PSTT. Hysterectomy done for PPH should be evaluated critically by expert pathologist where immunohistochemistry gives a definite diagnosis.

Prize Winners of Scientific Papers 2026

68th Annual Conference AICOG

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Dr Panchampreet Kaur
Dr Priyanka

Adolescent Health Sub-committee 2025-27

Chairperson: Dr Dipti Nabh
Advisors: Dr A G Radhika, Dr Manju Khemani , Dr Sanjeevni Khanna

Members
Dr Chandra Mansukhani
Dr Raka Guleria
Dr Meenakshi Sharma
Dr Panchampreet
Dr Seema Gupta
Dr Pratibha Garg
Dr Shweta Sardana
Dr Ruchi Singhal
Dr Sony Anand
Dr Sujata Aggarwal
Dr Mrinalini Mani
Dr Taru Gupta

Urogynaecology Subcommittee 2025-27

Chairperson: Dr Sonal Bathla
Member Secretary: Dr Shalu Jain
Advisors : Dr Ranjana Sharma, Dr Kishore Rajurkar, Dr Pawan Bhasin, Dr Achla Batra, Dr Manju Puri, Dr J B Sharma

Members
Dr Amita Jain
Dr Anuradha
Dr Bharti Uppal   Nayyar
Dr Geeta Mediratta
Dr Karishma Thariani
Dr Manasi Deograh
Dr Muntaha
Dr Monika Gupta
Dr Rajesh Kumari
Dr Sandhya Jain
Dr Uma Swain

Oncology Subcommittee 2025-27

Chairperson: Dr Bindiya Gupta
Member Secretary: Dr Seema Singhal
Advisors : Dr Neerja Bhatla, Dr Rupinder Sekhon

Members
Dr Anshuja Singla
Dr Archana Misra
Dr Kanika Batra Modi
Dr Mala Srivastava
Dr Neha Kumar
Dr Nidhi Gupta
Dr Pakhee Agarwal
Dr Saritha Shamsunder
Dr Satinder Kaur
Dr Sharda Patra
Dr Shruti Bhatia
Dr Vandana Jain

QI Obst. & Gynae Practice Subcommittee 2025-27

Chairperson : Dr Surveen Ghumman

Members
Dr Manju Puri
Dr Jyotsana Suri
Dr Renu Tanwar
Dr Akanksha Sharma
Dr Aakriti Batra

Breast and Cervical Cancer Awareness and Prevention Sub-committee 2024-26

Chairperson: Dr Seema Prakash

Members
Dr Poonam Goyal
Dr Mala Srivastava
Dr Tarini Taneja
Dr Neha Varun
Dr Srishti Prakash
Dr Anju Singh
Dr BhanuPriya
Dr Rajeshwari
Dr Nilanchali
Dr Astha Srivastava
Dr Nitasha Gupta

Community Health and public awareness Sub-committee 2024-26

Chairperson : Dr Deepa Gupta.
Advisors: Dr. Achla Batra, Dr. Shivani Agarwal

Members
Dr. Shakun Tyagi
Dr. Sujata Das
Dr. Rashmi
Dr. Suyesha
Dr. Manisha Navani
Dr. Vibha Bansal
Dr Neelu Mahajan
Dr Amita Agarwal
Dr. Kanika Chopra
Dr Srishti Prakash
Dr Megha Kansara
Dr Deepali Garg

Safe Motherhood Subcommittee 2024-26

Chairperson: Dr Shashi L Kabra Maheshwari

Members
Dr Meenkshi Ahuja
Dr Taru Gupta
Dr Jyoti Mallik
Dr Jaya Chawla
Dr Vinita Gupta
Dr Mera Hrisingani
Dr Vandana Gupta
Dr Sheeba Marwah
Dr Taruna
Dr Mrinanini Mani
Dr Auditi Talukdar
Dr Divya Solanki
Dr Manjusha
Dr Raka Guleria

Infertility & Reproductive Endocrinology Sub-committee 2024-26

Chairperson: Dr Pikee Saxena

Members
Dr Meenakshi
Dr Sunita Arora
Dr Leena Wadhwa
Dr Taru Gupta
Dr Bindu Bajaj
Dr Ankita Sethi
Dr Manju Khemani
Dr Parul
Dr Alpana Singh
Dr Neha Proothi
Dr Neeti Tiwari
Dr Surveen Ghumman
Dr Ritu Sharma
Dr Priti Dhamija

Medico-legal Subcommittee 2024-26

Chairperson: Dr Nidh Khera

Members
Dr Geeta Mediratta
Dr Prachi Renjhen
Dr Niharika
Dr Susheela Gupta
Dr Aishwarya
Dr Sharmishtha Garg
Dr Geetanjali Nabiyal

AOGD Subcommittees Chairperson Election (2026-28)
<u>Call for nominations</u>

Nominations for the Chairperson of following subcommittee are re-advertised as nomination received previously did not fulfil the eligibility criteria mentioned in AOGD Constitution.

- **Community Health & Public Awareness Subcommittee**
- **Medico-legal subcommittee**

Last date for submission of nominations is <u>**15/03/2026**</u>

✓ Applications by desirous candidates should be submitted on the prescribed form available on AOGD website (www.aogd.org) / bulletin / office, with due entry in the office register in a sealed envelope & through email aogdlhmc2025@gmail.com

✓ Nominations as per the eligibility criteria should reach AOGD secretariat: Department of Obst. & Gynae LHMC & SSK Hospital, New Delhi- 110001 (Phone no. 9717392924) by <u>**15 /03/2026.**</u>

Dr. Ratna Biswas (Secretary AOGD , 9971372695)

Important announcement : The chairpersons after being nominated have the responsibility to call for application for members of their respective subcommittee for up to a maximum of 10 members.

Eligibility Criteria for AOGD Sub-committee chairperson

1. The chairperson of a sub-committee should have been a member of the sub-committee in question for at least one term, with one term being equivalent to two years, prior to his/her appointment as chairperson of that sub-committee.
2. He/she should have been a member of the AOGD for fifteen years.
3. He/she should have experience in the field related to the subcommittee.
4. He/she should have completed at least fifteen years from the date of his/her registration as a medical practitioner. Further, he/she should have held a senior / faculty position for not less than that of associate professor, senior consultant or an equivalent there of in his/her respective organization, for a period of at least five years .
5. No person should hold chairperson ship of the same subcommittee for two consecutive terms with each term comprising of two years. Further, a person who has been chairperson of one subcommittee cannot be nominated as chairperson of another subcommittee unless separated by a duration equivalent to two terms of the subcommittee.
6. The Executive Committee may lay down additional criteria for the eligibility and pre-requisites for appointment as chairperson of each sub-committee from time to time.
7. An eligible member must send an application for nomination as chairperson of a sub-committee stating therein his/her previous experience in the field related to the sub-committee and future vision for furthering the goals of the AOGD through such sub-committee. One person shall not apply for chairpersonship of more than one sub- committee at a time. The application shall be scrutinized by the Executive Committee of AOGD for nomination as chairperson.
8. In the event of more than one application being received for appointment as chairperson of a subcommittee, and in the absence of unanimous decision of the Executive committee in this regard, the Executive Committee shall decide the nomination by cast of secret ballot.
9. The tenure of the chairperson of subcommittee shall be for a period of two years.

The Association of Obstetricians & Gynaecologists of Delhi

Nomination Form

Name:_____

Designation/Affilation_____

AOGD Membership no:_____

Official Address:_____

Residential Address:_____

Phone:_____Email:_____

Bio Sketch (Relevant to the Eligibility Criteria in 250words)

Post Applied for

Sub-committee Chairperson
2026-28

Subcommittee Name

Proposed by – Name	AOGD Membership no.	Signature

1.

Seconded by

1.

2.

Nominations should reach at AOGD Office
For any Query please call Mrs. Sarita : 9211656757, 9717392924

Events Held 2026

Awareness Session on Cyber Security and Public Health conducted by Community Health and public awareness Sub Committee in association with Delhi Paramedical & Management Institute (DPMI) on 3rd January 2026

Glimpses of 68th AICOG Conference conducted by Dept. of Obst. & Gynae Dr. RML Hospital in association With AOGD on 14th – 18th January, 2026 at Yashobhumi, Dwarka, New Delhi

Cervical Cancer Awareness Month Celebrations conducted by AOGD Oncology Committee in collaboration with Indian Society of Colposcopy and Cervical Pathology on 16.01.2026

Awareness Talk in Gynae OPD

Distribution of pamphlets

Skit presentation

Workshop on Robotics Training on Simulator and Suturing & Knotting Techniques organized by Dept. of Obst. & Gynae, LHMC & SSK Hospital under the aegis of AOGD in collaboration with Medtronic at Seminar room, Gynae Office, LHMC & SSK Hospital on 28th – 31st January 2026

The AOGD Monthly Clinical Meeting (virtual) conducted by the Department of Obst & Gynae, Dr RML Hospital on 30th January, 2026

Association of Obstetricians & Gynaecologists of Delhi
MEMBERSHIP FORM

Name:..

Surname: ....

Qualification (year): ....

PHOTO

Postal Address: ....

City:.. State: .... Pin code: ....

Place of Working: ....

Residence Ph. No. .... Clinical / Hospital Ph. No. ....

Mobile No:....................................... Email: ....

Gender: Male:.. Female:...

Date of Birth: Date.........................Month .... Year..............................

Member of Any Society:...

Proposed   by   ....

Cheque/DD / No: ....

Cheque/Demand Draft should be drawn in favour of: **Association of Obstetricians and Gynaecologists of Delhi**

FOR ONLINE TRANSFER THROUGH NEFT/RTGS
Name of Account: Association of Obstetricians and Gynaecologists of Delhi
Account no: 5786412323
Name of Bank: Central Bank of India
Branch: LHMC & SSK Hospital
IFSC code: CBIN0283462
MICR code: 110016067

ASSOCIATION OF OBSTETR

12418708@cbin

BHIM UPI

For Life Membership	: Rs. 11,000 + Rs. 1,980 (18% GST applicable) = Rs. 12,980
For New Annual Membership*	: Rs. 2,000 + Rs. 360 (18% GST applicable) = Rs. 2,360
For Old Renewal Membership+	: Rs. 1,200 + Rs. 216 (18% GST applicable) = Rs. 1,416

Encl.: Attach Two Photocopies of All Degrees, DMC Certificate and Two Photographs (Self attested)

* Annual Membership is for the calendar year January to December.

* In case of renewal, mention old membership number.

Note: 18% GST will be applicable as FOGSI requires it.

Send Complete Membership Form Along With Cheque / DD and Photocopy of required documents to the secretariat.
For online transaction send scan copy of all documents with payment slip on given mail id

Secretariat
Department of Obstetrics and Gynaecology
Lady Hardinge Medical College & SSK Hospital, New Delhi-110001
Tel.: 011-23408297, (M): 9717392924 | Email Id: aogdlhmc2025@gmail.com