



AOGD BULLETIN

Volume 22 | March 2023 | Monthly Issue 11



Safeguarding women and their Doctors

Issue Theme:
Critical Care in Obstetrics



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[#] Mirza F, et al. Dydrogesterone use in early pregnancy. Gynecol Endocrinol. 2016;32(2):97-106. [†] Schindler AE. Progestational effects of dydrogesterone in vitro, in vivo and on human endometrium. Maturitas. 2009;65(1):S3-S11.
[^] Novel-Estradiol hemihydrate first time in India. ⁺ Safer-As compared to conjugated equine estrogens. Smith NL et al Lower risk of cardiovascular events in postmenopausal women taking oral estradiol compared with oral conjugated equine estrogens. JAMA Intern Med. 2014; 174(1):25-31. ^{*} As Prescribing Information of Solfe, version 1; Dated: 25th July 2013

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From the AOGD Office



Dr. Asmita M. Rathore



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Dear AOGD members

Warm Greetings!

International Women's Day 2023 was commemorated on March 8 under the theme "DigitALL: Innovation and technology for gender equality". Aim being to highlight the issue of under representation of women in Science, Technology, Engineering and Mathematics (STEM fields).

Thankfully, many specialities under medical sciences have a good number of women professionals, particularly Obstetrics and Gynaecology. Overall, promoting gender equality in all areas of healthcare and ensuring that women have equal opportunities to succeed is crucial for creating a more equitable and just society.

As our one-year term as the Secretariat of the Association of Obstetricians and Gynaecologists of Delhi comes to an end on 31st March, we would like to extend our sincere thanks to all the members of the Association for their cooperation, support, and participation in various activities and initiatives that we have organized during the past year.

This is the penultimate issue of AOGD bulletin from the MAMC team. Our editorial team, ably helmed by Dr. Madhavi M. Gupta, has put together yet another engaging issue that focusses on an important topic that is, "Critical care in Obstetrics". It is this knowledge that saves young lives when things go out of control during pregnancy or childbirth.

As we prepare to hand over the reins to the new team from UCMS, under stewardship of Dr. Amita Suneja, we would like to congratulate them on their appointment and wish them the very best in their future endeavours. We are confident that they will take the Association to newer heights.

It has indeed been an honour and a privilege to serve as the Secretariat of AOGD!

Dr. Asmita M Rathore, President

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AOGD Risk Management Support [ARMS] Group

One of the ways to ensure the stress-free work environment and optimal patient care is mutual support among professional colleagues. We propose to form an advisory group of senior AOGD members that can be contacted if one of us is caught in a complex clinical dilemma / dealing with aggressive clients or is apprehensive about how to document or effectively troubleshoot a potential problem. This group will provide the timely advice and will be led by-

Convener- **Dr. Vijay Zutshi** - 9818319110

Co convener- **Dr. Aruna Nigam** - 9868656051

We invite suggestions from all members regarding functioning of this cell which will guide us forming the SOPs. Any member interested in being part of Advisory group may contact the convener.

Pl mail to aogdmamc2022@gmail.com

From the Editor's Desk



Dr. Madhavi M. Gupta
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Greetings to all !

Dear Friends

The editorial team is pleased to present to you the penultimate issue of the AOGD Bulletin from team MAMC, for the month of March 2023.

The focus of the current issue is "**Critical Care in Obstetrics**". The Game Changer section covers the **Surviving Sepsis Campaign Guidelines 2021- International Guidelines for Management of Sepsis and Septic Shock 2021**. The new guidelines specifically address the challenges of treating patients experiencing the long-term effects of sepsis.

We have covered obstetric triage, managing at risk mothers including maternal collapse, along with a thorough protocol of approaching a critically ill pregnant woman. Timely identification of at-risk obstetrics patients and appropriate level of care could prevent maternal mortality and severe morbidity in women. Managing maternal collapse is important and our Anaesthesia colleagues walk us through step by step. Fluid therapy is one of the most important cornerstones in the management of a critically ill patient. This issue will focus on the use of fluids for both resuscitation and maintenance therapy.

The ever increasing significance and need of perimortem cesarean section for maternal resuscitation cannot be overstated and all dealing with pregnant women should be well versed. Ultrasound is a useful tool in obstetric emergency, not just for fetal wellbeing but also for assessment and treatment while resuscitating a pregnant woman. The application and utilization of point of-care ultrasound (POCUS) in obstetrics has been dealt in detail.

"Safeguarding the Doctors" section is about the Revised MTP Act-2021. Though we all know that the MTP is now permissible until 24 weeks of gestation but it's not just this. The indications are specific and very clear. The powers and functions of the Medical Board are listed. The author takes us through the entire amendment. We need to understand these amendments lest we falter.

My heartfelt gratitude to all the authors for their efforts in putting together an interesting and informative read.

As always, we look forward to receiving your feedback to help us bring out a better version next time.

Yours in health

Dr. Madhavi M Gupta
Editor

GAME CHANGER:

International Surviving Sepsis Campaign Guidelines 2021 for the management of sepsis and septic shock: What's New?

Madhavi M Gupta*, **Nalini Bala Pandey****

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Recommendation of SSC 2021 Guidelines are available free at Society of critical care Medicine (SCCM) websites and on PubMed(<http://www.ncbi.nih.gov//PubMed>)

Evans L, Rhodes A, Alhazzani W, Antonelli M, Coopersmith CM, French C, Machado FR, Mcintyre L, Ostermann M, Prescott HC, Schorr C, Simpson S, Wiersinga WJ, Alshamsi F, Angus DC, Arabi Y, Azevedo L, Beale R, Beilman G, Bellecote E, Burry L, Cecconi M, Centofanti J, Coz Yataco A, De Waele J, Dellinger RP, Doi K, Du B, Estenssoro E, Ferrer R, Gomersall C, Hodgson C, Møller MH, Iwashyna T, Jacob S, Kleinpell R, Klompas M, Koh Y, Kumar A, Kwizera A, Lobo S, Masur H, McGloughlin S, Mehta S, Mehta Y, Mer M, Nunnally M, Oczkowski S, Osborn T, Papatheanassoglou E, Perner A, Puskarich M, Roberts J, Schweickert W, Seckel M, Sevransky J, Sprung CL, Welte T, Zimmerman J, Levy M. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. *Intensive Care Med.* 2021 Nov;47(11):1181-1247.

What is new in the 2021 guidelines?

Updated global adult sepsis guidelines, released in October 2021 by the Surviving Sepsis Campaign (SSC), place an increased emphasis on improving the care of sepsis patients after

they are discharged from the intensive care unit (ICU) and represent greater geographic and gender diversity than previous versions.

The new guidelines specifically address the challenges of treating patients experiencing the long-term effects of sepsis. Patients often experience lengthy ICU stays and then face a long, complicated road to recovery. In addition to physical rehabilitation challenges, patients and their families are often uncertain how to coordinate care that promotes recovery and matches their goals of care.

To address these issues, the guidelines recommend involving patients and their families in goals-of-care discussions and hospital discharge plans, which should include early and ongoing follow-up with clinicians to support and manage long-term effects and assessment of physical, cognitive, and emotional issues after discharge.

SSCM 2021 guidelines has total 93 recommendations. Use of 'Evidence to Decision' framework as a transparent and structured system for formulating recommendations. Questions selected following international evaluation of practice and uncertainties. PICO questions about long term outcomes after sepsis were added.

A few highlights

PICO Questions	2021 Recommendation	Recommendation Strength and Quality	Change from 2016
In acutely ill patients should we use qSOFA criteria to screen for the presence of sepsis?	We recommend against using qSOFA compared with SIRS, NEWS, or MEWS as a single screening tool for sepsis or septic shock.	Strong, moderate-quality evidence	New recommendation

In patients with known or suspected infection and hypotension and / or an elevated lactate should we administer 30mL/Kg Body weight of crystalloids or a rapid small volume fluid challenge and reassess?	For patients with sepsis induced hypoperfusion or septic shock we suggest that at least 30 mL/kg of I/V crystalloid fluid should be given within the first 3 hr of resuscitation.	Weak, low quality of evidence	Downgraded from Strong, low quality of evidence “We recommend that in the initial resuscitation from sepsis-induced hypoperfusion, at least 30 mL/kg of I/V crystalloid fluid be given within the first 3 hr”.
In adults with sepsis or septic shock, should we use intravenous vitamin C?	For adults with sepsis or septic shock, we suggest against using IV Vitamin C.	Weak recommendation, low quality of evidence	New recommendation
In patients with sepsis and septic shock, should we use a restrictive fluid management in the first 24 hours of resuscitation?	There is insufficient evidence to make a recommendation. on the use of restrictive versus liberal fluid strategies in the first 24 hr of resuscitation in patients with sepsis and septic shock who still have signs of hypoperfusion and volume depletion after the initial resuscitation.	No recommendation	New

Several new recommendations regarding – Capillary refill time, Empiric MRSA coverage, Empiric fungal coverage, peripheral vasopressor use of Levosimendan, Use of High Flow Nasal Canula and Non-invasive Ventilation, Use of ECMO and Post-ICU follow up were added.

Obstetric Triage and early identification of at-risk patients

Reena Rani

Assistant Professor, Maulana Azad Medical College and LNH, Delhi

Triage is the process of prioritising and classifying for early assessment and interventions. The obstetric triage unit is the entry point in the hospital where inaccessible medical care is available in emergencies in the field of obstetrics and gynaecology. The objective of obstetric triage and emergency assessment is to ensure that women, fetuses and newborns receive timely care when in need. This could be done by various available scores and evidence-based tools.

Table 1: The common critical condition in obstetrics

Pregnancy related	Obstetrical haemorrhage (Antepartum & Postpartum) Pre-eclampsia, Eclampsia, HELLP syndrome, Acute fatty liver of pregnancy, Peripartum cardiomyopathy, Sepsis, Amniotic fluid embolism syndrome
Pre-existing diseases that may worsen during pregnancy	Epilepsy, Myasthenia gravis, Valvular disease, Primary pulmonary hypertension, Congenital heart disease, Diabetes mellitus, Acceleration of chronic kidney disease
Diseases for which the pregnant patient has increased risk Sepsis	Urinary tract infection (particularly pyelonephritis), Listeriosis, Pneumonia, Diabetic ketoacidosis, Sheehan syndrome (secondary to peripartum haemorrhage), Pulmonary embolism Aspiration pneumonia, Deep venous thrombosis, Disseminated intravascular coagulopathy, Acute kidney injury, Acute on chronic renal failure
Diseases that may be co-incident to pregnancy	Trauma, Surgical illness like ruptured intracranial aneurysm appendicitis, cholecystitis

Early warning scores

Clinical deterioration has been seen to be preceded by changes in physiological and biochemical parameters. Delay in recognition and treatment of these changes increases the risk of death in critically ill patients.¹ Similarly, inappropriate action in response to the observed

abnormal physiological and biochemical variables may also lead to increased morbidity and mortality. Timely identification of the deterioration of these variables and appropriate action by qualified multidisciplinary team management can contribute to reducing the burden of severe maternal morbidity and associated long-term complications. This principle is utilised by various early warning systems. EWS uses physiological parameters to track a patient's condition to detect deterioration early and to trigger an increase in care.

EARLY WARNING SYSTEM includes 3 components:-

1. Early warning score - A tool to aid the recognition and management of a deteriorating woman.
2. Tracking – Periodic observation and recording of vital signs on an observation chart.
3. Trigger - Predetermined criteria 'trigger' the summoning for help based on score, involving timely response and appropriate level of assistance.

EWS can also be used to assess the severity of illness and predict outcomes in patients in critical care areas.² High scores are more likely to occur early during admission and falling EWS over time suggests a beneficial effect of treatment. EWS thus helps in assessing the efficiency of medical intervention and may be used as a monitoring tool.

Initially, most EWS were developed for the non-pregnant adult population. However, their direct application in pregnancy was questionable as pregnancy-induced changes (Table 2) in physiological parameters required modification in these early warning scores.

Table 2: Physiological Changes in Pregnancy

Physiological/Anatomical Parameters	Changes in pregnancy
Cardiac output	30-50% increase
Heart rate	Increase by 10-20 bpm
Mean arterial pressure (MAP)	10-15 mm Hg decrease in first two trimesters
Hematological	Fall in platelet count, hypercoagulability
Renal	increase in GFR and creatinine clearance, proteinuria
Pulmonary	
Airway/Trachea	Hyperemia, mucosal oedema, hypersecretion,
Diaphragm	Elevation because of gravid uterus
Total lung capacity	4-5% decline
Functional Residual Capacity	Decreased by 25%
Tidal volume	increase
Minute ventilation	Increased by 50%
Oxygen consumption	Increased by 20%

Various modified EWS (MEWS) are now extensively used in obstetric practice. The 2003-2005 Confidential enquiry into maternal and child health (CEMACH) report recommended the introduction of modified early obstetric warning system (MEOWS) in all obstetric patients (Table 3). The parameters commonly included in EWS are heart rate (60-100), respiratory rate (12-20/min), blood pressure (late sign, fall of SBP of 30mmHg/MAP of less than 60mmHg, BP more than 140/90 mmHg needs immediate action) and level of consciousness (AVPU: Alert, responds to Voice or Pain, and Unresponsive), oxygen saturation(target should be more than 95%). Other parameters such as the pain scores (0=no pain, 1=slight pain on movement, 2=intermediate pain at rest/moderate pain on movement), lochia characteristics and urine output are sometimes included, either in the score or recorded on the chart. A trigger was defined

as a single markedly abnormal observation (red trigger), or a combination of two simultaneous mildly abnormal observations (two yellow triggers). A trigger prompted an urgent medical intervention. Upgradation of the level of care is recommended with an increase in the score which may also require the involvement of other members of a multidisciplinary team.

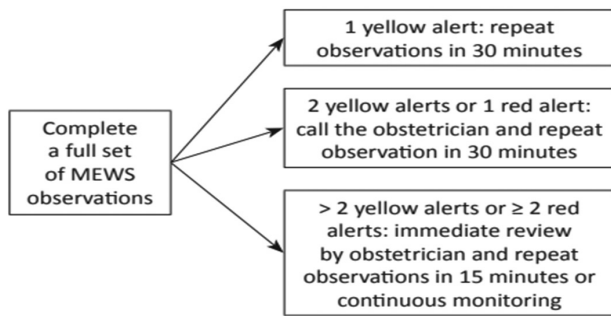
Table 4 is an example of various physiological parameters³ recorded as normal, yellow or red, depending on how abnormal the value is compared to normal pregnancy physiology. Any increase in score warrants escalation protocol of appropriate interventions for triggering pregnant women. Of note, if the care provider is concerned about the pregnant woman, she should be discussed with senior medical staff irrespective of MEWS.

A MEWS facilitates communication and provides an expectation and auditable standard for response by the medical team to deterioration in a pregnant woman's physiology.

Table 3: MEOWS

Table 4: MEWS

Physiological parameters	Normal values	Yellow alert	Red alert
Respirator rate	10-20 breaths per minute	21-30 breaths per minut	< 10 or >30 breaths per minute
Oxygen saturation	96-100%		< 95%
Temperature	36.0-37.4 oC	35-36 or 37.5-38 oC	< 35 or > 38 oC
Systolic blood pressure	100-139 mmHg	150 – 180 or 90 – 100 mmHg	>180 or <90mmHg
Diastolic blood pressure	80-89 mmHg	90-100 mmHg	>100 mmHg
Heart rate	50-99 beats per minute	100-120 or 40-50 beats per minute	>120 or < 40 beats per minute
Neurological response	Alert	Voice	Unresponsive, pain



In a study, MEWS reported that 27% of women triggered a response, and 17% of women fulfilled criteria for obstetric morbidity.⁴ The MEWS was found to be 86% sensitive and 85% specific for predicting the presence of maternal morbidity.

Despite EWS being an essential tool in any obstetric unit, its implementation experiences varied compliance. Some of the key barriers to implementation include:

- Lack of multidisciplinary coordination.
- Inadequate education.
- Suboptimal integration within hospital culture and practices.
- Lack of leadership support.
- Suboptimal alignment with other quality and safety initiatives.

Other simple triage tools

Shock Index (SI): Shock Index is a useful and reliable tool to predict hypovolaemic states and early haemodynamic compromise (e.g., major obstetric haemorrhage) in obstetric population even when the individual vital signs are within the normal values. Shock Index is calculated by dividing heart rate by systolic blood pressure. A normal Shock Index is considered to be between 0.5 and 0.7. A score less than 0.9 indicates that the risk of massive resuscitation is low and >1.4 indicates urgent intervention or stabilisation and transfer to a tertiary care facility.

Modified Shock Index: It is a ratio of heart rate to mean blood pressure (MAP). MSI is a stronger predictor of emergency patient mortality compared to heart rate and blood pressure alone, whereas SI does not have a significant correlation with emergency patient mortality rate.

qSOFA Score⁵: Obstetrically modified quick-SOFA score (omqSOFA) requires only clinical

data for assessment and thus can be performed quickly without waiting for the results of biochemical or laboratory tests. It is an important way of triaging in obstetric emergency for patients who are at risk of sepsis. Though in ICU setting SOFA score is a better predictor of sepsis.

Clinical parameter	Score
Systolic blood pressure ≤ 90 mmHg (≤ 100 mmHg in non-pregnant patient)	1
Respiratory rate ≥ 25 /min (≥ 22 /min in non-pregnant patient)	1
Altered mentation (any state other than alert) (Glasgow Coma Scale < 15 in non-pregnant patient)	1
SOFA – Sequential organ failure assessment; Infection + omqSOFA ≥ 2 – maternal sepsis; omqSOFA – Obstetrically modified Qsofa	

Obstetrically modified qSOFA score (obstetrically modified qSOFA)

Mini PIERs Model⁶: The mini PIERs (Pre-eclampsia Integrated Estimate of Risk) risk prediction model can also identify pregnant women at increased risk of death or major complications of pre-eclampsia. It had a good discriminatory ability (it could separate women who had adverse outcome from those who did not), and it designated women as being at high risk (25% or greater probability of an adverse outcome) with an accuracy of 85.5%.

This model included the following:

Parity, Gestational age on admission, Headache/visual disturbances, Chest pain/dyspnoea, Vaginal bleeding with abdominal pain, Systolic blood pressure and Dipstick proteinuria.

The full PIERs model also requires laboratory testing of platelet count, serum creatinine, lactate dehydrogenase, and aspartate transaminase and alanine aminotransaminase levels.

Conclusion

Like any other subspecialty in the health care system triaging in obstetrics is essential to reduce morbidity and mortality. Quality care is recommended even when the patient load is high, triaging via above mentioned tools could be helpful in getting good maternal and fetal outcomes.

References

1. Subbe CP, Gao H, Harrison DA. Reproducibility of physiological track and trigger warning system for identifying at risk patients on ward. *Intensive care medicine* 2007;33: 619-24
2. Goldhill DR, Worthington L, Mulcahy A, Tarling M, Sumner A. The patient at risk team: identifying and managing seriously ill ward patients. *Anaesthesia* 1999; 54:853-60.
3. Knight M, Nair M, Tuffnell D, et al. on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care – Surveillance of maternal deaths in the UK 2012-14 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009-14. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2016.
4. Singh A, Guleria K, Vaid NB, et al. Evaluation of maternal early obstetric warning system (MEOWS chart) as a predictor of obstetric morbidity: a prospective observational study. *Eur J Ob Gynecol Reproduct Biol.* 2016;207:11-17.
5. Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA.* 2016;315(8):801–810. doi:10.1001/jama.2016.0287
6. Payne BA, Hutcheon JA, Ansermino JM, Hall DR, Bhutta ZA, Bhutta SZ, et al. A risk prediction model for the assessment and triage of women with hypertensive disorders of pregnancy in low-resourced settings: the miniPIERS (Pre-eclampsia integrated estimate of RiSk) multi-country prospective cohort study. *PLoS Med.* (2014) 11(1):e1001589. 10.1371/journal.pmed.1001589.

Approach to a critically sick obstetric patient (ACCC Approach)

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Maternal collapse is a rare but life-threatening event, with a wide ranging aetiology. Maternal collapse is defined as an acute event involving the cardiorespiratory systems and/or central nervous systems, resulting in a reduced or absent conscious level (and potentially cardiac arrest and death), at any stage in pregnancy and up to 6 weeks after birth.¹

The following conditions may complicate a pregnancy and lead to severe maternal outcomes.

- Pregnancy specific conditions - Haemorrhage, sepsis, hypertensive disorders of pregnancy, amniotic fluid embolism, complex cardiac diseases, acute fatty liver, aspiration syndromes, infections and ovarian hyperstimulation syndrome.
- Surgical/medical condition not related to pregnancy - Trauma, asthma, diabetes, autoimmune diseases and anaphylaxis.
- Medical diseases that may worsen during pregnancy - Anemia, congenital heart diseases, rheumatic and non-rheumatic valvular diseases, pulmonary hypertension, renal failure, autoimmune diseases etc.

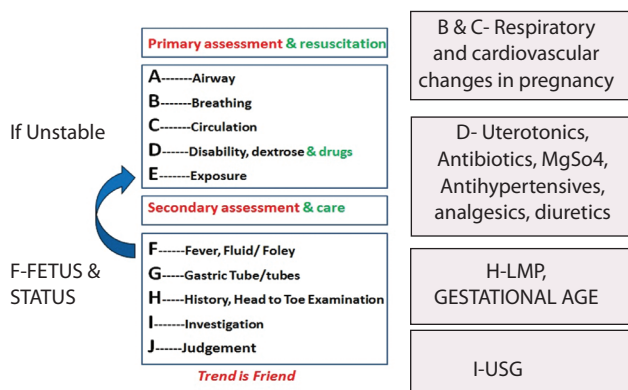
Maternal collapse can result from many causes which may or may not be pregnancy related. A systematic approach to assessment facilitates identification of the cause of collapse. If the cause is reversible, the survival rates are greater and those for which specific treatment exists must be rapidly considered. A systematic ABCDE approach should enable the clinical team to identify the most common causes of collapse.

Management of a critically ill obstetric patient requires a multidisciplinary approach with active involvement of intensivists, obstetricians and paediatricians. The facility should have a fully functional ICU, Operating rooms, Neonatal ICU, Blood bank and dialysis unit. In clinical settings where these facilities are not available

early referral Refer to a tertiary centre should be sought.

Maternal haemodynamic optimisation requires application of basic intensive care principles with modifications based on physiological changes during pregnancy. Ongoing regular ABCDE assessment should be performed as the risk of progression to cardiac arrest remains until the cause of the collapse is treated. Assessment of fetal well-being should be undertaken after ABCDE assessment. Assessment and resuscitation of mother and foetus should be simultaneous. Beware of pitfalls-systemic changes in pregnancy. Monitoring is key to detect lack of improvement/deterioration.

- Manual displacement of the uterus to the left is effective in relieving aortocaval compression in women above 20 weeks' gestation or where the uterus is palpable at or above the level of the umbilicus. This permits effective chest compressions in the supine position in the event of cardiac arrest. A left lateral tilt of the woman from head to toe at an angle of 15–30° on a firm surface will relieve aortocaval compression.



- Initial management is directed at resuscitation of the pregnant patient and stabilization of her condition because the fetus' life at this point is totally dependent on the integrity of the mother's.

- Fetal monitoring should be done after satisfactory resuscitation and stabilization of the mother's condition.

Initial Assessment

- Follow ABCDE protocol
- Early recognition and initiation of life preserving interventions

A. Airway – The airway in pregnancy is more vulnerable because of the increased risk of regurgitation and aspiration during pregnancy.

Assess airway - Patent/clear/threatened

First step : Ask the patient –“What is your name?”

If able to respond verbally the patient :

- Has a reasonably patent airway
- A reasonable tidal volume to phonate
- Has circulating oxygenated blood (i.e. has not had a cardiopulmonary arrest)
- Has reasonable cerebral perfusion to comprehend and answer

In case of a high suspicion of threatened/compromised airway patient can deteriorate very rapidly and will require prompt initiation of CPR. Airway is compromised/threatened in patients with active seizure, post ictal phase, altered sensorium, post-operative case under sedation and during a cardiac arrest.

The following signs can not be ignored: -

- Change in voice / gurgling sounds
- Noisy breathing (snoring and stridor)
- Low oxygen saturation of 93% or lesser is a late sign.

Management of a threatened airway

- Clear the airway - suctioning
- Open airway – Head tilt and chin lift
- Maintainable or not – oropharyngeal or nasopharyngeal airway
- Commence high flow oxygen at 15L/min

Secure a definitive airway in apnoea-Ventilate with Ambu-bag and mask until intubation has been achieved. Apply pulse oximeter and measure oxygen saturation.

B. Breathing -

Assessment

- RR <12 or > 35/min
- Accessory muscles of respiration / work of breathing (WOB)
- Colour of patient
- SPO2 target is > 95% in pregnancy
- Auscultation for air entry

Resuscitation - Treat hypoxia - Oxygenation using NRBM @ 15L/ min. Supplemental high flow oxygen should be administered as soon as possible to counteract rapid deoxygenation.

Bag and mask ventilation or insertion of a simple supraglottic airway should be undertaken until intubation can be achieved. Arterial blood gas analysis should be done for in-depth assessment.

C. Circulation

➤ **Assessment** - Heart rate (manually for 1 min, rate, volume and regularity), Blood pressure, Mean arterial pressure.

Other signs: Capillary refill time, Visible active bleeding and 'Blood on the floor!', Urine output > 0.5 ml/hr. Type, cause and class of shock should be assessed.

- Shock Index- SBP/HR > 0.9
- HR < 40 or > 110/ min
- SBP (<80 or >180mmHg)
- Modified shock Index > 1.3

If the airway is clear and there is no breathing, chest compressions should be commenced immediately. Two wide-bore cannulae (minimum 16 gauge) should be inserted as soon as possible. If peripheral venous access is not possible, early consideration of central venous access, intraosseous access or venous cutdown should be considered.

There should be an aggressive approach to volume replacement, although caution should be exercised in the context of pre-eclampsia or eclampsia. Administer fluid bolus 10-20 ml/kg crystalloid. Repeat the fluid challenge-Monitoring to be done by urine output and patient's condition. Transfuse blood and blood products in case of a haemorrhagic shock. Abdominal ultrasound by a skilled operator

can assist in the diagnosis of concealed haemorrhage. Consider inotropes if Septic shock.

D. Disability –

Assess -3 Ds include Disability, Dextrose, Drugs
Disability of the central nervous system can be assessed by:

- AVPU scale*: Alert/responsive to voice/painful stimuli/unresponsive
- Pupil size, symmetry and reaction to light
- Assessment for drowsiness, agitation, focal neurological deficits

***A = Awake.** The patient is **Awake**

V = Verbal. The patient responds to a **Verbal** stimulus

P = Pain. The patient responds to a **Pain** stimulus

U = Unresponsive. The patient is **Unresponsive** to stimulus

Check temperature, Blood sugars drugs that have been administered.

Review ABCDE

Frequent and repeated clinical re-assessment provides more information than investigations. Monitor and Review primary assessment.

- Decide if patient needs theatre/ICU for stabilization before moving to secondary assessment and definitive care.
- Only after the patient is stabilized, move to secondary assessment.
- At any time deterioration at any stage of assessment, re-assess the ABCDE.

E. Exposure- focus meticulous clinical examination. Check all wounds, episiotomy, dressings and drain site. Assessment of blood loss should be done simultaneously. Look for any distension of abdomen or swelling of legs for as an evidence for DVT. Head- to Toe-Examination in cases of trauma.

F. Fetus, Fever, Fluid

G. Gastric tube, other tubes

H. History- check records, operation notes. History can be taken from the patient's relatives.

"SAMLPE IS AMPLE"

S: Sign and symptoms

A: allergies

M: Medication to review the detailed list of medication.

P: Present and past illnesses

L: LMP, Last meal to decide about the anaesthesia if needs operation

E: Review of the sequence of events.

I. Investigations

A trend of results is more informative than a single value. The delay in investigation should not be a hurdle in the resuscitation. Non-invasive investigations should be the first step and invasive later. Point-of-care ultrasound (PoCUS) is an excellent tool for diagnosis and hemodynamic monitoring. Dynamic monitoring by IVC Compressibility for Fluid Responsiveness should be done.

1. Judgement

By the end of secondary assessment the treating team should be able to decide if the patient is stable or unstable. Definitive treatment for trigger should be started while continuing the resuscitation.

Debriefing is recommended for the woman, the family and the staff involved in the event. Accurate documentation is essential in all cases of maternal collapse, whether resuscitation is successful.

References

1. J Chu, TA Johnston, J Geoghegan, on behalf of the Royal College of Obstetricians and Gynaecologists. Maternal Collapse in Pregnancy and the Puerperium. BJOG 2020; 127: e14– e52.
2. Seif D, Perera P, Mailhot T, Riley D, Mandavia D. Bedside ultrasound in resuscitation and the rapid ultrasound in shock protocol. Crit Care Res Pract. 2012;2012:503254.

Fluid management in critically ill obstetric patient

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Fluid therapy is one of the most important cornerstones in the management of a critically ill patient. It can be used for resuscitation in patients with shock or as maintenance fluids in the perioperative period. This chapter will focus mainly on the use of fluids for resuscitation in shock and will also briefly describe the basics of maintenance therapy.

Shock is a life threatening condition of circulatory failure where the delivery of oxygen to the tissues is compromised. The delivery of oxygen depends on the cardiac output and the content of oxygen in the blood, which in turn depends on 3 variables- hemoglobin, partial pressure of oxygen in arterial blood (PaO₂) and oxygen saturation.

The classification of shock according to the pathophysiology is shown in Table 1.

Table 1: Classification of shock according to pathophysiology

Type of shock	Primary pathophysiology	Causes
Hypovolaemic	Low preload (reduced intravascular volume)	Haemorrhage, Diarrhoea, Vomiting, Burns
Cardiogenic	Low contractility	Cardiomyopathies, acute MI, severe CHF
Distributive	Low SVR (vasodilatation)	Septic shock, neurogenic, anaphylaxis
Obstructive	Low preload (obstruction of venous return to heart)	Cardiac tamponade, pneumothorax, massive PE

The most common reasons for shock in obstetrics are hypovolemic shock resulting from antepartum and postpartum hemorrhage; and distributive shock due to puerperal sepsis, chorioamnionitis and pyelonephritis.

How to suspect shock?

- Hypotension- can be either absolute with systolic BP below 90 mm Hg and Mean Arterial Pressure < 65 mm Hg; or relative with fall in systolic BP by 30 mm Hg
- Tachycardia- Is an early sign of shock and

mostly precedes development of hypotension.

- Tachypnea- an increase in respiratory rate (RR) can indicate metabolic acidosis. A RR of more than 22 is one of the components of the quick SOFA score, indicating the importance of tachypnea as a danger signal.
- Oliguria- decrease in urine output occurs due to preferential blood flow to vital organs- brain and heart, leading to a decrease in glomerular filtration.
- Abnormal mental status- Is due to diminished perfusion or metabolic encephalopathy which starts as agitation and restlessness and ends in coma.
- Cool, clammy, cyanotic skin- is a feature of poor peripheral circulation as there is redistribution of the blood to heart, brain and splanchnic circulation. Mottled cyanotic skin is seen in late stages. However it is important to remember that in distributive shock, especially in the initial stages, there may be warm peripheries due to pooling of blood.
- Metabolic acidosis- reflects the poor tissue perfusion and also may be contributed by renal failure.
- Hyperlactatemia- may or may not be accompanied by metabolic acidosis, but is one of the markers which has been extensively studied as a marker for prognostication of shock. Levels higher than 4-5 mmol/L are considered ominous.

What is fluid resuscitation and who needs it?

Fluid resuscitation is the administration of fluids **rapidly** and in **boluses** to patients with acutely impaired haemodynamic status. It is required to rapidly replete fluids to all cases of hypovolemic and septic shock. Conventionally it has been used in women with a MAP <60 mmHg or a CVP <8mm Hg. However these are static variables

and recently the concept of dynamic indicators of fluid responsiveness are recommended.^{1,2}

Fluid resuscitation is successful in patients who are *fluid responsive*. This means that oxygen delivery to the tissues will improve after fluid administration. Fluid responsiveness can be measured by increase in cardiac output or stroke volume of 15% after receiving 500ml bolus of fluid. A simple dynamic clinical test to determine whether a patient is fluid responsive is the passive leg raising test. The BP is first checked with patient at a 45 degree head up; this is followed by changing the position to 45 degree legs up. The BP is rechecked after about 5 minutes in this position. If the difference in pulse pressure (SBP-DBP) is > 9%, the patient is considered to be fluid responsive and will benefit with fluid resuscitation. Another dynamic bedside noninvasive method to check for fluid responsiveness is to determine the inferior vena cava collapsibility during inspiration on ultrasonography.

How much fluid should be administered in shock?

Resuscitative fluids are commonly administered as successive intravenous boluses (3.5 to 14 mL/kg) over 30 to 60 minutes until the desired response is observed (eg, improved urine output, improved mentation, normalizing base deficit). It is recommended that fluid be warmed to body temperature if large quantities are transfused rapidly so as to prevent hypothermia.

- Resuscitative fluids should be given in boluses: 1 litre at a time in women without congestive heart failure (CHF) or end stage renal disease (ESRD) (30ml/kg BW as initial fluid to be administered in first 3 hours in women with sepsis)
- In women with mild CHF or ESRD: 500ml litre boluses
- In women with severe CHF: 250 ml boluses
- Reassess clinical parameters after each bolus
- The bolus fluid can be administered through peripheral line of 14 or 16 G or through the central venous line.
- In women who are in shock due to loss of blood, the replacement with crystalloids is 3 times the volume lost. This is because of

equilibration of fluid between interstitial space and intravascular compartment in a ratio of 1:3 within 30 minutes. However all effort should be made to rapidly replace the blood and blood products as infusion of more than 2.5-3 litres of fluid can lead to complications like pulmonary edema.

- The estimation of blood loss in pregnant women on the basis of vital signs can be misleading because of the physiological changes of pregnancy affecting the cardiovascular system. A pregnant woman has the ability to withstand the loss of blood to a larger extent as compared to her non-pregnant counterpart because of the increase of about 40% of the blood volume and may easily remain asymptomatic even with a loss of as much as 1 litre (Table 2).

Table 2: Estimation of blood loss in obstetric vs. non-pregnant patient on the basis of clinical features.

	Class 1	Class 2	Class 3	Class 4
Blood loss	15%	15-30%	30-40%	>40%
Non pregnant (ml)	750	1000	1500	2000
Pregnant (ml)	<1000	1000-2000	2000-2700	>2700
RR (per min)	14-20	20-30	30-40	>40
HR (per min)	<100	>100	>120	>140
SBP	Normal	Normal	Decreased	Decreased
DBP	Normal	Increased	Decreased	Decreased
Mental status	Anxious	Anxious	Confused/agitated	Lethargic
Urine (ml/h)	>30	20-30	5-15	negligible
Fluid	Crystalloid	Crystalloid	Blood products	Blood products

Types of fluid for resuscitation

Fluid resuscitation can be done with crystalloid and colloids. Properties of crystalloids are as follows:

- Low tendency to stay intravascular (about 30 minutes)
- Solute of small molecules-hence exert low oncotic pressure
- Equilibrate between interstitial space and intravascular compartment in a ratio of 1:3 within 30 minutes (Fig 1)
- Overload especially in preeclampsia – pulmonary/cerebral oedema
- Used in immediate resuscitation of lost volume

Types of crystalloids and their uses are shown in Table 3.

The properties of colloids are:

- High tendency to stay intravascular (24 hours)
- Larger molecules-exert oncotic pressure
- Volume expansion depends on molecular weight & concentration
- Can be natural colloids (FFP, albumin) or synthetic (starch, gelatin, dextran)
- Useful in some situations of massive blood loss till blood products are available or in severe hypovolemia

Types of colloids available are shown in Table 4

Table 3: Types of crystalloids and their uses

Fluid	pH	Na+ mEq/l	Cl- Eq/l	K+ mEq/l	Ca2+ mEq/l	Other	mOsm/l	Comments
Plasma	7.4	140	100	4	24	Glucose - 0.85	290	
0.9% NaCl (NS)	5.5	154	154	0	0	0	308	Fluid choice for replacement, watch for hyperchloremic acidosis
Lactated ringer (LR)	6.5	130	109	4	3	Lactate 28 mEq/l	275	Fluid choice for replacement
Dextrose 5% (D5%)	4.5	0	0	0	0	Dextrose 50 g/l	285	Free water, hypotonic
D5% LR	5	130	109	4	3	Dextrose 50 g/l	275	Initial post-op maintenance
D5% NS	4	154	154	0	0	Dextrose 50 g/l	308	Initial post-op maintenance
D5% NS 4.5%	4	77	77	0	0	Dextrose 50 g/l	154 + 285	Hypotonic
D5% NS 2.5%	4	34	34	0	0	Dextrose 50 g/l	68 + 285	Hypotonic

Table 4: Types of colloids with their properties

Fluid	Avg Molecular weight (kD)	Oncotic Pressure (mmHg)	Initial volume expansion	Duration of volume expansion
4-5% Albumin	69	20-30	70-100%	12-24 hrs
20-25% Albumin	69	70-100	300-500%	12-24 hrs
10% Dextran 40	40	20-60	100-200%	1-2 hrs
6% Hydroxyethyl Starch (Hespan)	450	25-30	100-200%	8-36 hrs

Which fluid is preferred for fluid resuscitation?

Crystalloids are by far the fluids of choice for resuscitation.

- Colloids do not give any advantage over crystalloids in fluid resuscitation
- Lesser cost and easy availability and safer profile go in favour of crystalloids

Major problems with colloids:

- A meta-analysis comparing resuscitation with colloid solutions versus crystalloid favored the use of crystalloids with respect to mortality.³
- Anaphylaxis
- Coagulation abnormalities
- Acute kidney injury (hydroxyethyl starch solutions)
- Eventually solutes enter the interstitial space and holds lot of water in this space
- Hydroxyethyl starch is contraindicated in septic shock due to increased mortality & acute kidney injury

Normal saline vs Ringer lactate for fluid resuscitation

- Normal saline and Ringer lactate are the fluids of choice for resuscitation in hypovolemic shock. 5%Dextrose is isotonic only as long as it is in the bottle. The glucose is metabolized within minutes of transfusion and it becomes akin to free water hypotonic fluid transfusion which can be dangerous especially in women prone to cerebral edema (preeclampsia). 5D should never be used as a resuscitative fluid.
- Normal saline is considered a safe fluid. There are some concerns about its ability to cause a normal anion gap metabolic acidosis of uncertain significance. There is also some evidence that normal saline may lead to renal dysfunction in patients with shock.⁴
- The recent update of surviving sepsis guidelines recommend that for septic shock the resuscitative fluid of choice is lactated Ringer and not normal saline.⁵
- RL is also very safe and physiologically closest to plasma, but more expensive than NS. It is relatively contraindicated in hyperkalemia (minimum concern). Not advocated with

blood transfusion (calcium binds with citrate in blood).⁶

The effect of fluid resuscitation can be assessed by the following:

- Mean arterial pressure >65mmHg
- Urine output > 0.5ml/kg/hour
- CVP= 8-12mm Hg
- ScvO₂ > 70%
- Normalized lactate
- Normalized mental status
- Heart rate is not a reliable indicator of adequate resuscitation

Maintenance fluids

Maintenance fluids maintain hydration, electrolyte, and acid-base status and avoid catabolism in postoperative patients who cannot tolerate oral or enteral intake. For maintenance, the fluids used are mainly isotonic or hypotonic with added Dextrose and potassium (Table 3).⁵ Dextrose water can also be used as maintenance fluid to stimulate basal insulin secretion and prevent muscle breakdown. For postoperative patients with normal organ function, a volume of maintenance fluid between 1 and 1.5 mL/kg/hour will meet requirements. However if patient is not fit for enteral nutrition even after 5-7 days, muscle breakdown may take place without adequate nutritional support and hence parenteral nutrition is indicated.⁷

A common formula to calculate daily maintenance fluids is: $1500 + [(weight\ in\ kg - 20) \times 20]$; For example a 60 Kg patient would need: $1500 + [(60-20) \times 20] = 1500 + [40 \times 20] = 1500 + 800 = 2300\ ml$

The daily requirement of sodium is 1-2 mEq/kg BW whereas the daily potassium requirement is 1 mEq/kg BW. The daily requirement of dextrose is 50-100 gm/day. This is the minimum requirement to prevent starvation ketoacidosis.

Keeping the above facts in mind it can be appreciated that most of the commonly used fluids such as normal saline, lactated ringer and dextrose normal saline have more than required quantity of sodium (Table 3). However most of the fluids are deficient in potassium (K). The only fluid which contains K is RL (4 mEq/L), however even if 2 L of Ringer is give, it will give only 8 mEq

of K which is grossly inadequate. Thus, in a post op patient who needs IV fluids for more than 1-2 days, replacement of certain electrolytes like K becomes crucial to avoid complications like paralytic ileus.

The ideal maintenance fluid which provides the daily requirement of sodium, potassium and glucose would be D5 half (4.5%) NS (Table 3) with 20 mEq of added K per litre of fluid infused.

The maintenance regimen given above can be continued unless one of the following events:


- If the serum sodium starts to fall, a more concentrated solution should be given (eg, isotonic saline)
- If the serum sodium starts to rise, a more dilute solution should be given (eg, one-quarter isotonic saline)
- If the serum potassium starts to fall, more potassium should be added, and, if it rises above normal, potassium should be corrected.

Summary and key points

- Dynamic tests are preferred over static tests to determine fluid responsiveness
- Crystalloid are the fluid of choice for resuscitation
- NS and RL are considered equivalent in hypovolemic shock though RL may lead to lesser incidence of AKI
- RL is preferred over NS in septic shock
- IV fluids should be administered in discrete boluses through a wide bore short cannula
- Monitor the signs for adequate fluid resuscitation

Suggested Reading

1. P. E. Marik, M. Baram, and B. Vahid, "Does the central venous pressure predict fluid responsiveness? A systematic review of the literature and the tale of seven maids," *Chest*, vol. 134, no. 1, pp. 172-178, 2008.
2. P. E. Marik, X. Monnet, and J. Teboul, "Hemodynamic parameters to guide fluid therapy," *Annals of Intensive Care*, vol. 1, no. 1, pp. 2-9, 2011.
3. D. Annane, S. Siami, S. Jaber, et al., "Effects of fluid resuscitation with colloids versus crystalloids on mortality in critically ill patients presenting with hypovolemic shock: the CRISTAL randomized trial," *The Journal of the American Medical Association*, vol. 310, no. 17, pp. 1809-1817, 2013.

- 
4. Yunus NM, Bellomo R, Hegarty C, Story D, Ho L, Bailey M. Association between a chloride-liberal vs chloride-restrictive intravenous fluid administration strategy and kidney injury in critically ill adults *JAMA*. 2012 Oct 17;308(15):1566-72.
 5. Evans L, Rhodes A, Alhazzani W, Antonelli M, Coopersmith CM, French C, et al. Surviving sepsis campaign: International guidelines for management of sepsis and septic shock 2021: International guidelines for management of sepsis and septic shock 2021. *Crit Care Med* 2021;49(11):e1063–143.
 6. Lorenzo M, Davis JW, Negin S, et al. Can Ringer's lactate be used safely with blood transfusions? *Am J Surg* 1998; 175:308.
 7. Intravenous fluid therapy in adults in hospital (CG174). National Institute for Health and Care Excellence, December 2013(updated 2017)

Managing cardiac arrest in a pregnant woman

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Maternal mortality is defined as the death of a woman from any cause related to or aggravated by pregnancy or its management during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy. A maternal near miss is defined as a woman who nearly died but survived a complication that occurred during pregnancy, childbirth, or within 42 days of termination of pregnancy.

Sudden cardiac arrest in pregnant women is a complex grave condition owing to the physiological changes in pregnancy and presence of two lives (mother and foetus) requiring immediate treatment. The best chance for fetal survival is maternal survival. At approximately 24-25 weeks of gestational age, the fetus maybe able to survive outside the womb. The guidelines¹ updated by AHA (American heart association) in 2020 provide a framework to optimize resuscitation for in-hospital maternal cardiac arrest victims. The guidelines highlight concurrent intervention which means that multidisciplinary team responding to maternal cardiac arrest must perform maternal and obstetric treatments simultaneously to ensure return of spontaneous circulation (ROSC).

Physiological changes may impact the resuscitative efforts

Physiological changes occur in pregnancy to ensure that the foetus grows adequately, however these changes make cardiopulmonary resuscitation (CPR) more challenging.

Airway related changes

An approximate weight gain of 12 kg during pregnancy, presence of heavy breasts, airway mucosal oedema with possible friability, all contribute to a more difficult airway management. In addition to the patient being full stomach, there is also a greater risk of aspiration due to the relaxation of the lower oesophageal

sphincter. Passive regurgitation of stomach contents is a major concern as it is greater in volume and more acidic during pregnancy and, therefore, more likely to lead to damaging acid aspiration into the lungs (Mendelson syndrome). Hence, airway management should be done by the most experienced person.

Respiratory changes

The pregnant uterus and increased breast size lead to a 20% decrease in functional residual capacity and 45% decrease in chest compliance². There is also a significant increase in oxygen demand, due to a 15% increase in the maternal metabolic rate and a 20% increase in oxygen consumption. With this limited pulmonary reserve and diaphragmatic splinting in late pregnancy, there can be a rapid decline in oxygen saturation following hypoventilation. If there is a delay in securing the airway with an endotracheal tube, hypoxia with risk of aspiration may further hamper the outcome of the resuscitative efforts.

Cardiovascular changes

The plasma volume increases up to 40- 50% by about 30-32 weeks of gestation, but the erythrocyte volume increases only by 20-25% causing dilutional anaemia. Peripheral vasodilation leads to 20% fall in the systemic vascular resistance and to compensate for this the cardiac output rises by around 40-50% during pregnancy reaching a maximum at 32 weeks and then remaining at that level, with the stroke volume increasing by 30% and the heart rate increasing by 15-25%². Uterine blood flow is approximately 10% of cardiac output at term resulting in potential for massive haemorrhage during the peripartum period due to obstetric causes. It is important to maintain adequate circulatory volume with an appropriate intravenous access during resuscitation.

Aortocaval compression

In the supine position, after 20 weeks of gestation, the gravid uterus reduces venous return by up to 30-40%. The vena cava is completely occluded in 90% of term pregnant women lying supine and the stroke volume may be only 30% of that of a non-pregnant woman². Since CPR is done in the supine position, this aortocaval compression impacts effective cardiac compressions and there could be a delay in the ROSC. Initially to circumvent this problem, a left lateral tilt position was done but the chest compressions were found to be less effective in this position. Hence, presently left uterine displacement (LUD) is advocated for relief of aortocaval compression³.

Principle of resuscitation in a pregnant patient

- Maternal cardiopulmonary resuscitation is modified to accommodate the physiological changes in pregnancy.
- There are 2 potential patients, the mother and the fetus, hence it is important to perform maternal and obstetric interventions simultaneously and not sequentially.
- In an unresponsive parturient, the first responder team (basic life support providers) activates the maternal cardiac arrest team (ACLS team consisting of Critical Care Physician, Intensivist, Anaesthesiologist, Obstetrician, Neonatologist) and starts high quality CPR.
- Prevention of cardiac arrest by early identification of maternal risk factors should be done using a validated obstetric 'early warning score'(EWS)³. For parturient patient with EWS score of ≥ 6 (Fig.1)³ the maternal arrest team should be prepared to:
 - I. Manage cardiac arrest
 - II. Perform perimortem caesarean delivery by mobilizing the entire maternal cardiac arrest response team, and ensure the availability of equipment for caesarean delivery and resuscitation of the neonate
 - III. Manage obstetric complications
 - IV. Decisions involving the resuscitation status of the neonate, regarding foetal viability

should be made in collaboration with the obstetrician, neonatologist, and family. This decision would depend on the gestational age and the neonatal facilities available.

- Timely management of maternal complications

Systolic BP		
<80	3	
80-89	2	
91-139	0	
140-149	1	
150-159	2	
>160	3	
Respiratory rate		
<10	3	
10-17	0	
18-24	1	
25-29	2	
>30	3	
Heart rate		
<60	3	
60-110	0	
111-149	2	
>150	3	
FiO₂ to keep Sat >96%		
Room air	0	
24%-39%	1	
>40%	3	
Temperature		
<34	3	
34.1-35.0	1	
35.1-37.9	0	
38.0-38.9	1	
>39.0	3	
Consciousness		
Alert (GCS=15)	0	
Not alert (<15)	3	

Fig.1. EWS Score

Basic Life Support (BLS) in a pregnant patient

Out of hospital cardiac arrest (OHCA): At the site of victim after ensuring scene safety, the first responder should confirm unresponsiveness of the victim, activate the emergency medical services (EMS) team and ask for the defibrillator. Immediately start high quality CPR and transfer the parturient at the earliest to the hospital by the EMS team.

In hospital cardiac arrest (IHCA): After ensuring scene safety (personal protection) the first responder team places the victim in the supine position and assesses responsiveness of the victim. If the patient is unresponsive the maternal cardiac arrest response team is alerted. One member of the first responder team checks for pulse (carotid) and breathing over 5 to 10 sec. If there is no pulse or breathing, a hardboard is placed under the upper back of patient and good quality chest compression (maternal intervention) is started. The second

member of the team performs the LUD (obstetric intervention) which is maintained continuously during resuscitative efforts and continued throughout post arrest care. The time when pulselessness was confirmed should be documented.

Chest compression: The rescuer should place the heel of 1 hand on the centre (middle) of the victim's chest (the lower half of the sternum, just below the intermammary line) and the heel of the other hand on top of the first so that the hands overlap, the elbows are locked and the shoulders are vertically on top with the hip of the rescuer above the level of chest of the victim. Chest compressions should be performed at a rate of 100 - 120 per minute at a depth of 2-2.4 inches (5 - 6cm), allowing full recoil before the next compression, with minimal interruptions limited to 10 seconds except for specific interventions such as insertion of an advanced airway or use of a defibrillator. A compression-ventilation ratio of 30:2 is maintained. An assistant rescuer from the team, will provide the manual LUD (Fig. 2)⁴ from the left of the patient where the uterus is cupped and lifted up and leftward off the maternal vessels, or from the right of the patient where the uterus is pushed upward and leftward off the maternal vessels. The assistant rescuer must be careful not to inadvertently push down the uterus, which would increase the amount of inferior vena cava compression and negatively affect maternal hemodynamic parameters.

Fig 2. Left uterine displacement using 2-handed technique



Left uterine displacement using 1-handed technique

Appropriate airway management should be initiated: After compressions, the rescuer should open the airway with head tilt - chin lift and perform bag-mask ventilation with 100% oxygen at a flow rate of 15 L/min which is the most rapid effective modality to ventilate initially. Each breath is delivered over one second and expiration over one second with passive recoil of the chest. Two-handed bag-mask ventilation is more effective than a single-handed technique. Look for visible chest rise (effective breath). Hyperventilation is to be avoided. If attempts at mask ventilation do not produce a visible chest rise, the rescuer should try to reopen the airway and improve the seal of the mask on the patient's face or use an oropharyngeal airway (airway adjunct). A total of two rescue breaths are given and compressions restarted. A compression-ventilation ratio of 30:2 should be maintained.

Rapid automated defibrillation: Prompt application of automated external defibrillator (AED)/defibrillation in the setting of ventricular fibrillation or pulseless ventricular tachycardia is critical to maximize the likelihood of ROSC. Same recommended defibrillation protocol should be used in the pregnant patient as in the nonpregnant patient since transthoracic impedance remains unchanged during pregnancy. The patient should be defibrillated with biphasic shock energy of 120 to 200 J and immediately resume chest compressions. Subsequent shock will be delivered when indicated with escalation of energy output up to 200 J if a lower energy was used earlier.



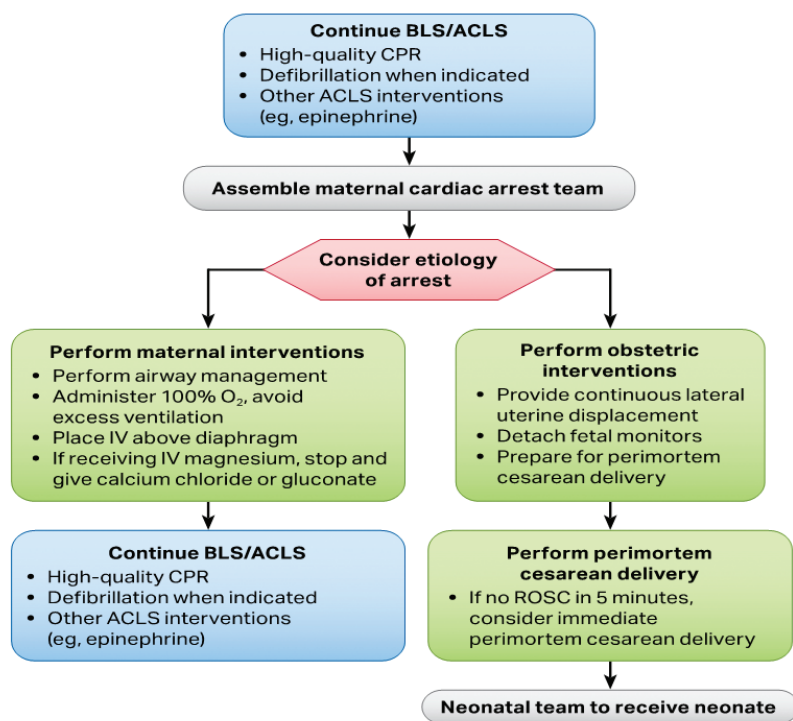
Advanced cardiac life support (ACLS) in the parturient:

Responsive Patient: Prevention of cardiac arrest in the unstable responsive parturient requires the maternal cardiac arrest team to have a rapid response which includes placing the patient in a left lateral decubitus position to relieve aortocaval compression, administering 100% oxygen by face mask to treat or prevent hypoxemia. An intravenous access should be established above the diaphragm (upper limb) to ensure that the intravenously administered therapy is not obstructed by the gravid uterus. Simultaneously, precipitating factors should be investigated and treated. The emergency code cart with defibrillator, emergency equipment and drugs, equipment to perform PMCD, difficult airway cart and neonatal resuscitation equipment should be available with the ACLS Team.

Unresponsive patient: In an unresponsive patient, the maternal cardiac arrest team takes over and will continue with BLS tasks and starts

performing advanced life support as per the ACLS algorithm (Fig. 3)⁴. Simultaneously, the team will look for and treat the reversible causes of arrest and consider perimortem caesarean delivery (PMCD) if applicable⁵.

Advanced airway placement and delivery of breaths: The airway is difficult and there is an increased risk of aspiration in an unprotected airway, so endotracheal intubation should be performed by an experienced health care personnel with a video-laryngoscope/direct laryngoscope using a smaller size endotracheal tube of 6/6.5/7 mm ID. Cricoid pressure is not recommended. Interruptions in chest compressions should be minimized during advanced airway placement. No more than 2 laryngoscopy attempts should be made to avoid airway trauma and bleeding, and prolonged apnoea time during attempts should be avoided to prevent deoxygenation. After intubation, in addition to clinical assessment, continuous waveform capnography is recommended as the most reliable method of confirming correct placement of the ETT and to monitor CPR quality,



Maternal Cardiac Arrest
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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

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Fig 3. Cardiac Arrest in Pregnancy In- Hospital ACLS Algorithm

(P_{ETCO_2} levels >10 mmHg) and to detect ROSC (a sudden rise in P_{ETCO_2}). For failed intubation, second generation supraglottic airway (with gastric drainage tube) placement is the preferred rescue strategy. However, in cannot intubate cannot oxygenate (CICO) situation, invasive airway access (emergency cricothyroidotomy) should be resorted to at the earliest. Once airway is secured the compression (100-120/min) and ventilation (one breath every 6 sec) are continued independently and uninterrupted.

Circulation: A wide bore canula is used to secure the venous access above the level of the diaphragm and isotonic crystalloid infusion is started. If bleeding is the cause of maternal collapse transfusion of blood and blood products is deemed necessary. Prompt application of defibrillation in the setting of ventricular fibrillation or pulseless ventricular tachycardia is critical to maximize the likelihood of survival and the steps remain the same as in BLS. The drugs for resuscitation are administered at recommended doses without modifications. Administer 1 mg epinephrine IV/IO every 3 to 5 minutes during cardiac arrest. For refractory (shock-resistant) ventricular fibrillation and tachycardia, amiodarone 300 mg IV should be administered with 150 mg dose repeated as needed. If the patient is receiving IV magnesium, stop it and give calcium chloride or gluconate.

Foetal assessment during cardiac arrest: Foetal assessment should not be performed during resuscitation and foetal monitor should be removed. During active CPR, the focus should remain on maternal resuscitation and restoration of maternal pulse and blood pressure with adequate oxygenation. During this time, evaluation of foetal heart will not be helpful and carries the risk of inhibiting or delaying maternal resuscitation and monitoring and also poses a hypothetical risk of electric arching during defibrillation. Should the mother achieve ROSC and her condition is stabilized, then foetal heart monitoring may be instituted when deemed appropriate.

Perimortem caesarean delivery (PMCD): is defined as the birth of the foetus after maternal cardiac arrest during resuscitation. During cardiac arrest, if the pregnant woman (with a fundus height at or above the umbilicus) has not achieved ROSC within 5 min with usual resuscitation measures and LUD, it is advisable to prepare to evacuate the uterus while resuscitative efforts continue. The purpose of

timely perimortem delivery is two-fold; firstly by relieving aortocaval compression after emptying the uterus by a PMCD, significantly improves resuscitative efforts⁵. Secondly, early delivery of the baby is accomplished with a decreased risk of permanent neurological damage from anoxia. In situations where the mother is non-revivable (severe trauma is present), timely delivery of the foetus becomes essential.

Technique of PMCD: The technique used to perform the PMCD is at the discretion of the physician performing the procedure. The procedure should be performed at the site of the maternal resuscitation. Time should not be wasted in moving the patient. Additionally, time should not be wasted waiting for surgical equipment or doing abdominal preparation. If desired, antiseptic solution may be poured on the maternal abdomen. The only equipment needed to start a PMCD is a scalpel. Other equipment that would be used if available are pack of sponges, retractor, Kelly clamp, needle with suture, needle holder and suture scissor. Resuscitative efforts should be continued during caesarean delivery, including manual LUD. The position of the rescuer performing the manual LUD will need to change to accommodate and allow access for the surgical field.

Post CPR care: Targeted temperature (32-34°C for 24 hours) management is recommended for pregnant women who remain comatose after successful resuscitation from cardiac arrest⁵. It is recommended that the foetus be continuously monitored for bradycardia which maybe a potential complication of targeted temperature management. Intensivist and neonatal consultation should be sought accordingly.

References

1. Jeejeebhoy MF, Zelop MC et al, Cardiac Arrest in Pregnancy. A scientific statement from the American Heart Association. *Circulation*. 2015;132:1747-1773
2. Pillay PS, Catherine NP, Mebazza A et al. Physiological changes in Pregnancy. *Cardiovascular Journal of Africa*. 2016; 27(2): 89-94
3. Carle C, Alexander P, Columb M, Johal J. Design and internal validation of an obstetric early warning score: secondary analysis of the Intensive Care National Audit and Research Centre Case Mix Programme database. *Anaesthesia*. 2013; 68:354-367.
4. 2020 AHA Updates on Maternal Resuscitation from Cardiac Arrest. Published on 8 January 2021
5. Highlights of the 2020 American Heart Association guidelines for CPR and ECC

Perimortem cesarean section/resuscitative hysterotomy – why, when and how?

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The incidence of maternal cardiac arrest occurring during the peripartum period is a rare event with an incidence of around 1/36,000 pregnancies.¹ Cardiac arrest in pregnancy is a unique challenge and requires timely intervention and quick resuscitation. Maternal Cardiac arrest in pregnancy can occur due to various conditions, the most common causes being heart failure, amniotic fluid embolism, sepsis, aspiration pneumonitis, venous thromboembolism, and preeclampsia/eclampsia. These situations may require conduct of Perimortem caesarean section to aid in maternal resuscitation.

The concept of perimortem caesarean (PMC) was introduced in 1986 by Katz et al as a procedure to increase the infant survival in acutely sick mother during peripartum period. They could demonstrate the infant survival of 69% when PMCS was performed within 5 minutes of cardiac arrest in mother. The author also explored maternal outcomes and demonstrated that hypoxic brain injury in mother occurred if PMC were performed after 6 minutes of maternal cardiac arrest.²

The term PMC or resuscitative hysterotomy are interchangeable. This term 'resuscitative hysterotomy' has been introduced by clinicians working in the trauma and emergency department, as this better explains that the procedure is primarily used for maternal resuscitation rather than to save the life of fetus through uterine evacuation. The fetus may also be saved in the process, although that is not the primary aim. This procedure is done to deliver the fetus in the setting of maternal cardiac arrest irrespective of fetal viability.

Not every obstetrician will encounter cardiac arrest in pregnancy during their career, it is important to be prepared to manage this acute emergency. The maternal physiologic changes from pregnancy and fetus adds to the

complexity in management.

The successful outcome, primarily for the mother but also for the foetus, depends entirely on prompt and effective resuscitation. The protocols of Resuscitation in pregnant women may be similar to adult resuscitation but many features are uniquely different. The most important difference is that we are treating two – mother and fetus and also physiological changes related to pregnancy making the situation complex. Therefore, the providers of maternal care should have thorough understanding and updated with protocols to prevent and treat cardiac arrest in pregnancy.

WHY?

Many case reports have been published on results of Perimortem caesarean delivery (PMCD) during maternal cardiac arrest. In a case series of 38 PMCDs, 12 of 20 women had return of spontaneous circulation immediately after uterine evacuation.³

The pregnant woman undergoes a lot of physiological changes that leads to challenges in achieving successful outcome of resuscitation:

- Gravid uterus beyond 20 weeks of gestation causes aortocaval compression thereby reducing the cardiac output by up to 30% and also efficacy of successful resuscitation³. During maternal cardiopulmonary arrest when chest compressions are performed immediately, the pregnant uterus may not allow increase in cardiac output as required. In pregnant woman due to aortocaval compression, the increase in cardiac output is only up to 10% of that achieved in non-pregnant women.⁴
- There is increase in tidal volume and minute ventilation due to increase in respiratory drive under the effect of progesterone. However, functional residual capacity (FRC) is decreased as a result of splinting of diaphragm by gravid

uterus. Reduced FRC along with increased oxygen demand by fetoplacental unit makes pregnant women hypoxic more rapidly during events of hypoventilation.⁵

Perimortem caesarean delivery of the fetus and placenta aids in effective resuscitation by improving venous return and cardiac output, reduces oxygen requirement, facilitates chest compressions and makes ventilation easier⁶. Thus, in case of no return of spontaneous circulation (ROSC) after effective resuscitation including left uterine displacement to relieve aortocaval compression, an early delivery of the fetus by PMC will aid in successful maternal resuscitation.⁷

WHEN?

- According to the 2020 AHA guidelines, ideally the goal of delivery of the fetus should culminate within 5 minutes of the time of cardiac arrest.⁸ The time interval is chosen as neurological damage begins to develop if there is no return of spontaneous circulation within 4 to 6 min of anoxic maternal cardiac arrest.⁸ In women beyond 20 weeks of gestation, If the response to correctly performed Cardiopulmonary resuscitation (CPR) is not there within 4 min of maternal collapse thereby requiring continued resuscitation, Perimortem caesarean delivery should be performed to assist maternal resuscitation.⁸
- The rescue team need not to wait for 5min to start PMC in certain circumstances. In situation where grave injury to the mother appearing as nonsurvivable and all resuscitative measures appear futile, PMC can be started straightway. In another situation of unwitnessed maternal cardiac arrest with suspicion of prolonged period of pulselessness, PMC can be considered on priority.

HOW?

Maternal cardiac arrest can happen in three situations- Out of hospital, at peripheral centre, or at Referral centre. Management protocol should be developed for timely referral to a centre equipped with facility for PMC when maternal cardiac arrest happens in periphery or at home.

- For out-of- hospital cardiac arrest (OHCA) in

pregnancy, pre hospital caregivers and health care providers at periphery to be apprised about the management protocols to facilitate timely transport to a centre equipped with facilities for Perimortem caesarean delivery.

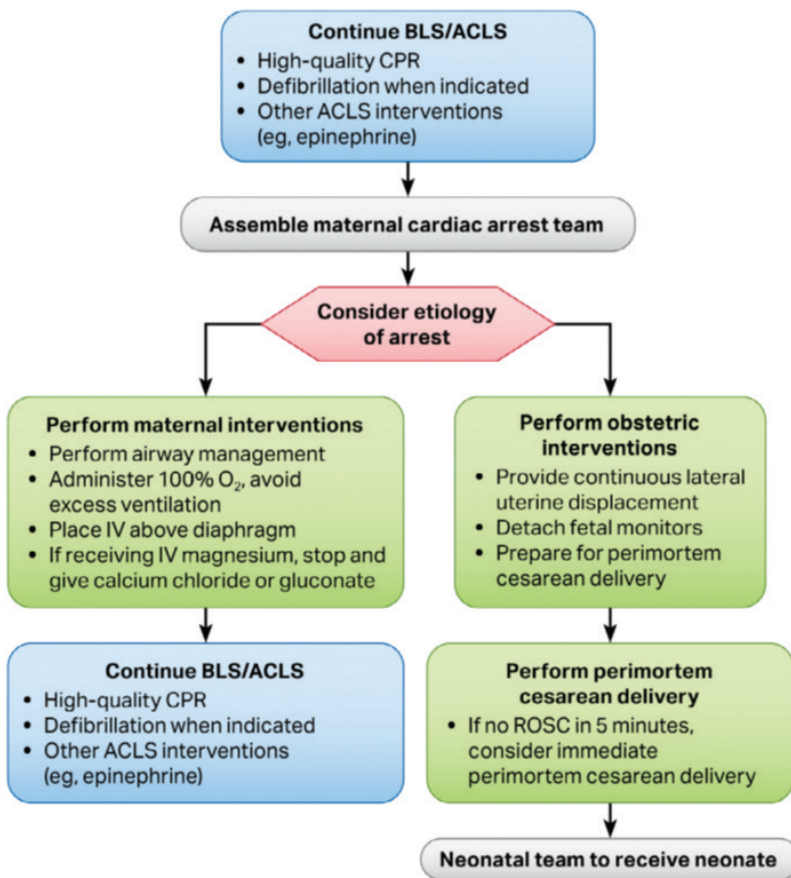
- The team planning for management of cardiac arrest in pregnancy should be done in conjunction with the obstetric, neonatal, emergency, anaesthesiology, intensive care, and cardiac arrest services. The decision of PMC in such a scenario should be taken done by the senior most obstetrician available on floor – usually a consultant.
- Resources for a perimortem caesarean delivery should be summoned as soon as cardiac arrest in a woman in the second half of pregnancy is recognized.
- Perimortem caesarean should be performed at the site of cardiac arrest of in- hospital cardiac arrest. Time should not be wasted by moving the woman to an operation theatre.
- Strict asepsis is not required as time is a crucial factor. One may choose to pour a very abbreviated solution or the step can be omitted entirely.
- PMC can be performed with minimal surgical instruments, scalpel being the only essential equipment. Table 1. shows the recommended instruments for PMCD but it may all depends on the availability and preference by a health facility. With no circulation, there is minimal blood loss and no anaesthesiologist is required.

Table 1. Equipment Contents of the Emergency Cesarean Delivery Tray

Scalpel with No. 10 blade
Lower end of a Balfour retractor
Pack of sponges
2 Kelly clamps
Needle driver
Russian forceps
Sutures and suture scissors

- Till the delivery of the fetus, continuous left uterine displacement (LUD) should be performed.
- The assessment of the height of the uterus may be difficult in obese women, then it is the discretion of the obstetrician to have his or her best assessment or bedside ultrasound may help.

Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm



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

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- The best incision to use is a midline vertical abdominal incision and a classical uterine incision as it gives the most rapid access, but many may not be familiar with this approach. The delivery can also be achieved rapidly with a transverse approach. Thus, the approach with which the operator is most comfortable should be used.
- The uterus and abdomen should be closed in the usual way to control blood loss and minimise the risk of infection.
- If woman is revived after successful resuscitation following delivery, immediate transfer to an appropriate environment should be done requiring anaesthesia and sedation, to control ensuing haemorrhage

and complete the operation.⁹ The patient can be transferred to a high-dependency/critical care area with appropriate staff and monitoring facilities. She may be transferred to an obstetric high dependency unit or an intensive care unit.

- If the woman does not revive despite all efforts, the CPR may be stopped as per the hospital protocols. The relatives need to be counselled with utmost compassion and understanding, explaining to them all that has happened and why. Preferably a senior staff member should be involved in breaking the news. The maternal mortality needs to be addressed as per the local guidelines, which includes reporting of all the data.

- The relatives may be debriefed simultaneously by an extra care provider, if available.

Consent: A written well-informed consent should ideally be taken, although not possible in all scenarios. The doctrine of 'emergency exception' would apply to conduct of this procedure if carried out without the relative's consent. So, don't delay treatment pending consent.¹⁰

Medico-legal aspect: All the resuscitative procedures should be documented simultaneously, if not possible then documentation should be completed after resuscitation is over. The unanimous consensus in the medical literature and of legal authorities is that a civil suit for performing a perimortem caesarean delivery, regardless of the outcome, would not result in a judgment against the Emergency Physician.¹⁰

Conclusion

Maternal cardiac arrest is complex clinical situation requiring multidisciplinary team work and unique coordination among themselves. In all cases of maternal collapse, the kind of care provided should be reviewed to ensure individual and organisational learning, and reassure staff and the family when care has been optimal. This can be accomplished via maternal near-miss or maternal mortality meetings at hospital, city or state level. The number of high risk pregnancies are on rise and so the complications leading to maternal cardiac arrest. The health care providers should be proactively prepared to deal with maternal cardiac arrest. Regular Life support training and mock drills should be done for teaching and

preparing for emergency. Maternal cardiac arrest committee should be formed in each institution to formulate and implement guidelines dealing with emergency.

References

1. Beckett VA, Knight M, Sharpe P. The CAPS Study: incidence, management and outcomes of cardiac arrest in pregnancy in the UK: a prospective, descriptive study. *BJOG*. 2017 Aug;124(9):1374-81.
2. Katz VL, Dotters DJ, Droegemueller W. Perimortem caesarean delivery. *Obstet Gynecol* 1986;68:571-6.
3. Chu J, Johnston TA, Geoghegan J; Royal College of Obstetricians and Gynaecologists. Maternal collapse in pregnancy and the puerperium: Green-top Guideline No. 56. *BJOG*. 2020 Apr;127(5): e14-52.
4. Goodwin AP, Pearce AJ. The human wedge. A manoeuvre to relieve aortocaval compression during resuscitation in late pregnancy. *Anaesthesia*. 1992;47:433-434.
5. Kerr MG. The mechanical effects of the gravid uterus in late pregnancy. *J Obstet Gynaecol Br Common* 1965;2:513-29.
6. Dijkman A, Huisman CM, Smit M et al. Cardiac arrest in pregnancy: increasing use of perimortem caesarean section due to emergency skills training? *BJOG*. 2010;117:282-287.
7. Jeejeebhoy et al. Cardiac Arrest in Pregnancy. A Scientific Statement from the American Heart Association. *Circulation*. 2015;132:1747-1773.
8. Panchal AR, Bartos JA, Cabañas JG, Donnino MW et al. Part 3: adult basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2020 Oct;142(16_Suppl_2): S366-468.
9. Einav S, Kaufman N, Sela HY. Maternal cardiac arrest and perimortem caesarean delivery: evidence or expert-based? *Resuscitation*. 2012;83:1191-1200.
10. Hossam E. Fadel et al. Postmortem and Perimortem Cesarean Section: Historical, Religious, and Ethical Considerations. *JIMA*. 2011; 43:194.

Role of Point of care USG (POCUS) in maternal collapse

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Introduction

As ultrasound technology has improved in quality and decreased in footprint, it is becoming more useful in the routine care of critically ill patients and an excellent tool for both, diagnosis and hemodynamic monitoring.¹ During the past decade, the application and utilization of point-of-care ultrasound (POCUS) have skyrocketed. Following appropriate training and governance, POCUS can provide timely and critical information. Awareness of a few basic POCUS measurements is useful for assessment of any hemodynamically unstable patient.² Moreover, visual information can be obtained quickly at the bedside without the risk of ionizing radiation.

A global POCUS physical examination of patients in shock can determine fundamental hemodynamic measures (e.g., stroke volume, cardiac contractility, and valvular diseases). For the purposes of hemodynamic monitoring, the basic transthoracic echocardiogram provides a wealth of information in experienced hands and offers minimal risk to the patient. In addition, POCUS can assess organ congestion and fluid tolerance.

Lung ultrasonography allows estimation of both extravascular lung water and fluid collections in the pleural space. Therefore, a thorough evaluation of lung and cardiac ultrasonography among patients with respiratory failure can lead to a narrower differential diagnosis.³

Various roles of Point of care Ultrasound (POCUS) in Maternal collapse are as -

- Obstetrical Diagnosis
- Heart And Lung USG
- Dynamic Monitoring by IVC Compressibility For Fluid Responsiveness
- Abdominal and thoracic cavity - eFAST
- Pulmonary Embolism, DVT
- RUSH Protocol

- BLUE Protocol

Apart from application of bedside Ultrasound for Obstetrics diagnosis, POCUS can also be utilized for diagnosis of etiology of shock. Shock is a state of circulatory dysfunction causing reduced tissue perfusion and metabolic upset. It is commonly encountered in the maternal collapse and maternal mortality. Diagnosing the etiology of shock in a patient can be challenging, as many causes share a similar clinical picture. A recent study has shown adding point-of-care ultrasound (POCUS) to the clinical assessment increases diagnostic accuracy for the etiology of shock from 45% to 89%.⁴ Another study showed early use of POCUS in patients with hypotension accurately guided diagnosis, significantly reduced diagnostic uncertainty, and substantially changed management and resource utilization in the emergency conditions.^{4,5}

“Rapid Ultrasound for Shock and Hypotension” RUSH Protocol⁶

The RUSH Protocol was published in 2009 by Perera et al. It was designed to be a rapid and easy-to-perform US protocol (<2 minutes) for emergency physicians. It is helpful to diagnose cause of undifferentiated shock in a rapid but systematic manner as in table 1.

The components of the RUSH protocol include examination of: Mnem: “HI-MAP”

1. Heart
2. Inferior vena cava
3. Morrison’s pouch / Fast abdominal views with thoracic windows
4. Aorta
5. Pneumothorax Screening

Table 1. Rapid Ultrasound in Shock (RUSH) protocol Ultra-sonographic findings seen with classic shock states

Rush Evaluation	Hypovolemic shock	Cardiogenic Shock	Obstructive Shock	Distributive Shock
Pump	Hyper-contractile heart Small Chamber size	Hypo contractile heart Dilated heart	Hyper-contractile heart Pericardial Effusion Cardiac Tamponade RV Strain Cardiac thrombus	Hyper-contractile heart (Early sepsis) Hypo contractile heart (Late sepsis)
Tank	Flat IVC Flat jugular veins Peritoneal fluid (Fluid loss) Pleural fluid (Fluid loss)	Distended IVC Distended jugular veins Pulmonary edema Pleural fluid (effusion) Peritoneal fluid (ascites)	Distended IVC Distended Jugular veins Absent lung sliding (pneumothorax)	Normal or small IVC (early sepsis) Peritoneal fluid (peritonitis) Pleural fluid (empyema)
Pipes	Abdominal aneurysm Aortic dissection	Normal	DVT	Normal

DVT - Deep venous thrombosis, IVC – Inferior vena cava, RV – Right Ventricle

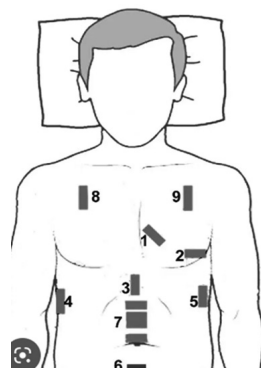
RUSH Examination

➤ The RUSH protocol involves a 3-step bedside using probe position as in Figure 1 and aids in physiologic assessment.

Step 1: How is the pump (Heart – Look for pericardial effusion/ Tamponade/ LV Contractility and RV Strain)

Step 2: How full is the tank? Is the tank leaking or compromised? (Fullness of Inferior vena cava, thoracic and abdominal compartments-eFAST exam (Ectopic) and Lung exam)

Step 3: How are the pipes? (Large Arteries/Veins for DVT)



RUSH(ed) Exam Sequencing

1. Parasternal Long Cardiac View
2. Apical Four-Chamber Cardiac View
3. Inferior Vena Cava View
4. Morison's with Hemothorax View
5. Spleno-renal with Hemothorax View
6. Bladder View
7. Aortic Slide View
8. Pulmonary View
9. Pulmonary View

Use Curvilinear Array for all Views
Add in a search for Ectopic Pregnancy and DVT depending on clinical circumstances

Figure 1: Probe position for RUSH Exam in Critically sick patient

Step 1: Examination of the Pump

- Views: Parasternal long and short axis views, apical 4-chamber view and sub xiphoid 4-chamber view
- Probe: Phased array probe (3.5 – 5 MHz)



Figure 2: Probe position for PLAX and PSAX view

1. Parasternal Long Axis View (PLAX)

Transducer position should be at left sternal edge 2nd – 4th intercostal space. Marker dot direction points towards the right shoulder (Figure 2 & 3)

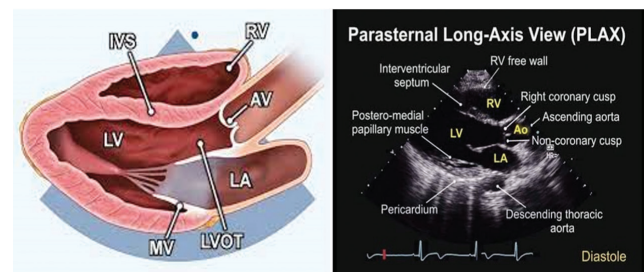


Figure 3: Parasternal Long-Axis View (LA-Left Atria, LV-Left Ventricle, RV-Right Ventricle, AV- Aortic Valve, IVS-Inter Ventricular Septum, MV-Mitral Valve, LVOT-Left Ventricular Outlet)

2. Parasternal Short Axis View (PSAX)

Transducer position should be at left sternal edge; 2nd – 4th intercostal space. Marker dot direction points towards left shoulder (90 degree clockwise from PLAX view). By tilting transducer on an axis between the left hip and right shoulder, short axis views are obtained at

different levels, from the aorta to the LV apex. (Figure 2 & 4)

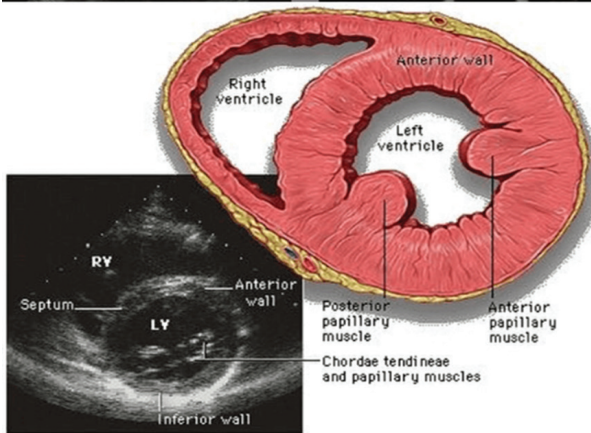


Figure 4: Parasternal Short Axis View

3. Apical four chamber view

Transducer position: The probe is placed lateral to the nipple line in the 5th intercostal space near the anterior axillary line with the pointer facing toward the left axilla. (Fig 5)

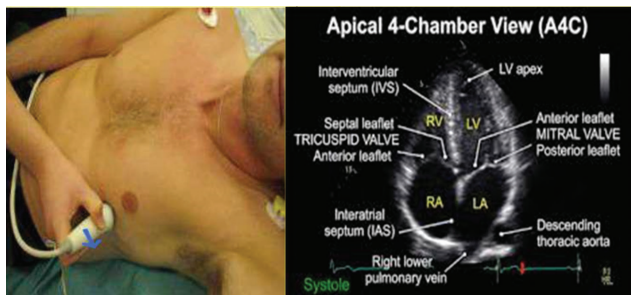


Figure 5: Probe placement and overview of Apical Four Chamber View

4. Subxiphoid view

Transducer position - probe is held as parallel to abdominal wall as possible and Probe marker is placed toward the left side in the direction of left shoulder as in figure 6.

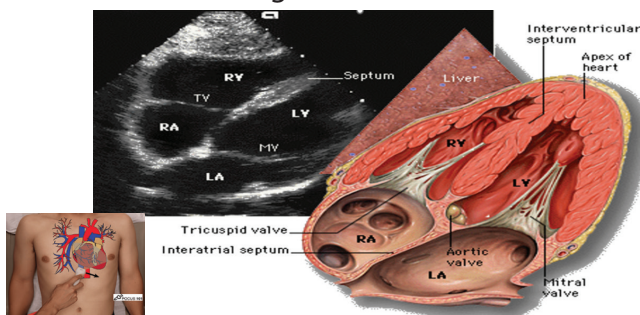


Figure 6: Probe placement and overview of Subxiphoid View

Abnormal Findings are-

A. Pericardial Effusion and potential Cardiac tamponade

- **Findings:** Pericardial effusions are best identified posterior to left ventricle and anterior to descending aorta as in figure 7.
- Also look for collapse of right ventricle during diastole (indicates tamponade effect).

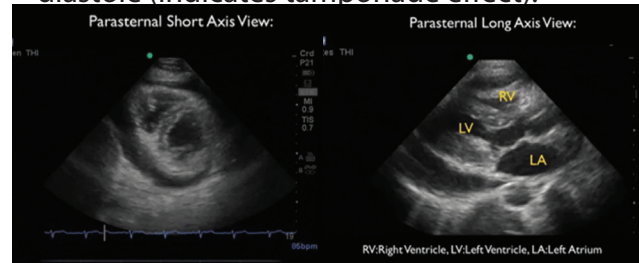


Figure 7: PLAX and PSAX View showing Pericardial Effusion

B. Assessment of Right ventricular strain

- **Findings:** An enlarged RV indicates right ventricular failure as one of the causes of shock. In an acute setting, it may indicate an acute pulmonary embolism or acute RV infarction. Normally, the RV is < 60% the size of LV. When RV equals or is more than LV, suspect RV failure.⁷ (Fig 8)

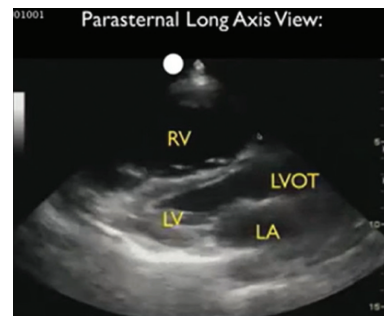


Figure 8: PLAX View showing Right ventricular strain

- **Mc Connell's sign:** RV free wall hypokinesia with sparing of the apex. It has specificity of 96% for pulmonary embolism, but sensitivity is only 16%.

C. Evaluation of Left ventricular Contractility.

- **Findings:** Normally, the anterior leaflet of mitral valve touches the septum. If it does not, it may indicate poor ventricular contractility.
- A vigorously contracting ventricle will almost completely obliterate the ventricular cavity during systole. <30% difference of LV size between systole and diastole indicates severely decreased LV function.

Step 2: Examination of the Tank

A. Inferior vena cava

- It is viewed in sub-xiphoid position using phased array probe (3.5 – 5 MHz). Optimize the ultrasound image and zoom in if you need to.
- With your calipers, try to measure its diameter approximately 2 cm from its attachment point to the right atrium.
- If you are using M mode, then it is at this spot that you want to place your cursor and then take measurement of IVC at Max and Min. (Fig 9) Regardless of whether you are using 2D measurements or M mode, make sure you are measuring it when it is at it's widest diameter.
- **Findings:** A smaller caliber IVC (<2 cm diameter) with an inspiratory collapse greater than 50% roughly correlates to a CVP of less than 10 cm of water and may indicate a hypovolemic or distributive shock (Fig 10).
- A larger sized IVC (>2 cm diameter) that collapses less than 50% with inspiration correlates to a CVP of more than 10 cm of water and may indicate a cardiogenic or obstructive shock.
- Relationship between IVC size and CVP with normal respiration is given in the table below-

Table 2. Relationship between IVC size and CVP with normal respiration

IVC Size (cm)	Respiratory change	CVP (cm H2O)
< 1.5	Total collapse	0 – 5
1.5 – 2.5	>50 % collapse	6 – 10
1.5 – 2.5	<50 % collapse	11 – 15
>2.5	<50 % collapse	16 – 20
>2.5	No change	>20

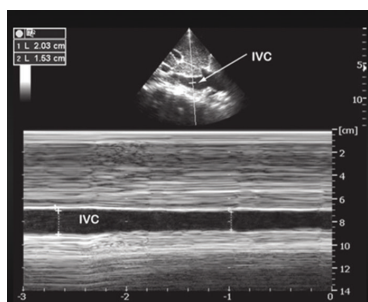


Figure 9: Measurement of IVC on M Mode showing IVC max and IVC min.

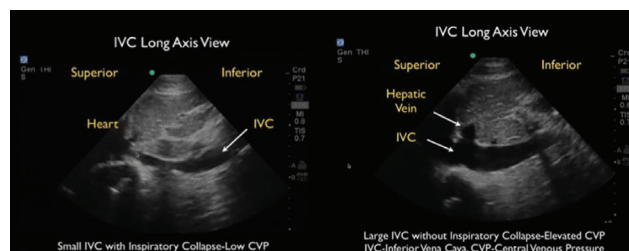


Figure 10: IVC Long Axis View showing Elevated and Low Central Venous Pressure (CVP)

- Caval Index is the IVC collapsibility index in spontaneous breathing patients, is calculated by the difference between the maximum (expiratory) and minimum (inspiratory) IVC diameters, divided by the maximum IVC diameter, and presented as a percentage. In a volume depletion status, where the IVC is collapsed, the index will be higher, approaching 100% as opposed to a state of volume overload, where the IVC is distended, therefore the caval index is very low, approaching 0%.

$$\text{Caval index} = \frac{\text{Maximum diameter of IVC (expiratory)} - \text{Minimum diameter (inspiration)} \times 100}{\text{Maximum diameter of IVC (expiratory)}}$$

Using this formula, the cut off is 18% change. Values > 18 % predict an increase in cardiac output to fluid challenge.

This relationship is reversed with positive pressure ventilation, in which positive intrathoracic pressure accompanies inspiration. In mechanically ventilated patients, IVC distensibility index > 18% was proved as a predictor of fluid responsiveness.

Distensibility Index (DI) = [Maximum diameter (Inspiration) - Minimum diameter (Expiration)] / Minimum diameter (expiration)

The degree of respiratory variation is related to volume status and venous return.⁸

Some exceptions should be noted, such as the plethoric IVC that may be found in cardiac tamponade, when the patient could be normovolemic or hypovolemic despite an indication of volume overload by an IVC ultrasound assessment. Therefore, findings should always be interpreted within their clinical context or after integration with a cardiac evaluation.

- The internal jugular veins can also be examined to evaluate the intravascular volume. Veins that are distended, with a closing meniscus level that is high in the

course of the neck, suggest a higher CVP.

B. Abdominal cavity

- The abdominal FAST views are used to visualize the peritoneal cavity using phased array probe.
- Specific views include the hepatorenal space or Morrison's pouch, the perisplenic space, and the recto vesicular / rectovaginal space or pouch of Douglas.(Fig 11)

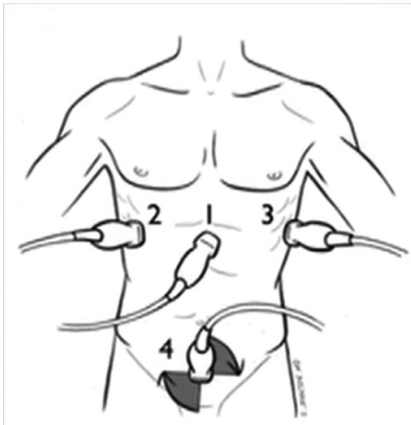


Figure 11: Probe position for Abdominal FAST View 1. Cardiac subxiphoid view, 2. Right Upper quadrant - hepatorenal view, 3. Left Upper quadrant - Splenorenal view and 4. Suprapubic view.

- **Findings:** Minimal amount of fluid in abdomen detected by EFAST is approximately 200-650ml which is highly sensitivity (63-100%) and highly specific (96-99%) in detecting haemoperitoneum. Free fluid noted in these potential spaces could indicate a hypovolemic shock due to internal blood loss, fluid extravasation, or other pathologic fluid collections (Figure 12).

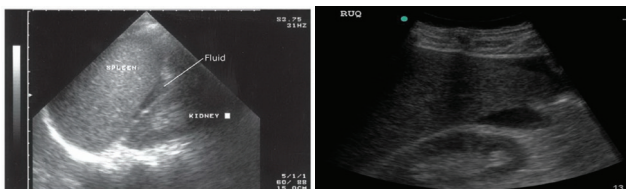


Figure 12: Right Upper quadrant - hepatorenal view showing fluid in Morrison pouch and Left Upper quadrant – Splenorenal view showing fluid in splenorenal region.

C. Thoracic cavity

- Evaluation of the thoracic cavity is done by extended FAST or E-FAST views by including views of the thoracic cavity with the abdominal FAST examination.
- Findings: Aiming the probe above the diaphragm will allow for identification of a

thoracic fluid collection, which may indicate a hemothorax. (Fig 13)

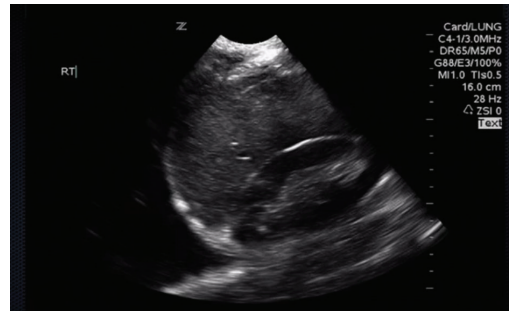


Figure 13: Right upper quadrant view extended to thoracic cavity showing fluid in pleural space (Thoracic spine sign)

D. Intrathoracic compromise

- Probe: Linear probe (7.5 – 10 MHz)
- Location: Midclavicular line, 3rd – 5th intercostal space
- **Findings:** Emergency ultrasound has proved to be more sensitive than clinical examination and Chest x ray for the diagnosis of lung pathologies.

In normal aerated lung, along with normal sliding sign, hyperechoic, horizontal lines arising at regular intervals from the pleural line can be seen, which are called A-lines (Fig 14). In short, if you see A-lines, the lungs are filled with air. B-lines are defined as discrete laser-like vertical hyperechoic artifacts that arise from the pleural line and extend to the bottom of the screen without fading, move synchronously with lung sliding and erase A-lines (Fig 14).

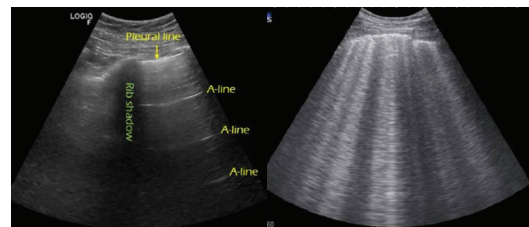


Figure 14: USG Lung showing Normal lung shadows with A lines (Left) and Multiple B lines suggesting Pulmonary congestion (Right)

Pulmonary congestion

Alveolo-interstitial syndrome (AIS), which is presence of multiple B-lines arising from the pleural line. B-lines seen on lung ultrasound provide semi-quantitative estimation of extravascular lung water, which is particularly important in critically ill patients and those with cardiorenal syndrome.⁹

Pneumothorax - Absent lung sliding and absent comet tails, Stratosphere sign and Barcode sign on M mode and presence of “lung point”.¹⁰

Step 3: Examination of the Pipes

A. Aorta

- Probe: Phased array probe (3.5 – 5 MHz)
- Location: Longitudinal and transverse views of abdominal aorta at 4 levels (infracardiac, suprarenal, infrarenal, and at the iliac bifurcation) plus PLAX and suprasternal views
- Findings: Aortic size >3 cm indicates abdominal aortic aneurysm (AAA). If >5 cm, consider ruptured AAA if no other cause for hypotension is found
- An aortic dissection may be indicated by a dilated proximal aortic root (>3.8 cm) in the PLAX view or the presence of an intimal flap anywhere along the course of the aorta
- A suprasternal view with the phased array probe helps to visualize the arch of aorta

B. Large Veins

- Probe: Linear probe (7.5 – 10 MHz)
- View: Large veins of the lower limb at 2 sites
 - a. The proximal femoral vein just below the inguinal ligament
 - b. The popliteal vein along the popliteal fossa
- **Findings:** Mass in the lumen of the vein is suggestive of deep vein thrombosis (DVT).
- The pathognomonic finding of DVT will be incomplete compression of the anterior and posterior walls of the vein. (Fig 15)

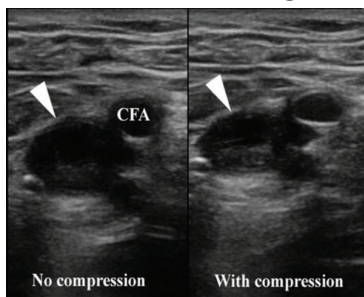


Figure 15: USG lower limb incomplete compression test suggestive of DVT

Other utility of POCUS includes-

Optic Nerve Sheath Diameter (ONSD)¹¹

Bedside ocular ultrasonography for measuring ONSD can be used an early test for diagnosing raised ICP as it is a noninvasive, cost-effective bedside test, which can be repeated for re-

evaluation. It is measured in supine position using 10 MHz linear array probe on closed eyelid. ONSD was measured 3 mm behind the globe in each eye. A mean binocular ONSD > 5 mm is 100% sensitive for elevated Intra Cranial Pressure. (Fig 16)

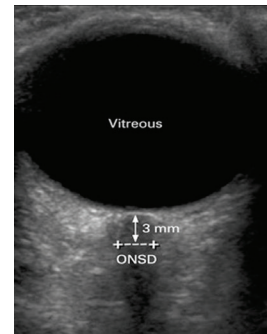


Figure 16: Showing ONSD measurement on Ocular USG

Conclusion

POCUS has been a practice-changing technology for the care of the emergent and critically ill patient. The ability to look inside the human body in real time without the risk of radiation helps physicians narrow the differential diagnoses early on in a patient's evaluation and helps guide decisions regarding further testing (if any is indicated). Furthermore, POCUS, ultimately improve initial diagnostic accuracy, initiation of proper management, and thus overall patient care. As the technology becomes more accessible, we can expect it to diffuse broadly.

References

1. Devangam S, Sigakis M, Palmer LJ, Goeddel L, Fiza B. Point-of-Care Ultrasound: A Moving Picture Is Worth a Thousand Tests. *Anesthesiology Clinics*. 2023 Mar 1;41(1):231-48.
2. Shokoohi H, Boniface KS, Pourmand A, Liu YT, Davison DL, Hawkins KD, et al. Bedside ultrasound reduces diagnostic uncertainty and guides resuscitation in patients with undifferentiated hypotension. *Crit Care Med*. 2015;43(12):2562–9.
3. “Bedside Ultrasound in Resuscitation and the Rapid Ultrasound in Shock Protocol”, Dina Seif, Phillips Perera, Thomas Mailhot, David Riley, and Diku Mandavia. *Critical Care Research and Practice*. Volume 2012, Article ID 503254
4. Atkinson P, Bowra J, Milne J, Lewis D, Lambert M, et al. International Federation for Emergency Medicine Consensus Statement: Sonography in hypotension and cardiac arrest (SHoC): An international consensus on the use of point of care ultrasound for undifferentiated hypotension and during cardiac arrest. *CJEM*. Cambridge

- University Press; 2017;19(6):459–70.
5. Perera P, Mailhot T, et al. "The RUSH Exam 2012: Rapid Ultrasound in Shock in the Evaluation of the Critically Ill Patient." *Ultrasound Clinics* 7 (2012): 255-278.
 6. Milne J, Atkinson P, Lewis D, et al. Sonography in Hypotension and Cardiac Arrest (SHoC): Rates of abnormal findings in undifferentiated hypotension and during cardiac arrest as a basis for consensus on a hierarchical point of care ultrasound protocol. *Cureus* 2016;8(4):e564.
 7. Tuzovic M, Adigopula S, Amsallem M, Kobayashi Y, et al. Regional right ventricular dysfunction in acute pulmonary embolism: relationship with clot burden and biomarker profile. *Int J Cardiovasc Imaging*. 2016 Mar;32(3):389-98.
 8. Orso D, Paoli I, Piani T, Cilenti FL, Cristiani L, Guglielmo N. Accuracy of ultrasonographic measurements of inferior vena cava to determine fluid responsiveness: a systematic review and meta-analysis. *Journal of intensive care medicine*. 2020 Apr;35(4):354-63.
 9. Lichtenstein DA. BLUE-protocol and FALLS-protocol: two applications of lung ultrasound in the critically ill. *Chest*. 2015 Jun 1;147(6):1659-70.
 10. Alrajab S, Youssef AM, Akkus NI, Caldito G. Pleural ultrasonography versus chest radiography for the diagnosis of pneumothorax: review of the literature and meta-analysis. *Crit Care*. 2013 Sep 23;17(5):R208.
 11. Lochner P, Czosnyka M, Naldi A, Lyros E, Pelosi P, Mathur S, Fassbender K, Robba C. Optic nerve sheath diameter: present and future perspectives for neurologists and critical care physicians. *Neurological Sciences*. 2019 Dec;40:2447-57.

Calendar of Virtual Monthly Clinical Meetings 2023

31 st March, 2023	MAMC & Lok Nayak Hospital
28 th April, 2023	LHMC & Smt. Sucheta Kriplani Hospital
26 th May, 2023	Sitaram Bhartia Hospital

Revised MTP Act-2021

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In today's age where the most developed countries of the world have been limiting women's access to abortions, India with a refreshing take, has extended its abortion services beyond its previous stipulated limits of 20 weeks.

In 2021, after taking into account the recent advances of Medical Technology for safe abortion, the Parliament of India passed the Medical Termination of Pregnancy (MTP) Amendment Act, amending India's 50 year old abortion law that legalized abortion. This bill followed an extensive consultative process with various stakeholders as well as concerned Ministries. It has been approved by the Ethics Committee of Experts formed in the Ministry to look into the aspects of dignity, confidentiality, safety and well-being of concerned parties. The Bill has been recommended by a Group of Ministers constituted under the chairpersonship of Hon'ble Transport Minister, Shri. Nitin Gadkari.

On 29th January 2020, Cabinet approved the bill. On 17th March 2020, the bill was passed in Lok Sabha and after a year on 16th March 2021 it was passed by Rajya Sabha. Finally, on 12th October 2021, The Rules of the MTP (Amendment) Act were published in the official gazette.

NEED FOR REVISION

Despite abortion being legal, the high estimated prevalence of unsafe abortion demonstrates a major public health problem in India.

A United Nations Population Fund (UNFPA)'s State of the World Population Report 2022 stated that about 67% of abortions in India are unsafe. It also said that eight women die each day due to unsafe abortions, which were the third most common cause of maternal mortality in the South Asian nation.¹

According to BMJ global report published on 25th March 2019, in 2007–2011 67.1%, abortions that occurred were classified as unsafe.²

According to a study published in the Lancet

Global Health on 12th December 2017, 15.6 million abortions occurred in India in 2015 of which 78% were outside health facilities.³

The MTP Act of 1971⁴ stated that abortions can only be provided up to 20 weeks. However, in recent years there have been many cases of women seeking abortions beyond 20 weeks due to foetal abnormalities that in many cases can only be detected after 20 weeks as well as in cases of rape.

In MTP Act of 1971, there was ambiguity around the provisions for unmarried women to terminate pregnancy due to contraceptive failure.

For second trimester abortions, the consent of two medical practitioners was required. This had been particularly challenging in rural areas where many a times a second practitioner is not available.

BRIEF HISTORY OF THE MTP ACT

Medical termination of pregnancy act was passed on 10th August, 1971⁴ to provide legal framework for making comprehensive abortion care services available in India. The act specified gestational age till which a pregnancy can be terminated, indications for termination and who can terminate the pregnancy. It aimed to not only to prevent unsafe abortions but also to provide protection to medical practitioners.

In 2021, the Parliament of India passed the Medical Termination of Pregnancy (MTP) Amendment Act⁵, amending India's 50-year-old abortion law that legalized abortion.

The goal is to strengthen access to comprehensive abortion care without compromising dignity, autonomy, confidentiality, and justice for women who need safe and quality services.

SALIENT FEATURES OF AMENDMENTS

- MTP Act 1971 required opinion of one provider for MTP up to 12 weeks and two providers for

MTP for 12-20 weeks. The 2021 amendment changes this to requirement of one provider for MTP up to 20 weeks and two providers for 20-24 weeks. This may lead to an increase in number of facilities especially in Public sector like PHCs eligible for service provision till 20 weeks.

- According to MTP Act 1971, MTP was permissible beyond 20 weeks only when it is immediately necessary to save the life of the pregnant woman. With the recent amendment, upper gestation limit has been raised from twenty to twenty-four weeks for special categories of women.
- In pregnancies with substantial fetal anomalies, the 1971 MTP Act had provision for termination of such pregnancies only up to 20 weeks. However, after the amendment, upper gestation limit does not apply in such pregnancies. For pregnancies beyond 24 weeks, decision is taken by a special board, the Medical Board, as prescribed under the Rules of the Act. This has facilitated access of women to safe and legal abortion services with substantial fetal anomalies diagnosed late.
- The Amendment aims to increase access of unmarried women to safe and legal abortion. The condition of failure of contraceptive has been extended from any married women or her husband to any woman or her partner.
- The Amendment has inserted a new clause to strengthen privacy of women. The Medical Termination of Pregnancy Regulation 2003 mentioned that information should not be disclosed except under authority of law. The new amendment states that name and other particulars of a woman whose pregnancy has been terminated shall not be revealed except to a person authorised by any law for the time being in force.

INDICATIONS UNDER WHICH IT CAN BE USED:

I) Upto 20 weeks:

- a) In order to save the life of the pregnant women
- b) In order to prevent grave injury to the physical and mental health of the pregnant woman

- c) In view of the substantial risk that if the child was born it would suffer from such physical or mental abnormalities as to be seriously handicapped
- d) As the pregnancy is alleged to have been caused by rape
- e) As the pregnancy has occurred as a result of failure of any contraceptive device or methods used by a woman or her partner

'Form I' is to be filled for MTP up to 20 weeks (Annexure-1)

II) Between 20-24 weeks :

- a) Survivors of Sexual Assault / Rape / Incest
- b) Minors
- c) Change of marital status during the ongoing pregnancy (widowhood and divorce)
- d) Women with Physical Disabilities (major disability as per criteria laid down under the Disability Act,2016 (49 of 2016)
- e) Mentally ill women including Mental Retardation
- f) The fetal malformation has substantial risk of being incompatible with life or if the child is born it may suffer from such physical or mental abnormalities to be seriously handicapped
- g) Women with pregnancy in humanitarian settings/disaster/and/or emergency situations as declared by Government

'Form E' is to be filled for MTP from 20 till 24 weeks (Annexure-2)

RULES UNDER MTP (AMENDMENT), ACT 2021⁵

Rules Under MTP (Amendment), Act 2021 states the following

1. Category of women who will be eligible for extended gestational period for termination of pregnancy from 20 to 24 weeks (already defined).
2. The powers and functions of the Medical Boards.
3. The norms for the Registered Medical Practitioner (RMP) whose opinion is required for termination of pregnancy at different gestational age.

A. The norms for the RMP whose opinion is required for termination of pregnancy at different gestational age

◇ Till 9 Weeks: Experience and training requirement for RMP - Opinion of 1 RMP is required:

1. Experience at any hospital 3 months in the practice of obstetrics and gynaecology or has independently performed 10 cases of MTP by MMA under supervision of a RMP in a hospital established or maintained or a training institute approved for this purpose by the government.
2. A practitioner who has assisted a RMP in the performance of 25 cases of MTP, of which at least five have been done independently in a hospital
3. A practitioner who holds a post-graduate degree or diploma in obstetrics and gynaecology
4. A practitioner who has completed 6 months of house surgery in obstetrics and gynaecology.
5. A practitioner who has experience at any hospital for a period of not less than 1 year in the practice of obstetrics and gynaecology

◇ Till 12 Weeks: Experience and training requirement for RMP- Opinion of 1 RMP is required

1. A practitioner who has assisted a RMP in the performance of 25 cases of MTP, of which at least five have been done independently in a hospital
2. A practitioner who holds a post-graduate degree or diploma in obstetrics and gynaecology
3. A practitioner who has completed 6 months of house surgery in obstetrics and gynaecology
4. A practitioner who has experience at any hospital for a period of not less than 1 year in the practice of obstetrics and gynaecology

◇ Beyond 12 Weeks till 20 Weeks: Experience and training requirement for RMP- Opinion of 1 RMP is required

1. A practitioner who holds a post-graduate degree or diploma in obstetrics and gynaecology

2. A practitioner who has completed 6 months of house surgery in obstetrics and gynaecology

3. A practitioner who has experience at any hospital for a period of not less than 1 year in the practice of obstetrics and gynaecology

◇ Beyond 20 Weeks till 24 Weeks: Experience and training requirement for RMP- Opinion of 2 RMPs is required

1. A practitioner who holds a post-graduate degree or diploma in obstetrics and gynaecology

2. A practitioner who has completed 6 months of house surgery in obstetrics and gynaecology

3. A practitioner who has experience at any hospital for a period of not less than 1 year in the practice of obstetrics and gynaecology

◇ Beyond 24 Weeks: Experience and training requirement for RMP- Opinion of Medical Board is required. For the termination procedure, when advised by the Medical Board, is carried out with all safety precautions along with appropriate counselling and at an approved place

1. A practitioner who holds a post-graduate degree or diploma in obstetrics and gynaecology

2. A practitioner who has experience at any hospital for a period of not less than 1 year in the practice of obstetrics and gynaecology

B. Powers and Functions of the Medical Boards:

Powers of the Medical Boards

(i) To allow or deny termination of pregnancy beyond twenty-four weeks of gestation period only after due consideration and ensuring that the procedure would be safe for the woman at that gestation age and whether the foetal malformation has substantial risk of it being incompatible with life or if the child when born would suffer

from such physical or mental abnormalities to be seriously handicapped

- (ii) Co-opt other specialists in the Board and ask for any additional investigations if required, for deciding on the termination of pregnancy

Functions of the Medical Boards:

- (i) To examine the woman and her reports, who would approach for medical termination of pregnancy
- (ii) Provide the opinion of Medical Board in Form D (Annexure-3) with regard to the termination of pregnancy or rejection of request for termination within three days of receiving the request for medical termination of pregnancy
- (iii) To ensure that the termination procedure, when advised by the Medical Board, is carried out with all safety precautions along with appropriate counselling within five days of the receipt of the request for medical termination of pregnancy

Composition of the Medical Boards

A Gynaecologist, a Paediatrician and a Radiologist or sonologist are the members of the MTP Board.

For composition of the Medical Boards, following suggestive points are as follows:

- The head of the department of Obstetrics and Gynaecology of that institution will be the chair of the Board
- It should have at least one women member, and
- One member from the Government Hospital
- Specialists from any other department may be included in the Board as per the requirement of the case
- Any Board Member, if not available at the point of time of discussion on a case, may be suitably substituted by another member by the Chair

The patient with substantial fetal anomaly at more than 24 weeks can apply directly to the Medical Board and petition in courts is not required anymore.

With the new amendment, the gestation limit for District Level Committee (DLC) approval for

private facilities has been increased. Criteria for DLC Approval for private facilities according to gestation have been set as:

I. Till 12 weeks :

- A gynecological examination / labour table
- Resuscitation and sterilization equipment
- Drugs and parental fluid
- Back up facilities for treatment of shock
- Facilities for transportation

II. Till 24 weeks :

- An operation table and instruments for performing abdominal or gynaecological surgery
- Anaesthetic equipment, resuscitation equipment and sterilization equipment
- Drugs and parental fluids for emergency use, notified by Government of India from time to time

II. Beyond 24 weeks :

- An operation table and instruments for performing abdominal or gynaecological surgery
- Anaesthetic equipment, resuscitation equipment and sterilization equipment
- Availability of drugs, parental fluids and blood for emergency use, notified by Government of India from time to time
- Facilities for procedure under Ultrasound guidance

➤ Note:

- Private facilities can perform abortion beyond 24 weeks only after the Medical Board opinion to termination the pregnancy beyond 24 weeks at the designated private facility with DLC approval.
- After the new amendment, medical methods of abortion can be used till 9 weeks of gestation limit in both public and private facilities.

LIMITATIONS AND PITFALLS :

Although the MTP Amendment act has risen hopes for streamlining the abortion laws in case of irregular pregnancies, it has some limitations:

1. The formation of Medical Boards in different states has been left at the hands of the State Governments without any strict plan of action.
2. Beyond 24 weeks, abortions are only allowed for pregnancies involving “substantial foetal abnormalities” and are not permitted for pregnancies resulting from rape which have crossed 24 weeks of gestation. In such cases, the pregnant woman is forced to pursue judicial intervention to obtain permission for abortion, which is often a lengthy and cumbersome process.
3. The Amendment Act makes has used the terminology ‘pregnant woman’ rather than ‘pregnant person’ throughout the Act. In doing so, it overlooks groups like transgenders, inter-sex & gender-diverse individuals who might require an abortion. Hence, fails to ensure equal access to abortions to all individuals, irrespective of their gender identity.

Annexure-1

FORM I

RMP Opinion Form

(For gestation age upto twenty weeks)

[See Regulation 3]

I _____
 (Name and qualifications of the Registered Medical Practitioner in block letters)

 (Full address of the Registered Medical Practitioner)

hereby certify that I am of opinion, formed in good faith, that it is necessary to terminate the pregnancy of _____

(Full name of pregnant woman in block letters)

resident of _____

(Full address of pregnant woman in block letters)

for the reasons given below*.

I hereby give intimation that I terminated the pregnancy of the woman referred to above who bears the Serial No. _____ in the Admission Register of the hospital/approved place.

Place:

Date:

Signature of the Registered Medical Practitioner

*of the reasons specified items (a) to (e) write the one which is appropriate:

- a. in order to save the life of the pregnant women,
- b. in order to prevent grave injury to the physical and mental health of the pregnant woman,
- c. in view of the substantial risk that if the child was born it would suffer from such physical or mental abnormalities as to be seriously handicapped,
- d. as the pregnancy is alleged by pregnant woman to have been caused by rape,
- e. as the pregnancy has occurred as a result of failure of any contraceptive device or methods used by a woman or her partner for the purpose of limiting the number of children or preventing pregnancy.

Note: Account may be taken of the pregnant woman’s actual or reasonably foreseeable environment in determining whether the continuance of her pregnancy would involve a grave injury to her physical or mental health.

Place:

Date:

Signature of the Registered Medical Practitioner

Annexure-2

FORM D

(See sub-clause (ii) of clause (b) of rule 3A)

Report of the Medical Board for Pregnancy Termination Beyond 24 weeks

Details of the woman seeking termination of pregnancy:

- 1. Name of the woman:
- 2. Age:
- 3. Registration/Case Number:
- 4. Available reports and investigations:

S.No	Report	Opinion on the findings

5. Additional Investigations (if done):

S.No	Investigations done	Key findings

6. Opinion by Medical Board for termination of pregnancy:

- a) Allowed
- b) Denied

Justification for the decision:

7. Physical fitness of the woman for the termination of pregnancy:

- a. Yes
- b. No

Members of the Medical Board who reviewed the case:

S.No	Name	Signature

Date and Time:

Annexure-3

FORM E

Opinion Form of Registered Medical Practitioners

(For gestation age beyond twenty weeks till twenty-four weeks)

[See sub-rule (2) of rule 4A]

I
(Name and qualifications of the Registered Medical Practitioner in block letters)

.....
(Full address of the Registered Medical Practitioner)

I
(Name and qualifications of the Registered Medical Practitioner in block letters)

.....
(Full address of the Registered Medical Practitioner)

hereby certify that we are of opinion, formed in good faith, that it is necessary to terminate the pregnancy of

.....
(Full name of pregnant woman in block letters)

resident of
(Full address of pregnant woman in block letters)

which is beyond twenty weeks but till twenty-four weeks under special circumstances as given below*.

*Specify the circumstance(s) from (a) to (g) appropriate for termination of pregnancy beyond twenty weeks till twenty-four weeks:

- (a) Survivors of sexual assault or rape or incest
- (b) Minors
- (c) Change of marital status during the ongoing pregnancy (widowhood and divorce)
- (d) Women with physical disabilities [major disability as per criteria laid down under the Rights of Persons with Disabilities Act, 2016 (49 of 2016)]
- (e) Mentally ill women including mental retardation
- (f) The foetal malformation that has substantial risk of being incompatible with life or if the child is born it may suffer from such physical or mental abnormalities to be seriously handicapped
- (g) Women with pregnancy in humanitarian settings or disaster or emergency situations as declared by Government

We hear by give intimation that we terminated the pregnancy of the woman referred to above who bears the Serial No. in the Admission Register of the hospital / approved place.

Signature of the Registered Medical Practitioner

Place: Signature of the Registered Medical Practitioner

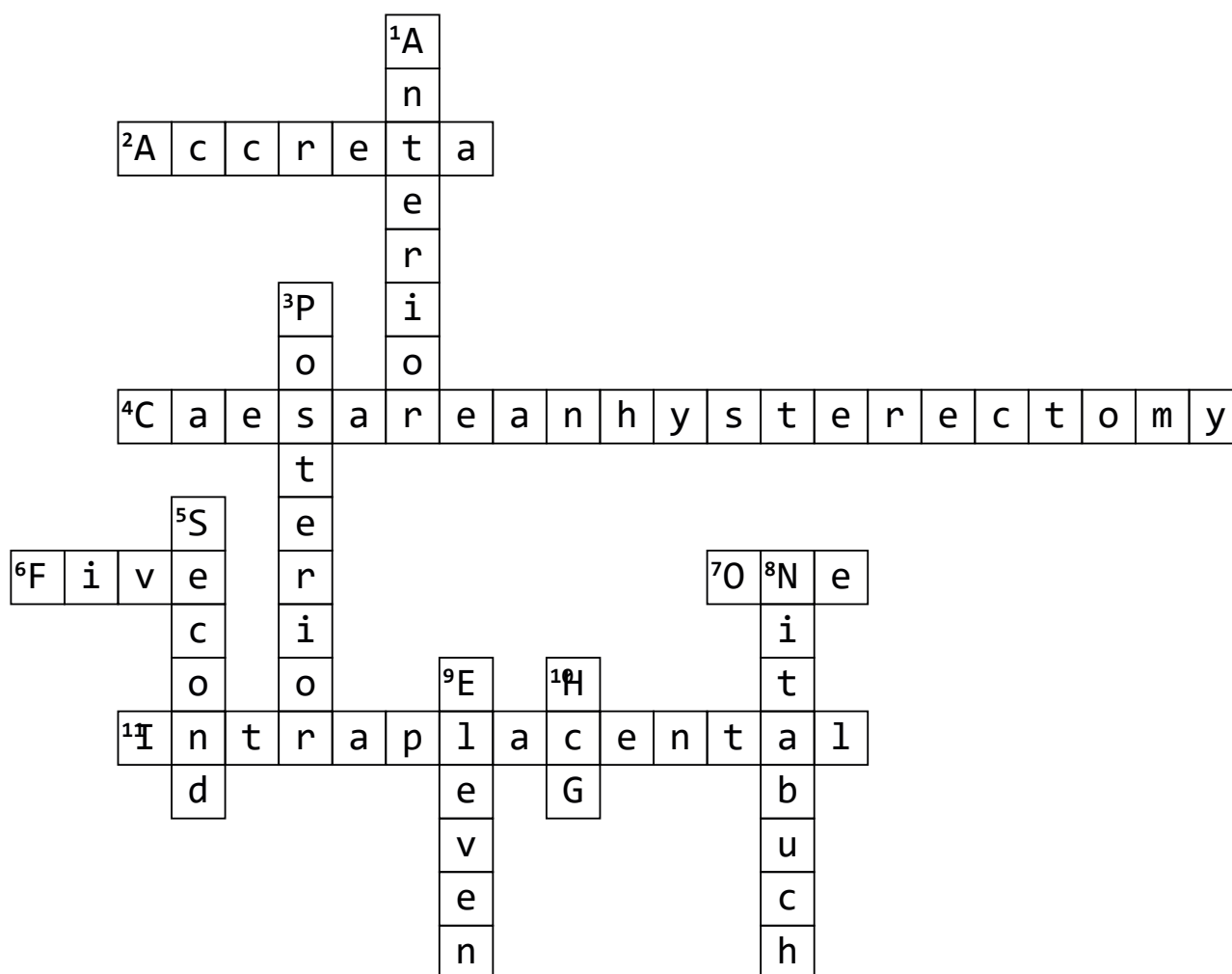
Date:

Note: Account may be taken of the pregnant woman's actual or reasonably foreseeable environment in determining whether the continuance of her pregnancy would involve a grave injury to her physical or mental health.

References :

1. United Nations Population Fund, State of the World Population Report 2022: Seeing the Unseen, [Internet], 2022, [cited 2023 March 22], Available from: <https://india.unfpa.org/en/publications/state-world-population-report-2022-seeing-unseen>
2. Yokoe R, Rowe R, Choudhury SS, et al. Unsafe abortion and abortion-related death among 1.8 million women in India. *BMJ Global Health* 2019;4:e001491.
3. Singh, S., Shekhar, C., Acharya, R., Moore, A. M., Stillman, M., Pradhan, M. R., Frost, J. J., Sahoo, H., Alagarajan, M., Hussain, R., Sundaram, A., Vlassoff, M., Kalyanwala, S., & Browne, A. (2018, January). The incidence of abortion and unintended pregnancy in India, 2015. *The Lancet Global Health*, 6(1), e111–e120.
4. Ministry of Health and Family Planning, Govt of India. The Medical Termination of Pregnancy Act (Act No. 34, 1971). New Delhi: Government of India, 1971 [cited 2023 Mar 22].
5. Ministry of Law and Justice, Govt of India. The Medical Termination of Pregnancy (Amendment) Act 2021, no 8 of 2021. The Gazette of India. CG-DL-E-26032021-226130. March 25, 2021

Answer key of Quiz of February 2023



Winners of the monthly Quiz, February Issue 2023

1. Dr Rachita Garg
2. Dr Shalini Parashar

Events held in February 2023

S No	Date	Events
1	08.02.2023	Health camp in Jamia Hamdard campus by AOGD
2	17.02.2023	Webinar on Contraception by FOGSI Family welfare committee
3	24.02.2023	AOGD Monthly Clinical meeting by UCMS & GTB Hospital

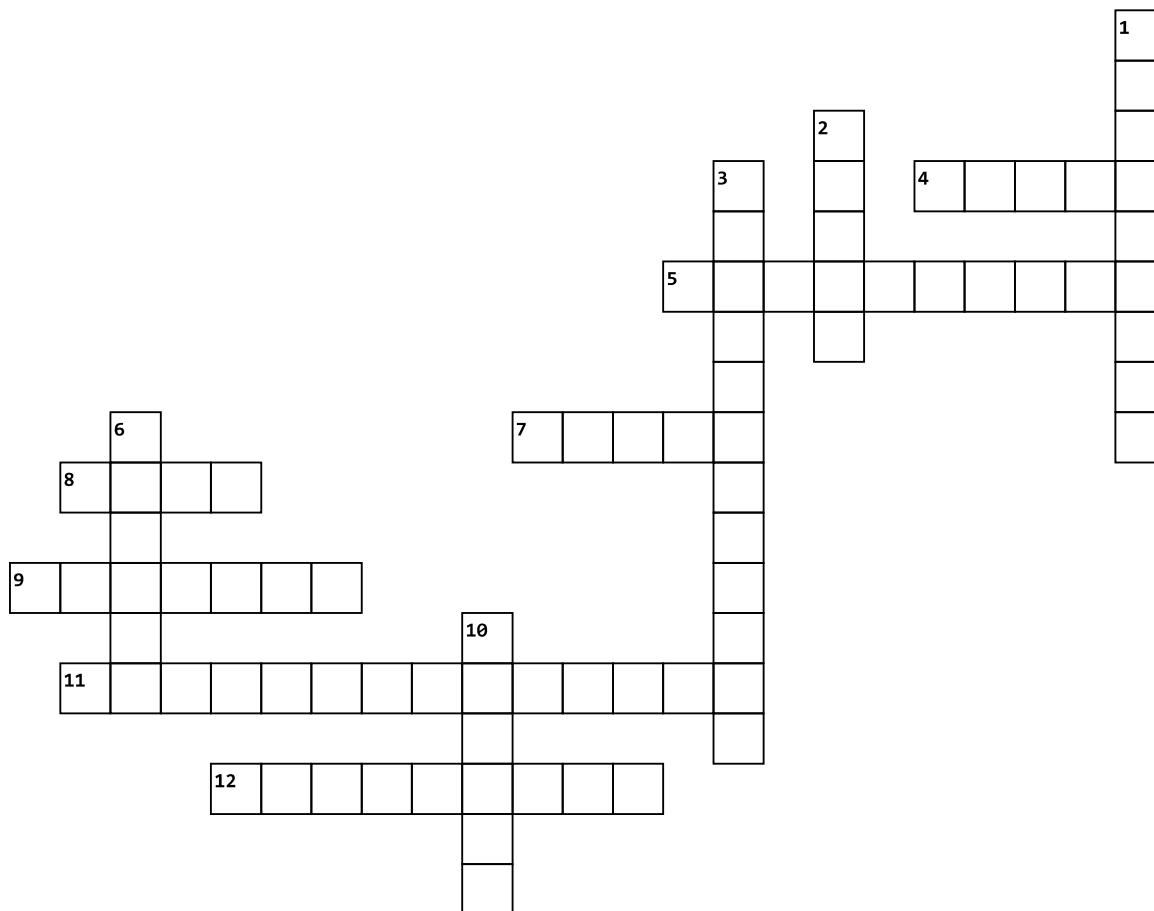
Forthcoming Events

S No	Date	Events
1	01-03-2023 to 02-03-2023	Public awareness came on Amemia on Rural health committee AOGD along with NARCHI Delhi and FOGSI
2	03-03-2023	CME on Range of medical devices under Multidisciplinary Committee AOGD
3	10-03-2023	Webinar on Perinatal Autopsy in Genomic Era by AOGD Genetic & Fetal Medicine Subcommittee
4	15-03-2023	Public Awareness Camp on Anemia in LHMC Hospital by Rural health committee of AOGD, NARCHI- Delhi and FOGSI
5	16-03-2023	Web on Common Urinary Problems in females under Uro-Gynae Subcommittee & DGFC
6	20-03-2023	PG Forum on Infertility by UCMS & GTB Hospital
7	16.04.2023	POCUS Masterclasses (Basics of Ultrasound) at Fortis Hospital Noida in collaboration with AEPI and multidisciplinary committee of AOGD

Cross Word Puzzle

Nalini Bala Pandey*, Caroline Laishram**

*Consultant, **Senior Resident, Department of Obstetrics and Gynaecology, Lok Nayak Hospital, Delhi



Across

4. The treatment for PPCM is given under which label.
5. Manual Left Uterine Displacement should be used to relieve _____ compression during resuscitation of maternal collapse.
7. Assessment of pregnant women requiring HDU and ICU care is done using which scoring?
8. Pregnancy modified scoring system for DIC was proposed by?
9. Criteria used for diagnosis of Acute Fatty Liver of Pregnancy.
11. A transthoracic electrical current for lethal ventricular fibrillation (VF)
12. Recombinant factor VIIa(rFVIIa) augments which clotting pathway?

Down

1. Aspiration pneumonitis caused by aspiration of stomach contents (principally gastric acid) during anesthesia in childbirth.
2. Class IV hemorrhage involves blood volume loss of more than _____ percent.
3. Which hormone primarily controls the changes in the respiratory system in women during pregnancy.
6. Process of prioritizing and classifying patients for early assessment and interventions.
10. Which findings seen on lung ultrasound provide a semi-quantitative estimation of extravascular lung water (Pulmonary congestion).

Mail the answers to aogdeditor22@gmail.com. The correct answers and names of the three winners will be announced in the next issue.

AOGD Sub-Committee Chairpersons 2022-2024

Committee	Chairperson	Contact No	Email.id
Breast and Cervical Cancer Awareness, Screening & Prevention Sub-Committee	Dr Mrinalini Mani	9811835888	drmrinal5@gmail.com
Infertility Sub-Committee	Dr Manju Khemani	9810611598	dr.manjukhemani@gmail.com
Rural Health Sub-Committee	Dr Shivani Agarwal	9868249464	dragarwal.shivani@gmail.com
Multidisciplinary Sub-Committee	Dr Kiran Guleria	9811142329	kiranguleria@yahoo.co.in

AOGD Sub-Committee Chairpersons 2021-2023

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Urogynaecology Sub-Committee	Dr Geeta Mediratta, Chairperson	9810126985	gmediratta@yahoo.com
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Fetal Medicine & Genetics Sub-Committee	Dr Seema Thakur, Chairperson	9818387430	Seematranjan@gmail.com
	Dr Sangeeta Gupta, Co-Chairperson	9968604349	drsangeetamamc@gmail.com
Endoscopy Sub-Committee	Dr Kanika Jain	9811022255	dr.kanika@gmail.com

Proceedings of the AOGD monthly clinical meeting at UCMS & GTB Hospital on 24.02.2023

Experience of hysterectomy in young unmarried women : Setback to breakthrough

Jyotsna Yadav, Richa Sharma, Kiran Guleria

Hysterectomy in unmarried, young females, especially those with intellectual disability or visual impairments have social, ethical and medicolegal dilemmas. Our case series unfolds these dilemmas in therapeutic and non therapeutic hysterectomies.

In our index case, a 17 yrs, unmarried girl with spastic cerebral palsy since birth and irregular menses was brought to OPD by her mother with a request for hysterectomy citing inability to maintain menstrual hygiene and social anxiety. The medical board set up for the same advised to continue medical management. The girl in the second case was 23 yrs old, unmarried with severe mental retardation (IQ 28) with DM type II, had primary amenorrhea with transverse vaginal septum with hematometra with hematosalpinx. Hysterectomy was done here on family's insistence in spite of the knowledge about the alternative treatment options, after due approval from medical board. In the last scenario, a 26 yrs young, unmarried woman with cortical blindness presented to OPD with cicatrization of earlier treated transverse vaginal septum with recurrent hematocolpos with adnexal mass (endometrioma). Tired of multiple recurrences and surgical interventions, the patient herself along with the family requested for hysterectomy which was done after due consent as the girl was a self consenting adult.

Disability is defined as a person with long term Physical, Mental, Intellectual or Sensory impairment which, in interaction with barriers, hinders his/ her full and effective participation in society equally with others. Universal declaration of human rights 2015 article 6 and The Rights of Persons with Disabilities Act 2016, mentions that no one should be subjected to cruel, inhuman, torture or degrading treatment or punishment and also no one with disability should be subjected to treatment that leads to infertility without his or her free and informed consent. This indicates that adult woman, even if she is unmarried can give consent for hysterectomy, but if a girl has intellectual disability then her parents

or guardians need to seek permission from court.

Non therapeutic hysterectomy for menstrual hygiene in these girls is not justified and whenever mass hysterectomies for any reason are done, it is always criticised in the court. Various case reports are published wherein, therapeutic hysterectomy among girls with intellectual disabilities were done for mullerian anomalies and none of these were challenged by health activists or taken to court.

Thus there is an urgent need for some specialized laws or act, like MTP Act and medical board, so that a valid decision can be obtained regarding therapeutic and non therapeutic hysterectomies among women with intellectual disability.

Unusual cause of breathlessness in a young postpartum woman: A diagnostic dilemma

Sruthi Bhaskaran, Penzy Goyal, Archana Chaudhary, Abha Sharma, Amita Suneja

Case: A 21 year old, P1L1A3 presented to Gynae casualty at postnatal day 26 of preterm vaginal delivery with C/o gradual onset breathlessness on exertion, generalized body ache (mainly upper back) for 15-20 days and cough with sputum with occasional hemoptysis for 4-5 days. Her antenatal period was uneventful and she was referred at 35 weeks with preterm labor and had PTVD, was breast feeding and discharged on Day 3. On Examination - Patient was Tachypneic with B/L chest clear. On Gynecological examination B/L adnexal masses firm, mobile, nontender Rt-8x8 cm , Lt-4x4 cm felt. Ultrasound abdomen/pelvis - uterus normal, Rt- 8x8 cm solid ovarian, Lt- 4x4 cm solid-cystic mass ovarian mass. Chest X ray- reported as Miliary mottling with confluence, possibility of tuberculosis - started on ATT. Suspicion of Tuberculosis with? Krukenberg tumor? Germ cell tumor kept. Tumor markers for germ cell tumor - normal. Sputum for AFB came negative. Patient was put on oxygen support, however, her condition deteriorated rapidly requiring Noninvasive ventilation. CECT chest, abdomen and pelvis was suggestive of solid ovarian masses with multiple bony metastasis, Large IVC thrombus, Lymphangitic carcinomatosis in lungs. Also, B/L Breasts showed suspicious lesions for which FNAC

was done which suggested malignancy. Trucut biopsy from ovarian masses revealed metastatic adenocarcinoma. On reexamining breasts-multiple small firm nodule felt in B/L breast. Final diagnosis was Stage IV breast cancer with ovarian metastasis with Lymphangitic carcinomatosis with Venous thrombosis. Patient was started on palliative care after oncology opinion.

Conclusion: Pregnancy associated breast cancer is a distinct clinical entity and has poorer outcome as it is often detected in advanced stages. All pregnant and postpartum women should be educated about self breast awareness and clinical breast examination should be an essential part of examination. Pulmonary Lymphangitic carcinomatosis is a form of pulmonary metastasis most commonly seen with breast cancer and represents end stage malignancy.

Insight into a rare variety of ovarian soft tissue sarcoma

Anshuja, Sandhya, Rachna, Seema , Bhanu, Upasana

Angiosarcoma of ovary is extremely rare tumour, contributes to approximately 1% of ovarian malignancy. It is highly aggressive tumour associated with poor prognosis.

A 34yr old Indian lady presented to gynaecologic OPD with complaints of pain & distension of abdomen since 1 month. After examination, investigations (tumour markers, USG and CECT abdomen & pelvis) and detailed work up provisional diagnosis of malignant ovarian tumour was made. She underwent staging laparotomy with cytoreductive surgery, intraoperatively left solid cystic ovarian mass of around 9x8cm with hemorrhagic fluid noted. On combined, HPE and IHC (CD 31) final diagnosis of angiosarcoma stage 1c2 was made. Patient is planned for radiotherapy and chemotherapy.

Diagnosis of angiosarcoma of ovary is still challenging due to non-specific clinical presentation, highly malignant and rapid progression of tumour. Imaging modalities like USG, CT scan and MRI are diagnostic tools but for definite diagnosis, HPE and IHC are required. Surgical resection , radiotherapy and chemotherapy are mainstay of treatment.

Events held under Aegis of AOGD in February 2022

AOGD Monthly Clinical Meeting on 24th February 2023 UCMS & GTB Hospital

Transcending Labour Analgesia: A step towards transforming maternal care & Birthing Experience on 28th Feb, 2022 AOGD Safe Motherhood Committee

Time	Topic	Speakers
4:00 - 4:15 PM	Welcome Address & Introduction	
Session 1		
4:15 - 4:30 PM	Labour Analgesia: An Unmet Right of Labouring Mothers in India	Dr Manju Puri
Session 2		
4:30 - 5:15 PM	Panel Discussion: Pain Relief Options in Labour - Is Epidural the Only Choice?	Moderator: Dr Rinku Sen Gupta Dhar Panelists: Dr Manju Khemani, Dr Swati Sinha, Dr Vidhi Chaudhary, Dr Shilpi Srivastava (PT), Dr Gowri Meena, Gill Perks, Priyali Sur
Session 3		
5:15 - 6:00 PM	Panel Discussion: Epidural Analgesia: Fine Tuning the Controversies Conversation Between Anaesthesiologist & Obstetrician	Moderator: Dr Payal Chaudhary Discussants: Dr Vivek Saluja, Dr Rakhi Goyal, Dr Urvasi Sehgal, Dr Mamta Dagar

Public awareness camp on Anemia on 1st & 2nd March Rural health committee AOGD along with NARCHI Delhi and FOGSI



CME on Range of medical devices on 3rd March, 2023 Multidisciplinary Committee AOGD



Public awareness on Menstrual health on 8th March 2023



Webinar on Perinatal Autopsy in Genomic Era on 10th March 2023
AOGD Genetic & Fetal Medicine Subcommittee

AOGD GENETIC & FETAL MEDICINE SUBCOMMITTEE
10th March, 2023 | 5:30 - 8:30 PM
TOPIC: PERINATAL AUTOPSY IN GENOMIC ERA

Experts
 Dr. Ratna Puri, Dr. Vandana Chadha, Dr. Aamita Rathore
Guest of honour
 Dr. Aamita Rathore, President, AOGD

Chairpersons
 Dr. Sanggeeta Gupta, Dr. Seema Thakur, Dr. Manisha Kumar

Master of Ceremony: Dr. Shreyasi Sharma, Dr. Saloni Arora

Time	Topic	Speaker
5:30 : 5:35 PM	Welcome Address	Dr. Seema Thakur
5:40 : 5:45 PM	Inaugral Speech	Dr. Asmita Rathore
Session 1		
Chairpersons: Dr. Akshatha Sharma, Dr. Chanchal, Dr. Sumitra, Dr. Tina Verma, Dr. K Aparna Sharma		
5:50 - 6:05 PM	Autopsy: Dymorphic Clue to Genetic Syndromes	Dr. Seema Thakur
Session 2		
Chairpersons: Dr. Savita Dagar, Dr. Renu Arora, Dr. Rachna Gupta, Dr. Reema Bhatt, Dr. Apoorva Reddy		
6:10 - 7:10 PM	Autopsy - Internal Examination Including Brain & Heart: How I do it	Dr. Sunil Jainan
Session 3		
7:15 - 8:25 PM	Case Based Discussion: Autopsy - Sharing Our Experience Presenters: Dr. Deepika Meena, Dr. Veronica, Dr. Vrunda, Dr. Geetanji, Dr. Deepa Khurana	Moderators: Dr. Manisha Kumar, Dr. Sunita Kapoor
	Vote of Thanks	Dr. Seema Thakur

Public Awareness Camp on Anemia on 14th March 2023 in BSA Hospital
Rural health committee of AOGD, NARCHI- Delhi, and FOGSI



Public Awareness Camp on Anemia on 15th March 2023 in LHMC Hospital
Rural health committee of AOGD, NARCHI- Delhi, and FOGSI



Web on Common Urinary Problems in females on 16th March 2023
Uro-Gynae Subcommittee & DGFC

Webinar on
COMMON URINARY PROBLEMS IN FEMALE
Organised Under Aegis of
AOGD Uro-Gynae Subcommittee & Delhi Gynaecological Forum Central
16th March, 2023 | 2:00 - 4:00 PM

Master of Ceremony: Dr. Sharmistha Garg

Time	Topic	Speaker
Chairpersons: Dr. K. Gujral, Dr. Mamta Dagar, Dr. Jyoti Bali		
2:00 : 2:20 PM	How to Evaluate a Case of Urinary Incontinence	Dr. Aparna Hegde
Chairpersons: Dr. Harsha Khullar, Dr. Chandra Mansukhani, Dr. Mala Srivastava		
2:20 : 2:40 PM	Bladder Pain: When it is not UTI	Dr. Amita Jain
2:40 : 3:00 PM	Q & A	
Experts: Dr. Geeta Mediratta, Dr. Ranjana Sharma		
3:00 - 3:20 PM	Video Session on Management of Urologic Injuries in Obst & Gynae	Dr. Vipin Tyagi
3:20 - 3:40 PM		Dr. Uma Rani Swain
3:40 - 4:00 PM		Dr. Mrinal Pahwa
4:00 PM	Vote of Thanks	Dr. Rannik Sabharwal

PG Forum on Infertility on 20th March 2023
UCMS & GTB Hospital

Association of Obstetricians & Gynecologists of Delhi
 invites you to
Delhi PG Forum
 Case discussion on
INFERTILITY
Post Graduates of UCMS & GTB Hospital, Delhi,
Monday, 20th March 2023 | 7:00 pm to 8:30 pm

Moderators:
 Dr. Alpana Singh, Prof. (OBG), UCMS & GTB Hospital, Delhi
 Dr. Arpita De, Associate Prof. (OBG), Hansard Institute of Medical Sciences & Research, Delhi
 Dr. Leena Wadhwa, Prof. (OBG) & Incharge, Reproductive Medicine and Surgery (RMS), ESOPUS, Basaidapur, New Delhi

Chairperson:
 Dr. Preeti Thakur, PG Residents OBG, UCMS & GTB Hospital, Delhi
 Dr. Mahua Das, PG Residents OBG, UCMS & GTB Hospital, Delhi

PG RESIDENTS

Coordinator Delhi PG Forum: Dr. Sunita Malik
Co-Coordinator Delhi PG Forum: Dr. Shivani Agarwal

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Your Date for Next Class on - Monday, 17th April 2023 -
Topic: Post Partum Haemorrhage

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Association of Obstetricians & Gynaecologists of Delhi

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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.

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<ul style="list-style-type: none"> ➔ Determine cause of fetal demise or still birth by analyzing products of conception ➔ Detect the cause of structural abnormalities in fetus¹ ➔ Offer more diagnostic clarity even in structurally normal fetus² 	<ul style="list-style-type: none"> ➔ Offering superior yield (23.3%) ➔ 6% increased diagnostic yield when karyotype is normal in structurally abnormal fetuses³ ➔ <0.25% failure rate ➔ High resolution screening ➔ No need for live cells ➔ Screens for UPD/LOH ➔ Syndromic evaluation involving micro-deletion/duplication 	<ul style="list-style-type: none"> ➔ CAP accredited reports ➔ Strict adherence to ACMG guidelines ➔ All prenatal samples being evaluated for maternal cell contamination (MCC) ➔ Reports reviewed and approved by clinical geneticist ➔ Free genetic counselling ➔ Comprehensive CMA offering including Optima, 750K, HD and XON array

Source:
 1. Dugoff L, Norton ME, Kuller JA. The use of chromosomal microarray for prenatal diagnosis. J Obstet Gynecol 2016;215(04):B2-B9
 2. Microarrays and Next-Generation Sequencing Technology: The use of Advanced Genetic Diagnostic Tools in Obstetrics and Gynecology. Obstet Gynecol 2016;128(06):262-268
 3. N Engl J Med. 2012 December 6; 367(23): 2175-2184. doi:10.1056/NEJMoa1203382.