III Съезд Congress

5-7 сентября 2018 / Санкт-Петербург
September 5-7, 2018 / St. Petersburg

Maternal Collapse

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АССОЦИАЦИЯ АНЕСТЕЗИОЛОГОВ-РЕАНИМАТОЛОГОВ

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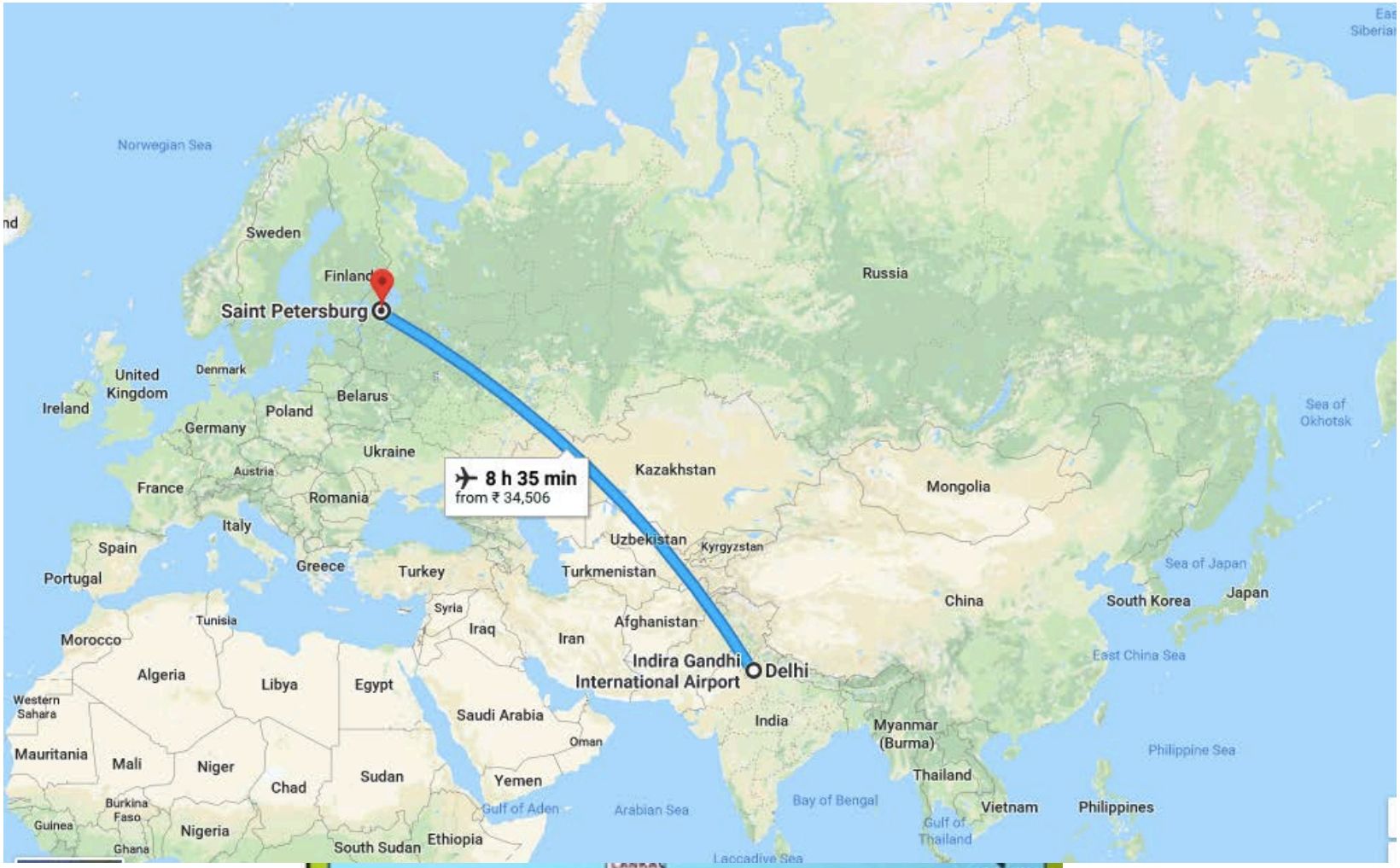

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ALL INDIA INSTITUTE OF MEDICAL SCIENCES

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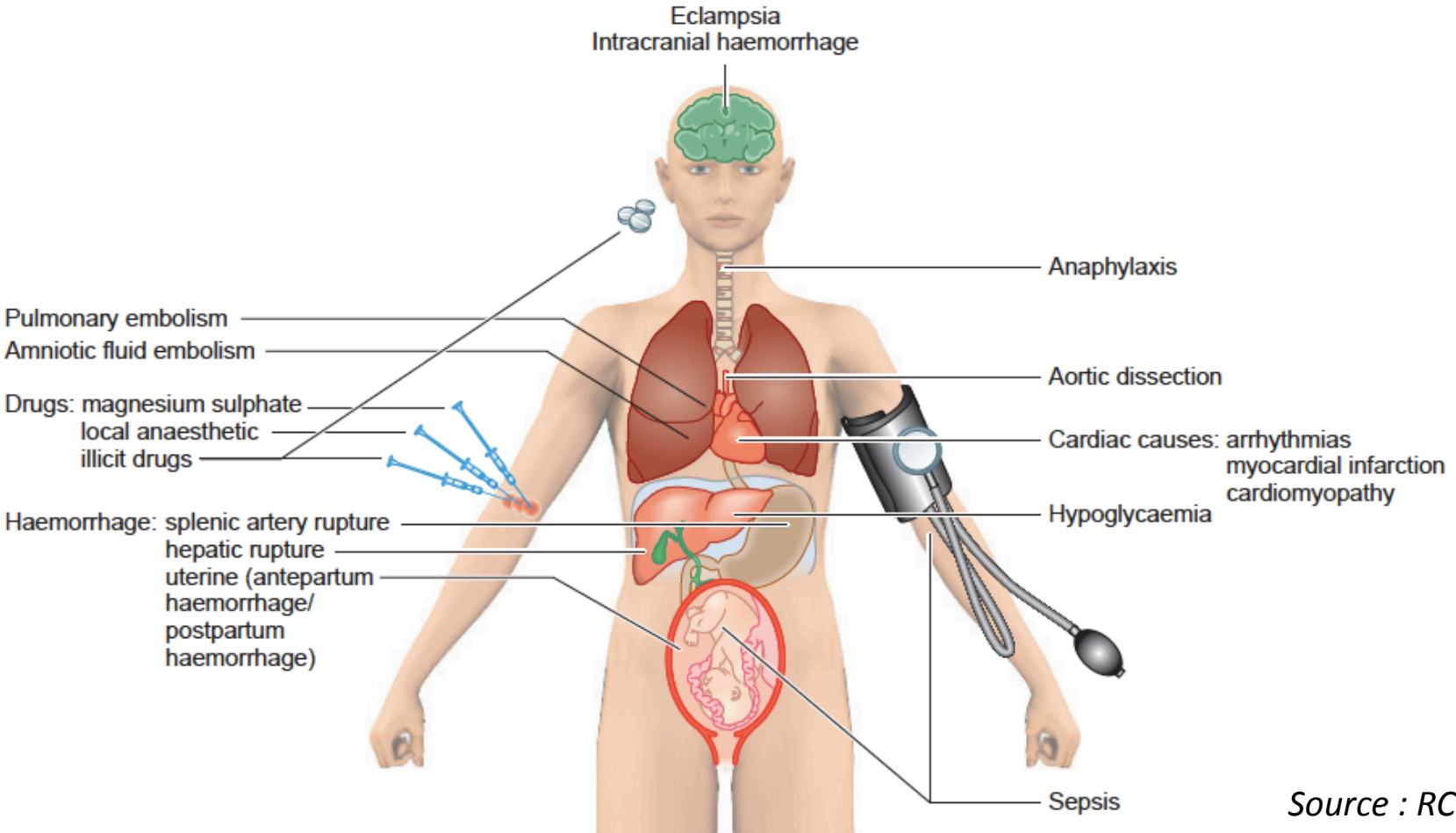
Maternal collapse

- **Definition**
  - A**cute** event involving the **cardiorespiratory systems** and/or **brain** resulting in a reduced or absent conscious level (and potentially death), **at any stage in pregnancy** and up to **six weeks** after delivery
    - *RCOG;2011*
- **Incidence**
  - **8.5 /100,000 births (UK)** MBRRACE-UK 2016
  - 440/100,000 (India)

Causes of maternal collapse



Source : RCOG

4 Hs	**Hypovolemia**	• Bleeding (maybe concealed); APH/PPh/Ectopic/Ut rupt/Splenic art rupture/Hepatic rupture • Relative; hypovolemia of dense spinal block/septic or neurogenic shock
	Hypoxia	• Easily become hypoxia • Cardiac events ; Peripartum cardiomyopathy/MI/aortic dissection
	Hypo/Hyper Kalemia / other electrolyte abnormality	• Nebulisation/Diuretics/Blood transfusions
	Hypothermia	• Especially in peripheral hospitals/Winters
4 Ts	**Thromboembolism**	• Amniotic fluid embolus/Pulmonary Em/MI
	Toxicity	• Local Anesth Syst Toxicity LAST/Magnesium
	Tension Pneumothorax	• Trauma/Suicide attempt
	Temponade (Cardiac)	• Trauma/Suicide attempt
	Eclampsia/PreEclampsia	• Subarachnoid hemorrhage

NICE; 2007
watkinson et al 2006
Gopalan et al 2004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KARNATAKA
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KERALA
LAKSHADWEEP (INDIA)
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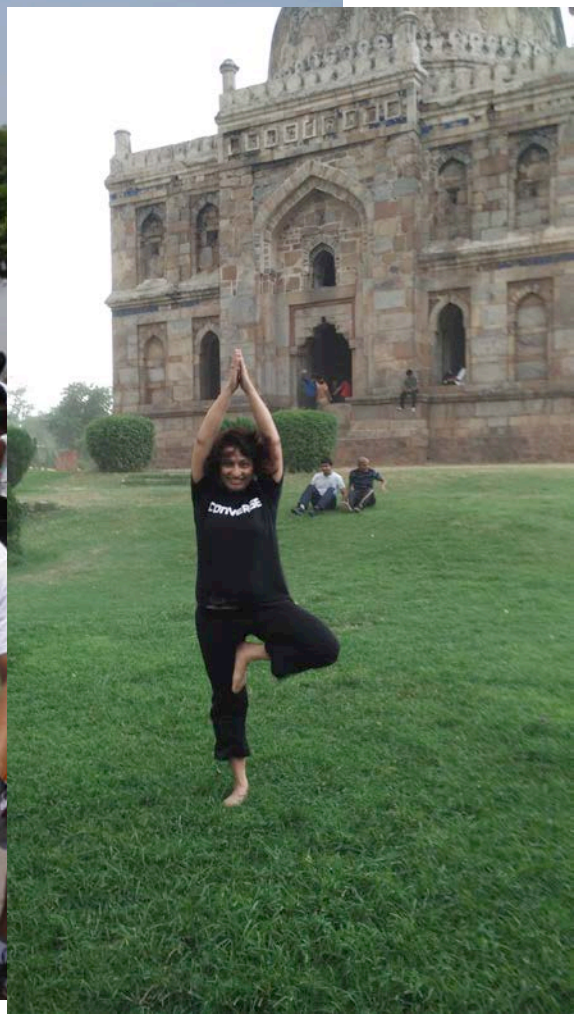


Early Warning Signs (EWS)

- Quickly determine degree of illness
- Based on vital signs
  - Respiratory Rate
  - Oxygen Saturation
  - Temperature
  - Blood pressure
  - Pulse/Heart rate
  - AVPU response

NICE; 2007/Watkinson et al 2006/ Gopalan et al 2004

Early Warning Score

Score	3	2	1	0	1	2	3
RR	>35	31-35	21-30	9-20			<7
SpO2	<85	85-89	90-92	>92			
Temp (C)		>38.9	38-38.9	36-37.9	35-35.9	34-34.9	<34
Systolic BP		>199		100-199	80-99	70-79	<70
HR	>129	110-129	100-109	50-99	40-49	30-39	<30
AVPU				Alert	Verbal	Pain	Unresponsive

Score >5; increased likelihood of death or admission

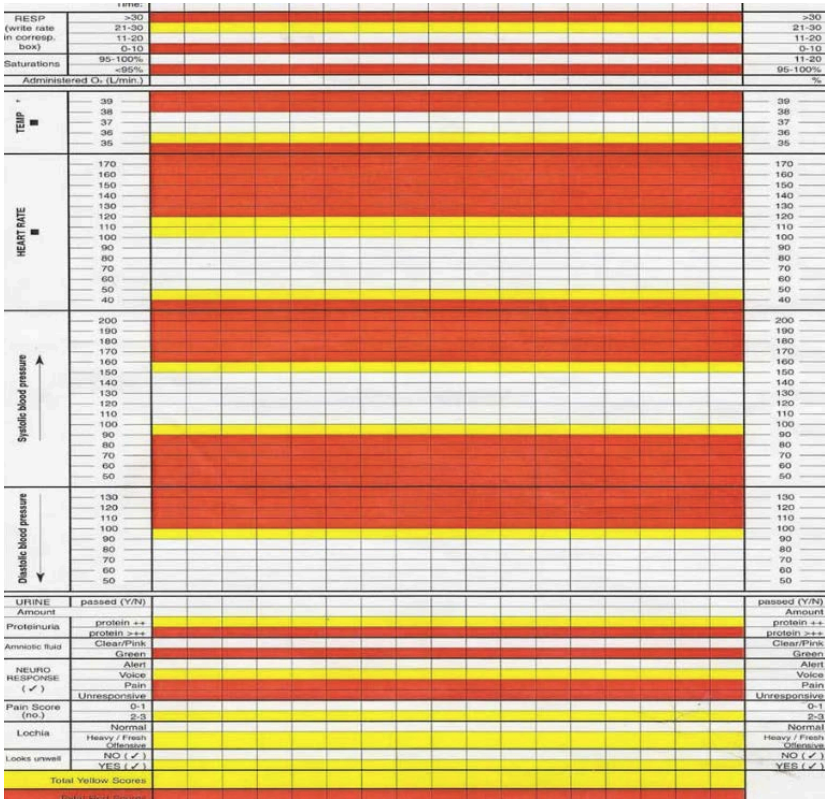
Maternal Early Warning Criteria (MEWC)

Systolic BP; mmHg	**<90 or >160**
Diastolic BP; mmHg	**>100**
Heart rate; / min	**<50 or >120**
Respiratory rate; /min	**<10 or >30**
Room air Oxygen saturation; %	**<95**
Sea level Oliguria	**<30 mL/hr for 2 hrs**

CEMACE 2011

Significance of EWS

- Monitor EWS/MEWC at regular intervals
- Prompt reporting
- Bedside evaluation
  - First responder generally anesthetist



Singh et al; 2012
Clarke et al;2009

Management of Maternal Collapse

- Look for 4 Hs & 4 Ts & treat accordingly

- If non responsive then proceed to CPR
- *Before* 20 weeks
  - Normal BLS/ACLS

- *After* 20 weeks
  - Modification of CPR due to physiological changes

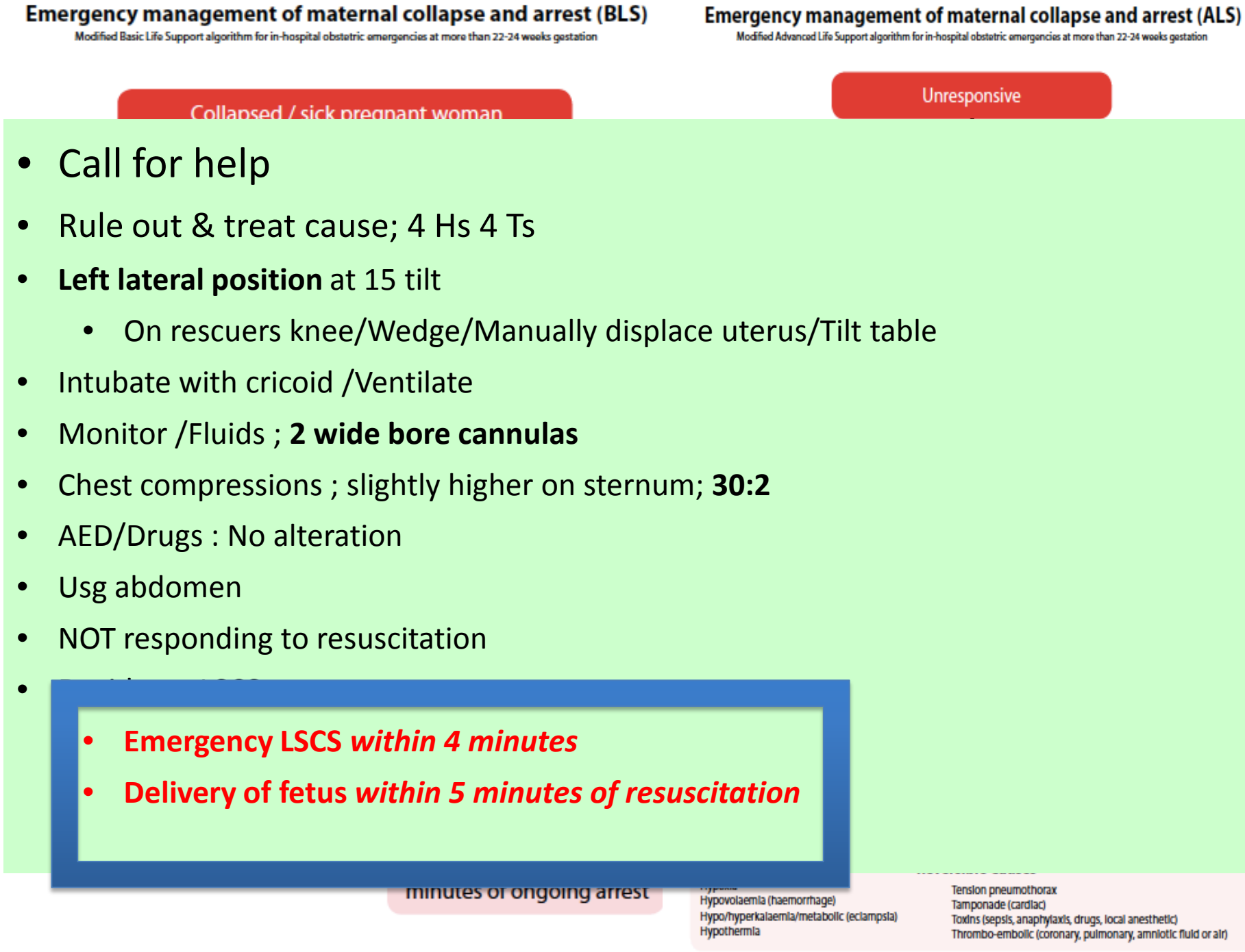
Cardiovascular system	Changes	Implications
Plasma volume	↑ 50 %	Dilutional anemia ↓ O2 carrying
HR	↑15-20 b/min	↑CPR demand
CO	↑40 %	↑CPR demand
Uterine bld flow	10 % of CO	Massive hemorrhage
SVR	↓	
BP	↓ 10-15mmHg	↓reserve
Venous return	↓	↑CPR demand

Respiratory system

RR	↑	↓
O2 consumption	↑ 20 %	Early Hypoxia
Arterial PCO2	↓	↓ buffering/acidosis
FRC	↓ 25 %	↓ buffering/acidosis
Laryngeal edema	↑	Diff intubation

Other systems

Gastric motility	↓	**aspiration**
LESphincter	relaxed	aspiration
Uterus	↑	FRC/diff ventilation Supine hypotension Venous return /CPR
Weight	↑	Diff intubation/ventilation


Emergency management of maternal collapse and arrest (BLS)
Modified Basic Life Support algorithm for in-hospital obstetric emergencies at more than 22-24 weeks gestation
Collapsed / sick pregnant woman
Emergency management of maternal collapse and arrest (ALS)
Modified Advanced Life Support algorithm for in-hospital obstetric emergencies at more than 22-24 weeks gestation
Unresponsive
• Call for help
• Rule out & treat cause; 4 Hs 4 Ts
• Left lateral position at 15 tilt
• On rescuers knee/Wedge/Manually displace uterus/Tilt table
• Intubate with cricoid /Ventilate
• Monitor /Fluids ; 2 wide bore cannulas
• Chest compressions ; slightly higher on sternum; 30:2
• AED/Drugs : No alteration
• Usg abdomen
• NOT responding to resuscitation
• Emergency LSCS within 4 minutes
• Delivery of fetus within 5 minutes of resuscitation
minutes of ongoing arrest
Hypovolaemia (haemorrhage)
Hypo/hyperkalaemia/metabolic (eclampsia)
Hypothermia
Tension pneumothorax
Tamponade (cardiac)
Toxins (sepsis, anaphylaxis, drugs, local anesthetic)
Thrombo-embolic (coronary, pulmonary, amniotic fluid or air)

Perimortem cesarean section

- If resuscitation not effective ; deliver fetus & placenta immediately within 5 mts
- Maternal benefit
  - ↑ Venous return & CO
  - Facilitates chest compression & ventilation
- Place of surgery : Wherever patient is
- Incision
  - Midline incision best/ Incision most comfortable for obstetrician
  - Close abdomen in normal layers
- Equipment
  - Scalpel/gloves/cord clamp
- For maternal benefit mainly

Katz; 1986/2005/2012
Cobobianco; 2008

American Journal of Obstetrics and Gynecology (2005) 192, 1916–21

ELSEVIER

American Journal of OBSTETRICS and GYNECOLOGY

www.ajog.org

Perimortem cesarean delivery: Were our assumptions correct?

Vern Katz, MD,[a,*] Keith Balderston, MD,[a] Melissa DeFreest, MD[b]

Results: There were 38 cases of perimortem cesarean delivery identified; 34 infants survived (3 sets of twins, 1 set of triplets), 4 other infants survived initially, but died several days after the deliveries from complications of prematurity and anoxia. Of the 34 infants (25-42 weeks' gestation), time of delivery after maternal cardiac arrest was available for 25. Eleven infants were delivered within 5 minutes, 4 were delivered from 6 to 10 minutes, 2 were delivered from 11 to 15 minutes, and 7 were delivered more than 15 minutes. Of 20 perimortem cesarean deliveries with potentially resuscitatable causes, 13 mothers were resuscitated and discharged from the hospital in good condition. One other mother was successfully resuscitated after the delivery, but died within 24 hours from complications related to her amniotic fluid embolism. In 12 of 18 reports that documented hemodynamic status, cesarean delivery preceded return of maternal pulse and blood pressure, often in a dramatic fashion. Eight other cases noted improvement in maternal status. Importantly, in no case was there deterioration of the maternal condition with the cesarean delivery. We wish to emphasize the large selection bias in this data

EBioMedicine 6 (2016) 253–257

rate before and after 5 min. In fact, the best available evidence suggests that the injury free survival for both declines in a more or less linear fashion with time. Furthermore, with only 11% of Cesareans accomplishing birth within 60 s, the assumption that birth can normally

So what clinical guideline should replace the Four-Minute Rule? "Deliver the baby as quickly as possible—for both maternal and feta benefit," should become the new guideline based on the best available

evidence. It is also important to note that of all the reversible causes cited for maternal cardiac arrest by the American Heart Association, many are absolute indications for prompt birth (DIC, abruption, bleeding, amniotic fluid embolism) (Jeejeebhoy et al., 2015). The potential direct benefit on the physiology of resuscitation itself has been described on the basis of experimental evidence by Rose et al. who also call for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JUNE 26, 2016 | CAPITAL | PAGES 56 | INCLUDING TIMESLIFE, CLASSIFIEDS AND DELHI TIMES | TIMESOFINDIA.CO
OF INDIA
Poland Enter Quarters
Lewandowski's men pip
Swiss in shootout P 25
CM Mehbooba Wins
Weathers anger over
PDP-BJP tie-up P 12
LeT rebels ambush CRPF bus
near Srinagar, kill 8 troopers
0 Others Hurt
Worst Strike
STOP
LYNCHING
d Bandra resident fought back, Khar police registered an
GOVT POLICY
TERROR PROBE
REACHES TOP
RSS LEADER
n Carter Rd
ed an FIR only after much persuasion
bus in South Delhi at 9.30pm
STOP
CRIMES ON
WOMEN

Recommended equipment for routine airway management:

- Facemasks
- Oropharyngeal airways: three sizes
- Nasopharyngeal airways: three sizes
- Laryngeal mask airways
- Tracheal tubes in a range of sizes
- Two working laryngoscope handles
- Macintosh blades: sizes 3 and 4
- Tracheal tube introducer ('gum-elastic' bougie)
- Malleable stylet
- Magill forceps

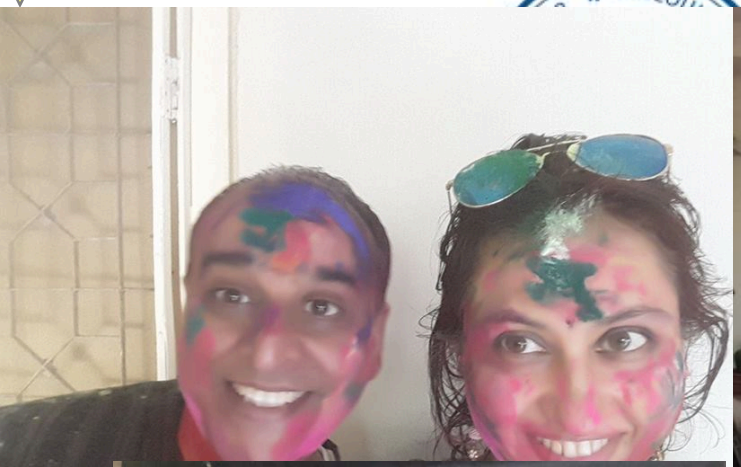
Recommended equipment for management of unanticipated difficult intubation

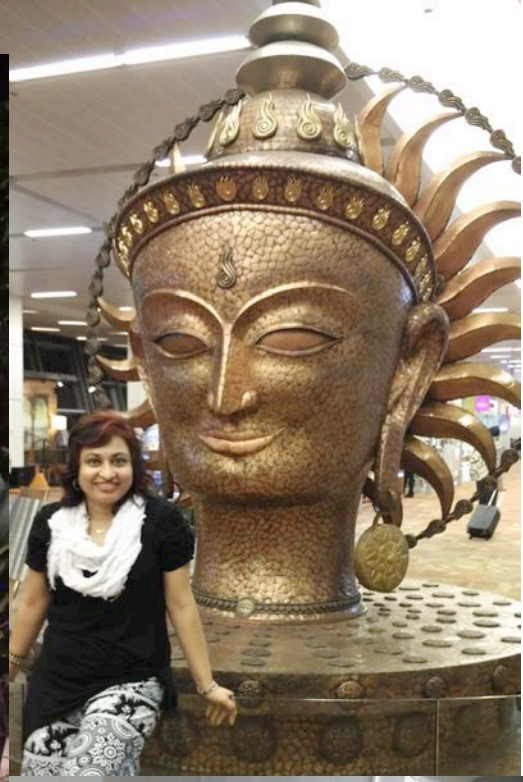
- Difficult Airway Society guidelines algorithm flowcharts (or modified local version)
- Equipment list for restocking
- At least one alternative blade (e.g. straight, McCoy)
- Intubating laryngeal mask airway (ILMA™) set (sizes 3, 4 and 5 with dedicated tubes and pusher)
- Tracheal tubes – reinforced and microlaryngeal, sizes 5 mm and 6mm
- Flexible fibreoptic laryngoscope (with portable/battery light source)
- Proseal laryngeal mask airway (ProSeal LMA™)
- Cricothyroid cannula (e.g. Ravussin) with a high-pressure jet ventilation system (e.g. Manujet) or large-bore cricothyroid cannula (e.g. Quicktrac)
- Surgical cricothyroidotomy kit
- (Scalpel with no. 20 blade, tracheal hook, 6/7 mm tracheal and tracheostomy tubes)

Alternative specialised techniques of proven value[57]

- Bullard-type laryngoscope
- Trachlight
- Aintree intubation catheter
- Combitub

Source : RCOG





Royal College of Obstetricians & Gynaecologists

Maternal Collapse in Pregnancy and the Puerperium

Green–top Guideline No. 56

January 2011

- **American Heart Association**
- **European Resuscitation Council**
- **Society for Obstetric Anesthesia and Perinatology**

Role of anesthetist in management of maternal collapse

- Usually first responders
- Hemorrhage
- Venous thromboembolism
- Amniotic fluid embolism
- Anaphylaxis; 0.5 ml adrenaline IM
- Drug toxicity
  - Local anesthetic; intralipid
  - Magnesium; 10ml calcium gluconate
- Sepsis
  - Sepsis bundle

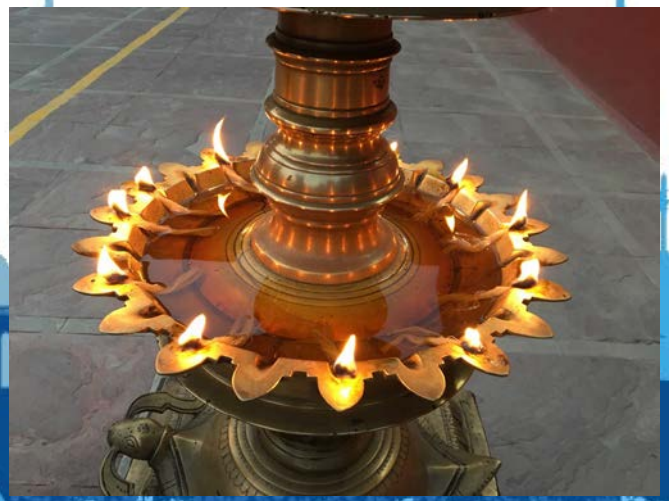
Post cardiac arrest care

- Close communication between nursing staff/ obstetricians/ Senior Resident Anesthetists along with consultant in charge /Critical care/ Hematologist
- Documentation
- Incident reporting/ Morbidity meet
- Debriefing
- Training at regular intervals

How we do it ?

- **Anesthetist first responder**
- **Patient in Obstetric Ward**
  - **Detailed orders with frequent assessments by emergency team**
  - EWS < 5
    - Vigorous communication b/w Anesthetists & Obstetricians
  - If EWS > 5
    - Shift to ICU
- **Post LSCS with high risk**
  - Shift to recovery room of Anesthesia /ICU
- **Post cardiac arrest/ respiratory arrest shift to ICU**
- **Cardiac or neurological factors pre or post delivery; shift to appropriate section**
- **Regular training of support staff**

- When there is maternal collapse , aim to deliver fetus as fast as possible but definitely within 5 minutes with all necessary precautions
- Monitoring for Early Warning Symptoms especially in pregnant ladies can avoid morbidity & mortality



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