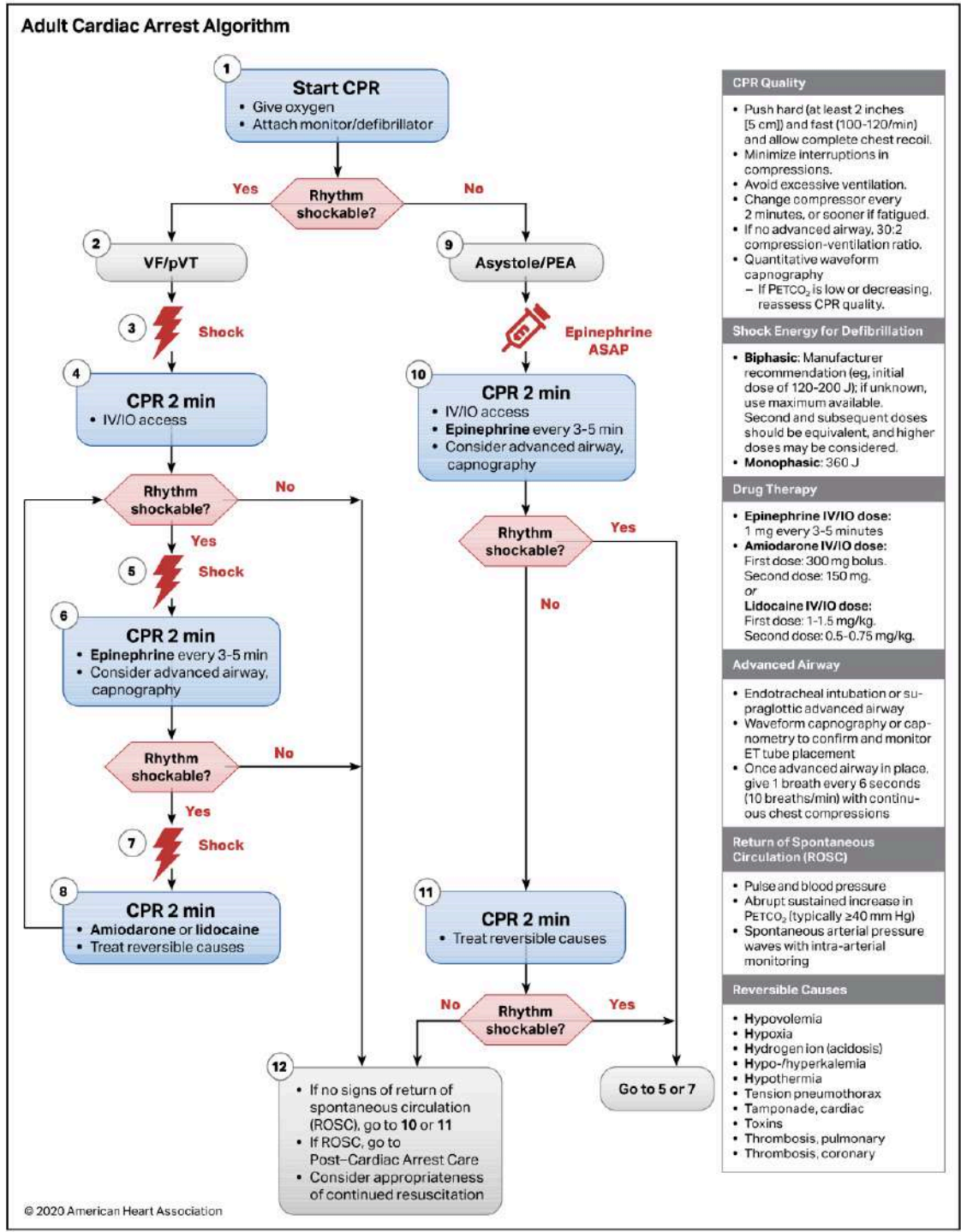


# LR Conference March 2024



- CPR Quality**
- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
  - Minimize interruptions in compressions.
  - Avoid excessive ventilation.
  - Change compressor every 2 minutes, or sooner if fatigued.
  - If no advanced airway, 30:2 compression-ventilation ratio.
  - Quantitative waveform capnography
    - If PETCO<sub>2</sub> is low or decreasing, reassess CPR quality.
- Shock Energy for Defibrillation**
- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
  - **Monophasic:** 360 J
- Drug Therapy**
- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
  - **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg. or
  - **Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.
- Advanced Airway**
- Endotracheal intubation or supraglottic advanced airway
  - Waveform capnography or capnometry to confirm and monitor ET tube placement
  - Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions
- Return of Spontaneous Circulation (ROSC)**
- Pulse and blood pressure
  - Abrupt sustained increase in PETCO<sub>2</sub> (typically ≥40 mm Hg)
  - Spontaneous arterial pressure waves with intra-arterial monitoring
- Reversible Causes**
- Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypo-/hyperkalemia
  - Hypothermia
  - Tension pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary

### **CPR Quality**

- Push hard (at least 2 inches/5 cm) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography

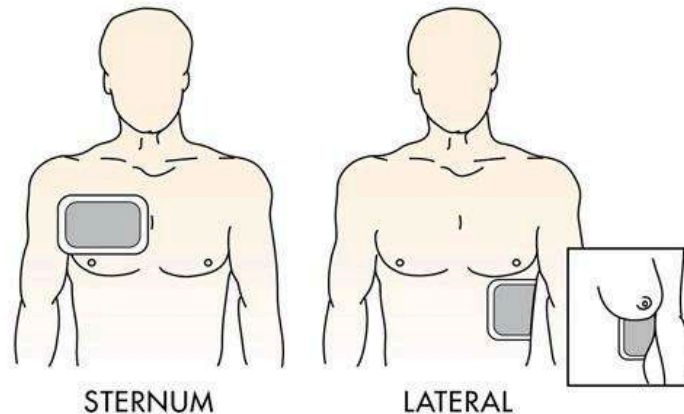
### **Oxygenation**

- A healthcare provider should use the head tilt–chin lift maneuver to open the airway of a patient when no cervical spine injury is suspected  
( using a jaw thrust without head extension in suspected cervical spine injury)
- The use of an airway adjunct (eg, oropharyngeal and/or nasopharyngeal airway) may be reasonable in unconscious (unresponsive) patients with no cough or gag reflex to facilitate delivery of ventilation with a bag-mask device

### **Shock energy for defibrillation**

- Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J; if unknown, use maximum available.
- Second and subsequent doses should be equivalent, and higher doses may be considered.
- Monophasic: 360 J
- CPR is recommended until a defibrillator or AED is applied and should be resumed immediately after shock has been delivered without a postshock rhythm check

## ADULT ANTERIOR/LATERAL



### Drug therapy

- **Epinephrine IV/IO dose:**
  - 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:**
  - First dose: 300 mg bolus.
  - Second dose: 150 mg.
- **Lidocaine IV/IO dose:**
  - First dose: 1-1.5 mg/kg.
  - Second dose: 0.5-0.75 mg/kg

### Advanced airway

- Before placement of an advanced airway (supraglottic airway or tracheal tube), it is reasonable for healthcare providers to perform CPR with cycles of 30 compressions and 2 breaths
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

### Ventilation during cardiac arrest

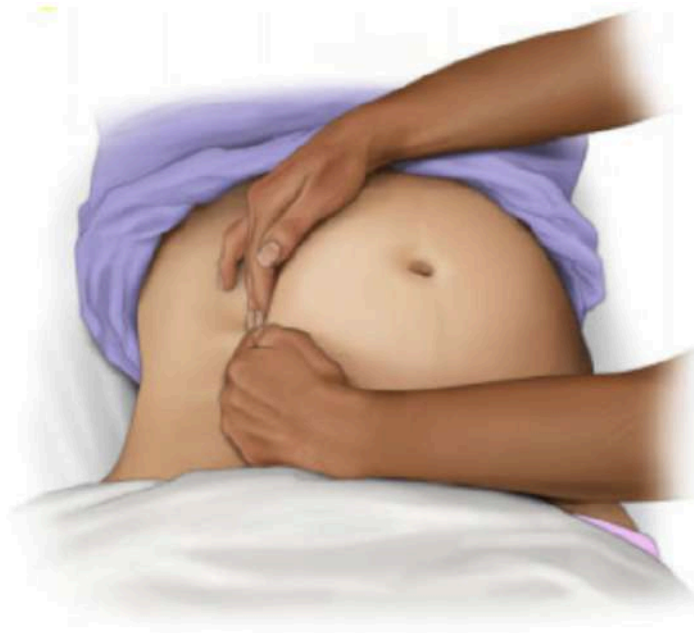
- For adults in cardiac arrest receiving ventilation, tidal volumes of approximately 500 to 600 mL, or enough to produce visible chest rise, are reasonable

- Excessive ventilation is unnecessary and can cause gastric inflation, regurgitation, and aspiration
- Excessive ventilation can also be harmful by increasing intrathoracic pressure, decreasing venous return to the heart, and diminishing cardiac output and survival

### **Left lateral uterine displacement**



One-handed technique



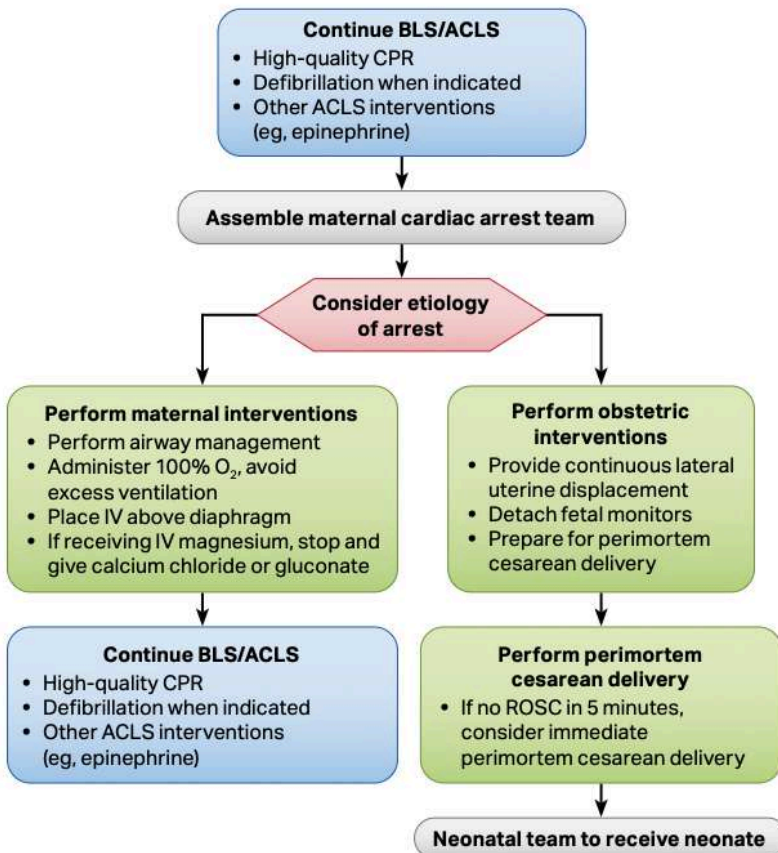
Two-handed technique

- Team planning for cardiac arrest in pregnancy should be done in collaboration with the obstetric, neonatal, emergency, anesthesiology, intensive care, and cardiac arrest services
- Because immediate ROSC cannot always be achieved, local resources for a perimortem cesarean delivery should be summoned as soon as cardiac arrest in a woman in the second half of pregnancy is recognized
- The gravid uterus can compress the inferior vena cava, impeding venous return, thereby reducing stroke volume and cardiac output. In the supine position, aortocaval compression can occur for singleton pregnancies starting at approximately 20 weeks of gestational age or when the fundal height is at or above the level of the umbilicus. Manual left lateral uterine displacement effectively relieves aortocaval pressure in patients with hypotension
  - Evacuation of the gravid uterus relieves aortocaval compression and may increase the likelihood of ROSC.
- Airway, ventilation, and oxygenation are particularly important in the setting of pregnancy because of increased maternal metabolism and decreased functional reserve capacity due to the gravid uterus, making pregnant patients more prone to hypoxia.

Furthermore, fetal hypoxia has known detrimental effects. Both of these considerations support earlier advanced airway management for the pregnant patient.

- Resuscitation of the pregnant woman, including PMCD when indicated, is the first priority because it may lead to increased survival of both the woman and the fetus. Fetal monitoring does not achieve this goal and may distract from maternal resuscitation efforts, particularly defibrillation and preparation of the abdomen for PMCD.
  - The optimal timing for the performance of PMCD expert recommend for timing for PMCD in cardiac arrest at less than 5 minutes remains an important goal
  - Neonatal survival has been documented with PMCD performed up to 30 minutes after the onset of maternal cardiac arrest
- There are no randomized trials of the use of TTM in pregnancy. However, there are several case reports of good maternal and fetal outcome with the use of targeted temperature management after cardiac arrest.
- After successful maternal resuscitation, the undelivered fetus remains susceptible to the effects of hypothermia, acidosis, hypoxemia, and hypotension, all of which can occur in the setting of post- ROSC care with TTM. In addition, deterioration of fetal status may be an early warning sign of maternal decompensation

## 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.

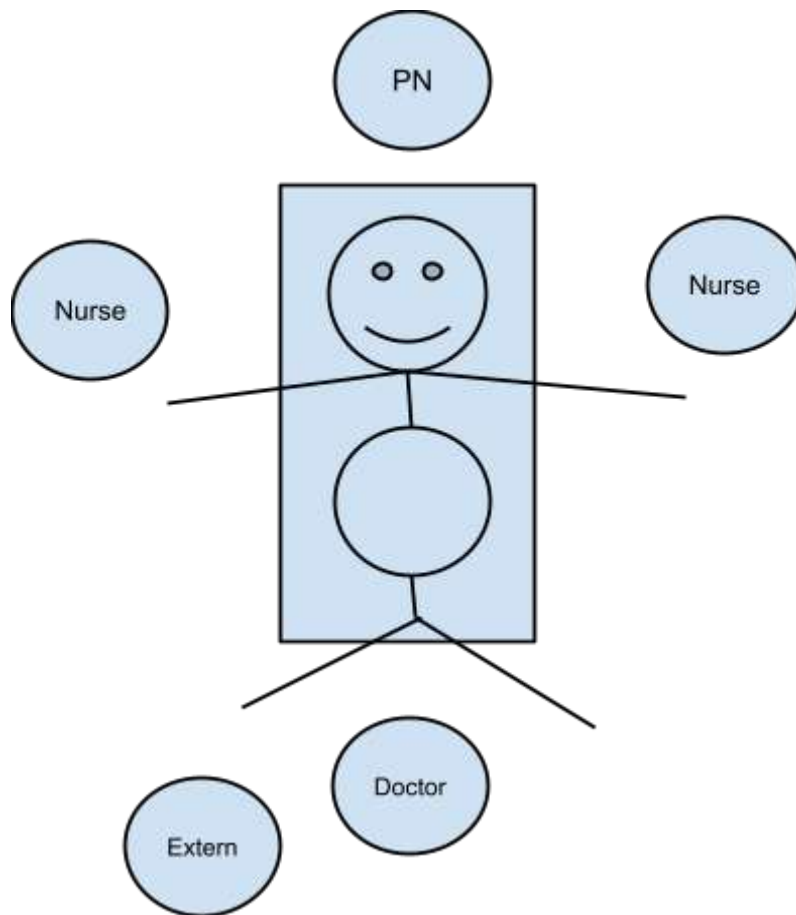
### Advanced Airway

- 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

## Normal situation



### จำนวนบุคลากรที่น้อยที่สุดต่อเวร

Resident 2-3 คน/เวร

Intern 1-2 คน/เวร

Extern 1 คน/เวร

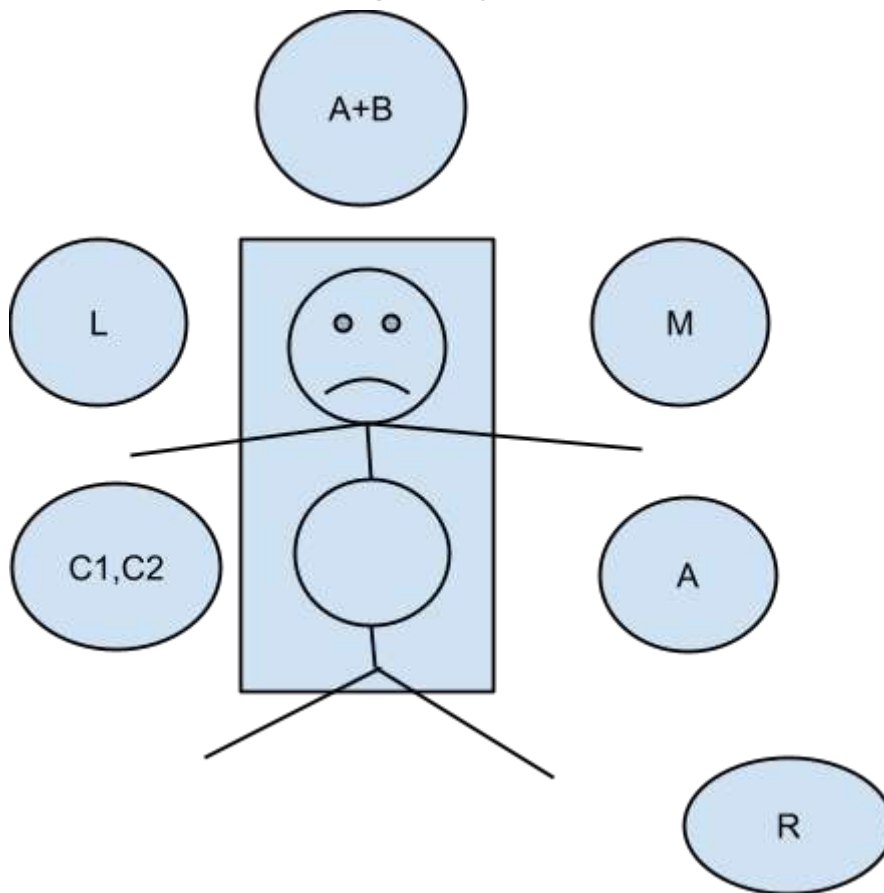
พยาบาล 4 คน/เวร

PN 1 คน/เวร

Total 10 คน/เวร



## Cardiac arrest in pregnancy



<p>ตำแหน่ง L (Doctor 1) Leader แพทย์ผู้ทำคลอดหรืออยู่ที่ห้องคลอดขณะนั้นเป็น Leader</p>	
<p>ตำแหน่ง C (2 คน) (Nurse/PN/Extern/นสพ) เป็นตำแหน่งที่ต้องมีการ เปลี่ยนทุก 2 นาที เนื่องจาก การ CPR ต่อเนื่องจะทำให้ไม่ adequate CPR ได้</p>	<ul style="list-style-type: none"> <li>● C1: เข้าทางด้านขวาของผู้ป่วย ใส่ cardiac board และเริ่มทำ Chest compression 30:2</li> <li>● C2: left lateral uterine displacement</li> </ul>
<p>ตำแหน่ง B (Nurse1)</p>	<ul style="list-style-type: none"> <li>● เตรียมจัด position, open airway, clear airway</li> <li>● Head tilt-chin lift/ Jaw thrust</li> <li>● Ambu-bag, อุปกรณ์ suction</li> <li>● Ventilate 30:2</li> </ul>
<p>ตำแหน่ง A (Nurse 2)</p>	<ul style="list-style-type: none"> <li>● เข้าทางด้านซ้ายของผู้ป่วย</li> <li>● ติด monitor เครื่อง defibrillator พร้อมแจ้งให้หยุด CPR ทันทีเมื่อติด monitor</li> </ul>

	<p>เสร็จ (at LR ไม่มีเครื่อง defibrillator ต้องทำการย้ายจาก NICU)</p> <ul style="list-style-type: none"> <li>● Leader แปลผล EKG</li> </ul>
ตำแหน่ง M (Nurse 2 + Nurse 3)	<ul style="list-style-type: none"> <li>● เปิดเส้นเลือดดำ (IV above diaphragm) เตรียมให้สารน้ำ</li> <li>● เจาะเลือดตามแผนการรักษา</li> <li>● เตรียมยาและผสมยาตามแผนการรักษาของแพทย์</li> <li>● ติด fetal monitor</li> <li>● เตรียม scarpel</li> </ul>
ตำแหน่ง R (Nurse 4)	<ul style="list-style-type: none"> <li>● จับเวลาและขานเวลาทุก 2 นาที</li> <li>● ประเมินการเปลี่ยนแปลงของผู้ป่วยเป็นระยะ บันทึกสัญญาณชีพ</li> <li>● บันทึกการรักษาพยาบาลในแบบบันทึกข้อมูลผู้ป่วยหัวใจหยุดเต้น (cardiac arrest)</li> </ul>
Intern 1	<ul style="list-style-type: none"> <li>● Notify resident 2,3</li> <li>● Notify PED (GA, EFW)</li> <li>● Consult MED emergency</li> <li>● Notify Anes</li> </ul>

If resident 2 visit case	<ul style="list-style-type: none"> <li>● แพทย์เตรียมใส่ ETT</li> <li>● พยาบาลเตรียมอุปกรณ์สำหรับ ETT</li> </ul>
--------------------------	---

If resident 3 visit case	<ul style="list-style-type: none"> <li>● Notify staff</li> <li>● Perimortem cesarean delivery if no ROSC in 5 minutes (ACLS), 4 minutes (ACOG)</li> </ul>
--------------------------	---

- คุยญาติ
- จอง ICU
- เตรียม ETT
- เตรียม CS
- scarpel

