European Society of
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XXIX CONGRESSO NAZIONALE

ESRA Italian Chapter

CESENA, Cesena fiere

7-9 Novembre 2024

Presidente del congresso
Vanni Agnoletti
Domenico Pietro Santonastaso
Andrea Tognù

MZ EVENTS

European Society of Regional Anaesthesia & Pain Therapy
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ARRESTO CARDIACO IN GRAVIDANZA

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ARRESTO CARDIACO IN GRAVIDANZA

La morte materna è considerato un evento sentinella

che rispecchia efficacia ed appropriatezza

dell'assistenza al percorso nascita ed alle cure

perinatali di un Sistema Sanitario

ItOSS
Italian Obstetric Surveillance System

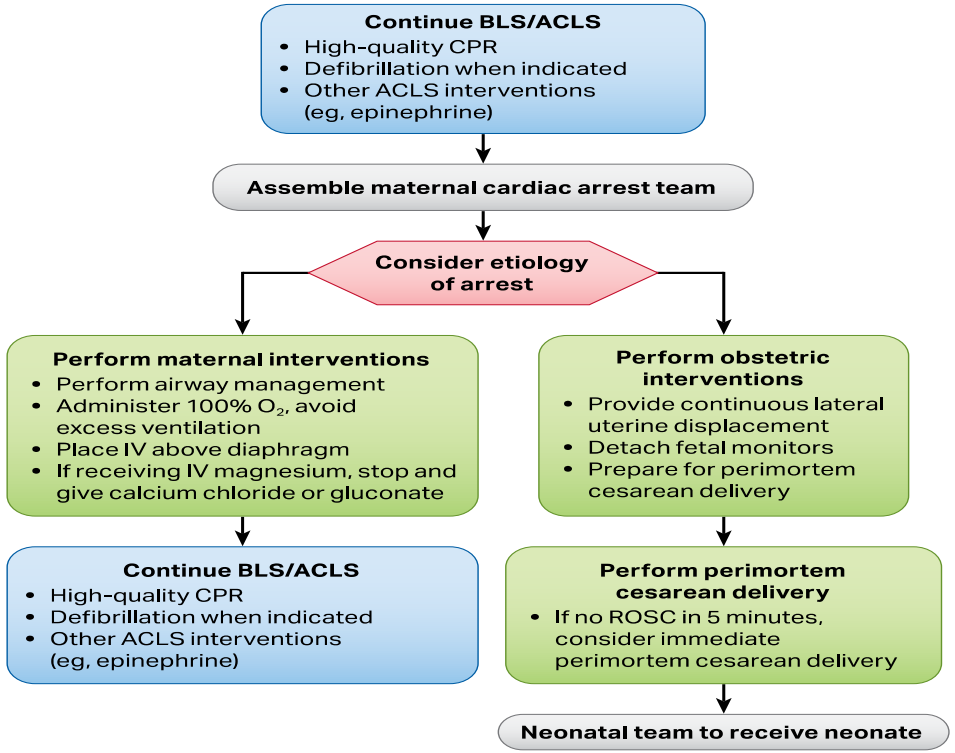
Istituto Superiore di Sanità

Primo Rapporto ItOSS.

Sorveglianza della mortalità materna 2019.

Primo Rapporto ItOSS
Sorveglianza della Mortalità Materna

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.

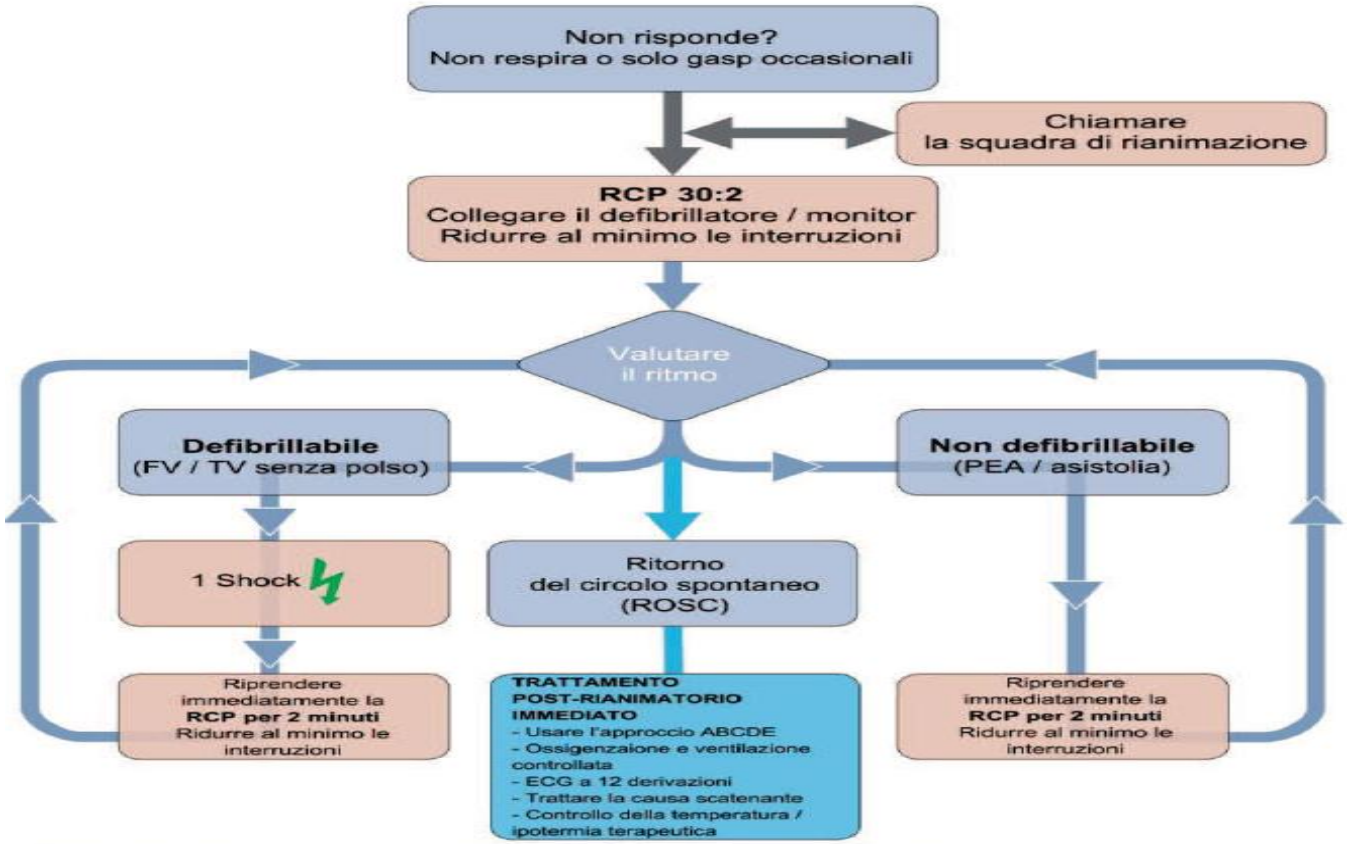
Advanced Airway

- 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

Advanced Life Support



DURANTE LA RCP
- Garantire RCP di alta qualità: frequanza, profondità, rilascio completo del torace
- Pianificare le azioni prima di interrompere la RCP
- Somministrare ossigeno
- Considerare gestione avanzata delle vie aeree e capnografia
- Compressioni continue del torace se si sta ventilando attraverso vie aeree avanzate
- Accesso vascolare (via endovenosa, intraossea)
- Somministrare adrenalina ogni 3-5 minuti
- Correggere le cause reversibili

CAUSE REVERSIBILI
- Ipossia
- Ipovolemia
- Ipo - / iperkalemia / metaboliche
- Ipotermia
- Trombosi - coronarica o polmonare
- Tamponamento cardiaco
- Tossici
- PneumoTorace iperTeso

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Resuscitation Council UK
MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

Obstetric Cardiac Arrest

Alterations in maternal physiology and exacerbations of pregnancy related pathologies must be considered. Priorities include calling the appropriate team members, relieving aortocaval compression, effective cardiopulmonary resuscitation (CPR), consideration of causes and performing a timely emergency hysterotomy (perimortem caesarean section) when [illegible]

START

- ☐ **Confirm cardiac arrest** and **call for help. Declare 'Obstetric cardiac arrest'**
  - Team for mother and team for neonate if > [illegible]
- ☐ **Lie flat, apply manual uterine displacement to the left**
  - Or left lateral tilt (from head to toe at an angle of 15–[illegible] on a firm surface)
- ☐ **Commence CPR** and request **cardiac arrest trolley**
  - Standard CPR ratios and hand position apply
  - **Evaluate potential causes (Box A)**
- ☐ **Identify team leader, allocate roles including scribe**
  - Note time
- ☐ **Apply defibrillation pads and check cardiac rhythm** (defibrillation is safe in [illegible]
  - if VF / pulseless VT ➔ defibrillation and first adrenaline and amiodarone after 3rd [illegible]
  - If PEA / asystole ➔ resume CPR and give first adrenaline immediately
  - [illegible]
  - Repeat adrenaline every 3-5 minutes
- ☐ **Maintain airway and ventilation**
  - [illegible] valve-[illegible] device
  - Insert supraglottic airway with drain port *–or–* tracheal tube if trained to do so (intubation may be difficult, and airway pressures may be higher)
  - Apply waveform capnography monitoring to airway
  - If expired CO_2 is absent, presume oesophageal intubation until absolutely excluded
- ☐ **Circulation**
  - I.V. access above the diaphragm, if fails or impossible use upper limb intraosseous (IO)
  - See **Box B** for reminders about drugs
  - Consider extracorporeal CPR (ECPR) if available
- ☐ **Emergency hysterotomy (perimortem caesarean section)**
  - Perform if [illegible]
  - Perform immediately if maternal fatal injuries or prolonged pre-hospital arrest
  - Perform by 5 minutes if no return of spontaneous circulation
- ☐ **Post resuscitation from haemorrhage - activate Massive Haemorrhage Protocol**
  Consider uterotonic drugs, fibrinogen and tranexamic acid
  Uterine tamponage / sutures, aortic compression, hysterectomy

Version 1.1

Box A: POTENTIAL CAUSES ***4H's and 4T's*** **(specific to obstetrics)**	
Hypoxia	Respiratory – Pulmonary embolus (PE), Failed intubation, aspiration Heart failure Anaphylaxis Eclampsia / PET – pulmonary oedema, seizure
Hypovolaemia	Haemorrhage – obstetric (remember concealed), abnormal placentation, uterine rupture, atony, splenic artery/hepatic rupture, aneurysm rupture Cardiac – arrhythmia, myocardial infarction (MI) Distributive – [illegible] anaphylaxis
[illegible]	Also consider blood sugar, sodium, calcium and magnesium levels
Hypothermia	
Tamponade	Aortic dissection, peripartum cardiomyopathy, trauma
Thrombosis	Amniotic fluid embolus, PE, MI, air embolism
Toxins	Local anaesthetic, magnesium, illicit drugs
Tension pneumothorax	Entonox in pre-existing pneumothorax, trauma

Box B: IV DRUGS FOR USE DURING CARDIAC ARREST	
Fluids	**500 mL IV** crystalloid bolus
Adrenaline	**1 mg IV** every 3-5 minutes in non-[illegible] after 3rd [illegible]
Amiodarone	**300 mg IV** after 3rd [illegible]
Atropine	**0.5-1 mg IV** up to 3 [illegible]
Calcium chloride	**10% 10 mL** IV for Mg overdose, low calcium or [illegible]
Magnesium	**2 g IV** for polymorphic VT / hypomagnesaemia, **4 g IV** for eclampsia
Thrombolysis/PCI	For suspected massive pulmonary embolus / MI
Tranexamic acid	**1 g** if haemorrhage
Intralipid	**1.5 mL kg^{-1} IV** bolus and **15 mL kg^{-1} hr^{-1} IV** infusion

Obstetric Anaesthetists' Association
Promoting the highest standards of anaesthetic practice in the care of mother and baby
GUIDELINES 2021

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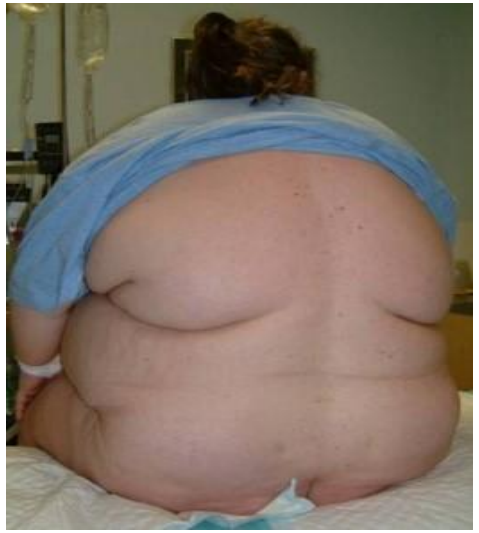
FATTORI DI RISCHIO:

- Età
- Obesità
- Etnia
- Classe sociale



CAUSE:

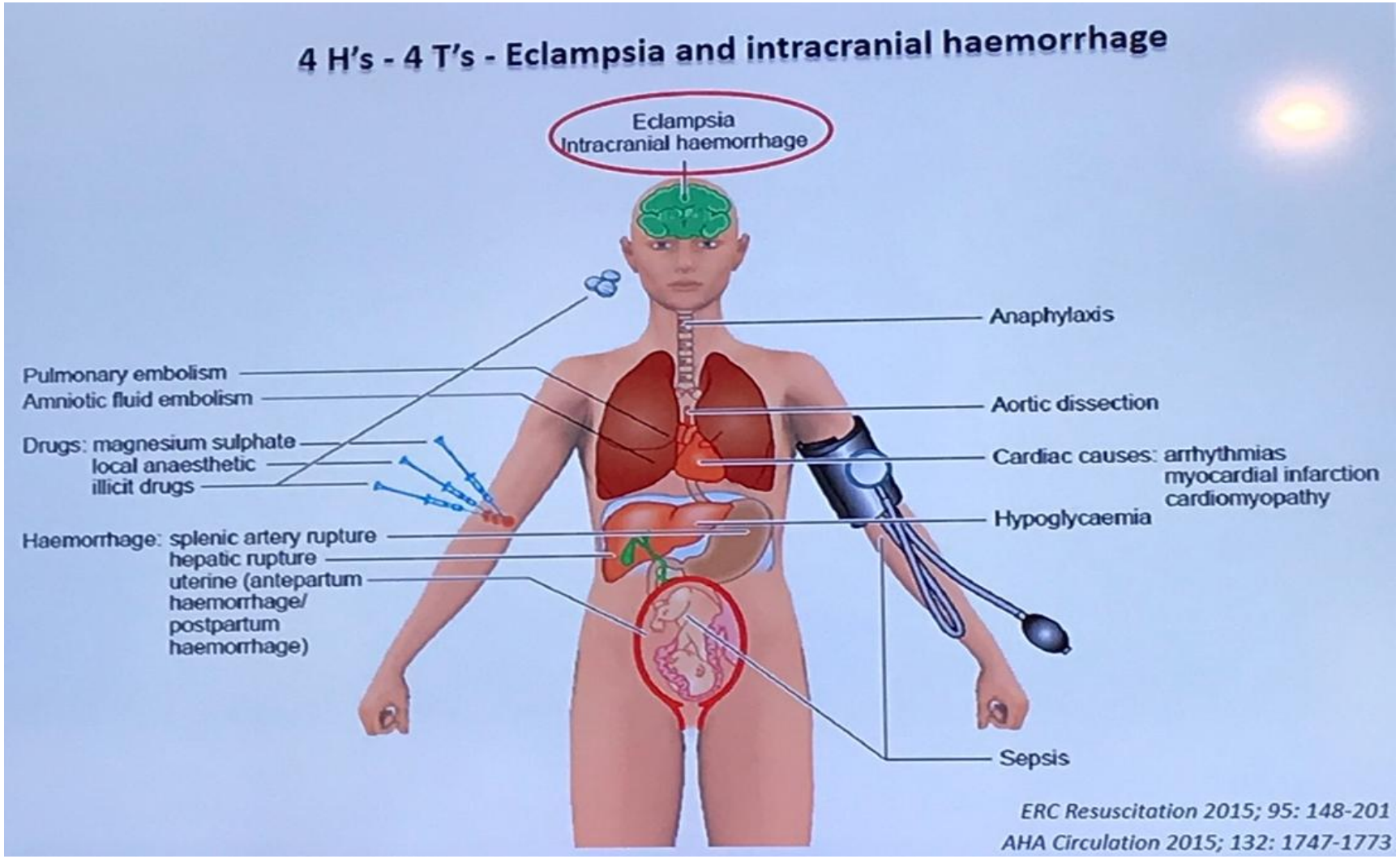
TABLE
Etiologies for cardiac arrest during pregnancy (adapted from American Heart Association)[9]

Anesthetic causes	High spinal or epidural
	Intravascular injection of local anesthetic
	Airway complications
	Aspiration
Accidents	Trauma
Bleeding	Uterine atony
	Abnormally adherent placentation
	Coagulopathy
Cardiovascular	Valvular disease
	Congenital cardiac disease
	Ischemia and atherosclerosis
	Arrhythmias
	Rupture of dissection
Drugs	Tocolytic agents
	Illicit drugs leading to overdose
	Anaphylaxis
	Uterotonics
	Magnesium
Embolism	Venous embolism
	Amniotic fluid embolism
Fever	Sepsis
	Necrotizing fasciitis
	Viral syndromes
	Acute respiratory distress syndrome
General	Metabolic abnormalities
	Hypocalcemia or hyperkalemia during massive hemorrhage
Hypertension	Stroke (thrombotic or hemorrhagic)
	Preeclampsia/eclampsia/HELLP

CAUSE REVERSIBILI DI ARRESTO CARDIACO

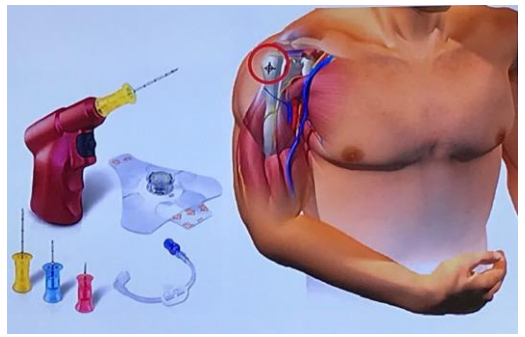
CERCA E TRATTA I POTENZIALI FATTORI CONTRIBUENTI
Bleeding/DIC
Embolism: coronary/pulmonary/amniotic fluid embolism
Anesthetic complications
Uterine atony
Cardiac disease (MI, ischemia/aortic dissection(cardiomiopathy)
Hypertension/preeclampsia/eclampsia
Other: differential diagnosis of standard ACLS guidelines
Placenta abrupto/previa
Sepsis

LE 4 (5) I E LE 4T NELLA PAZIENTE GRAVIDA



PECULIARITA' NELLA RIANIMAZIONE DELLA PAZIENTE GRAVIDA

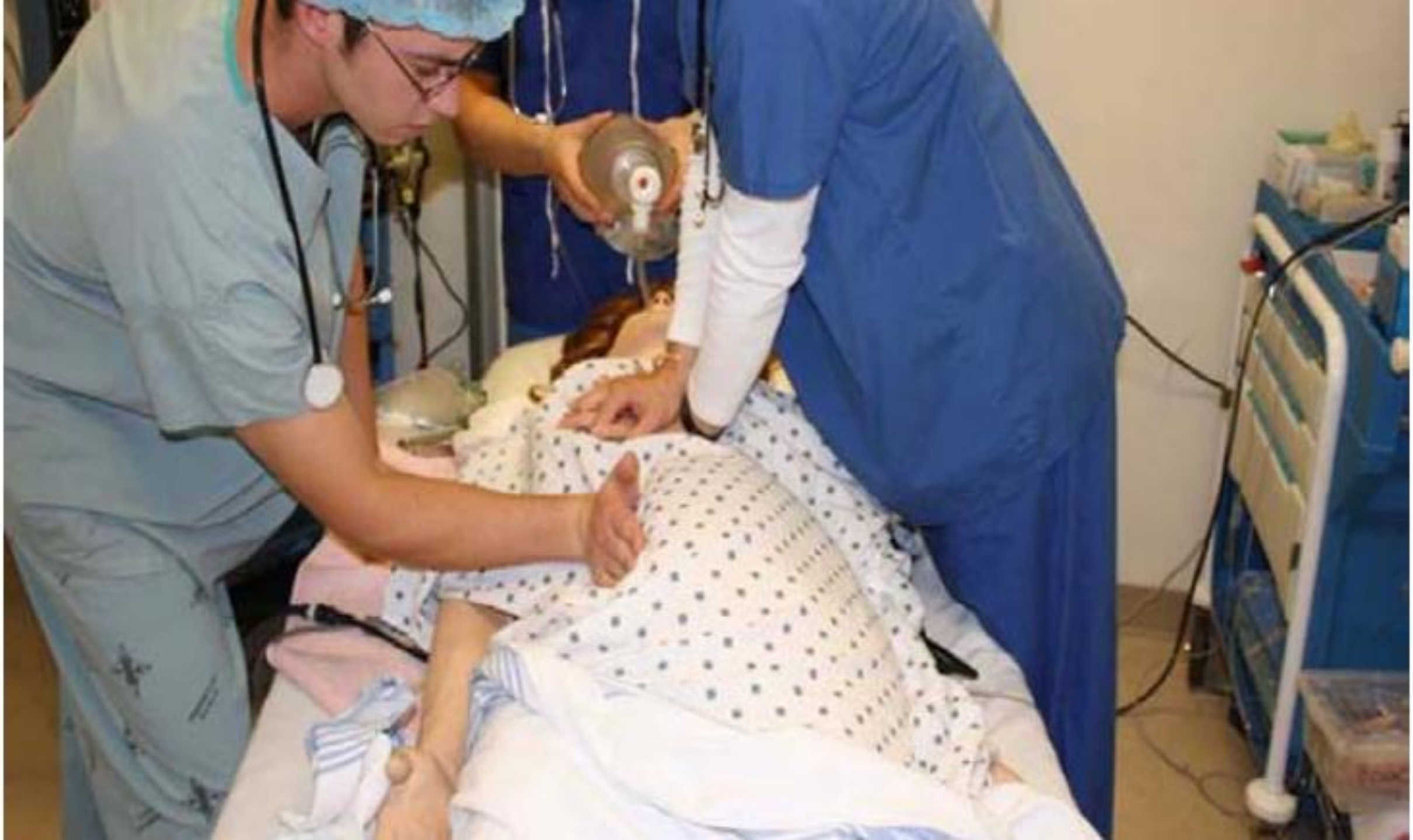
- Dislocamento dell'utero a sinistra;
- Le vie aeree della paziente gravida sono "difficili per definizione" per aumentato rischio di sanguinamento ed edema; considerare gestione avanzata precoce;
- Le CTE (compressioni toraciche esterne), in rapporto 30:2, 5 cm di profondità con rivalutazione ogni 2' o asincone se IOT, devono essere eseguite al centro dello sterno (non nel terzo inferiore) a causa della prominenza mammaria e della risalita del diaframma;
- Le energie di defibrillazione sono le medesime: 200 J la prima scarica e 360 J dalla seconda in poi; per il posizionamento delle gel-pad è da preferire la posizione antero-posteriore;
- RCP di alta qualità, minimizzare le interruzioni!
- Considerare accesso IO (intraosseo) in sede omerale sin;
- Fattore tempo; considerare Lucas (massaggiatore esterno).



Call for help **Start CPR**	☐ Call maternal code blue (Time: _____) ☐ Backboard (Time: _____) ☐ IMMEDIATE BLS ☐ AED/defibrillator ☐ Maternal airway equipment ☐ Scalpel/cesarean pack ☐ Assign timer/documenter ☐ Document time of cardiac arrest (Time: _____) ☐ Assign cognitive aid reader/recorder
C Circulation Chest Compressions	☐ Left uterine displacement (manual) (Time: _____) ☐ Hands midsternum ☐ 100 compressions/min (Time: _____) ☐ PUSH HARD, PUSH FAST ☐ Change compressors every 2 minutes ☐ Obtain IV access above diaphragm (Time: _____)
A Airway	☐ Minimize interruptions in chest compressions ☐ Chin lift/jaw thrust if not trauma victim ☐ 100% O_2 at ≥15 L/min (Time: _____) ☐ Use self-inflating bag-mask ☐ Oral airway or ☐ Experienced personnel: intubation with 6.0- to 7.0-mm inner diameter ETT or (Time: _____) ☐ Supraglottic airway (eg, laryngeal mask airway with gastric port) (Time: _____)
B Breathing	☐ If not intubated: 30 compressions to 2 breaths ☐ If intubated: 8–10 breaths/min ☐ Administer each breath over 1 second
D Defibrillate	☐ Pads front and side ☐ AED: analyze/defibrillate every 2 minutes (Time: _____) ☐ Immediately resume CPR for 2 minutes ☐ Prepare for delivery
E Extract Fetus	☐ PMCD started (Time: _____) and ☐ Fetus delivered (Time: _____)

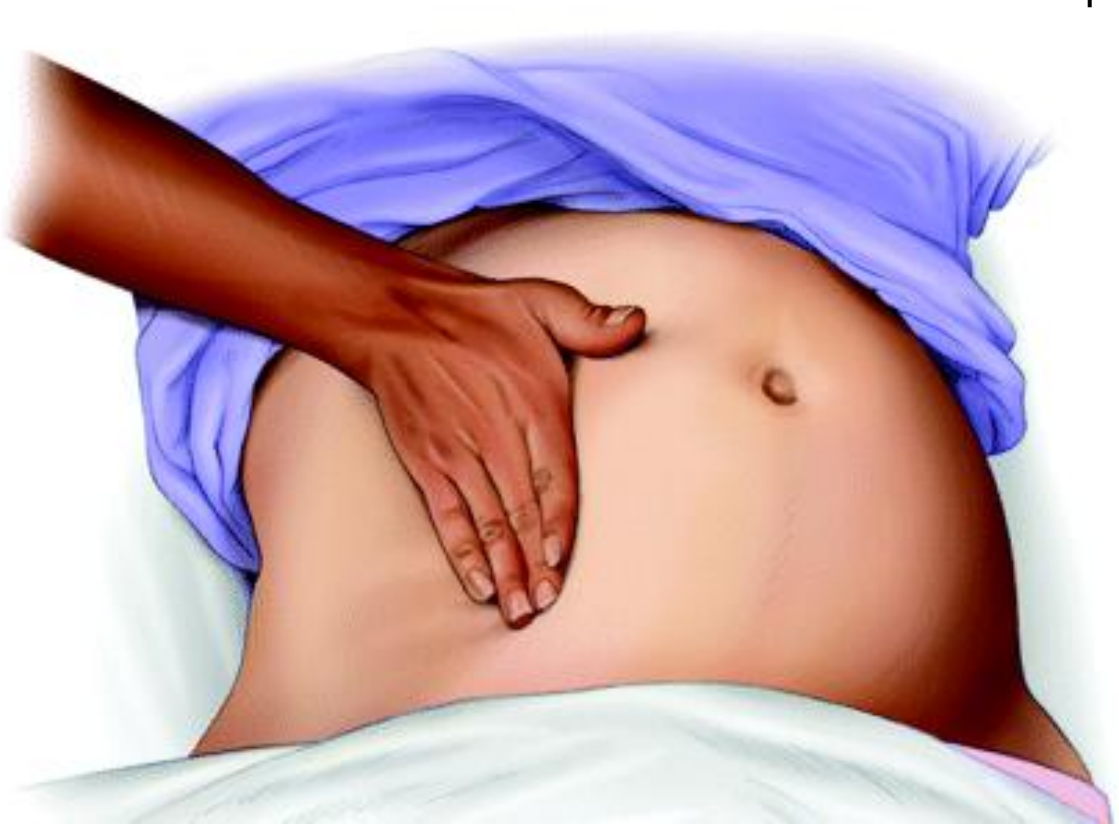
Check-list CPR

- Cognitive aid checklist for cardiac arrest in pregnancy. AED indicates automated external defibrillator; BLS, basic life support; CPR, cardiopulmonary resuscitation; ETT, endotracheal tube; IV, intravenous; and PMCD, perimortem cesarean delivery.
- Modified with permission from Lipman et al.103a Copyright © 2014, International Anesthesia Research Society.



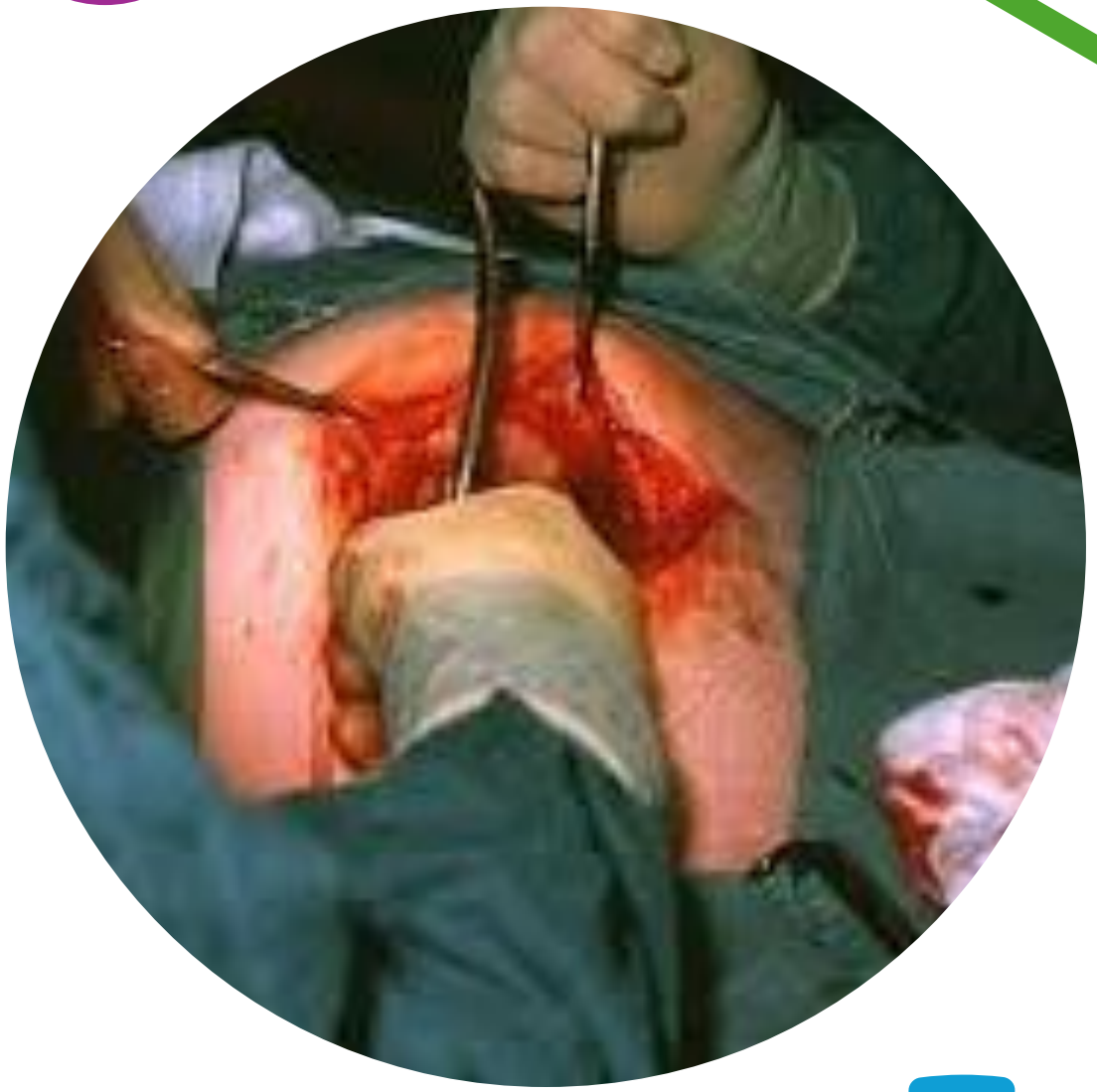
DISLOCAMENTO MANUALE O BIMANUALE DELL'UTERO A SINISTRA

POSIZIONARE UN CUNEO DI CARDIFF O DISLOCARE MANUALMENTE L'UTERO A SINISTRA per evitare la compressione della vena cava



Manual LUD, performed with one-handed technique.

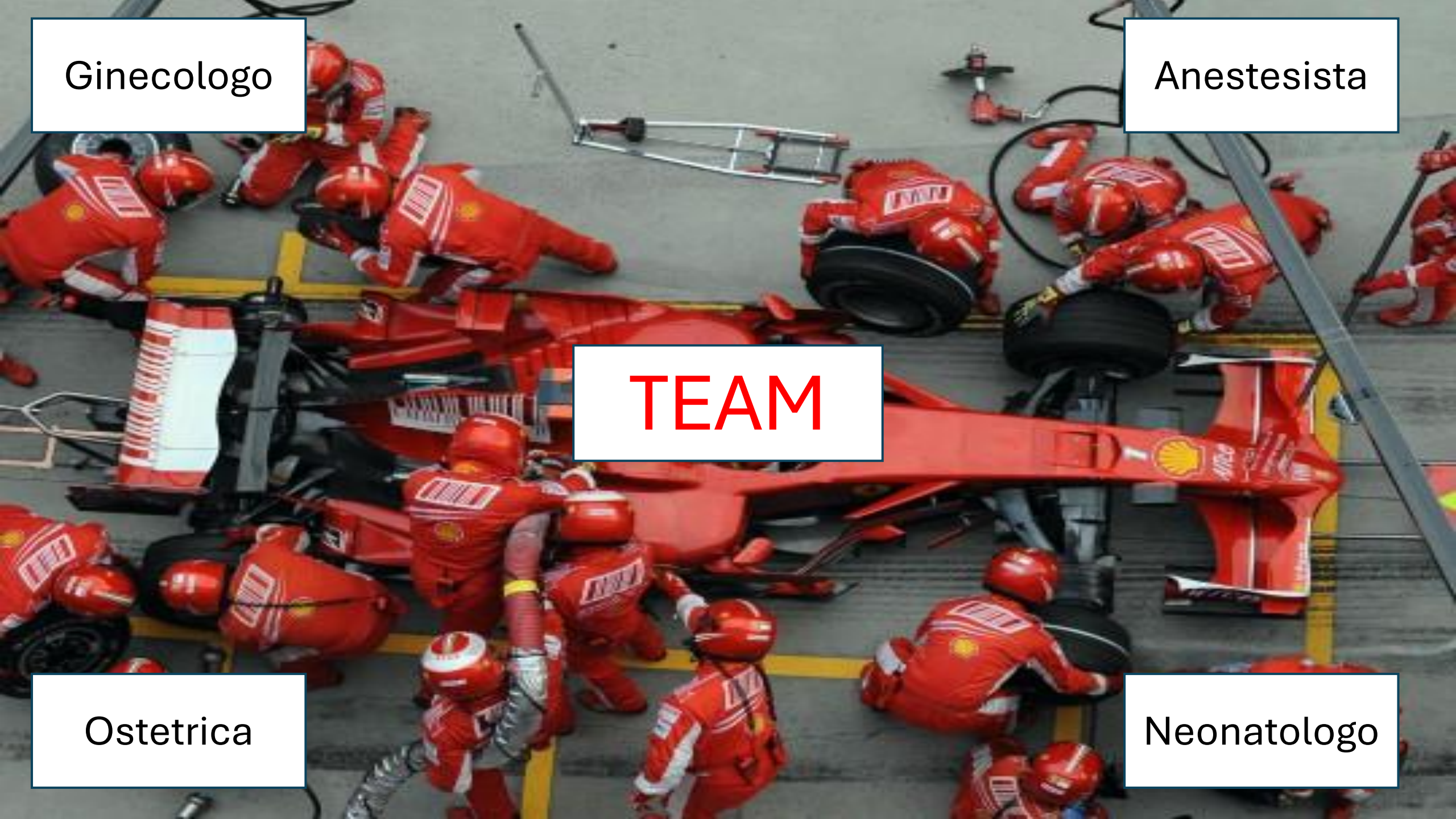
Two-handed technique during resuscitation.



INDICAZIONI AL TC PERIMORTEM: entro 5’ dalla diagnosi di ACR!

LAVORARE IN URGENZA

- **CHIAMARE AIUTO!!!**
- Sicurezza e DPI (dispositivi di protezione individuale);
- Anticipazione e preparazione materiali (conoscere carrello urgenze);
- Suddivisione compiti e monitoraggio tempi;
- Team work (team leader e team members);
- Comunicazione e ”chiusura del cerchio”;
- Feedback a risoluzione evento;
- Fattore umano e comunicazione notizie.


Ginecologo
Anestesista
TEAM
Ostetrica
Neonatologo

A team is not a group of people
who work together.

A team is a group of people
who trust each other.

GRAZIE PER L'ATTENZIONE!!!