



ECOCARDIOCHIRURGIA®  
ECO-RM-TC CHIRURGIA-INTERVENTISTICA

ZIONALE VIII CONGRESSO NAZIONALE VIII CONGRESSO NAZIONALE VIII CONGRESSO NAZIONALE V  
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# GESTIONE DEL PAZIENTE IN PERIARRESTO (dalla diagnosi al trattamento)

*Dr. Laura Ferrari*  
*ASST Lariana Como*

**DIRETTORI**  
ANTONIO MANTERO  
GIUSEPPE TARELLI

ro Congressi  
zzo delle Stelline  
o Magenta, 61  
23 Milano

**Peri-arrest period n.** the recognized period, either just before or just after a full cardiac arrest, when the patient's condition is very unstable and care must be taken to prevent progression or regression into a full cardiac arrest



# A kindly midsummer night

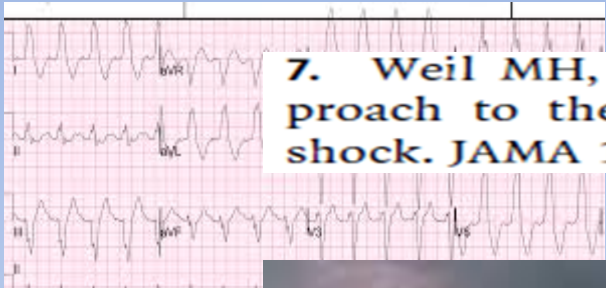
Nicola 65 A A ADD  
apparente

- PA 70/40
- FC 130
- Spo2 no
- Pallido, s  
diffusa a  
gasping

Francesca 60 A A cardiopatia  
FE conservata



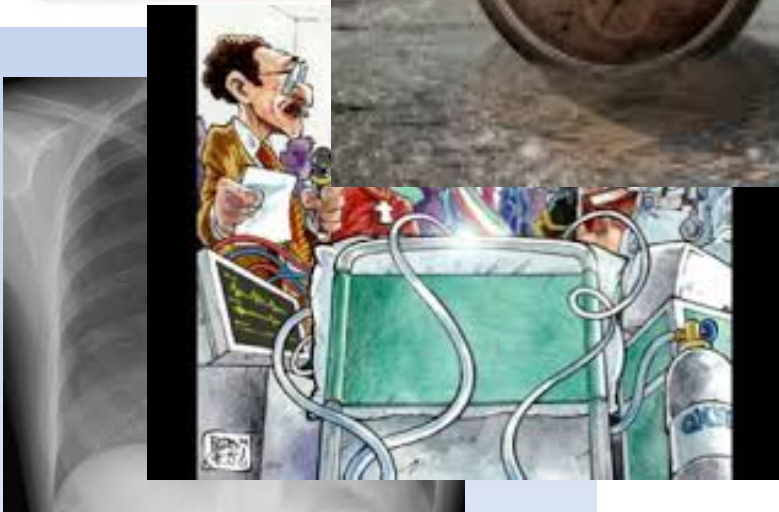
evabile  
samente  
llo stimolo  
ata, turgore  
aterale



7. Weil MH, Shubin H. The "VIP" approach to the bedside management of shock. JAMA 1969;207:337-40.

Tipo di campione	Arterioso	
T	37,0 °C	
FO <sub>2</sub> (l)	21,0 %	
Valori gas ematici		
pH	7,211	[ 7,360 - 7,440 ]
pO <sub>2</sub>	78,0 mmHg	[ 32,0 - 48,0 ]
pCO <sub>2</sub>	30,5 mmHg	[ 83,0 - 108 ]
HCO <sub>3</sub> <sup>-</sup>	12,0 g/dL	[ - - ]
sO <sub>2</sub>	43,1 %	[ - - ]
FO <sub>2</sub> Hb		[ - - ]
FCOHb		[ - - ]

The NEW ENGLAND  
 Circulation  
 Jean-Louis Vincent, M.D., Ph.D.



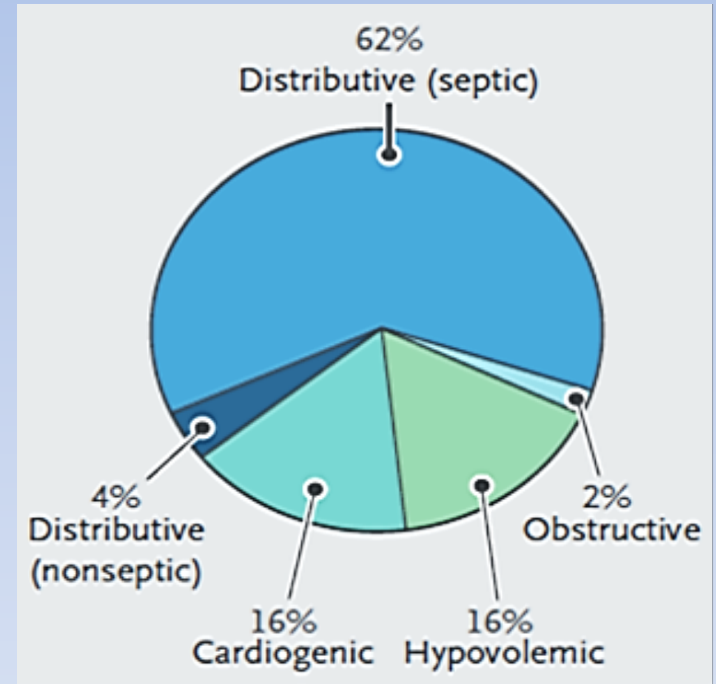
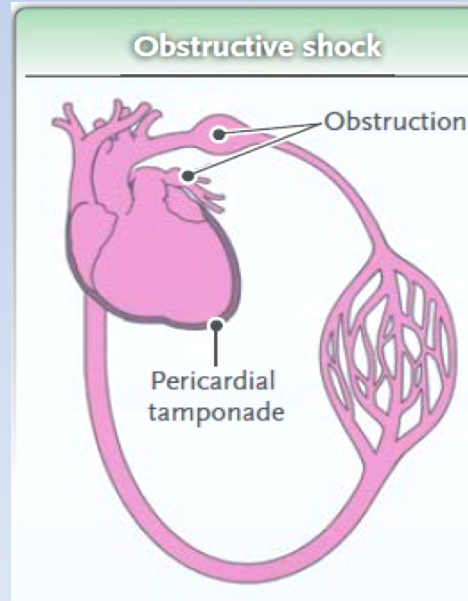
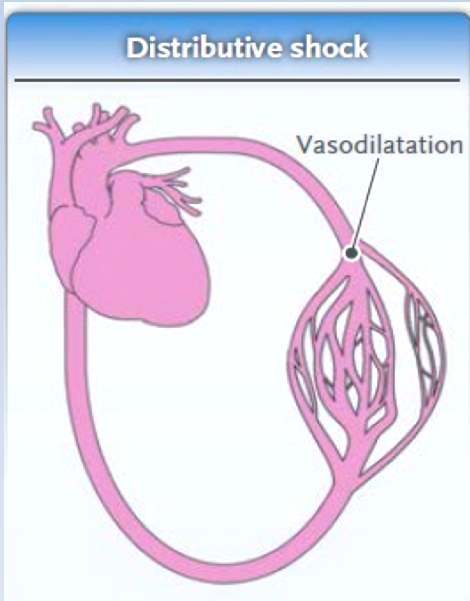
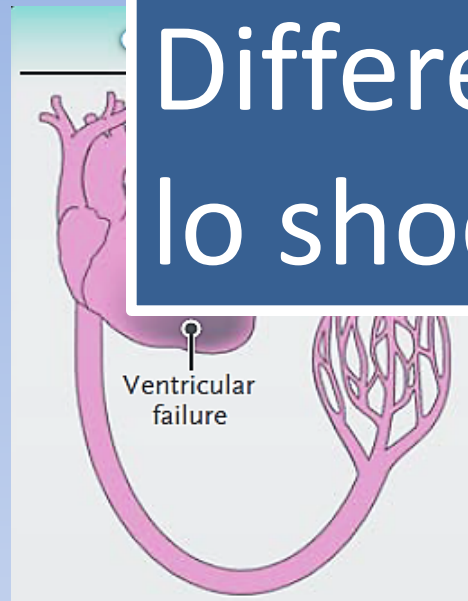
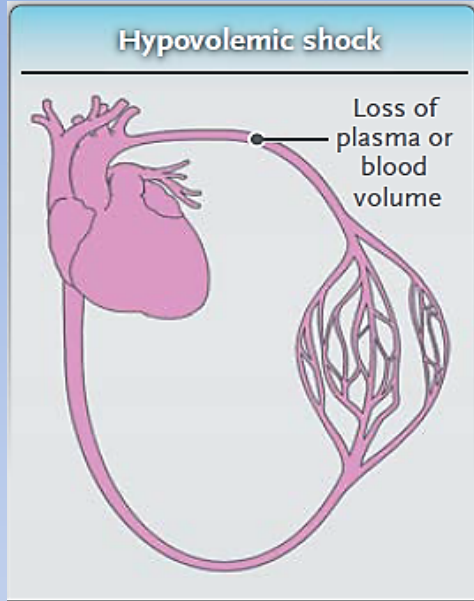
## Part 7: Adult Advanced Cardiovascular Life Support American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

S. Link, Chair; Lauren C. Berkow; Peter J. Kudenchuk; Henry R. Halperin; Erik P. Hess;  
 Ankur K. Moitra; Robert W. Neumar; Brian J. O'Neil; James H. Paxton; Scott M. Silvers;  
 Roger D. White; Demetris Yannopoulos; Michael W. Donnino

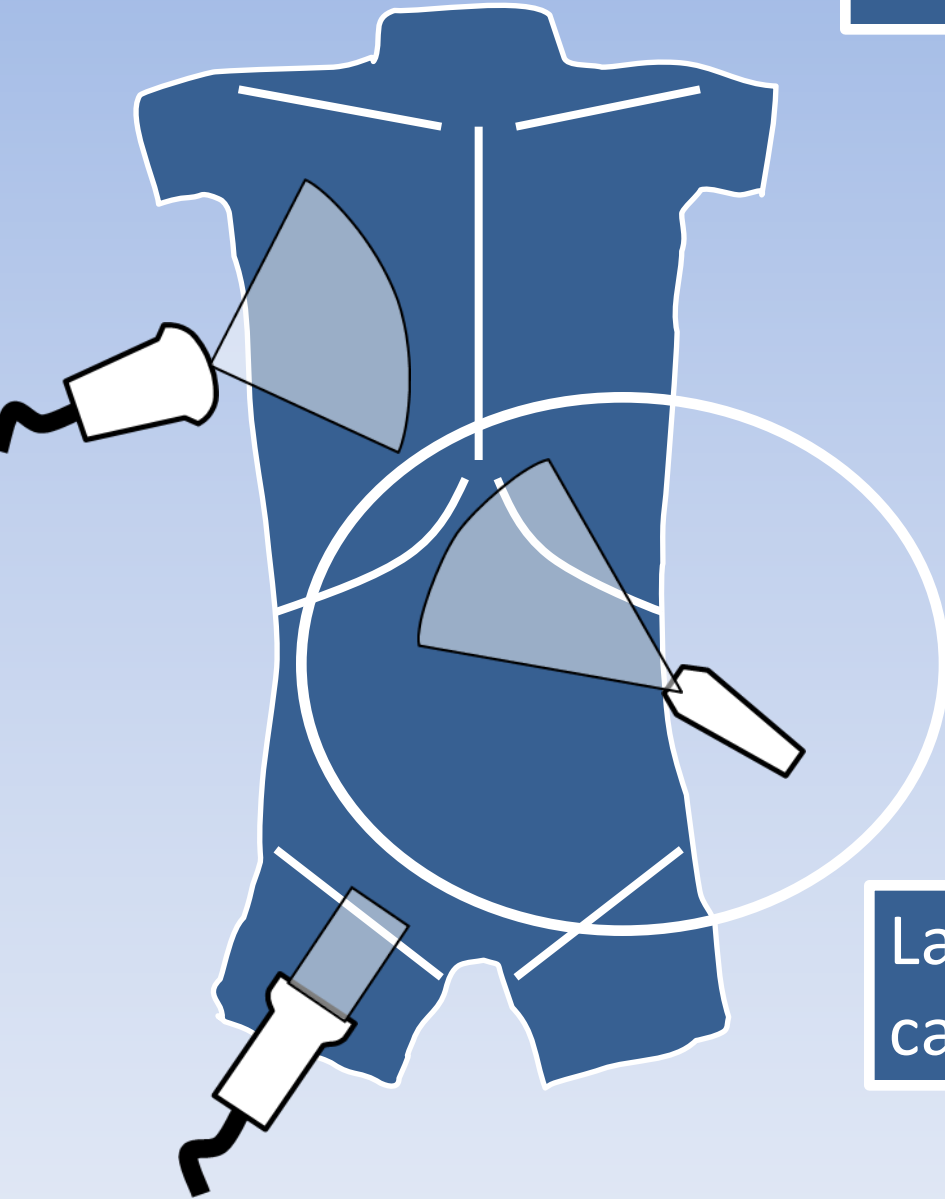




# Differenziare lo shock

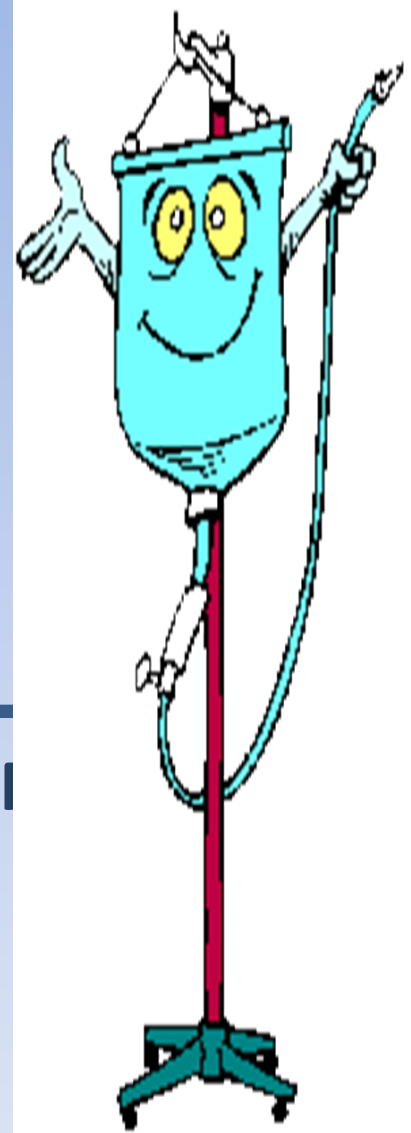
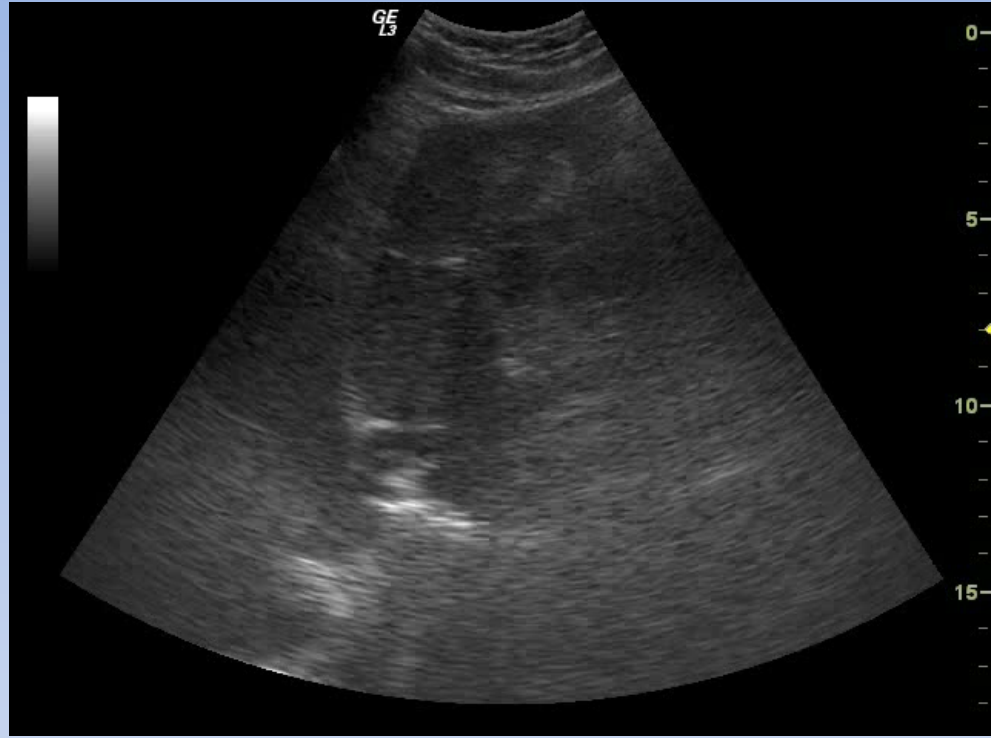


# Ecografia Bedside



- Disponibile 24h/24
- Bedside
- Multiarea orientata problemi
- Risponde a domande semplici dicotomiche
- Conduce a decisioni immediate

La rivincita della 4 camere sottocostale



## SHOCK DISTRIBUTIVO 66%

- Settico 62%
- Non settico 4%  
(anafilattico, neurogeno)

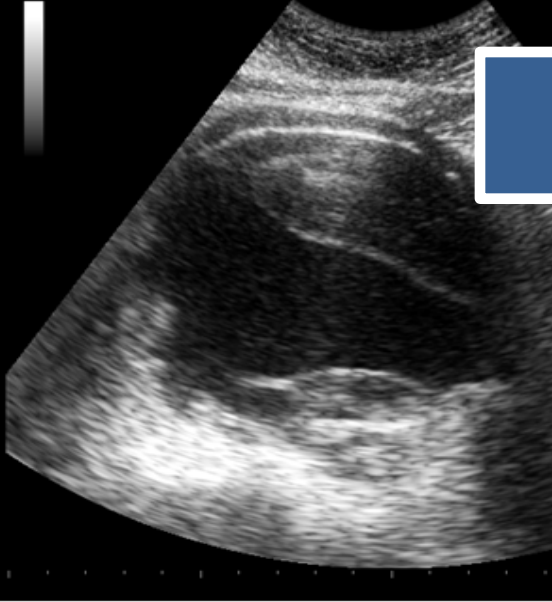
## SHOCK IPOVOLEMICO

- Emorragico
- Non emorragico

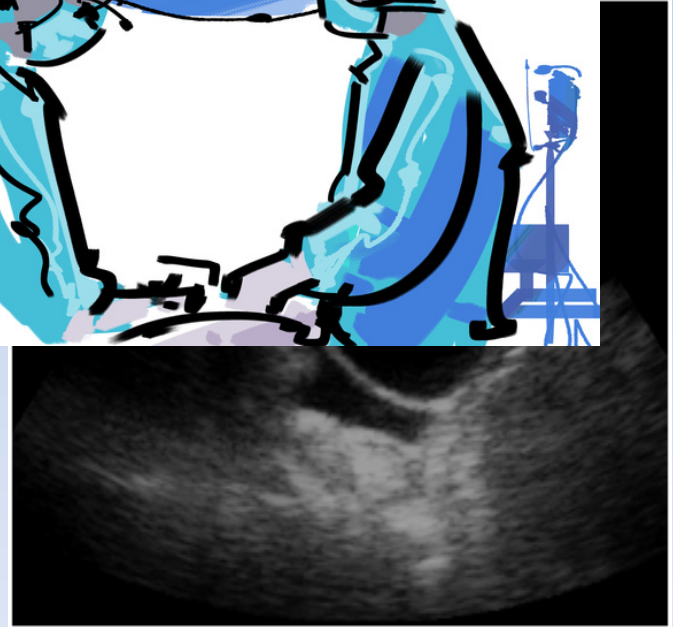
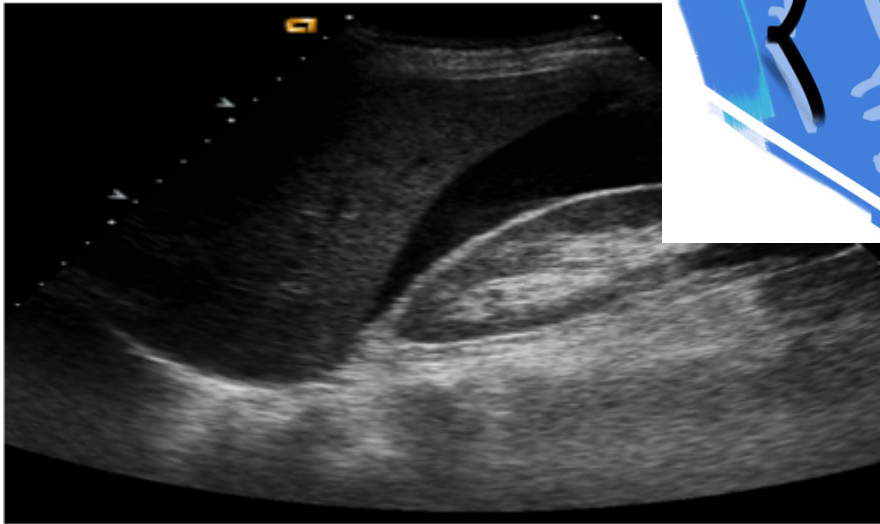
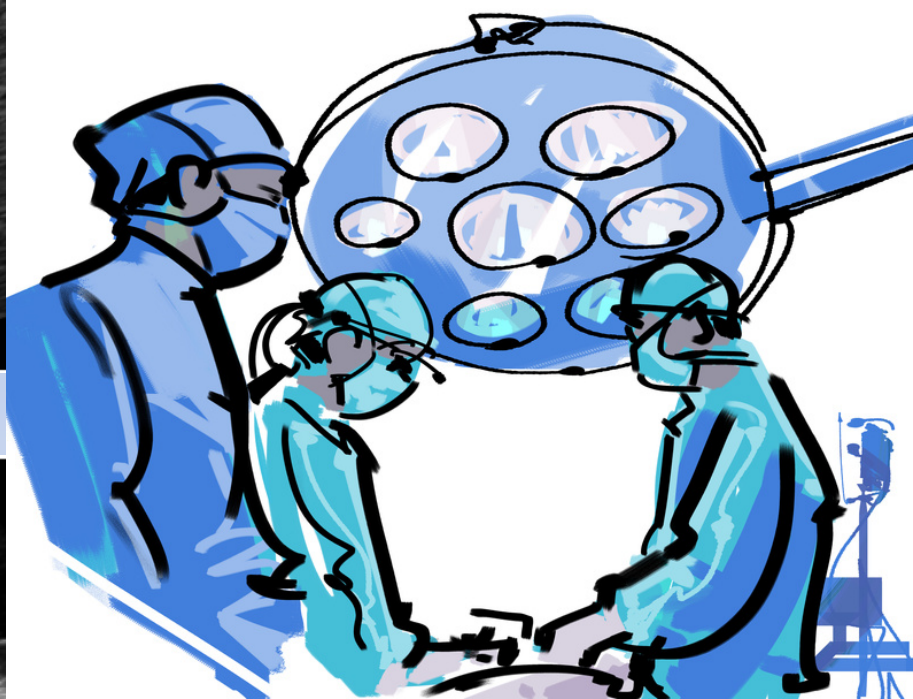


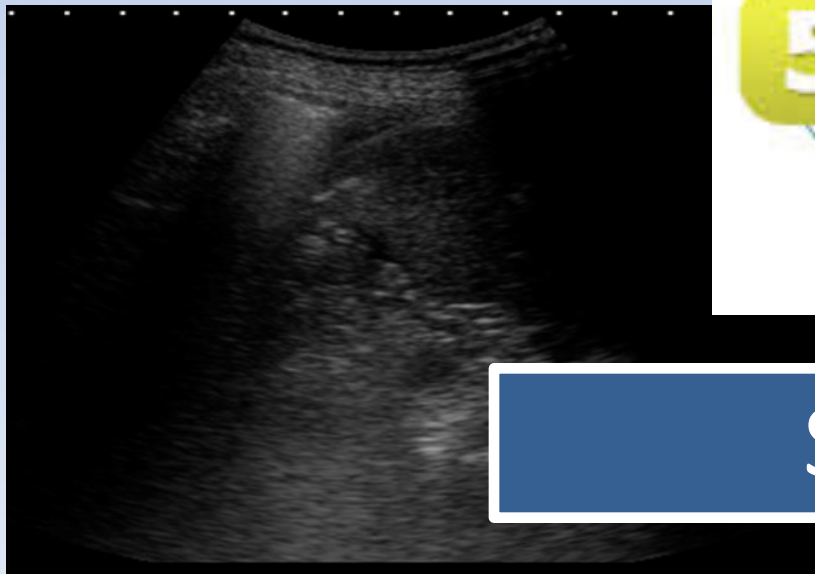
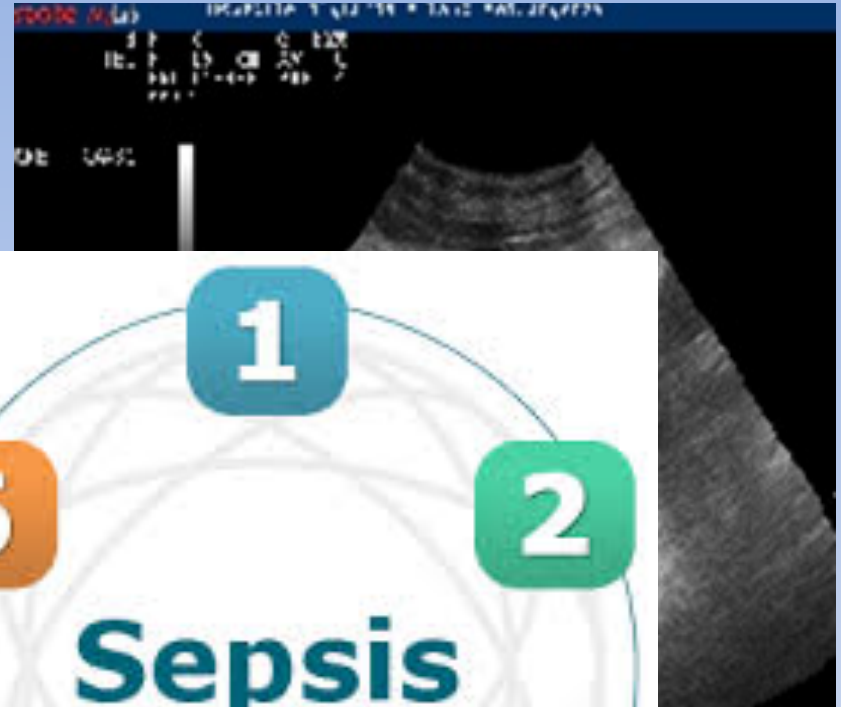
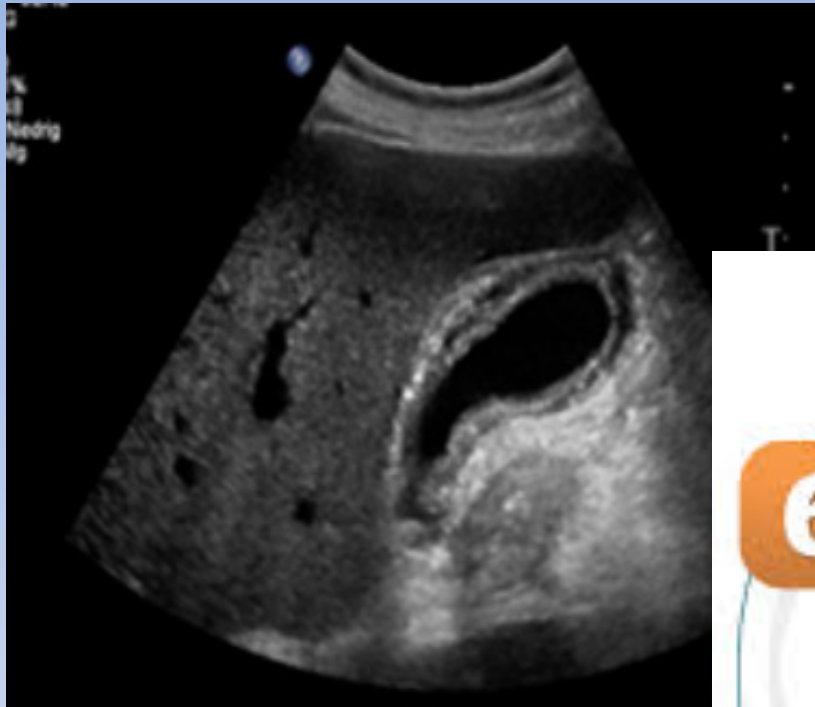


CA431



# Shock emorragico





Shock settico

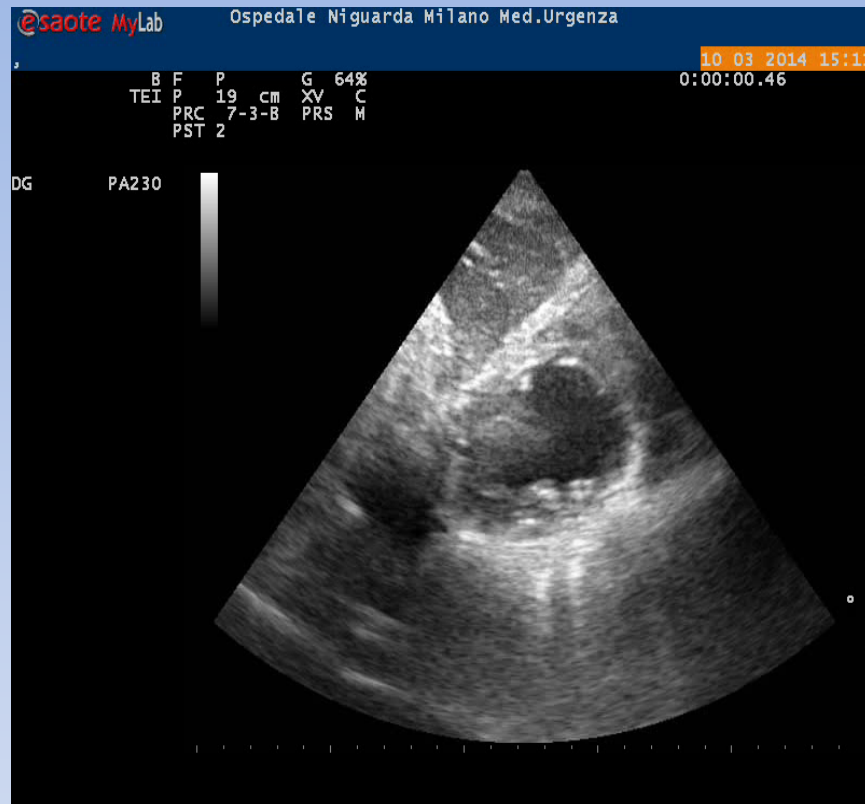
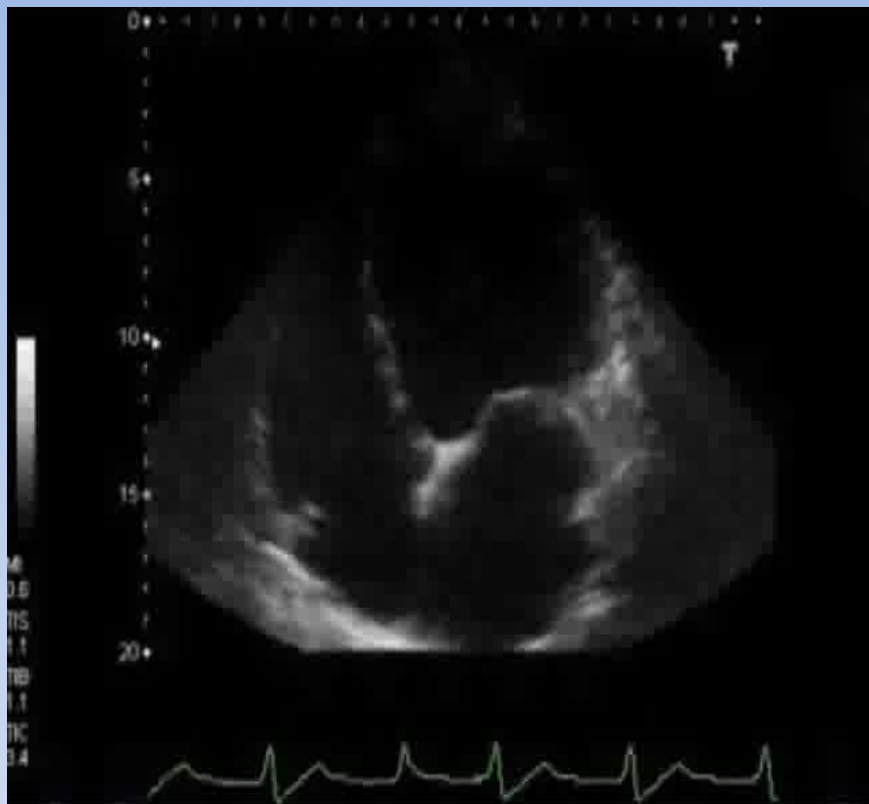


## **SHOCK CARDIOGENO 16%**

- Trombosi coronarica
- Cardiomiopatie terminali
- Miocardiodepressione settica

## **SHOCK OSTRUTTIVO 2%**

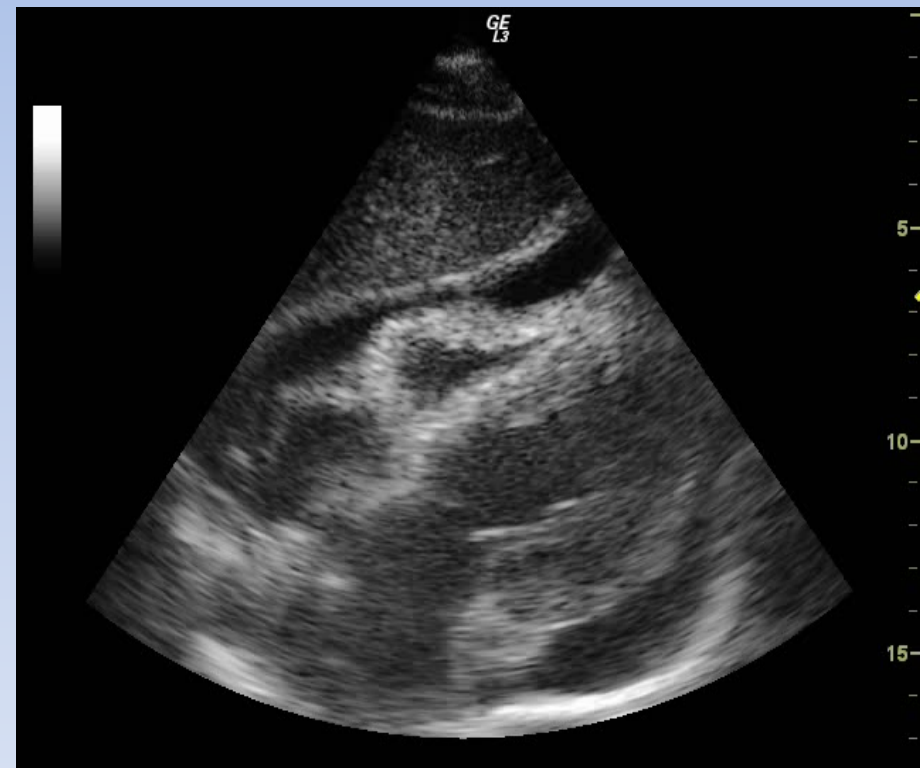
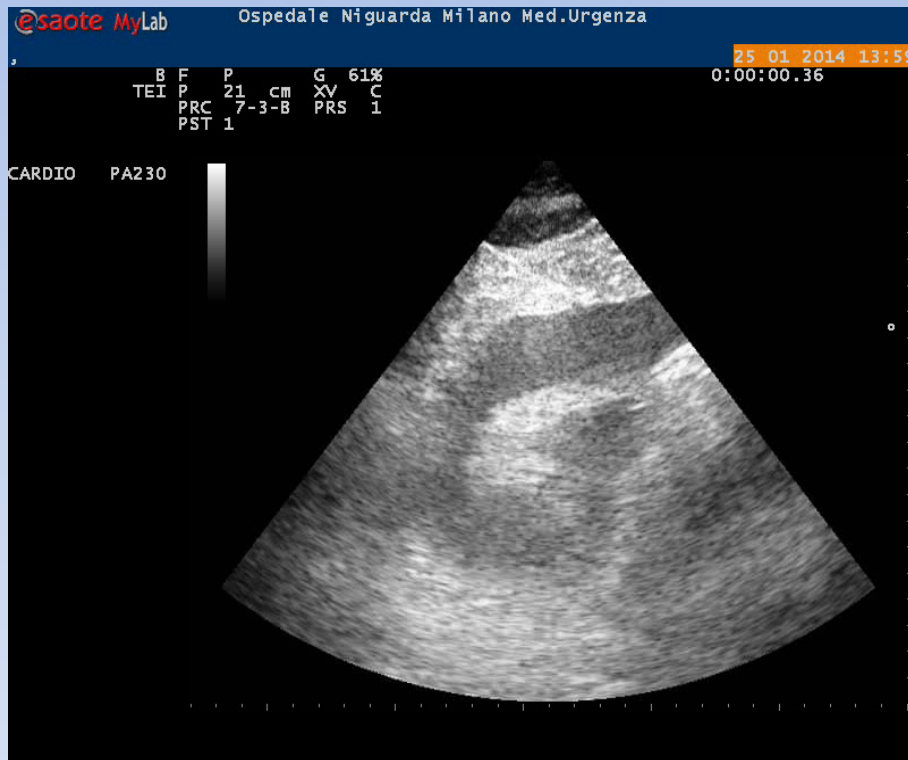
- Tromboembolia polmonare
- Tamponamento pericardico
- Pneumotorace iperteso

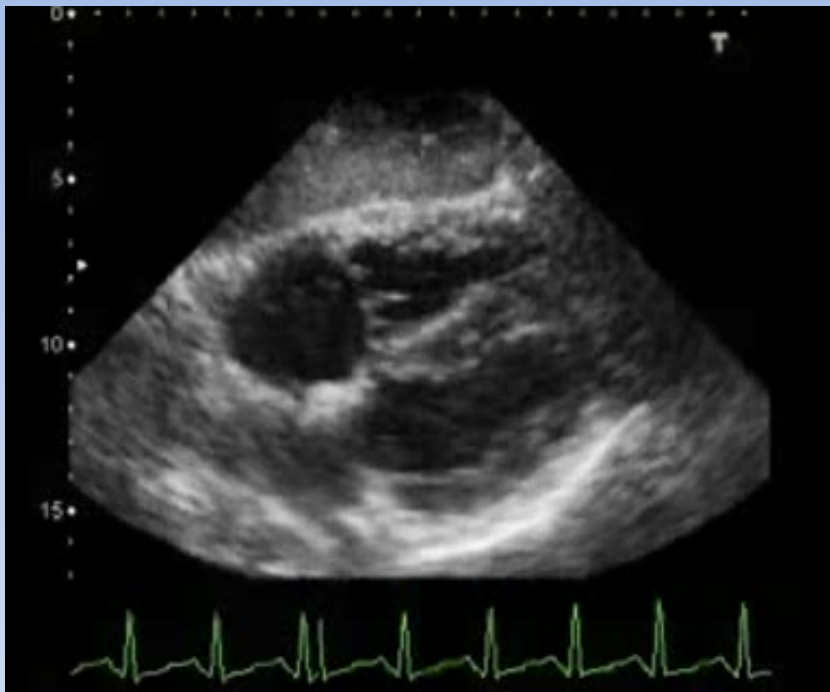


Shock cardiogeno  
Amine  
Sala emodinamica

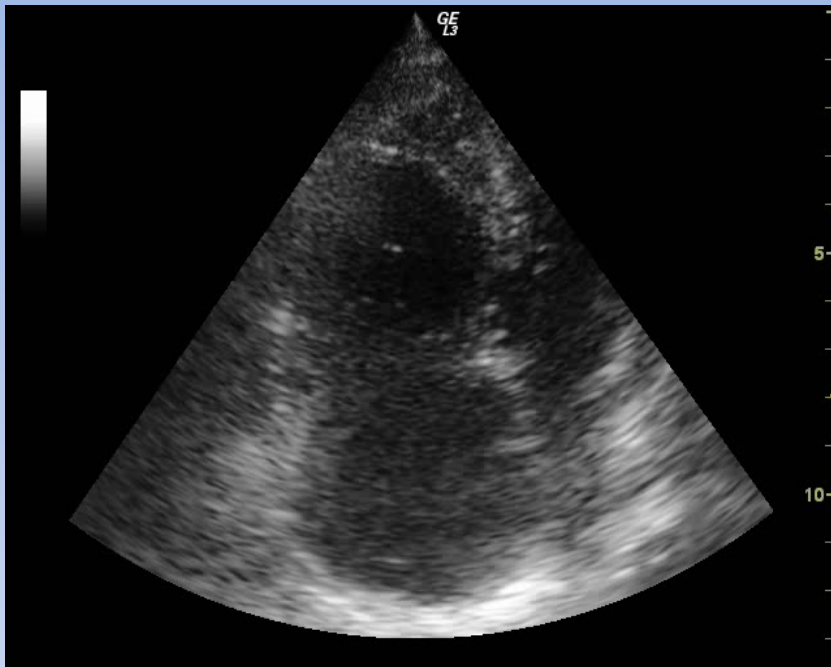


# Tamponamento cardiaco PERICARDIOCENTESI





Pneumotorace iperteso  
DRENAGGIO TORACICO



## SEGNI INDIRETTI

- $VD/VS > 1$  in 4C sottocostale ( $>0.7$  in A4C)

# Tromboembolia polmonare TROMBOLISI

## SEGNI DIRETTI

- Visualizzazione diretta del trombo in transito

**Web Table 3** Approved thrombolytic regimens for pulmonary embolism

Streptokinase	250 000 IU as a loading dose over 30 minutes, followed by 100 000 IU/h over 12–24 hours
	Accelerated regimen: 1.5 million IU over 2 hours
Urokinase	4400 IU/kg as a loading dose over 10 min, followed by 4400 IU/kg per hour over 12–24 hours
	Accelerated regimen: 3 million IU over 2 hours
rtPA	100 mg over 2 hours; or
	0.6 mg/kg over 15 minutes (maximum dose 50 mg)

IU = international units; rtPA = recombinant tissue plasminogen activator.

*Patients with PE presenting with shock or hypotension are at high risk of in-hospital death, particularly during the first few hours after admission.*

*Besides haemodynamic and respiratory support, intravenous UFH should be administered to these patients as the preferred mode of initial anticoagulation, as LMWH or fondaparinux have not been tested in the setting of hypotension and shock.*

*Primary reperfusion treatment, particularly systemic thrombolysis, is the treatment of choice for patients with high-risk PE*

*2014 ESC Guidelines on the diagnosis and management of acute pulmonary embolism. European Heart Journal (2014) 35, 3033–3080 doi:10.1093/eurheartj/ehu283*



## FALLS-protocol

### 1) Ruling out obstructive shock

Simple cardiac sonography:

Pericardial tamponade  
Right ventricle dilatation<sup>1</sup>

BLUE-protocol: pneumothorax (A'-profile)

### 2) Ruling out cardiogenic shock<sup>2</sup>

BLUE-protocol: pulmonary edema (B-profile)

### 3) Ruling out hypovolemic shock (A-profile)

Correction of parameters of shock  
under fluid administration

### 4) Detecting distributive shock, septic shock currently

Fluid therapy not able to improve  
circulation, eventually generating  
a B-profile

0 |-----| Group 1 |-----| Group 2

June 2014, *Chest*. BLUE-Protocol and FALLS-Protocol.

L. Cardinale  
M. Giraudo  
V. Stefanone  
E. Boero  
P. Nazerian  
R. Pozzi  
M. F. Frascisco

## CONSENSUS STATEMENT

Emergent Setting:  
American Society of  
Emergency Medicine  
and American College of  
Emergency Physicians

## Early versus delayed

Table 1  
Rapid Ultrasound in SHock (RUSH) protocol: ultrasonographic findings seen with classic shock states

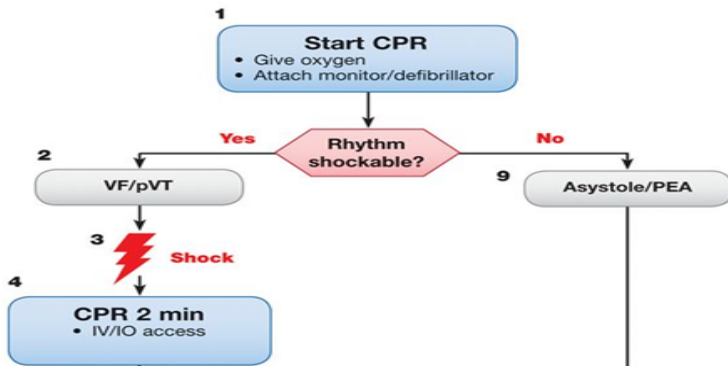
RUSH Evaluation	Hypovolemic Shock	Cardiogenic Shock	Obstructive Shock	Distributive Shock
Pump	Hypercontractile heart Small chamber size	Hypocontractile heart Dilated heart	Hypercontractile heart Pericardial effusion Cardiac tamponade RV strain Cardiac thrombus	Hypercontractile heart (early sepsis) Hypocontractile heart (late sepsis)
Tank	Flat IVC Flat jugular veins Peritoneal fluid (fluid loss) Pleural fluid (fluid loss)	Distended IVC Distended jugular veins Lung rockets (pulmonary edema) Pleural fluid Peritoneal fluid (ascites)	Distended IVC Distended jugular veins Absent lung sliding (pneumothorax)	Normal or small IVC (early sepsis) Peritoneal fluid (sepsis source) Pleural fluid (sepsis source)
Pipes	Abdominal aneurysm Aortic dissection	Normal	DVT	Normal

Abbreviations: DVT, deep venous thrombosis; IVC, inferior vena cava; RV, right ventricle.

2010, *Emerg Med Clin N Am*. The RUSH Exam  
Rapid Ultrasound in SHock in the Evaluation  
of the Critically Ill patients

# ARRESTO CARDIACO

Adult Cardiac Arrest Algorithm—2015 Update



- 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.
  - Rotate 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> <10 mm Hg, attempt to improve CPR quality.
    - Intra-arterial pressure
    - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.
- Shock Energy for Defibrillation**
- **Biphasic:** Manufacturer recommendation (eg, initial 120-200 J, second shock 150-200 J)

## 2015 Recommendations—Updated

Ultrasound (cardiac or noncardiac) may be considered during the management of cardiac arrest, although its usefulness has not been well established (Class IIb, LOE C-EO).

If a qualified sonographer is present and use of ultrasound does not interfere with the standard cardiac arrest treatment protocol, then ultrasound may be considered as an adjunct to standard patient evaluation (Class IIb, LOE C-EO).

- Amiodarone
- Treat reversible causes



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

## CAUSE REVERSIBILI:

- Ipovolemia*
- Ipossia*
- Idrogenioni (acidosi)*
- Ipo-Iperkalemia*
- Ipotermia*
- pneumoTorace*
- iperteso*
- Tamponamento cardiaco*
- Trombosi coronarica*
- Trombosi polmonare*
- Tossici*

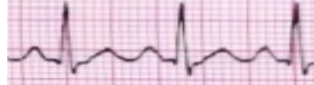


# ARRESTO CARDIACO

PEA

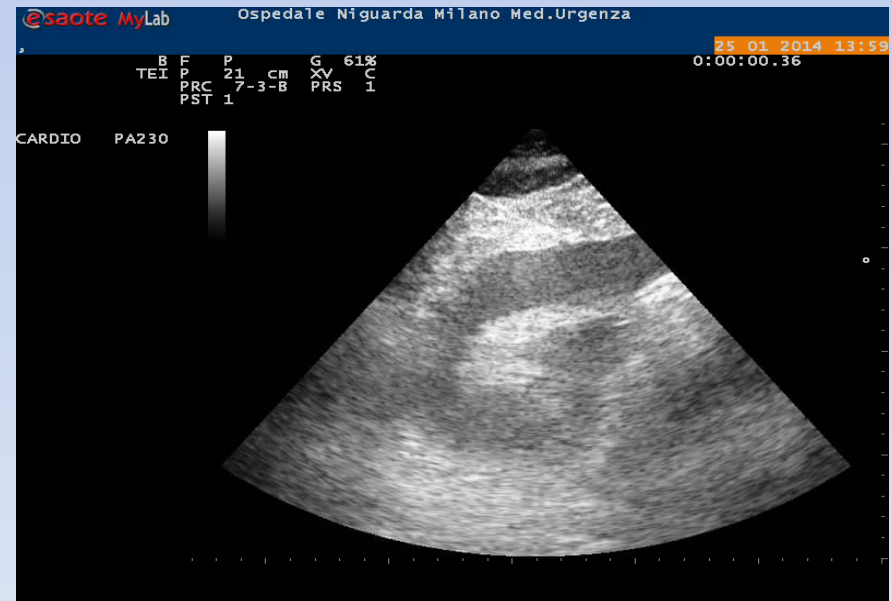
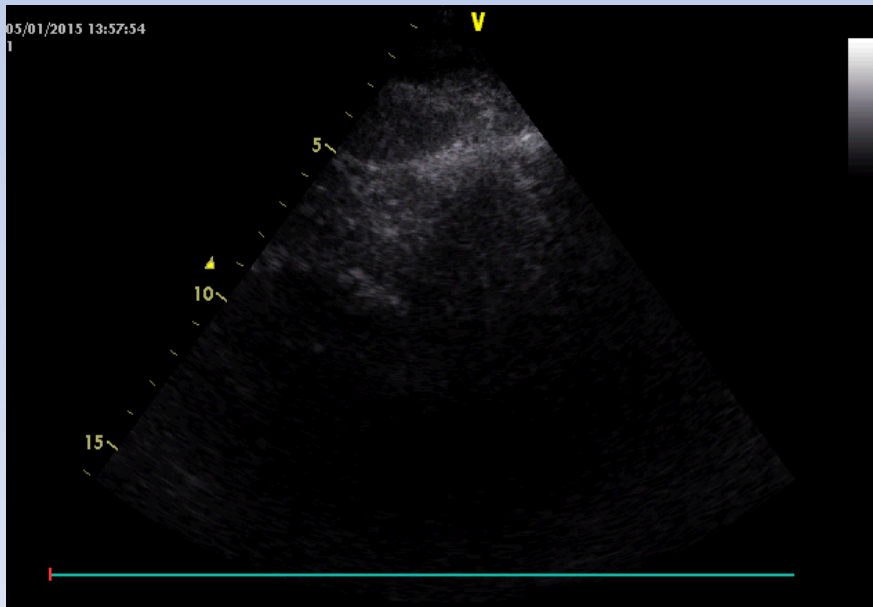
PEA vero

Mortalità >90%



PseudoPEA

Mortalità 45-50%



2010, Resuscitation. Focused echocardiographic evaluation in life support and peri-resuscitation of emergency patients(FEEL): A prospective trial. Raoul Breikreutz, et al., Susanna Priceb, et al.

# A kindly midsummer night

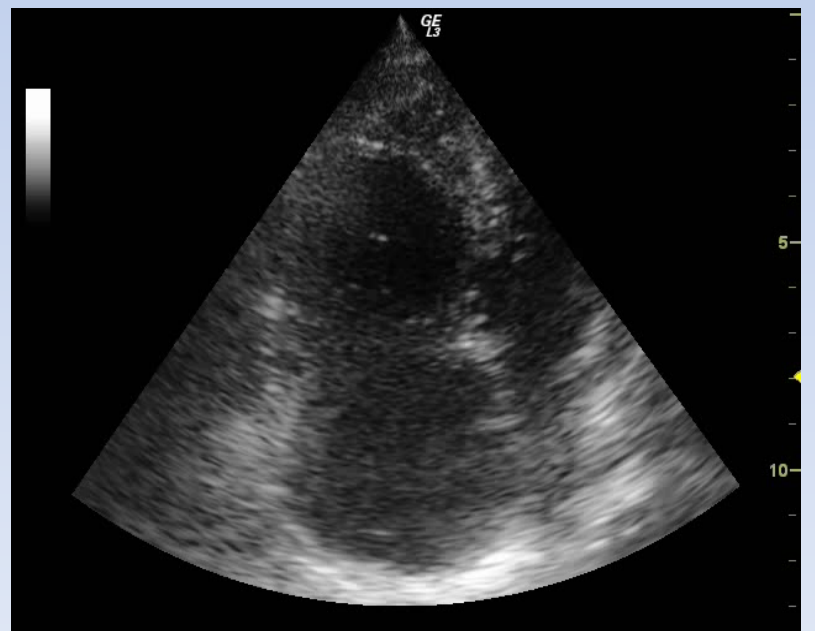
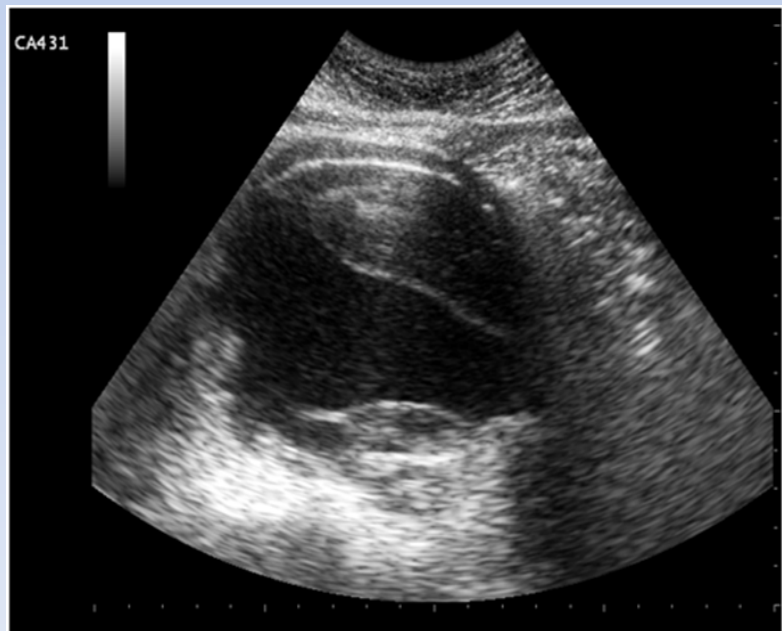
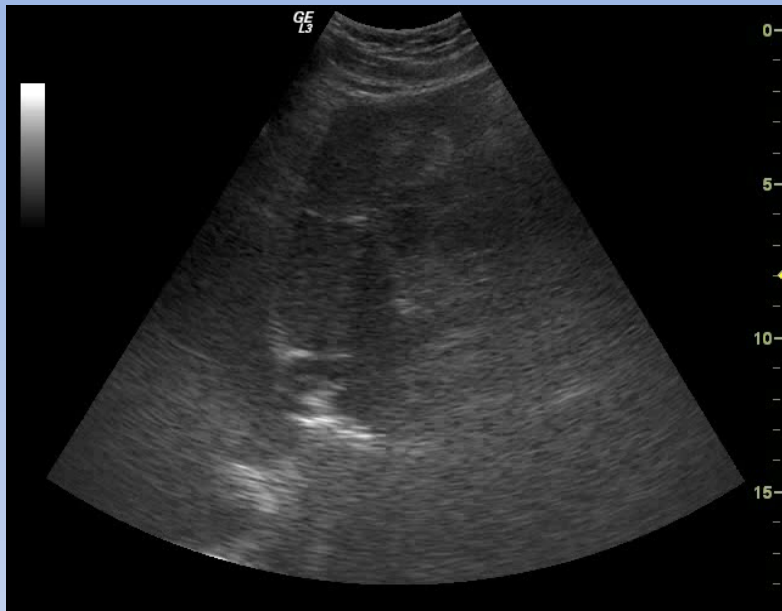
## **Nicola 65 AA APR apparentemente muta**

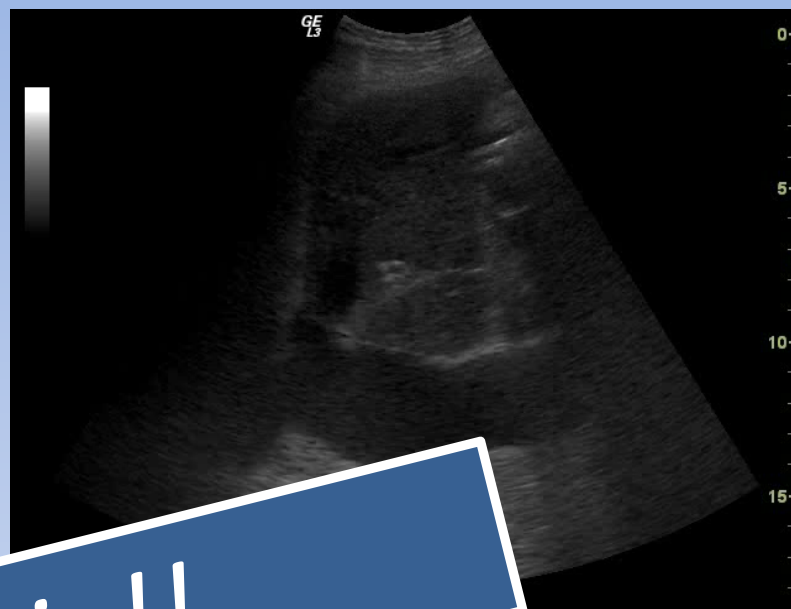
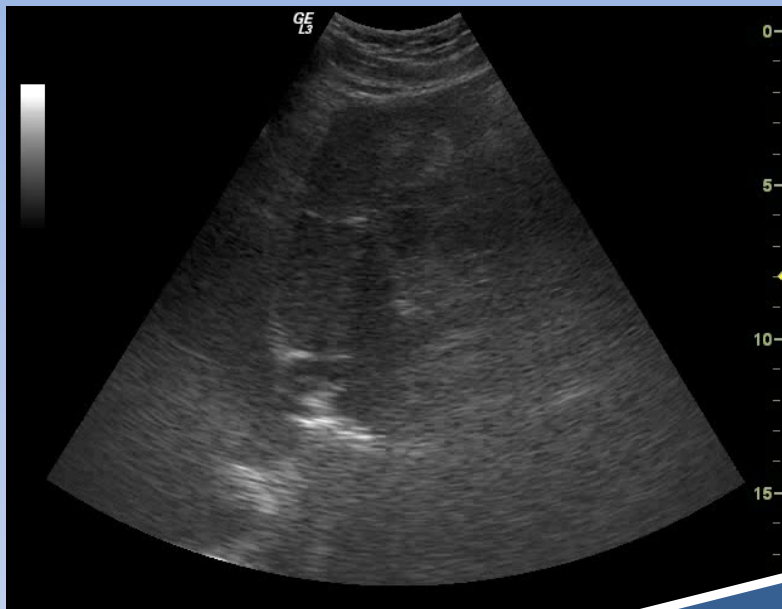
- PA 70/40
- FC 130
- Spo2 non rilevabile
- Pallido, sudato, marezzatura diffusa a tronco e arti, gasping

## **Francesca 60 AA cardiopatia ischemica con FE conservata all'ultimo eco**

- PA 75/50
- Fc 140
- Spo2 non rilevabile
- Pallida, scarsamente responsiva allo stimolo verbale, sudata, turgore giugulare bilaterale







Grazie!!

