

IRC 2021

CONGRESSO
NAZIONALE

16•17•18 DICEMBRE

NUOVE LINEE GUIDA 2021:
RIANIMAZIONE CARDIOPOLMONARE
POST-LOCKDOWN



Italian
Resuscitation
Council



Chi Trasportare Quando? Ongoing... *CPR*

Carlo Coniglio

Rianimazione Emergenza Territoriale 118 HEMS

Bologna

Dipartimento Emergenza – Ospedale Maggiore

11.30 - 13.15	ADVANCED LIFE SUPPORT 2021 PARTE 2	S. SCELSI S. DI MARCO
11.30 - 11.45	MONITORAGGIO DELLA RCP IN CORSO	C. SORLINI
11.45 - 12.00	COMPRESSORI MECCANICI QUANDO?	A. CUCINO
12.00 - 12.15	CHI TRASPORTARE E QUANDO?	C. CONIGLIO
12.15 - 12.30	QUANDO NON INIZIARE LA RIANIMAZIONE? QUANDO TERMINARE LA RIANIMAZIONE?	L. LANGELLA
12.30 - 12.55	DISCUSSIONE	



- Premessa
- Letteratura
- Indicazioni
- Come farlo



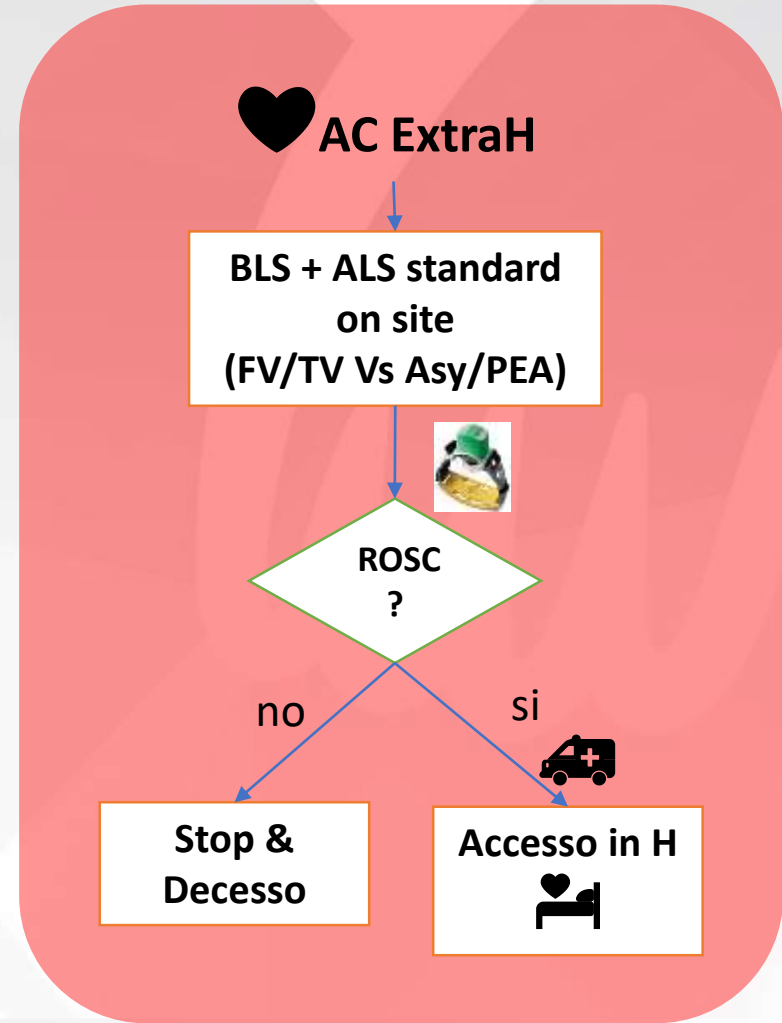
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Premessa... ACR extra H (OHCA)

- Mortalità OHCA alta >70%
- Circa 1/5 pz raggiungono ROSC all'arrivo in H... Ma solo 10% sopravvivono a lungo termine
- EuReCa ONE: 35.9% pz arrivano in H dopo RCP da EMS:
 - 25.2% con return-of-circulation (ROSC)
 - **10.7% in on-going CPR**
- Time (to ROSC) is Brain:
 - ROSC <5' ? → sopravvivenza >50% more than 50%
 - ROSC >25' ? → <10%




CPR



Stay & Play!

Universal Termination of Resuscitation rule (uTOR)

Suggest that resuscitation should be terminated if, after at least four 2-minute intervals of cardiopulmonary resuscitation, three criteria are met:

- 1) the arrest was not witnessed by emergency medical services (EMS)
- 2) there has been no return of spontaneous circulation (ROSC)
- 3) no shocks were delivered.

ILCOR recommended the use of TOR rules to assist clinicians in deciding ...

A Paradigm Shift?



A red square icon with a white circle containing a person lying on their back with a hand on their chest, labeled "CPR".

A photograph showing two paramedics in red and yellow uniforms performing CPR on a patient lying on a stretcher at an accident scene.

A green rounded rectangle containing a yellow stretcher with a green resuscitator on it, a white ambulance, a black icon of a person lying on a stretcher with a heart above them, and a 3D anatomical model of a human torso with a heart and blood vessels.

Stay & Play!

Load & Go!

Perché ongoing?

- ACR «Refrattario»
- Tutti gli ACR OH
 - Accertamento Med Legale : Sistemi non medicalizzati
- Selezionati da Protocollo
 - Caratteristiche favorevoli
 - Potenziali cause reversibili
 - Trattabili in H



Alcune Indicazioni ... ?

- Luoghi pubblici
- Pazienti più giovani
- FV persistente...
- Paz con PEA/Asy dopo primo shock x FV
- ROSC intermittente...
- Paz per i quali si può fare di più (... Ma in H)

Impact of Ongoing CPR on VA ECMO Outcomes

K.J. Fujita, A.P. Rabenstein, R. Chiu, F. Seifert, A.J. McLarty. Stony Brook University, Stony Brook, NY.

The Journal of Heart and Lung Transplantation, Vol 37, No 4S, April 2018

Veno-arterial ECMO (VA ECMO) was placed in 78 patients. Survival to hospital discharge was 26%.

Ongoing CPR at time of cannulation (39 patients) did not influence mortality (p=0.604). Median duration of CPR was 60.0 minutes (range 10-197).

Durata dell'Ongoing... NON decisiva per ECMO

Conclusion: Mortality after VA ECMO was significantly impacted by age and BMI but not by ongoing CPR.

There was no increased mortality noted in longer versus shorter periods of CPR. Transportation to the OR for ECMO cannulation, despite providing a sterile setting with optimal resources, resulted in worse outcome. Establishing ECMO at the site of arrest may avoid interruptions in resuscitation that occur during transport, improving survival. Conduct of the resuscitation rather than length of the code appears to be critically important. Time to establishing ECMO support should therefore not dictate the length of the resuscitative effort.



Clinical Paper

Exploring which patients without return of spontaneous circulation following ventricular fibrillation out-of-hospital cardiac arrest should be transported to hospital?☆



Dion Stub^{a,b,c,*}, Ziad Nehme^{d,e}, Stephen Bernard^{a,d,e}, Marijana Lijovic^{d,e}, David M. Kave^{a,b,d}, Karen Smith^{d,e,f}

Victorian Ambulance Cardiac Arrest Registry (VACAR)
2003 and 2012.

5593 OHCA meeting inclusion criteria.

Analysis on 3095 (55%) not achieve sustained ROSC in the field

- **only 589 (20%) had ongoing CPR to hospital**
- **Survival to hospital discharge occurred in 52 (9%)** of patients who had ongoing CPR





- patients with OHCA 3 aa
- **354** patients (228 patients (64.4%) with ROSC and **126 patients (35.6%) with on-going CPR** on admission
- ED **mortality** of 28.5% (5.7% in the ROSC group and **69.8% in the on-going CPR group**)
- Asystole was documented in more patients with on-going CPR than in patients with ROSC on admission
- ventricular fibrillation as initially monitored rhythm is associated with ED survival in patients with ROSC on ED arrival but not in patients with on-going CPR on admission.
- In patients with on-going CPR on admission, **no clinical or demographic predictors for ED mortality** were found. Higher lactate and lower pH were predictors in both OHCA groups.

RESEARCH ARTICLE

Out-of-hospital cardiac arrests in Switzerland: Predictors for emergency department mortality in patients with ROSC or on-going CPR on admission to the emergency department

Thomas C. Sauter^{1*}, Nora Iten¹, Patrik R. Schwab^{1,2}, Wolf E. Hautz¹, Meret E. Ricklin¹, Aristomenis K. Exadaktylos¹

¹ Department of Emergency Medicine, Inselspital, University Hospital Bern, Bern, Switzerland, ² Sanitaetspolizei Bern, Emergency Medical Service, Bern, Switzerland

Table 1. Baseline characteristics of OHCA patients according to ROSC or ongoing CPR on admission.

Characteristics	OHCA (n = 354)	ROSC on admission (n = 228)	Admission with ongoing CPR (n = 126)	p
Age (years)	64.9±15.9	65.6±15.5	63.6±16.7	0.269
Gender (female)	92 (26.0%)	61 (26.6%)	31 (24.6%)	0.659
History of ischaemic heart disease	85% (24%)	55 (24.1%)	30 (23.8%)	0.563
<i>Preclinical characteristics</i>				
First monitored rhythm (asystole, ventricular fibrillation, PEA, unknown)	75 (21.2%); 171 (48.3%); 77 (21.8%); 31 (8.6%)	41 (18.0%); 129 (56.6%); 44 (19.3%); 14 (6.1%)	34 (27.0%); 54 (42.9%); 33 (26.2%); 5 (4.0%)	0.047*; 0.013*; 0.132
Witnessed arrest	236 (66.7%)	152 (66.7%)	84 (66.7%)	0.678
Non-interventional interval (downtime) (min)	8.26±7.9	7.5±7.6	9.6±8.2	0.019*
Bystander CPR	148 (41.8%)	95 (41.7%)	53 (42.1%)	0.845
Time to ROSC (min)	23.1 (±18.2)	21.0 (±15.3)	36.3 (±27.3)	0.001*
CPR duration (min)	34.8 (±29.6)	20.5 (±16.6)	60.1 (±30.8)	<0.001*
Adrenaline administered (number)	304 (85.9%)	182 (79.8%)	122 (96.8%)	<0.001*
Adrenaline dosage (mg)	3.83±3.9	2.75±3.2	5.64±4.3	<0.001*
Cordarone (number)	121 (34.2%)	79 (34.6%)	42 (33.3%)	0.803
Number of shocks	2.08±2.8	1.87±2.5	2.46±3.5	0.649

RESEARCH

Open Access



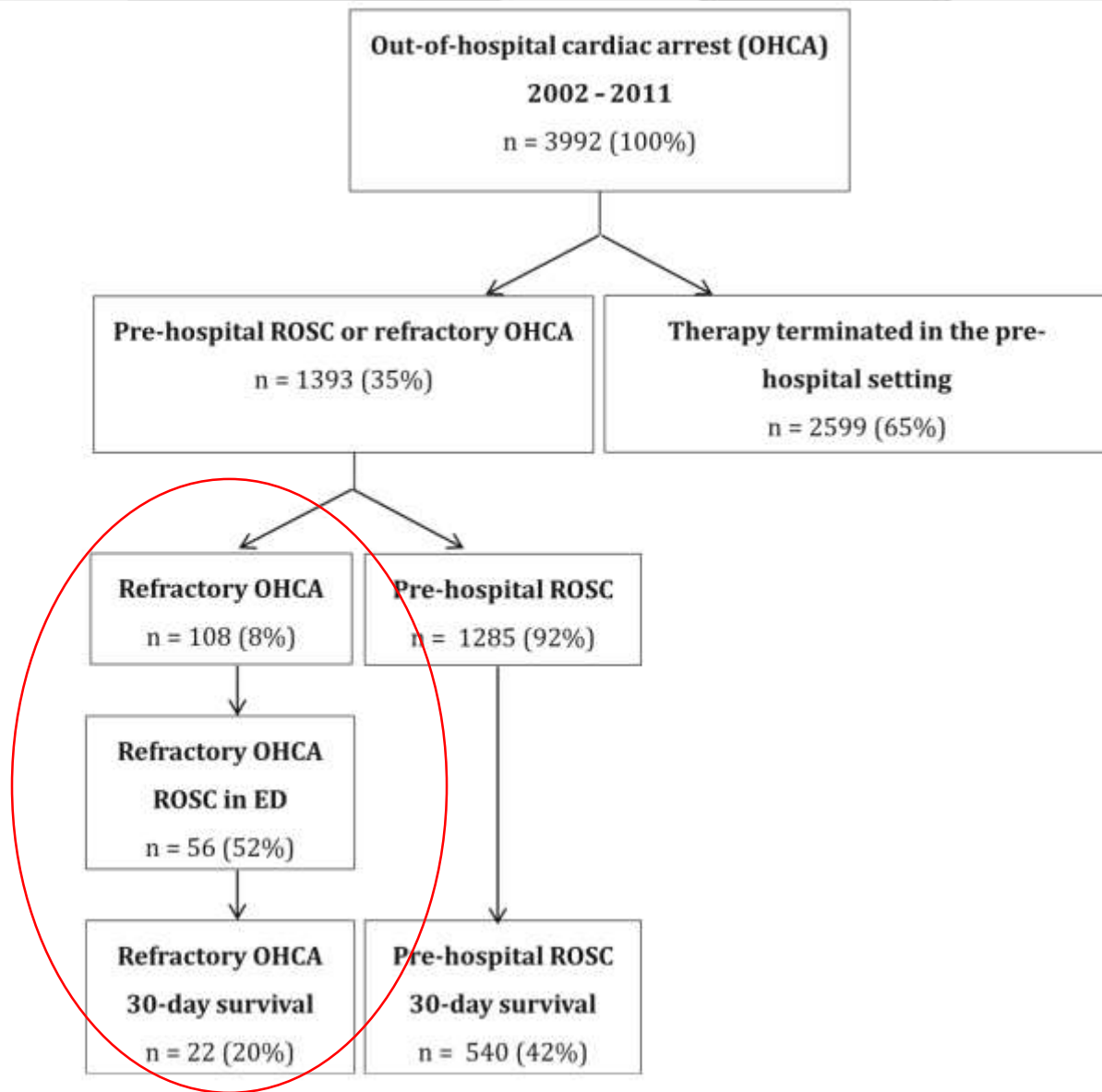
Refractory out-of-hospital cardiac arrest with ongoing cardiopulmonary resuscitation at hospital arrival – survival and neurological outcome without extracorporeal cardiopulmonary resuscitation

Emilie Gregers^{1*}, Jesper Kjærgaard¹, Freddy Lippert², Jakob H. Thomsen¹, Lars Køber¹, Michael Wanscher³, Christian Hassager¹ and Helle Søholm^{1,4}



- 2002–2011
- 3992 OHCA patients with resuscitation attempts were included;
 - 2599, treatment was terminated prehospital
 - 1393 (35%) were brought to the hospital
 - with ROSC (n = 1285, 92%)
 - **with refractory OHCA (n = 108, 8%)**
- **56 (52%) achieved ROSC in the emergency department**
- **Thirty-day survival was 20%** in patients with refractory OHCA compared with **42%** in patients with prehospital ROSC (p < 0.001).
- **No difference in favorable neurological outcome** prehospital ROSC 84% vs. refractory OHCA 86%; p = 0.7).

- 35' to ED for ongoing CPR (40' in preH ROSC)
- Load & Go strategy
- refractory OHCA (Independent factors associated)
 - **public** OHCA (52% vs. 16%, $p < 0.001$)
 - **witnessed** OHCA (86% vs. 61%, $p < 0.001$)
 - **EMS witnessed** OHCA (13% vs. 4%, $p < 0.001$)
 - **bystander** CPR performed (56% vs. 36%, $p < 0.001$)
 - **shockable** primary rhythm (51% vs. 15%, $p < 0.001$)
- **NNT = 5:1**
 - we found that 5 patients with refractory OHCA need to be transported to hospital with ongoing CPR in order to save 1 patient with refractory OHCA (NNT 4.9).





Available online at www.sciencedirect.com

Resuscitation Plus

journal homepage: www.elsevier.com/locate/resuscitation-plus

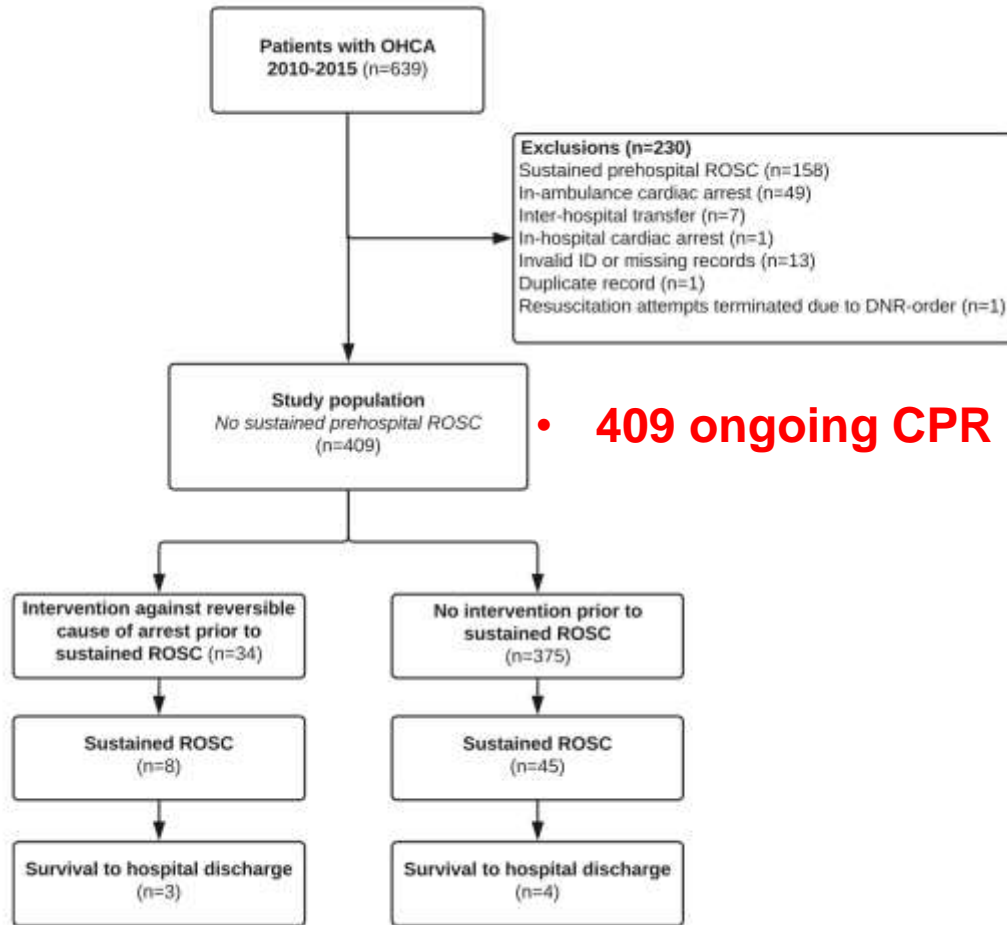


Clinical paper

Outcomes and interventions in patients transported to hospital with ongoing CPR after out-of-hospital cardiac arrest – An observational study



S. Schmidbauer^{a,b,*}, E.J. Yates^c, C. Andréll^{a,d}, D. B. H. Friberg^{a,b}



• 409 ongoing CPR

- 9 cases of pericardial decompression
- Coronary angiography was performed in 7 cases

- 7 of 409 patients (1.7%) survived to hospital discharge
- 4 FV – 3 PEA
- Asistolia = 0 surv
- uTOR recommended termination of resuscitation for 2 patients



Table 2 - All interventions attempted during ongoing cardiopulmonary resuscitation.

Intervention	No. of attempts	No. of attempts followed by sustained ROSC	No. of attempts followed by survival to hospital discharge
Advanced airway manoeuvres	7	3	1
Blood transfusion	1	0	0
Potassium correction	1	0	0
Rewarming after hypothermia	1	0	0
Coronary angiography	7	3	2
Percutaneous coronary intervention	5	2	1
Pericardial decompression	9	1	0
Intravenous thrombolysis	4	1	0
Pleural decompression	1	0	0
Antidote administration	5	0	0
Unique patients	34	8	3

Individual patients might have received more than one intervention.

The findings of the present **study do not support routine transportation of OHCA patients prior to achievement of field ROSC.**

Clinical decision rules on termination of resuscitation need to be validated locally prior to implementation.

Used only as part of a holistic patient assessment.





Ongoing... Come?

- Manikin study
- **mechanical chest compressions were found to provide superior CPR-quality in terms of compression depth and frequency**
- Altri studi- higher coronary perfusion pressure, higher end-tidal CO₂ and lower lactate levels than manual chest compressions

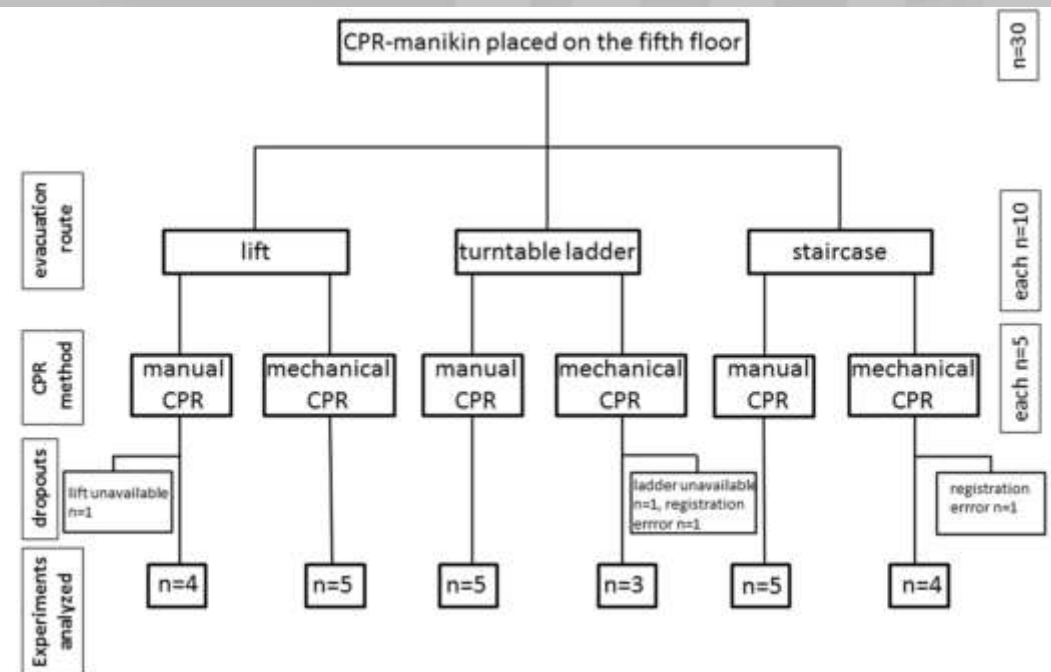
ORIGINAL RESEARCH

Open Access



Rescue under ongoing CPR from an upper floor: evaluation of three different evacuation routes and mechanical and manual chest compressions: a manikin trial

Hendrik Drinhaus^{1,2*}, Sebastian Nüsgen², Niels Adams^{1,2}, Wolfgang A. Wetsch¹ and Thorsten Anneck¹





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Quindi... Serve?



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Progetto OnGoing CPR



Area Metropolitana Bologna



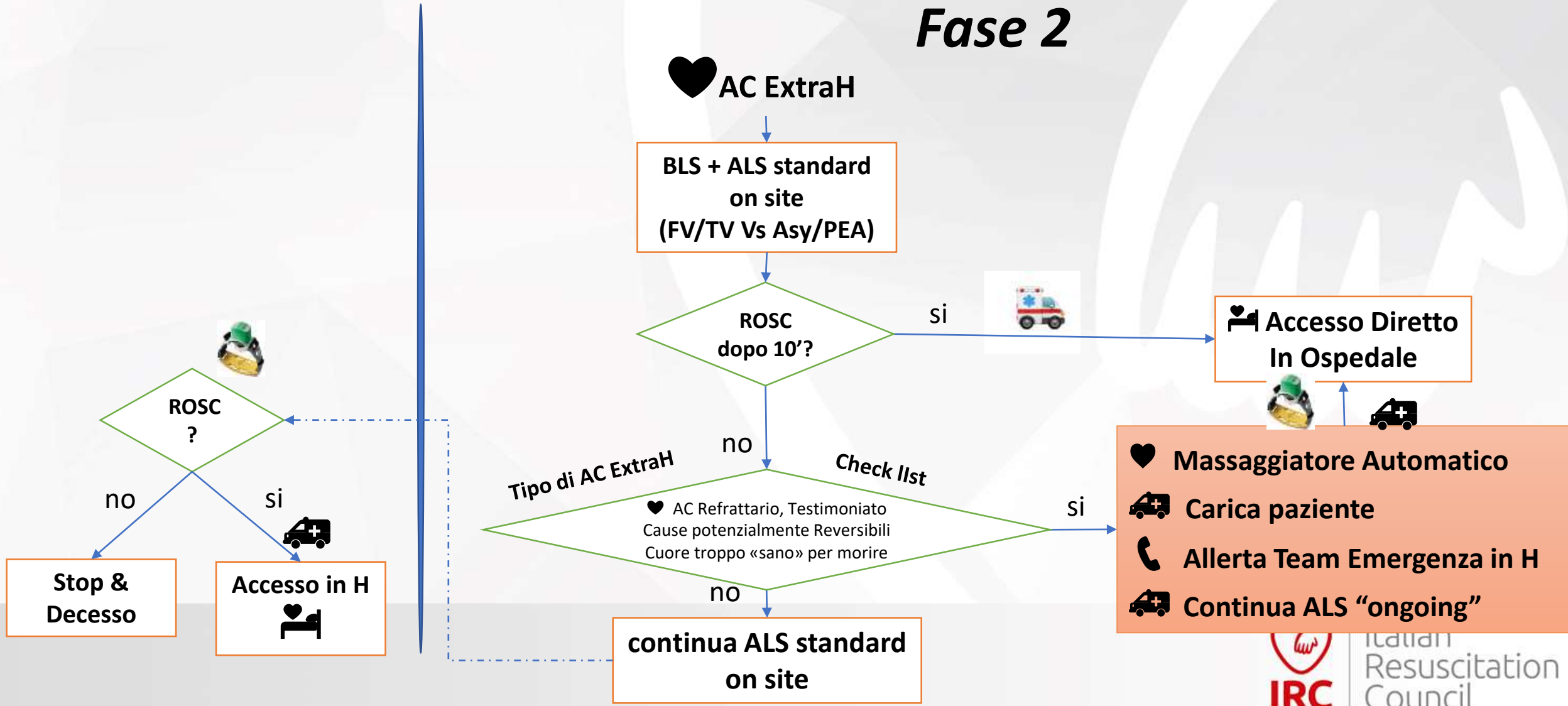
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- Trasportare nel CAC pazienti in AC refrattario (10-15 minuti di AC senza ripresa di circolo)
 - in presenza di cause potenzialmente reversibili e trattabili in ospedale e
 - con tempi di arresto tali da non pregiudicare un esito neurologico potenzialmente favorevole.
- testare la fattibilità nel Sistema 118 metropolitano
 - di individuare i criteri di arruolamento
 - applicare correttamente i sistemi di CTM (ES. LUCAS),
 - allertare il Team di risposta all'AC dell'Ospedale di riferimento
 - VALUTARE TEMPI DI trasporto verso il CAC
 - analizzare eventuali criticità relative all'implementazione

Dalla Fase 1 alla Fase 2 : «OnGoing CPR» to Cardiac Arrest Center»

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Fase 2



Check List - Fase 2: «OnGoing CPR» Cardiac Arrest Center»

NO ROSC dopo 10' di ALS (<4 cicli) considera trasporto paziente con «Ongoing CPR» in H

Tipo di AC ExtraH

AC Extra Refrattario

Tutte le successive

- Età <70aa, >/= 14aa
- AC extraH Testimoniato
- FV/TV iniziale o Shock somministrato dal DAE o Causa Potenzialmente “reversibile” (ipotermia, intossicazioni, embolia polmonare, tamponamento cardiaco, attività meccanica all’ecoscopia)
- No Flow < 10’
- ETCO2 >10 mmHg
- Raggiungimento H <40’ dall’inizio RCP (tranne se ipotermia/farmaci)

CRITERI DI ESCLUSIONE: Chi no?

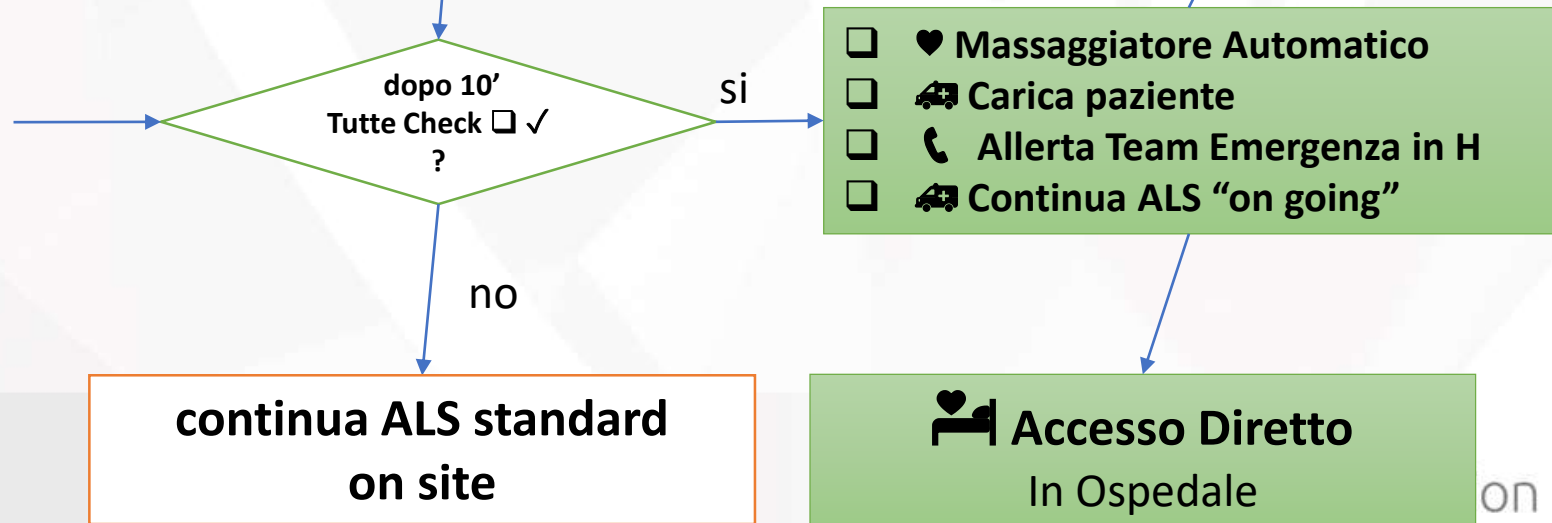
Tutte le successive

- No patologia cardiaca/respiratoria severa (NYHAIII-IV, COPD GIII-IV), epatica, vascolare
- NoPatologia neoplastica

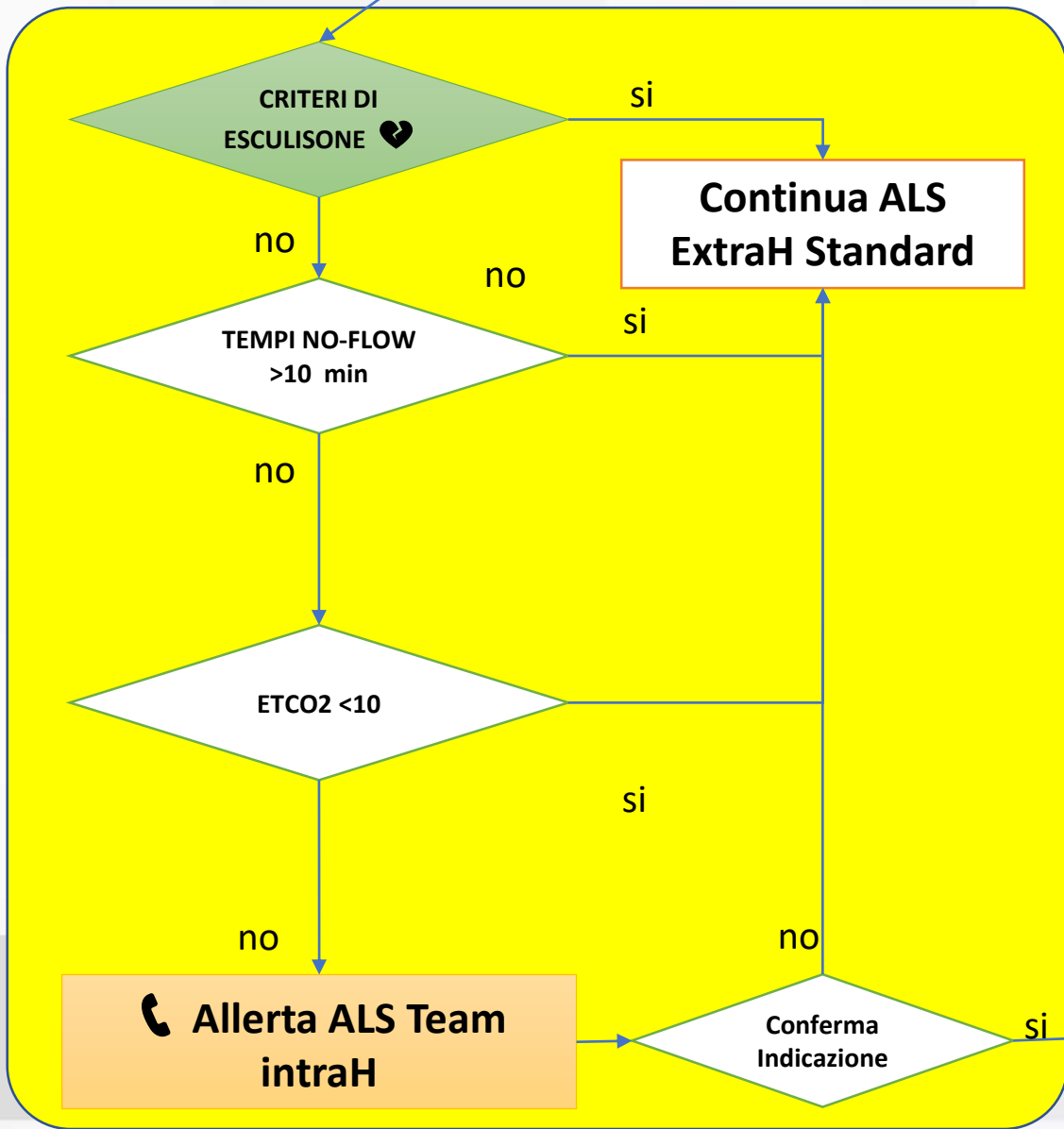
INFORMAZIONI MEDICO 118 →

Medico Team Emergenza in H:

- Sesso, Età’, Peso stimato
- Ritmo di presentazione
- Tempo No-Flow
- Tempo Low-Flow (da inizio RCP)
- EtCO2
- Tempo Stimato di Arrivo



**AC Extraospedaliero
Refrattario Testimoniato** ❤️



❤️ **AC Extra Refrattario –
definizione/indicazioni: Chi?**

- Età ≥ 14 e <70 aa
- ACR extraH Testimoniato
- RCP da Bystander
- FV/TV iniziale o Shock somministrato dal DAE o Causa Potenzialmente “reversibile” (ipotermia, intossicazioni, embolia polmonare)
- NO ROSC dopo 15’ di ALS (<4 cicli)

❤️ **CRITERI DI ESCLUSIONE: Chi no?**

1. ROSC nei 15’
2. patologia cardiaca/respiratoria severa (NYHAI-III-IV, COPD GIII-IV), epatica, vascolare
3. Patologia neoplastica
4. Emorragia in atto

Continua Trattamento

- Emodinamica
- Cause reversibili
- +/- ECLS

Stop

☎️ **INFORMAZIONI MEDICO 118 →
Medico ALS IntraH Team:**

Sesso, Età’, Peso stimato
Ritmo di presentazione;
Tempo No-Flow; Tempo Low-Flow
EtCO2; Tempo Stimato di Arrivo

🏠 **Accesso Diretto «OnG-CPR»
In Ospedale**

🚑 **Continua ALS “on going”**

- RCP di “qualità” con Massaggiatore Automatico
- ALS Standard
- Ventilazione fiO_2 100% Ambu o Ventilatore
- Collare cervicale

🚑 **Continua ALS “ongoing”**

🏠 **Accesso Diretto «OnG-CPR»**

OSO : da definire
OM: Sala Emergenza PS – Trauma Team

ALL'ARRIVO DEL PAZIENTE IN H?

- coronarografia d'emergenza in caso di ROSC e ritmo di esordio in FV/TV o causa cardio-ischemica fortemente sospetta
- altri interventi specifici se individuate cause potenzialmente reversibili e trattabili (es. alterazioni elettrolitiche)
- a posizionamento di REBOA come procedura rescue di ripristino della circolazione spontanea (ROSC)
- a valutazione di eventuale posizionamento di ECMO per ECPR una volta implementata questa procedura.

Pre H _{NON-Traumatic} CA – EMS 118 ALS Bologna Soccorso

Escludi potenziali cause trattabili (4H/4T)
 EFAST /POCUS -
 subcostal first



ACR Non-Trauma

ALS Standard
 IOT/SG
 MCE/AC⁺
 Vena/IO
 Adrenalina/amiodarone?
 EtCO₂

**FV/TV refractory &/or
 Potential Reversible Causes
 NO ROSC after 10-15 min**

No comorbidità End Stage
 ACR testimoniato con BLS entro 5'
 ETCO₂ >10
 <75aa
 Identificazione di "Causa Reversibile" non trattabile in extraH

Continue ALS, RCP "on going"
 Direct transport to ER OM
 Allert for – AC-Reboa protocol

Ongoing CPR

Ongoing CPR...Conclusioni

- Bassa sopravvivenza
- Casi selezionati
- Cause potenzialmente reversibili
- Se in H ... Posso fare di più
- Raccogliamo dati italiani?



Italian Resuscitation Council

 ircouncil.it

Grazie

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