

# IRC 2021

CONGRESSO  
NAZIONALE

16•17•18 DICEMBRE

NUOVE LINEE GUIDA 2021:  
RIANIMAZIONE CARDIOPOLMONARE  
POST-LOCKDOWN



Italian  
Resuscitation  
Council

**Dott. Niccolò B. Grieco**

*Cardiologist at "De Gasperis Cardiocenter"  
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## Accessi vascolari e farmaci



# Accessi vascolari e farmaci

ILCOR suggests the intravenous route as opposed to the intraosseous route is used as the first attempt for drug administration during adult cardiac arrest. This weak recommendation is based on very low-certainty evidence drawn from three retrospective observational studies which included 34,686 adult out-of-hospital cardiac arrests which suggests worse outcomes when the IO route was used.

Since the ILCOR review, secondary analyses of the PARAMEDIC2 and ALPS randomised trials suggested no significant effect modification by drug administration route although the studies were underpowered to assess for differences between the IV and IO routes. Consistent with ILCOR, the ERC suggests attempting IV access first to enable drug delivery in adults in cardiac arrest. IO access may be considered if unable to obtain IV access in adults in cardiac arrest.

# Su cosa si basano le raccomandazioni?



Resuscitation

Volume 149, April 2020, Pages 150-157



Review

## Intravenous vs. intraosseous administration of drugs during cardiac arrest: A systematic review

Asger Granfeldt <sup>a, b</sup>, Suzanne R. Avis <sup>c</sup>, Peter Carøe Lind <sup>b</sup>, Mathias J. Holmberg <sup>d, e</sup>, Monica Kleinman <sup>f</sup>, Ian Maconochie <sup>g</sup>, Cindy H. Hsu <sup>h, i, j</sup>, Maria Fernanda de Almeida <sup>k</sup>, Tzong-Luen Wang <sup>l, m</sup>, Robert W. Neumar <sup>h, i</sup>, Lars W. Andersen <sup>a, d, e</sup> ✉

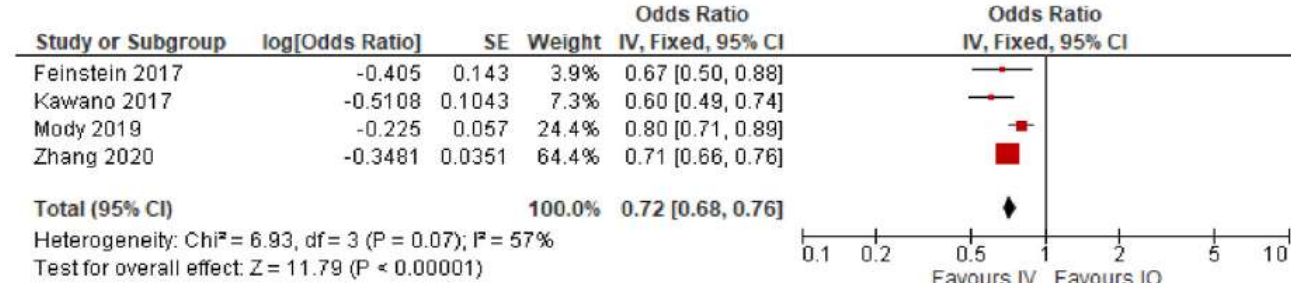
# Intravenous vs. intraosseous administration of drugs during cardiac arrest: A systematic review



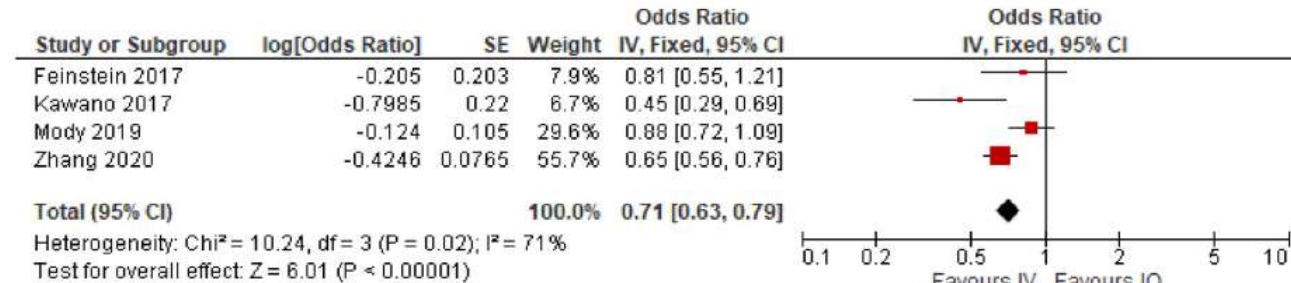
Asger Granfeldt<sup>a,b</sup>, Suzanne R. Avis<sup>c</sup>, Peter Carøe Lind<sup>b</sup>, Mathias J. Holmberg<sup>d,e</sup>,  
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RESUSCITATION 149 (2020) 150 –157

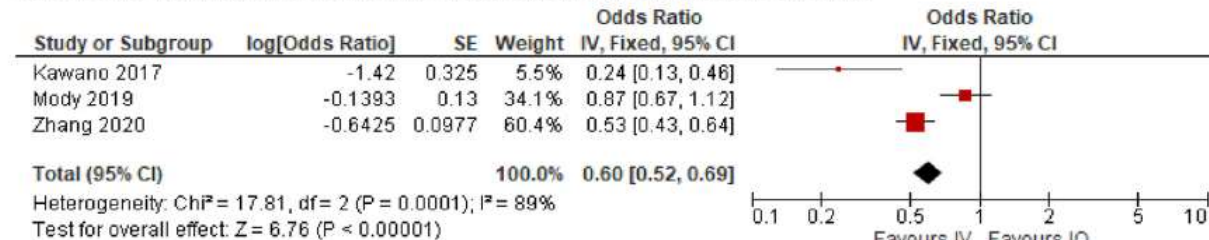
## ROSC



## Survival to hospital discharge



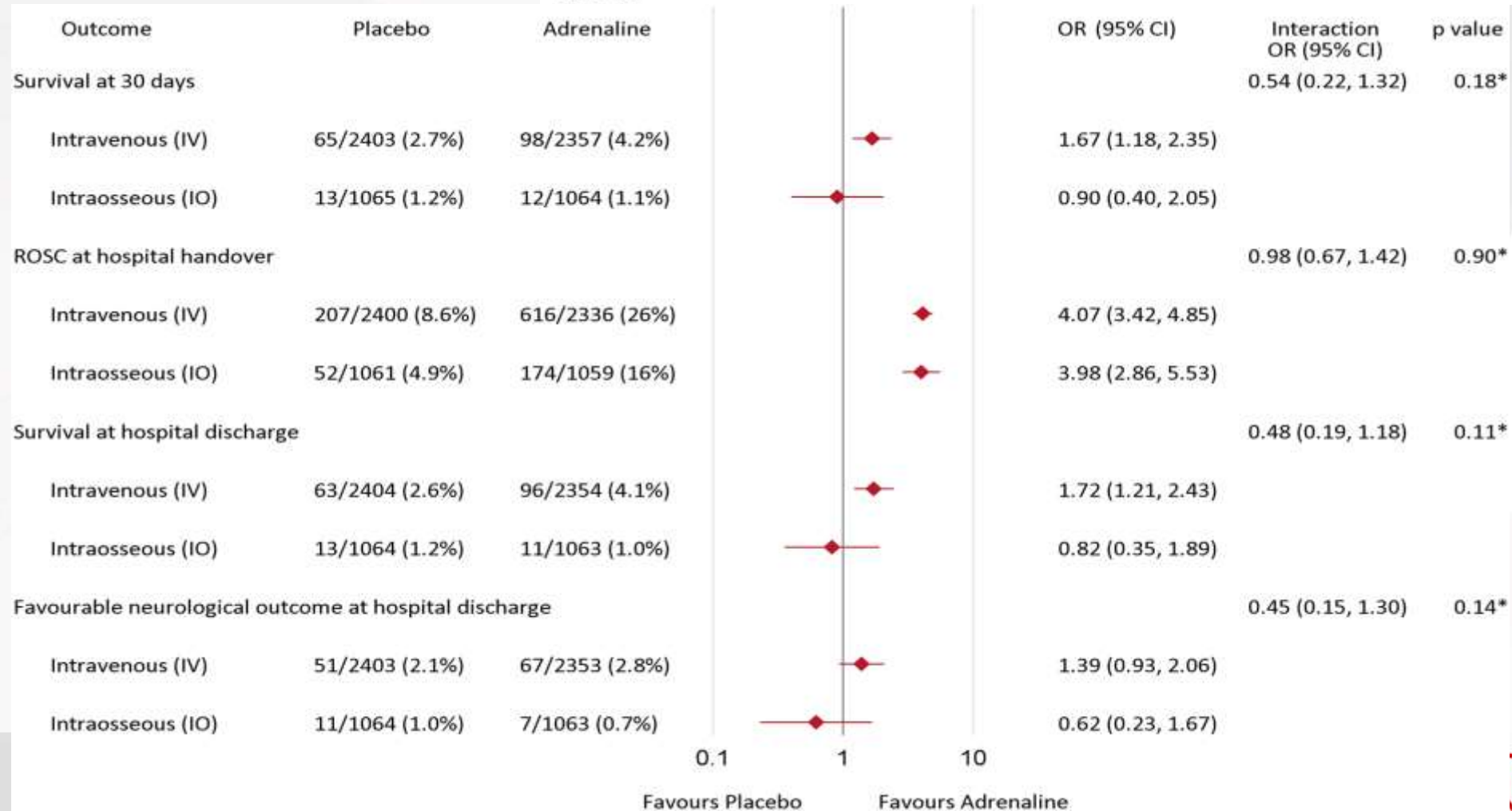
## Survival to hospital discharge with a favourable neurological outcome



Analisi di 6 studi osservazionali  
(2017-2020)

- Solo adulti
- IV o IO come prima scelta di accesso
- esclusi i crossover per failure accesso

# Intraosseous versus intravenous administration of adrenaline in patients with out-of-hospital cardiac arrest: a secondary analysis of the PARAMEDIC2 placebo-controlled trial



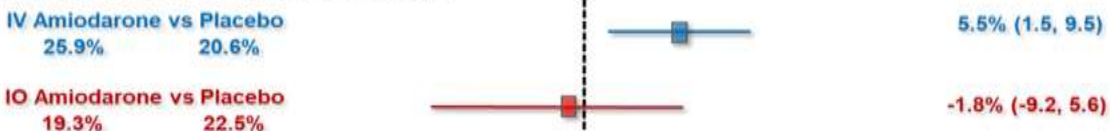
### Adjusted Absolute Difference (95% CI)

#### IV vs IO Amiodarone (unadjusted %'s)

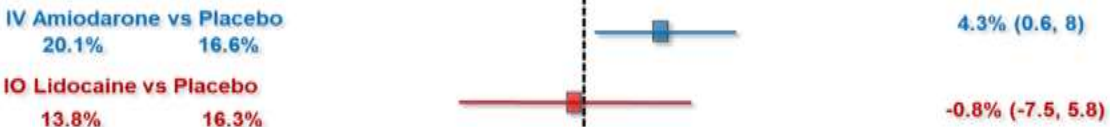
##### Survival to Hospital Admission



##### Survival to Hospital Discharge



##### mRS ≤ 3 at Hospital Discharge

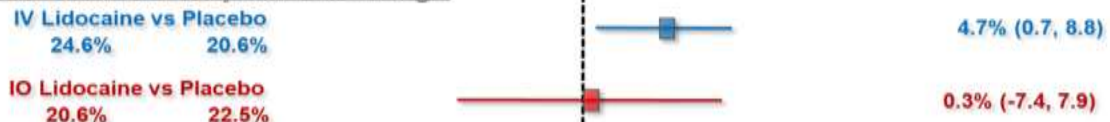


#### IV vs IO Lidocaine (unadjusted %'s)

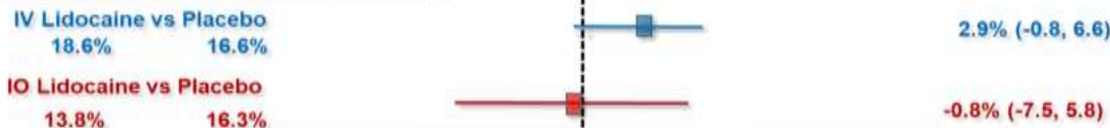
##### Survival to Hospital Admission



##### Survival to Hospital Discharge



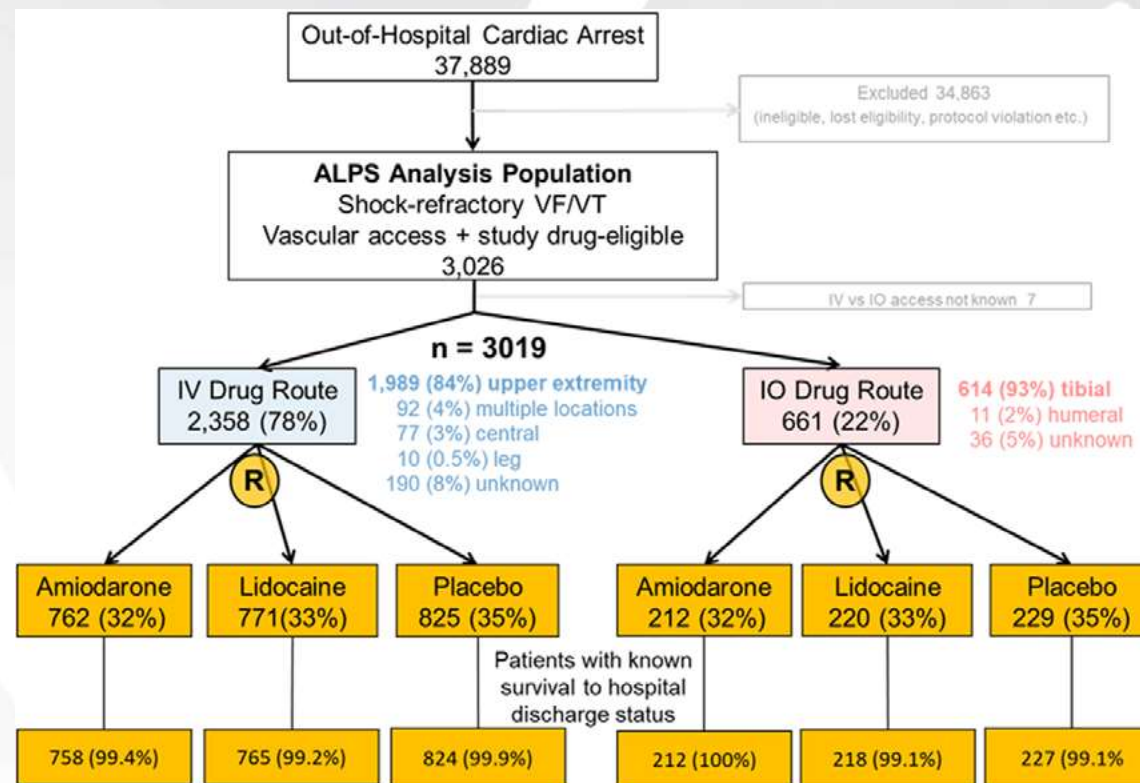
##### mRS ≤ 3 at Hospital Discharge



-20 Favors IO 0 Favors IV 20

# Survival After Intravenous Versus Intraosseous Amiodarone, Lidocaine, or Placebo in Out-of-Hospital Shock-Refractory Cardiac Arrest

Circulation. 2020;141:188–198.



# *Is this the end, my only friend? The end of our elaborate plans*

*The Doors 1967*

## Editorial

# Intraosseous adrenaline for adult out-of-hospital cardiac arrest: Faster access with worse outcomes

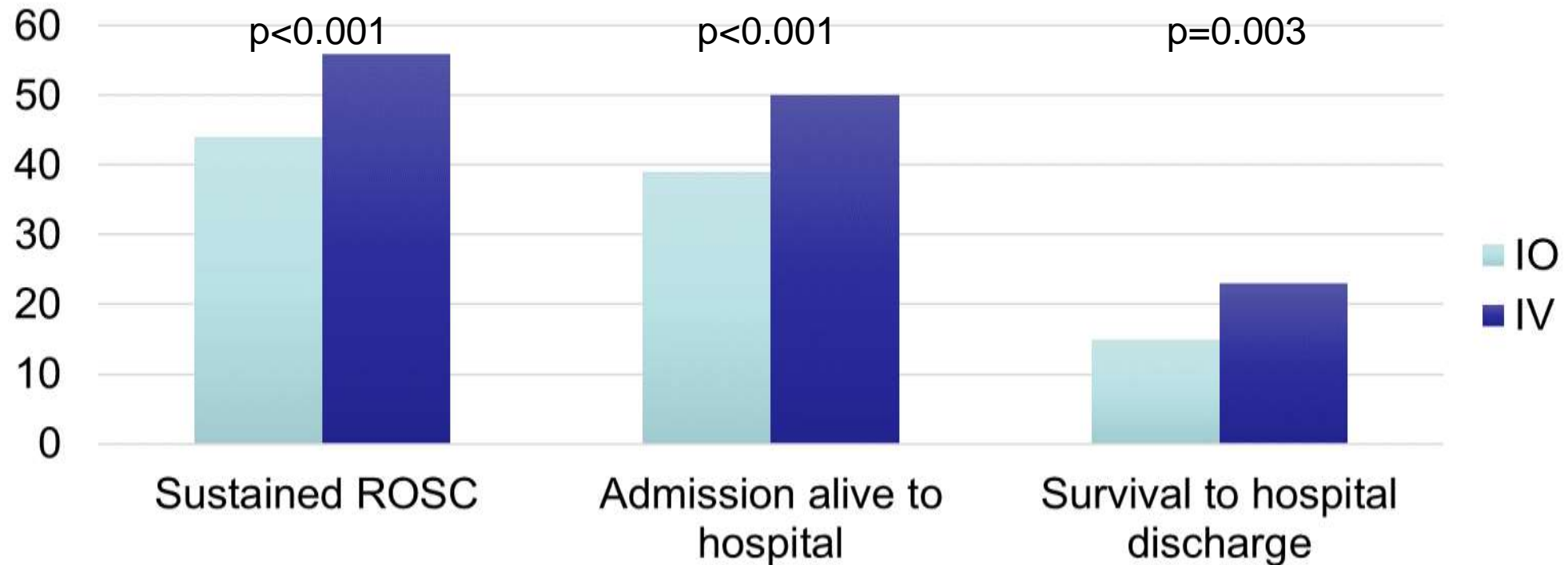
These survival differences were statistically significant when compared in a multivariate logistic regression model (adjusted odds ratio of IV route for survival to discharge: 1.47 [95%CI 1.26-1.71]), and after propensity score matching (aOR 1.43 [95%CI 1.16-1.76]). **Rates of prehospital ROSC and survival to discharge with favorable neurologic outcome were also higher in the group receiving IV adrenaline.**

Interestingly, while IO adrenaline was indeed administered earlier, the magnitude of this difference (median 15.6 vs. 16.7 min) was relatively small. **Arguably, we should conclude that IV adrenaline is superior when it is associated with only minor delays in adrenaline administration.** The potential benefit of IO adrenaline for a patient in whom obtaining IV access rather than IO access would cause more considerable delays (e.g., children or adults with vascular access challenges)

# Intraosseous compared to intravenous drug resuscitation in out-of-hospital cardiac arrest<sup>☆</sup>

Bryan A. Feinstein<sup>a</sup>, Benjamin A. Stubbs<sup>b</sup>, Tom Rea<sup>c</sup>, Peter J. Kudenchuk<sup>d,\*</sup>

1525 pts. via IV  
275 via tibial-IO



Outcome	Multivariable OR <sup>a</sup> (95% CI)	P value
All patients, n (%)		
Sustained ROSC	0.67 (0.50, 0.88) <sup>b</sup>	0.004
Admission alive to hospital	0.68 (0.51, 0.91) <sup>b</sup>	0.009
Survival to discharge	0.81 (0.55, 1.21) <sup>b</sup>	0.31

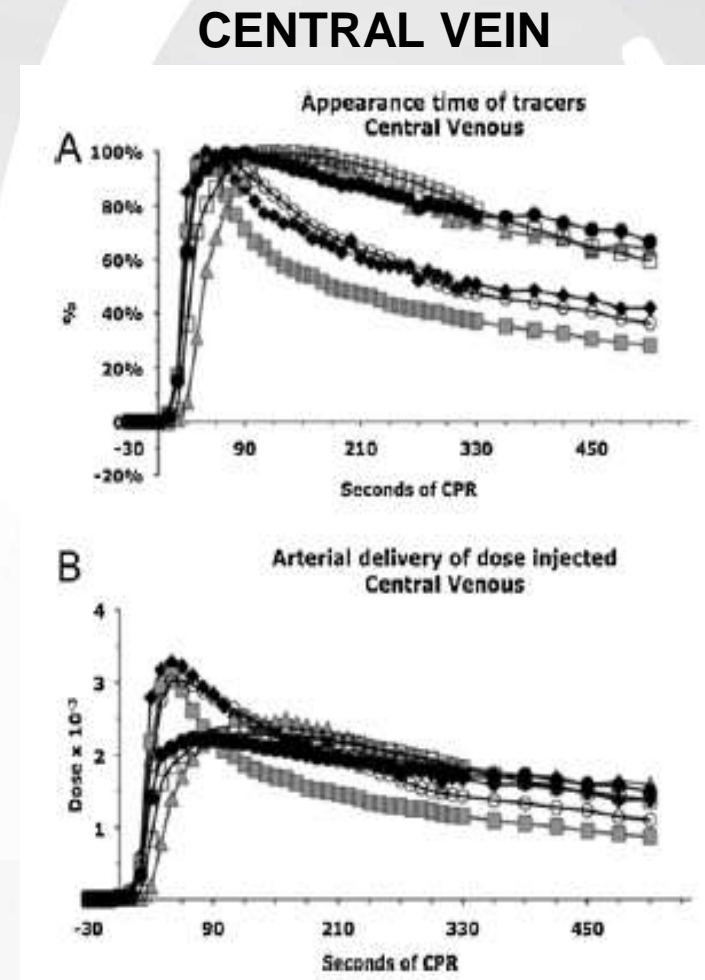
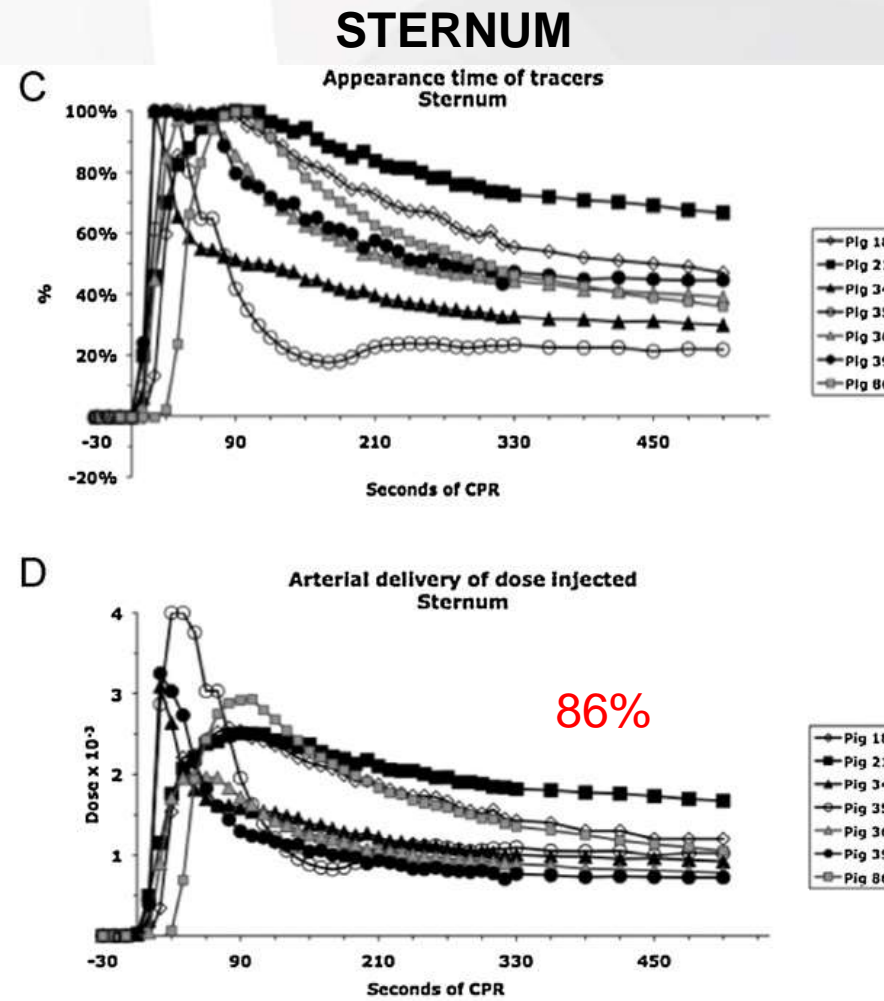
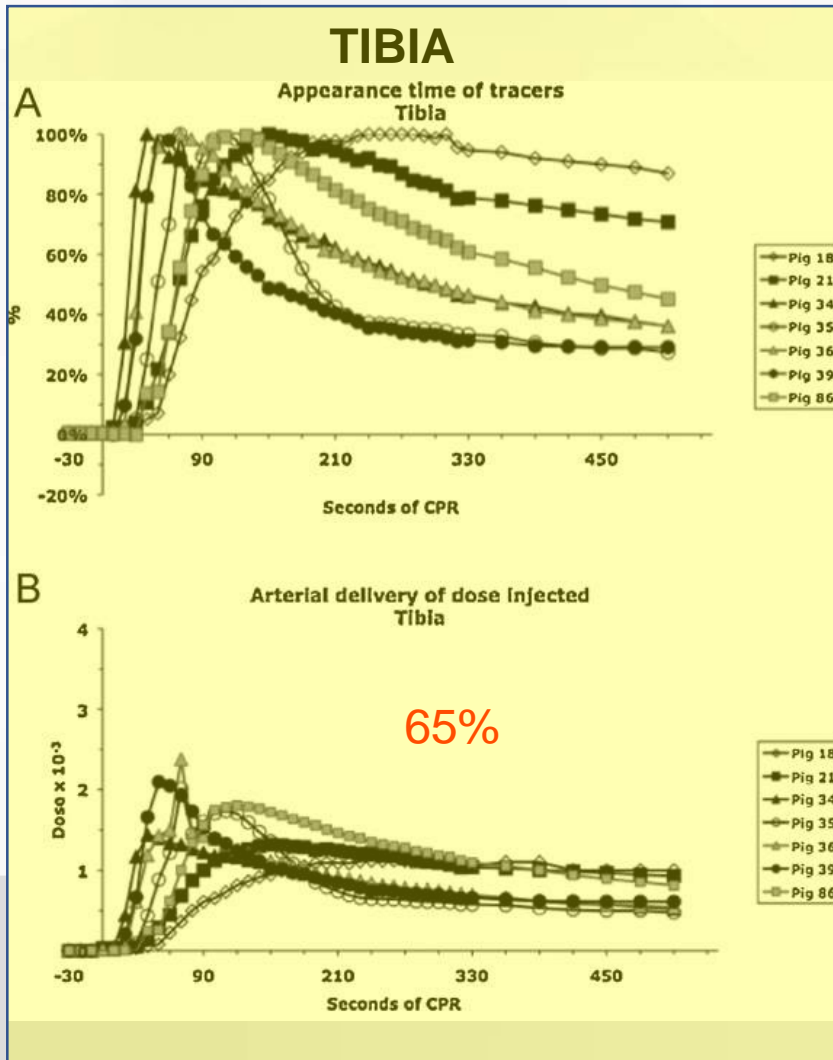
**IO access was associated with a lower likelihood of intermediate outcomes of ROSC and survival to hospital admission**



# Pharmacokinetics of intraosseous and central venous drug delivery during cardiopulmonary resuscitation ☆,☆☆

Pigs

Stephen L. Hoskins<sup>a</sup>, Paulo do Nascimento Jr.<sup>a,b</sup>, Rodrigo M. Lima<sup>a,b</sup>, Jonathan M. Espana-Tenorio<sup>a</sup>, George C. Kramer<sup>a,\*</sup>

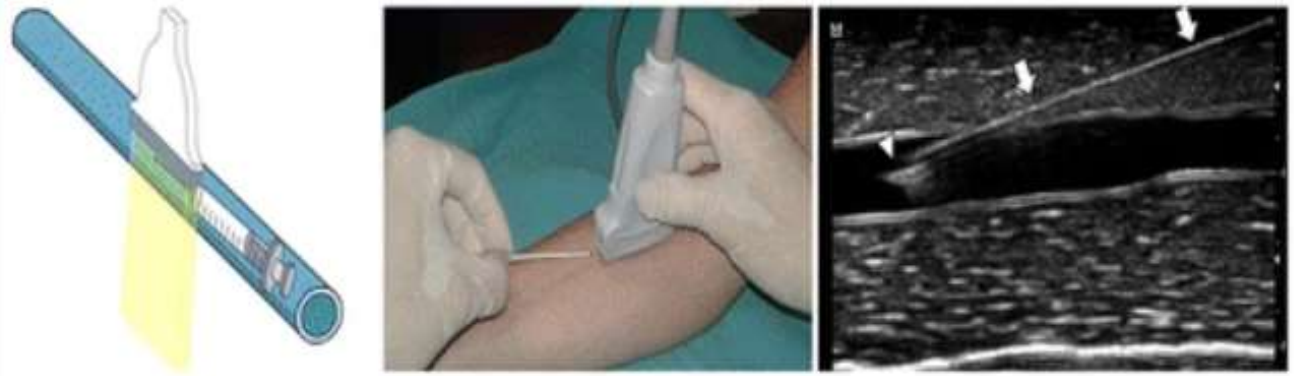


### Cannulation technique

#### Out-of-plane



#### In-plane



# Considerazioni sparse finali

- Non esistono trial randomizzati empowered per testare la differenza tra i due accessi. Nell'analisi prespecificata del trial randomizzato ALPS entrambe in farmaci erano confrontati con placebo e non direttamente tra loro.
- I dati animali mostrano una maggiore efficacia dell'accesso IO sterno/omero vs tibiale. Tuttavia in registri OHCA l'accesso tibiale rappresenta circa il 93-99% nell'adulto
- Lidocaina e Amiodarone hanno comportamenti farmacocinetici particolari che potrebbero condizionare le osservazioni (assorbimento nel periostio e nel midollo grasso con conseguente riduzione della dose circolante disponibile)

... ἔοικα γοῦν τούτου γε σμικρῷ τινι αὐτῷ τούτῳ σοφώτερος εἶναι, ὅτι ἂ μὴ οἶδα οὐδὲ οἶομαι εἰδέναι.

... è dunque probabile che io sia più saggio di lui almeno proprio in questo piccolo particolare, che le cose che non so neppure credo di saperle.



*Critone chiude gli occhi a Socrate di Antonio Canova – Milano Gallerie d'Italia*

**Una vita senza ricerca non è degna per l'uomo di essere vissuta.**



Rimini  
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# Italian Resuscitation Council

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