

# III CONGRESSO NAZIONALE ANEU

(Associazione Neurologia d'Emergenza Urgenza)

Bologna, 8-10 marzo 2018

V SESSIONE

**Cefalee nell'emergenza-urgenza**

*Moderatori: S. Cevoli (Bologna), F.A. de Falco (Napoli)*

**SCENARI DI PRESENTAZIONE DELLA CEFALEA  
NEL DIPARTIMENTO DI EMERGENZA-URGENZA**

Mario Cavazza  
PS e Medicina d'Urgenza  
AOU di Bologna



La gratitudine  
è la più squisita  
forma di cortesia.  
Jacques Maritain

Aforismario



**grazie**



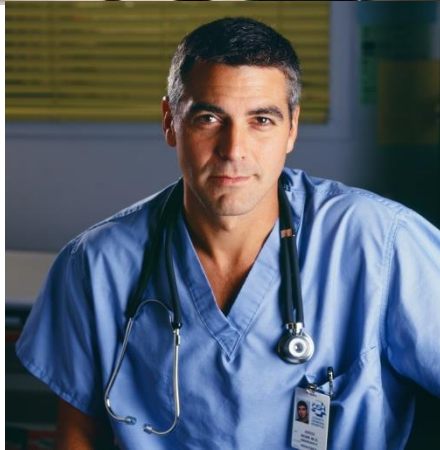
...ma anche a  
**SIN e ANEU**

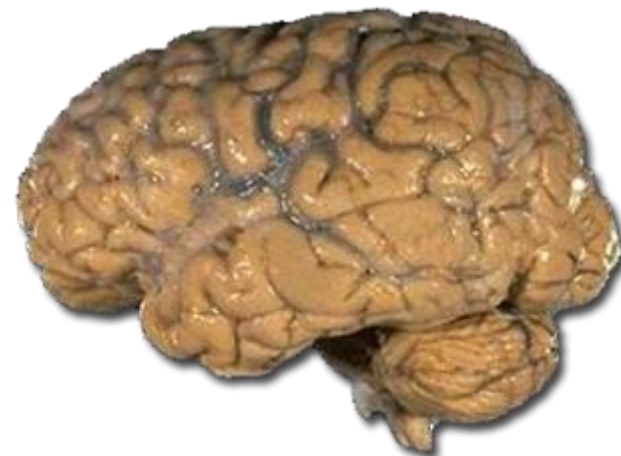


a  
**Pietro  
Cortelli  
e  
alla  
sua  
band**



# il nostro contesto

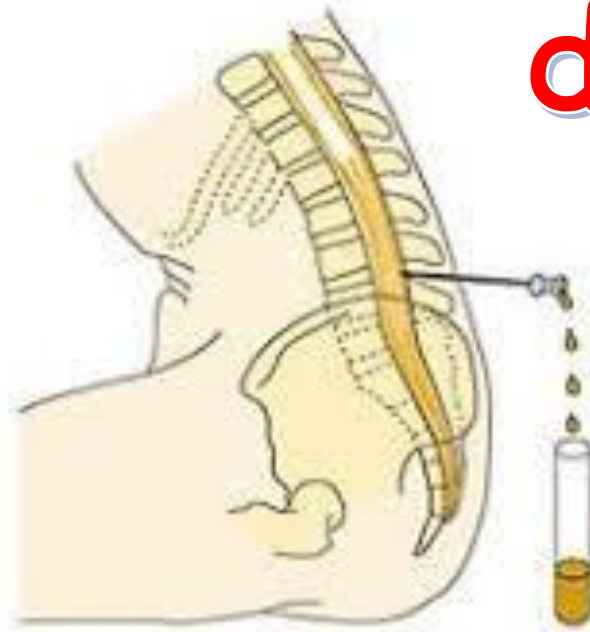




# toolkits



# dopo...



“L'approccio diagnostico alla  
cefalea acuta  
simboleggia la pratica della  
medicina d'urgenza  
con una alta posta in gioco  
e senza una netta manifestazione  
clinica ma con tante rivalse  
in agguato”

Christopher R. Carpenter,



# Evidence-Based Diagnosis of Nontraumatic Headache in the Emergency Department: A Consensus Statement on Four Clinical Scenarios

P. Cortelli, MD; S. Cevoli, MD; F. Nonino, MD; D. Baronciani, MD; N. Magrini, MD; G. Re, MD; G. De Berti, MD; G. C. Manzoni, MD; P. Querzani, MD; A. Vandelli, MD

on behalf of the **Multidisciplinary** Group for Nontraumatic Headache in the Emerg.Department

(*Headache* 2004;44:1-9)



# Risk stratification of non-traumatic headache in the emergency department

Daniela Grimaldi, Francesco Nonino, Sabina Cevoli,  
Alberto Vandelli, Roberto D'Amico, Pietro Cortelli

(J Neurol, 2009, e 256, 51-57)





## SCENARIO 1

"worst ever headache"

Insorta tipo fulmine a ciel sereno e/o

con segni neurologici focali e/o

con vomito o sincope all'esordio

## SCENARIO 3

No storia di cefalea

Cefalea esordita recentemente

progressivamente ingravescente

## SCENARIO 2

Cefalea severa associata a febbre e/o rigor nucale



## SCENARIO 4

Storia di cefalea

Attacco simile ai precedenti come intensità, durata e sintomi associati

## *Conclusions 1*

An algorithm based on **four clinical scenarios** can be administered to the majority of patients presenting to the ED with the chief complaint of NTH.



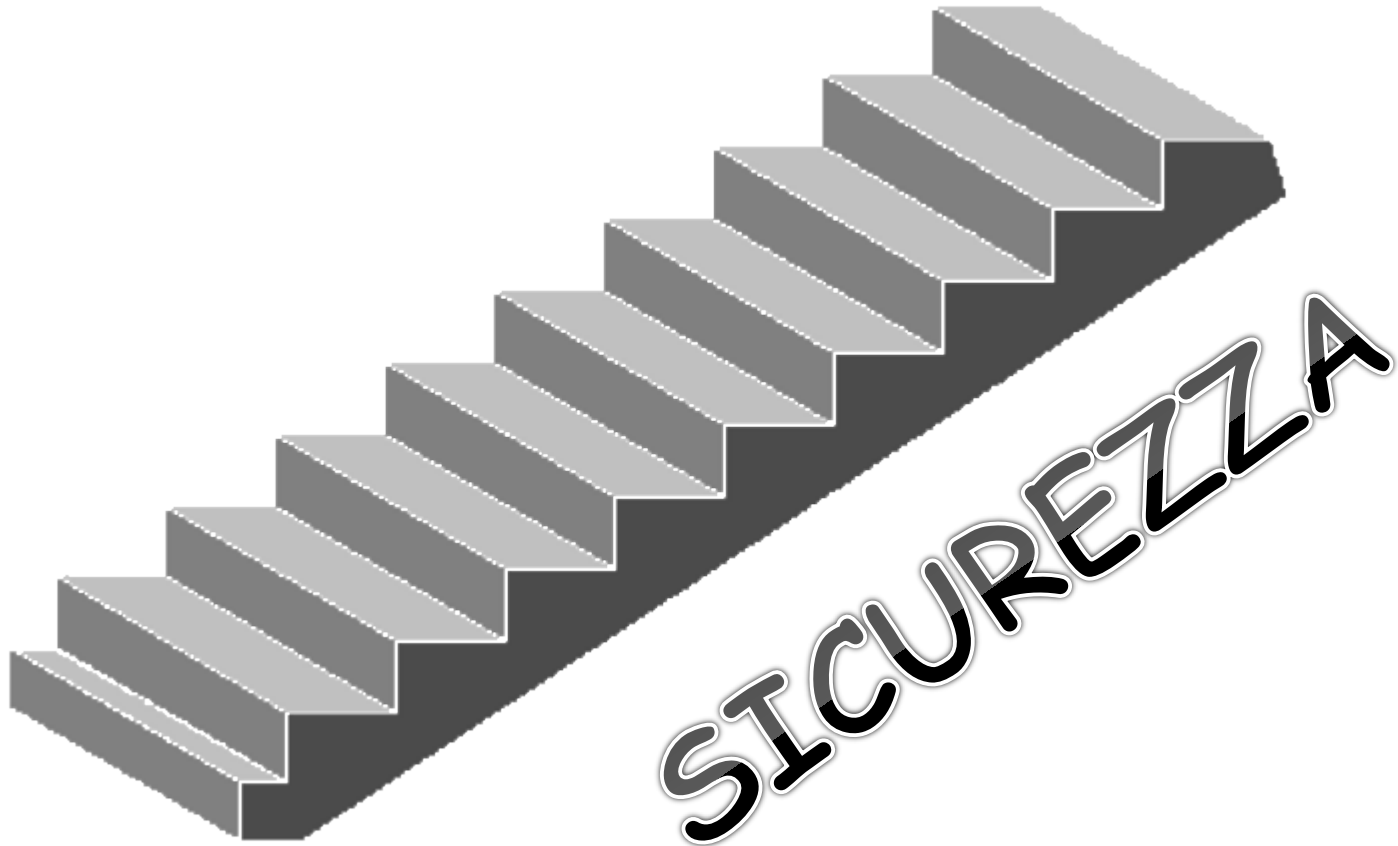
## Conclusions 2

The algorithm showed a **good accuracy** in identifying patients with non-life threatening causes of headache and could be used as a **risk stratification** tool to improve clinical decision-making.



# LA FILOSOFIA DI BASE DELL'EMERGENZA

- **FAI AL MEGLIO**
- **CON QUELLO CHE HAI**
- **PIU' RAPIDAMENTE CHE PUOI**



# IL PROBLEMA "CEFALEA ACUTA" IN ED

## ○ I VOLUMI:

Frequenza come "chief complaint":  
2-4 % (4° più comune).

30 ml gli accessi ai PS italiani nel  
2015.

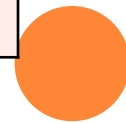
## ○ LE SFIDE:

Escludere le "life threatening  
diseases"





<b>ACCESSI di PS 2017</b>	<b>71367</b>
<b>ACCESSI PER CEFALEA ACUTA</b>	<b>1489 (2.08 %)</b>
<b>SESSO</b>	<b>43% M 57% F</b>
<b>ETA' MEDIA</b>	<b>47.23</b>
<b>RICOVERATI</b>	<b>88 (5,9%)</b>



# Headache in the Emergency Department

## Avoiding Misdiagnosis of Dangerous Secondary Causes

Ramin R. Tabatabai, MD\*, Stuart P. Swadron, MD, FRCPC

Emerg Med Clin N Am 34 (2016) 695–716



An in-depth understanding of several specific pathologic entities, many of them rare, is necessary to identify serious disease without the overuse of diagnostic resources in patients with primary and benign presentations.





# IL PROBLEMA IN ED

## ○ Cefalea secondaria: **5%** di tutte le cefalee acute in ED

Intracranial hemorrhage (subarachnoid, parenchymal)
Cerebral venous thrombosis
Reversible cerebral vasoconstriction syndrome (RCVS)
Carotid or vertebral artery dissection
Acute posttraumatic (postconcussive) headache
Hydrocephalus
Meningitis
Encephalitis
Acute angle closure glaucoma
Acute sinusitis
Systemic infection
Medication-induced headache
Intracranial mass

Approach to the Workup and Management of Headache in the Emergency Department and Inpatient Settings

Morris Levin, MD<sup>1</sup>

Semin Neurol 2015;35:667-674.





# IL PROBLEMA IN ED

## "red flags"

Red flag signs and symptoms (SNOOP)

- S Sintomi sistemici** Having HIV infection, history of cancer
  - N Sintomi/segni neurologici** Ataxia, asymmetric reflexes or other abnormalities on examination
  - O Insorgenza** Second thunder-clap
  - O Età avanzata** New onset or progressive headache
  - P Storia di cefalea** Headache or different (change in attack frequency, severity, or clinical features)
- Headache in children > 5 years old  
Headache worsening under observation

Clinic and Emergency Room Evaluation and Testing of Headache

Barbara L. Nye, MD; Thomas N. Ward, MD

Headache | October 2015



# IL SISTEMA "SCENARIO"



J Neurol, 2009

Headache, 2004

i soliti sospetti...

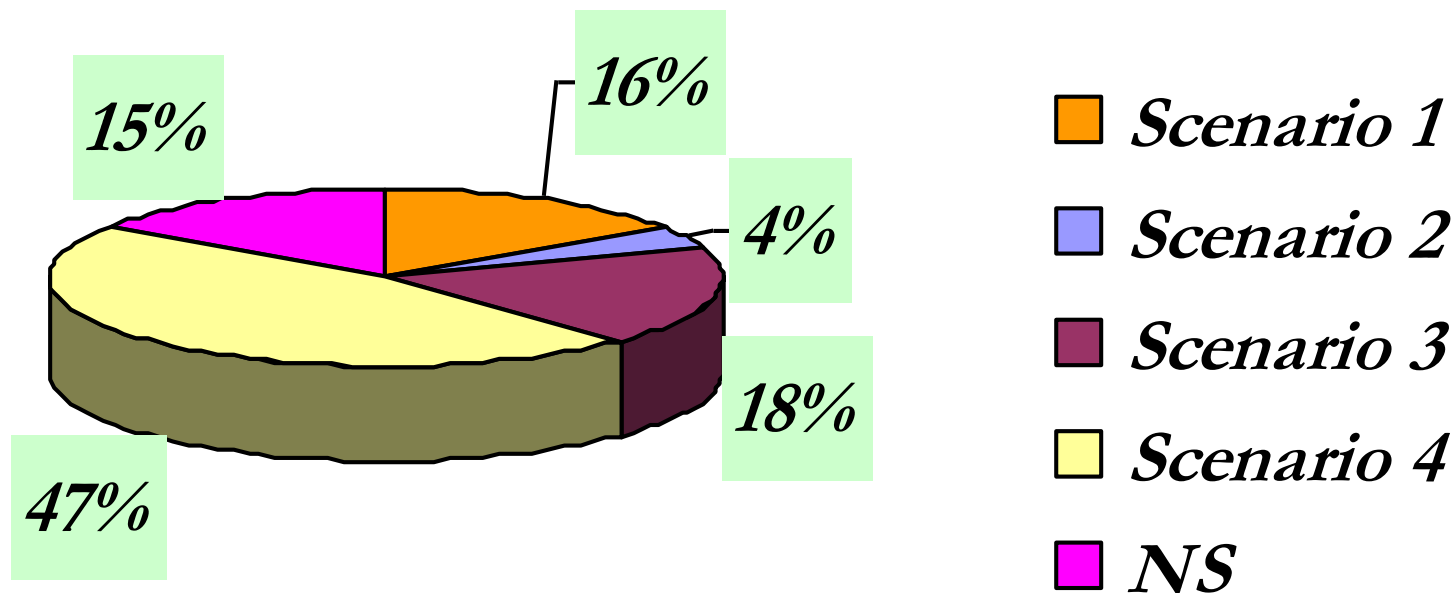


# Risultati DIACEF

N° = 256

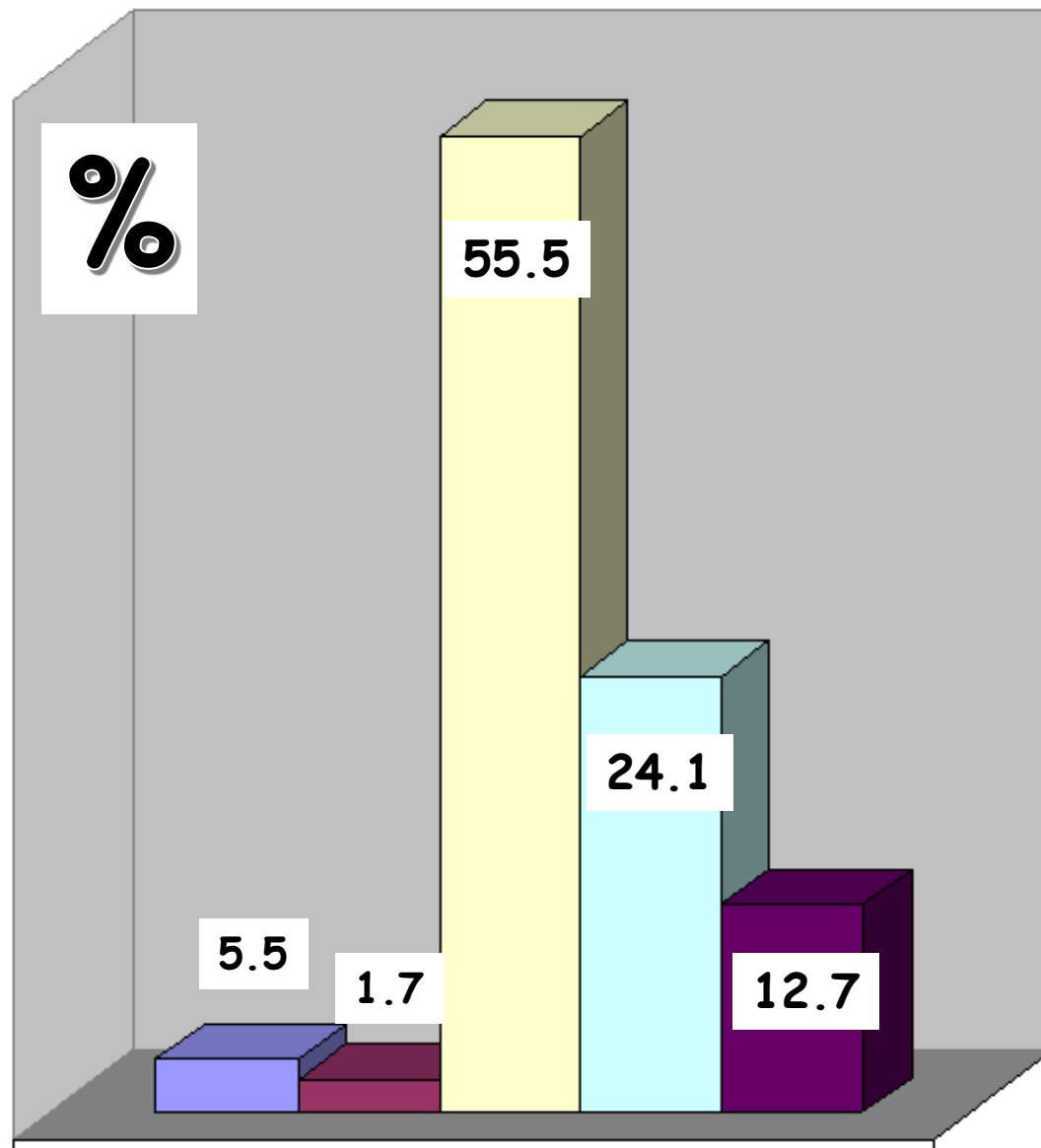
F= 176 (68,8%)

Età media: 45aa (range 18-93)



*Distribuzione per scenari dei paziente inclusi*





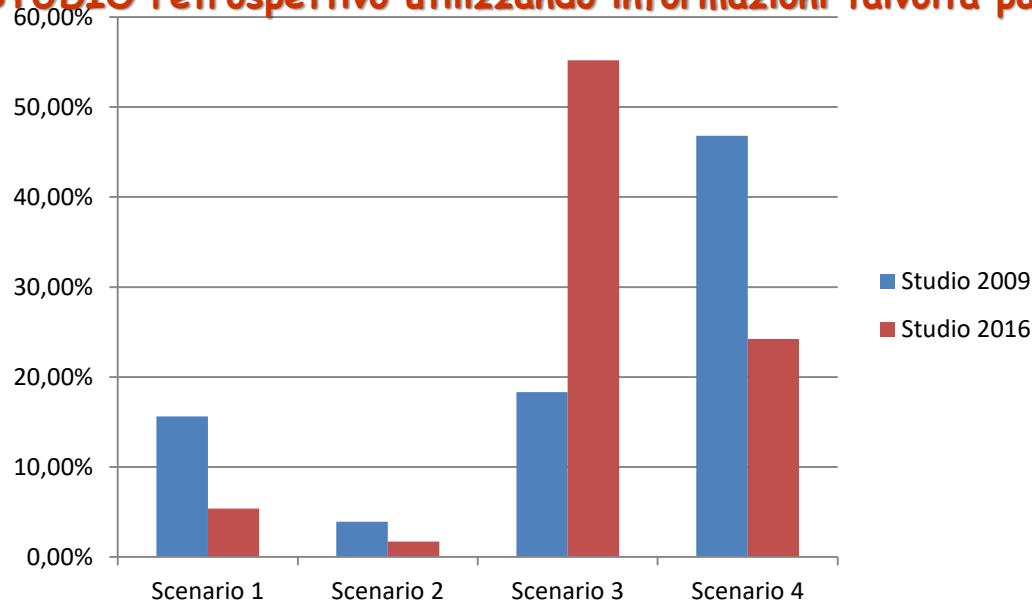
- scenario 1
- scenario 2
- scenario 3
- scenario 4
- Non classificabile in scenari

Scenario 1 2 3 4 n.d.



•Diacef: studio prospettico dove il medico attribuiva immediatamente il paziente ad uno scenario

•2016-2017 : **STUDIO** retrospettivo utilizzando informazioni talvolta parziali ed incomplete.



Comunque si evidenzia che nel **86.48%** dei casi (pari al 96.85% dei casi in cui i dati erano sufficienti per la corretta valutazione dell'attribuzione dello scenario) i pazienti sono stati correttamente attribuiti allo scenario Appropriato.



# SCENARIO 1

"worst ever headache"

insorta tipo fulmine a ciel  
sereno

e/o

con segni neurologici focali

e/o

con vomito o sincope all'esordio





**ESA**





## DIAGNOSI MANCATE

- 12-53% nei vari contesti
- 5% nei PS
- Prevalentemente casi a bassa acuzie
- Di più in non-teaching hospital
- Emorragia sentinella non diagnosticata: 70% mortalità



# Spontaneous Subarachnoid Hemorrhage: A Systematic Review and Meta-Analysis Describing the Diagnostic Accuracy of History, Physical Exam, Imaging, and Lumbar Puncture with an Exploration of Test Thresholds

*Acad Emerg Med.* 2016 September ; 23(9): 963–1003. doi:10.1111/acem.12984.

**Christopher R. Carpenter, MD, MSc [Associate Professor of Emergency Medicine],**  
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**Adnan M. Hussain, MD [Resident Physician],**  
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**Gregory J. Zipfel, MD [Associate Professor of Neurosurgery],**  
Washington University in St. Louis

**Susan Fowler [Clinical Librarian],**  
Becker Medical Library, Washington University School of Medicine in St. Louis

**Jesse M. Pines, MD, MBA, MSCE [Professor of Emergency Medicine] [Director, Center for Practice Innovation], and**  
George Washington University

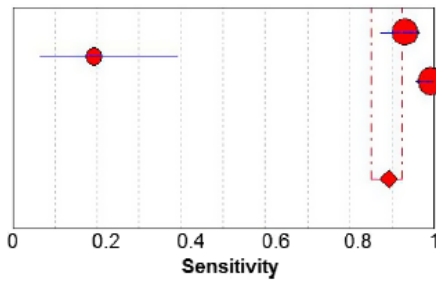
**Marco L.A. Sivilotti, MD, MSc [Professor of Emergency Medicine and of Biomedical & Molecular Sciences]**  
Queen's University



***Background:*** Spontaneous subarachnoid hemorrhage (SAH) is a rare, but serious etiology of headache. The diagnosis of SAH is especially challenging in alert, neurologically intact patients, as missed or delayed diagnosis can be catastrophic.

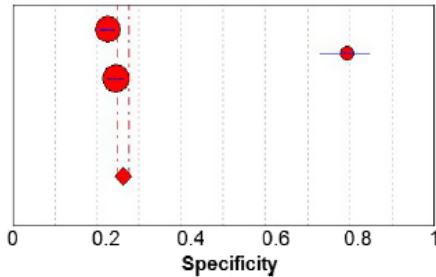


## Worst Headache of Life



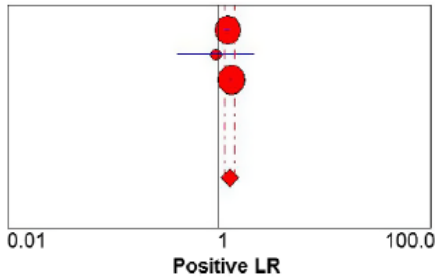
Study	Sensitivity (95% CI)
Perry 2010	0.20 (0.15 - 0.25)
Czuczman 2013	0.93 (0.87 - 0.97)
Perry 2013	0.99 (0.96 - 1.00)

Pooled Sensitivity = 0.89 (0.85 to 0.93)  
Chi-square = 94.09; df = 2 (p = 0.0000)  
Inconsistency (I-square) = 97.9 %



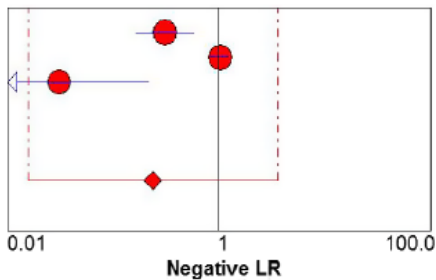
Study	Specificity (95% CI)
Perry 2010	0.23 (0.21 - 0.24)
Czuczman 2013	0.79 (0.73 - 0.85)
Perry 2013	0.24 (0.23 - 0.26)

Pooled Specificity = 0.26 (0.25 to 0.28)  
Chi-square = 256.24; df = 2 (p = 0.0000)  
Inconsistency (I-square) = 99.2 %



Study	Positive LR (95% CI)
Perry 2010	1.20 (1.14 - 1.27)
Czuczman 2013	0.93 (0.40 - 2.15)
Perry 2013	1.31 (1.28 - 1.35)

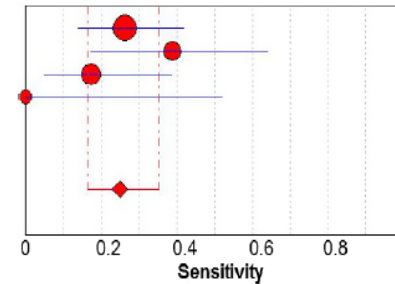
Random Effects Model  
Pooled Positive LR = 1.25 (1.13 to 1.39)  
Cochran-Q = 13.90; df = 2 (p = 0.0010)  
Inconsistency (I-square) = 85.6 %  
Tau-squared = 0.0056



Study	Negative LR (95% CI)
Perry 2010	0.31 (0.16 - 0.58)
Czuczman 2013	1.02 (0.83 - 1.24)
Perry 2013	0.03 (0.00 - 0.22)

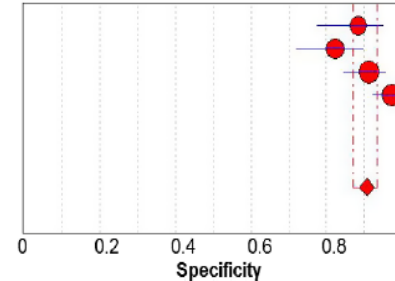
Random Effects Model  
Pooled Negative LR = 0.24 (0.02 to 3.55)  
Cochran-Q = 105.17; df = 2 (p = 0.0000)  
Inconsistency (I-square) = 98.1 %  
Tau-squared = 5.3999

## Altered Mental Status



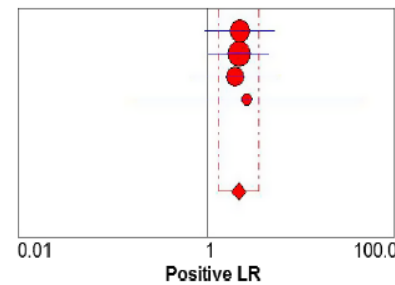
Study	Sensitivity (95% CI)
Linn 1998	0.26 (0.14 - 0.42)
Morgenstern 1998	0.39 (0.17 - 0.64)
Landtblom 2002	0.17 (0.05 - 0.39)
Carstairs 2006	0.00 (0.00 - 0.52)

Pooled Sensitivity = 0.25 (0.16 to 0.35)  
Chi-square = 5.36; df = 3 (p = 0.1474)  
Inconsistency (I-square) = 44.0 %



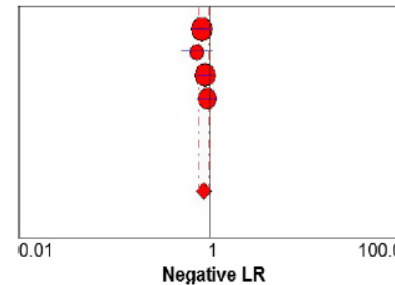
Study	Specificity (95% CI)
Linn 1998	0.88 (0.77 - 0.95)
Morgenstern 1998	0.82 (0.72 - 0.90)
Landtblom 2002	0.91 (0.84 - 0.96)
Carstairs 2006	0.97 (0.92 - 0.99)

Pooled Specificity = 0.91 (0.87 to 0.93)  
Chi-square = 13.55; df = 3 (p = 0.0036)  
Inconsistency (I-square) = 77.9 %



Study	Positive LR (95% CI)
Linn 1998	2.24 (0.95 - 5.31)
Morgenstern 1998	2.19 (1.04 - 4.64)
Landtblom 2002	1.98 (0.68 - 5.78)
Carstairs 2006	2.67 (0.15 - 45.97)

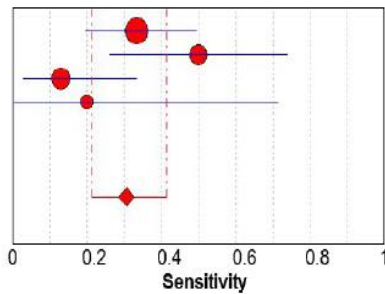
Random Effects Model  
Pooled Positive LR = 2.18 (1.33 to 3.56)  
Cochran-Q = 0.05; df = 3 (p = 0.9967)  
Inconsistency (I-square) = 0.0 %  
Tau-squared = 0.0000



Study	Negative LR (95% CI)
Linn 1998	0.84 (0.68 - 1.02)
Morgenstern 1998	0.74 (0.51 - 1.09)
Landtblom 2002	0.91 (0.74 - 1.10)
Carstairs 2006	0.95 (0.74 - 1.21)

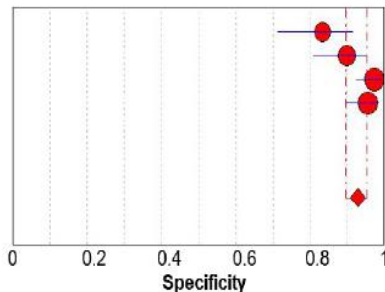
Random Effects Model  
Pooled Negative LR = 0.87 (0.78 to 0.98)  
Cochran-Q = 1.69; df = 3 (p = 0.6396)  
Inconsistency (I-square) = 0.0 %  
Tau-squared = 0.0000

# Focal Neuro Deficit



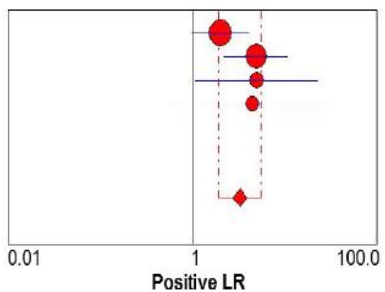
Study	Sensitivity (95% CI)
Linn 1998	0.33 (0.20 - 0.50)
Morgenstern 1998	0.50 (0.26 - 0.74)
Landtblom 2002	0.13 (0.03 - 0.34)
Carstairs 2006	0.20 (0.01 - 0.72)
<b>Pooled Sensitivity</b>	<b>0.31 (0.21 to 0.41)</b>

Chi-square = 7.27; df = 3 (p = 0.0637)  
Inconsistency (I-square) = 58.8 %



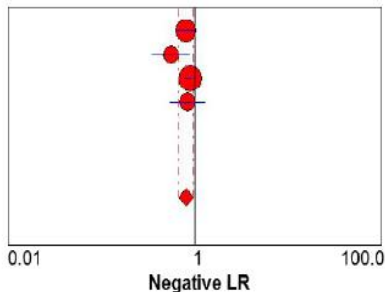
Study	Specificity (95% CI)
Linn 1998	0.83 (0.71 - 0.92)
Morgenstern 1998	0.90 (0.81 - 0.96)
Landtblom 2002	0.97 (0.93 - 0.99)
Carstairs 2006	0.95 (0.90 - 0.99)
<b>Pooled Specificity</b>	<b>0.93 (0.90 to 0.95)</b>

Chi-square = 12.94; df = 3 (p = 0.0048)  
Inconsistency (I-square) = 76.8 %



Study	Positive LR (95% CI)
Linn 1998	2.00 (0.98 - 4.06)
Morgenstern 1998	4.94 (2.21 - 11.02)
Landtblom 2002	4.96 (1.07 - 23.04)
Carstairs 2006	4.44 (0.63 - 31.24)
<b>Random Effects Model</b>	<b>Pooled Positive LR = 3.26 (1.93 to 5.52)</b>

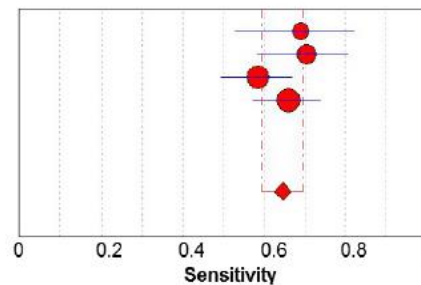
Cochran-Q = 3.29; df = 3 (p = 0.3486)  
Inconsistency (I-square) = 8.9 %  
Tau-squared = 0.0287



Study	Negative LR (95% CI)
Linn 1998	0.80 (0.63 - 1.02)
Morgenstern 1998	0.56 (0.35 - 0.89)
Landtblom 2002	0.89 (0.76 - 1.05)
Carstairs 2006	0.84 (0.54 - 1.30)
<b>Random Effects Model</b>	<b>Pooled Negative LR = 0.81 (0.67 to 0.97)</b>

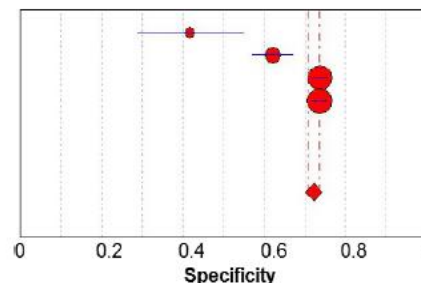
Cochran-Q = 4.99; df = 3 (p = 0.1726)  
Inconsistency (I-square) = 39.9 %  
Tau-squared = 0.0138

# Vomiting



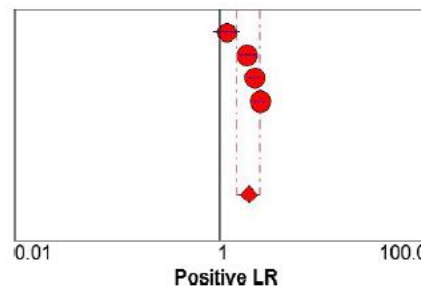
Study	Sensitivity (95% CI)
Linn 1998	0.69 (0.53 - 0.82)
Bo 2008	0.70 (0.58 - 0.81)
Perry 2010	0.58 (0.49 - 0.67)
Perry 2013	0.66 (0.57 - 0.74)
<b>Pooled Sensitivity</b>	<b>0.65 (0.59 to 0.69)</b>

Chi-square = 3.65; df = 3 (p = 0.3023)  
Inconsistency (I-square) = 17.7 %



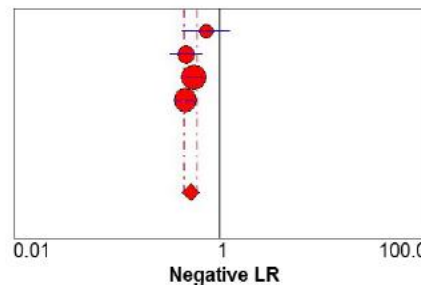
Study	Specificity (95% CI)
Linn 1998	0.42 (0.29 - 0.55)
Bo 2008	0.62 (0.57 - 0.67)
Perry 2010	0.74 (0.72 - 0.76)
Perry 2013	0.74 (0.72 - 0.76)
<b>Pooled Specificity</b>	<b>0.72 (0.71 to 0.74)</b>

Chi-square = 45.48; df = 3 (p = 0.0000)  
Inconsistency (I-square) = 93.4 %



Study	Positive LR (95% CI)
Linn 1998	1.18 (0.88 - 1.59)
Bo 2008	1.86 (1.52 - 2.27)
Perry 2010	2.22 (1.89 - 2.62)
Perry 2013	2.50 (2.16 - 2.88)
<b>Random Effects Model</b>	<b>Pooled Positive LR = 1.92 (1.48 to 2.48)</b>

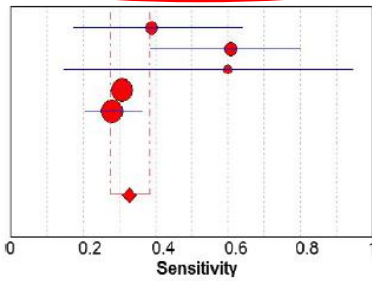
Cochran-Q = 22.10; df = 3 (p = 0.0001)  
Inconsistency (I-square) = 86.4 %  
Tau-squared = 0.0580



Study	Negative LR (95% CI)
Linn 1998	0.74 (0.43 - 1.28)
Bo 2008	0.48 (0.33 - 0.69)
Perry 2010	0.56 (0.46 - 0.69)
Perry 2013	0.46 (0.36 - 0.59)
<b>Random Effects Model</b>	<b>Pooled Negative LR = 0.52 (0.45 to 0.61)</b>

Cochran-Q = 3.40; df = 3 (p = 0.3336)  
Inconsistency (I-square) = 11.8 %  
Tau-squared = 0.0031

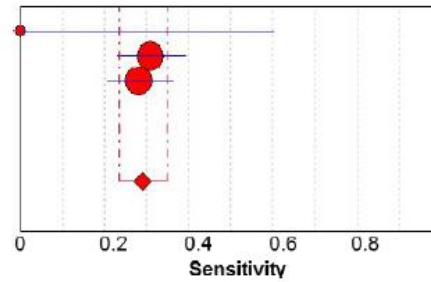
## Neck stiffness, subjective



Study	Sensitivity (95% CI)
Morgenstern 1998	0.39 (0.17 - 0.64)
Landtblom 2002	0.61 (0.39 - 0.80)
Carstairs 2006	0.60 (0.15 - 0.95)
Perry 2010	0.31 (0.23 - 0.39)
Perry 2013	0.26 (0.21 - 0.37)

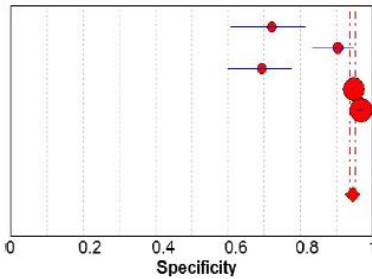
Pooled Sensitivity = 0.33 (0.28 to 0.38)  
Chi-square = 11.07; df = 4 (p = 0.0258)  
Inconsistency (I-square) = 63.9 %

## Neck stiffness, objective



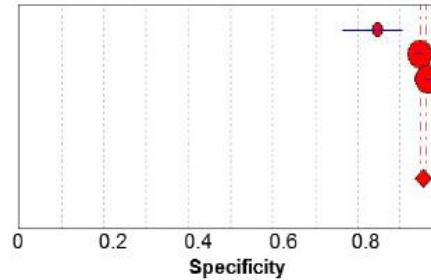
Study	Sensitivity (95% CI)
Carstairs 2006	0.00 (0.00 - 0.00)
Perry 2010	0.31 (0.23 - 0.39)
Perry 2013	0.28 (0.21 - 0.37)

Pooled Sensitivity = 0.29 (0.24 to 0.35)  
Chi-square = 3.00; df = 2 (p = 0.2236)  
Inconsistency (I-square) = 33.2 %



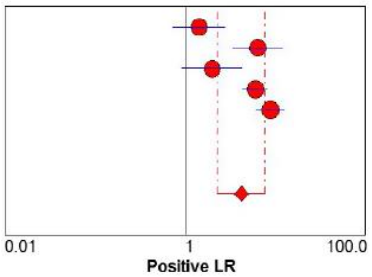
Study	Specificity (95% CI)
Morgenstern 1998	0.72 (0.61 - 0.82)
Landtblom 2002	0.90 (0.83 - 0.95)
Carstairs 2006	0.69 (0.60 - 0.78)
Perry 2010	0.95 (0.94 - 0.96)
Perry 2013	0.97 (0.96 - 0.98)

Pooled Specificity = 0.95 (0.94 to 0.95)  
Chi-square = 136.97; df = 4 (p = 0.0000)  
Inconsistency (I-square) = 97.1 %



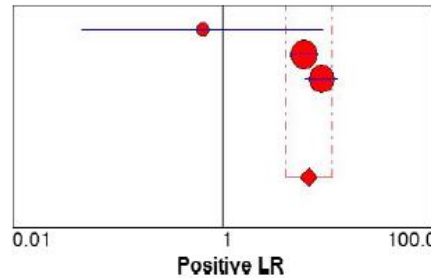
Study	Specificity (95% CI)
Carstairs 2006	0.85 (0.77 - 0.91)
Perry 2010	0.95 (0.94 - 0.96)
Perry 2013	0.97 (0.96 - 0.98)

Pooled Specificity = 0.96 (0.95 to 0.96)  
Chi-square = 29.70; df = 2 (p = 0.0000)  
Inconsistency (I-square) = 93.3 %



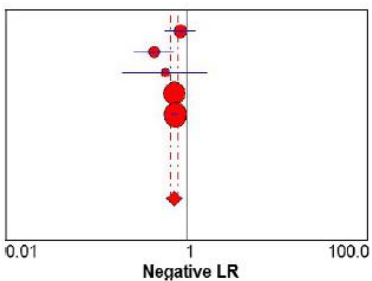
Study	Positive LR (95% CI)
Morgenstern 1998	1.40 (0.71 - 2.75)
Landtblom 2002	6.31 (3.29 - 12.09)
Carstairs 2006	1.96 (0.91 - 4.22)
Perry 2010	5.93 (4.29 - 8.19)
Perry 2013	8.76 (6.08 - 12.60)

Random Effects Model  
Pooled Positive LR = 4.12 (2.24 to 7.59)  
Cochran-Q = 29.38; df = 4 (p = 0.0000)  
Inconsistency (I-square) = 86.4 %  
Tau-squared = 0.4022



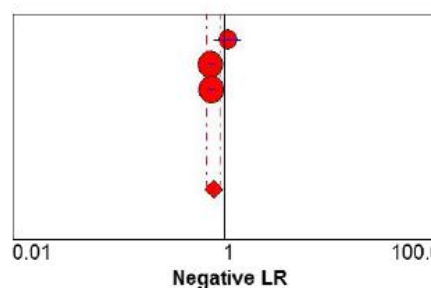
Study	Positive LR (95% CI)
Carstairs 2006	0.64 (0.04 - 9.19)
Perry 2010	5.93 (4.29 - 8.19)
Perry 2013	8.76 (6.08 - 12.60)

Random Effects Model  
Pooled Positive LR = 6.59 (3.95 to 11.00)  
Cochran-Q = 5.69; df = 2 (p = 0.0581)  
Inconsistency (I-square) = 64.9 %  
Tau-squared = 0.1111



Study	Negative LR (95% CI)
Morgenstern 1998	0.85 (0.57 - 1.25)
Landtblom 2002	0.43 (0.26 - 0.72)
Carstairs 2006	0.58 (0.20 - 1.70)
Perry 2010	0.73 (0.65 - 0.82)
Perry 2013	0.74 (0.67 - 0.83)

Random Effects Model  
Pooled Negative LR = 0.73 (0.66 to 0.80)  
Cochran-Q = 5.00; df = 4 (p = 0.2870)  
Inconsistency (I-square) = 20.0 %  
Tau-squared = 0.0027



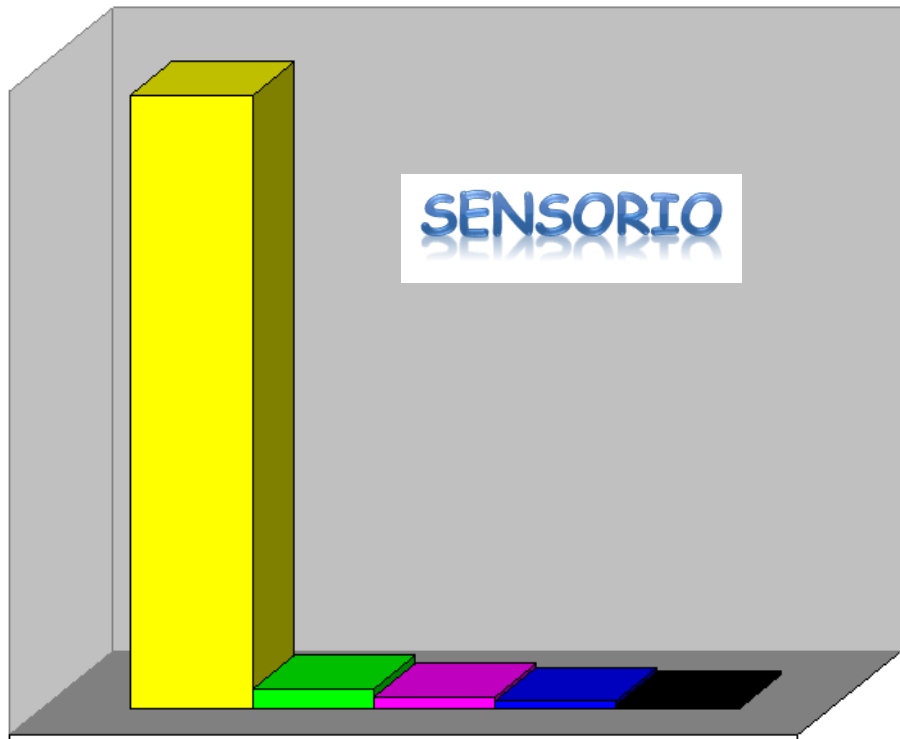
Study	Negative LR (95% CI)
Carstairs 2006	1.07 (0.79 - 1.44)
Perry 2010	0.73 (0.65 - 0.82)
Perry 2013	0.74 (0.67 - 0.83)

Random Effects Model  
Pooled Negative LR = 0.78 (0.68 to 0.90)  
Cochran-Q = 5.58; df = 2 (p = 0.0615)  
Inconsistency (I-square) = 64.1 %  
Tau-squared = 0.0096

## CONCLUSIONI

- Anche se alcuni segni o sintomi aumentano o riducono la probabilità di ESA, **NESSUNA** singola caratteristica è sufficiente per escluderla o confermarla.





- Normale
- Agitato
- Confuso
- Assopito
- Coma

1



**ACCESSI di 71367 PS 2017**

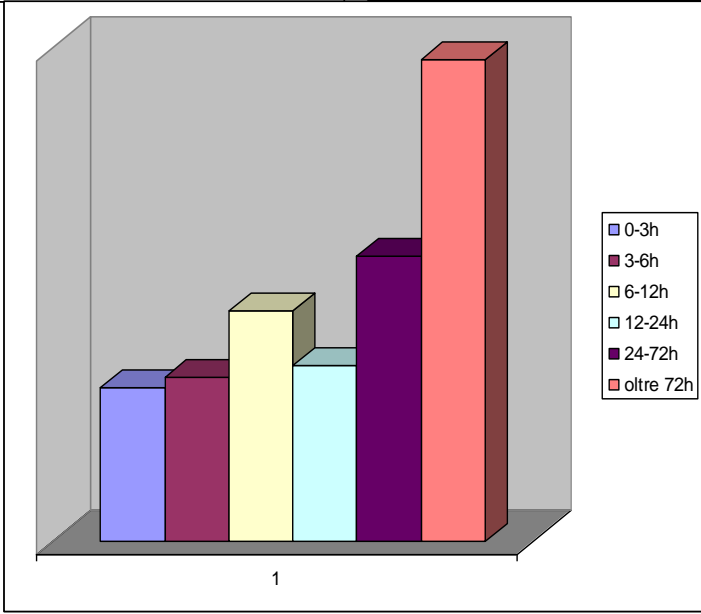
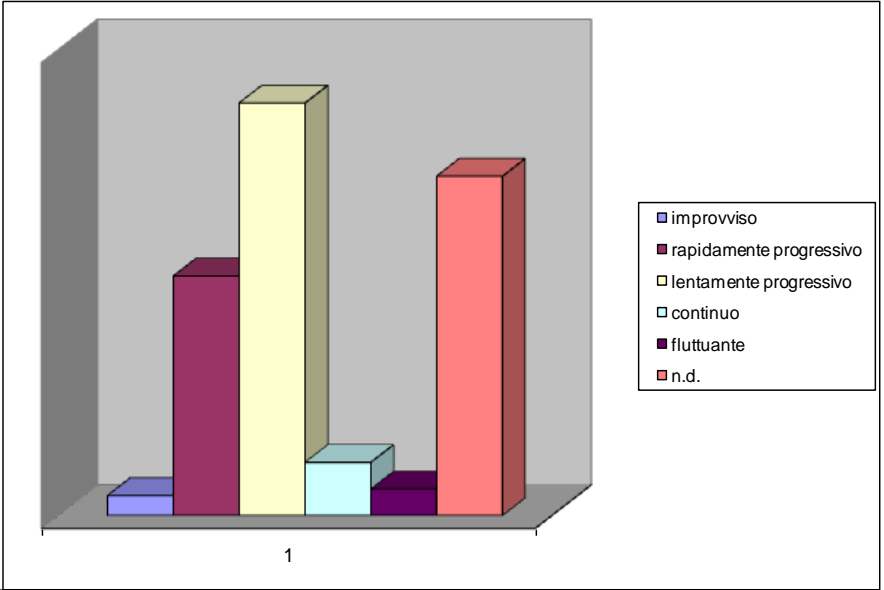
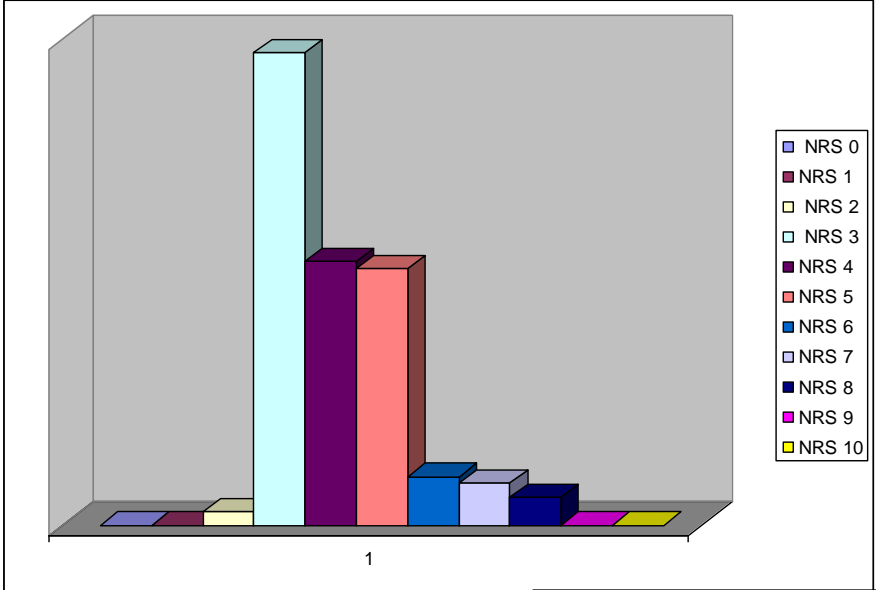
<b>GCS</b>	
15	=92%
14	=3%
13	=2%
<8	=3%





# DOLORE (NRS)


# ANDAMENTO DEL DOLORE



# TEMPO D'ESORDIO



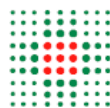
# Distinguishing Characteristics of Headache in Nontraumatic Subarachnoid Hemorrhage

Brian Mac Grory, MB, BCh, BAO ; Linh Vu, MD; Shawna Cutting, MD; Evadne Marcolini, MD; Christopher Gottschalk, MD; David Greer, MD, MA

*Headache* 2017;

	PPV	NPV
Onset during exertion	64%	96%
<u>“Worst headache of my life”</u>	81%	98%
Location of headache		
Occipital	27%	92%
Holocranial	22%	92%
Headache quality		
Stabbing	50%	91%
Presence of prior headaches	8%	70%
Time to peak intensity		
<u>Instantaneously (&lt;1 second)</u>	48%	95%
0-60 seconds	41%	97%





PDTA del paziente affetto da emorragia  
subaracnoidea

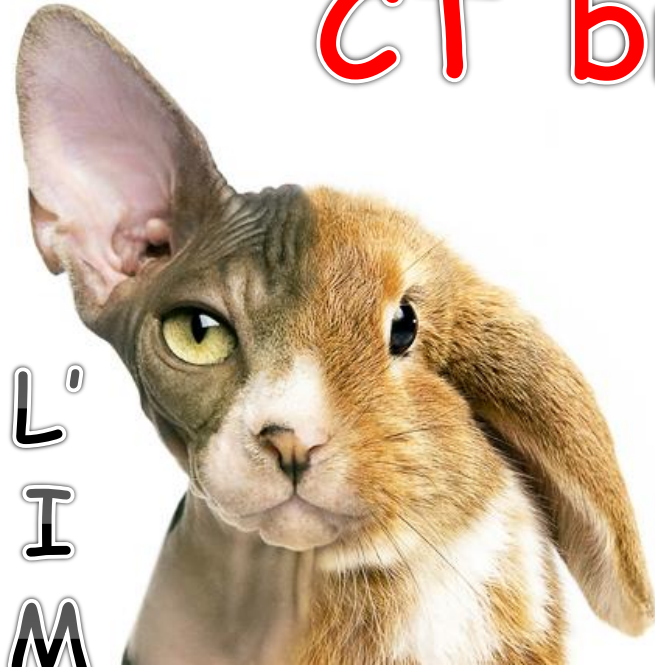
Percorso Diagnostico Terapeutico Assistenziale  
Codice PDTA017 AUSLBO

Redazione

Coordinatore: Carlo Bortolotti, U.O.C. di Neurochirurgia IRCCS

In una percentuale di pazienti (intorno al 20 %), l'esordio clinico può essere preceduto da una cefalea modesta (cefalea sentinella o **"warningleak"**) spesso sottostimata dal paziente o non correttamente diagnosticata dal personale medico (circa il 40% dei casi), espressione di un piccolo sanguinamento dell'aneurisma nello spazio sub-aracnoideo o di fenomeni di microdissezione della parete dell'aneurisma, che in oltre il 75 % dei casi si verifica entro le due settimane che precedono il sanguinamento maggiore.

# CT brain



L'  
I  
M  
P  
U  
L  
S  
O



Anche se so che nel 95% dei casi è normale non la faccio?



# CT brain



la saggezza



# Determinants of Computed Tomography Head Scan Ordering for Patients with Low- Risk Headache in the Emergency Department

Meaghan J. Mackenzie <sup>1</sup> , Rashi Hiranandani <sup>2</sup> , Dongmei Wang <sup>3</sup> , Tak Fung <sup>4</sup> , Eddy Lang <sup>5</sup>

2017 Mackenzie et al. Cureus 9(10): e1760.

Evidence-based guidelines and algorithms are being implemented in Canadian Emergency Departments to encourage a **resource-conscious** approach to diagnostic imaging

Choosing Wisely Canada emphasizes the importance of selecting the **right type** of intervention, if any, for the particular clinical scenario.

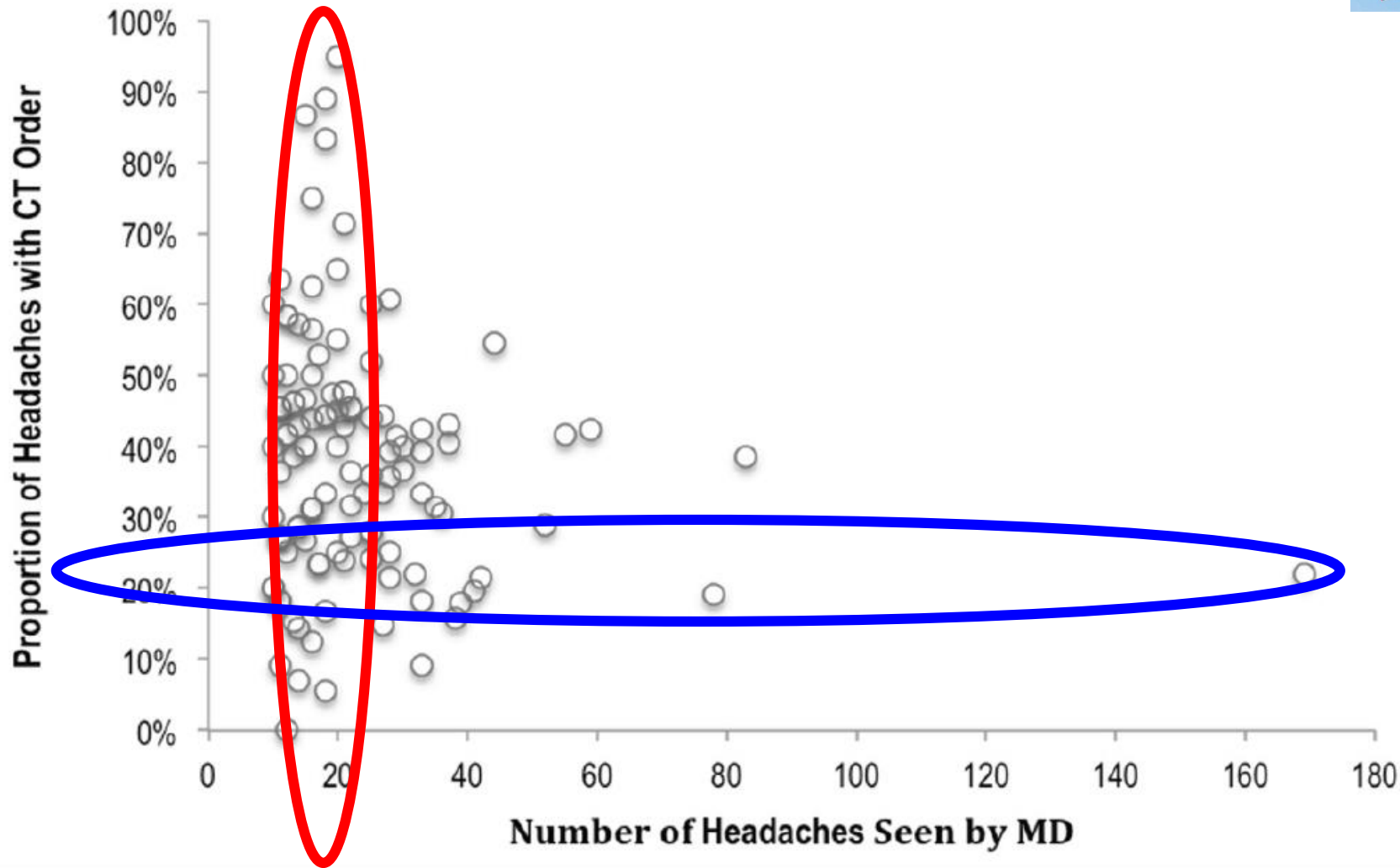


## CT:

• **M > F** ( $p=0.002$ )

• patients in **day and evening**  
> in **night** ( $p<0.001$ )

• **oldest** group (41.6 - 50  
years) > **younger** ( $p<0.001$ ) ●



2017 Mackenzie et al. Cureus 9(10): e1760.



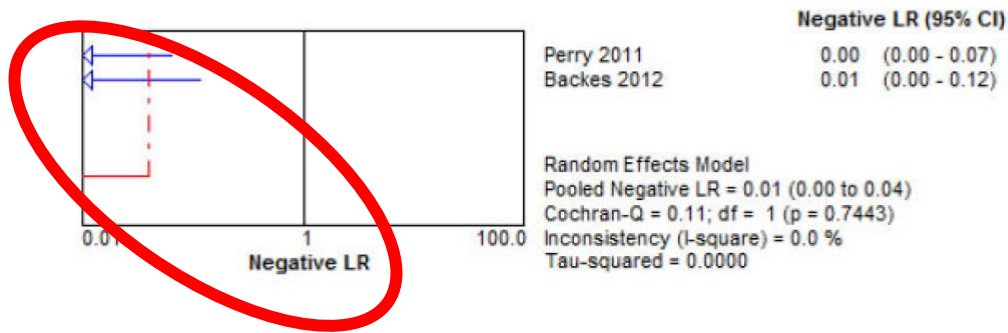
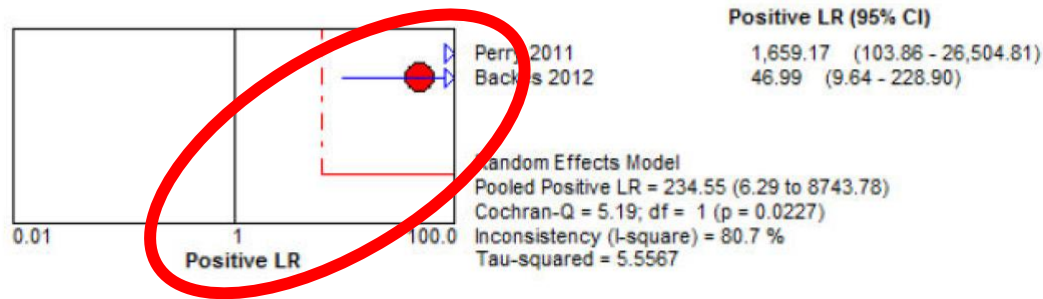
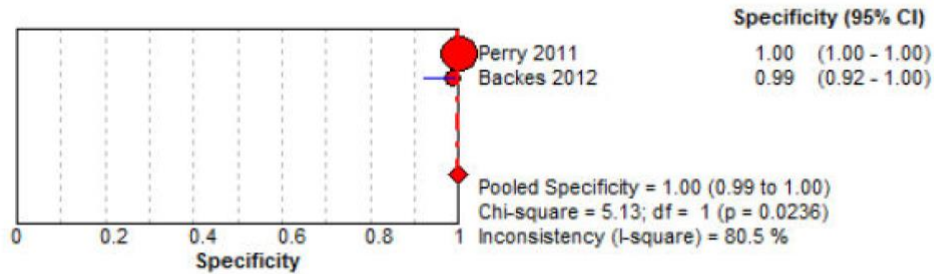
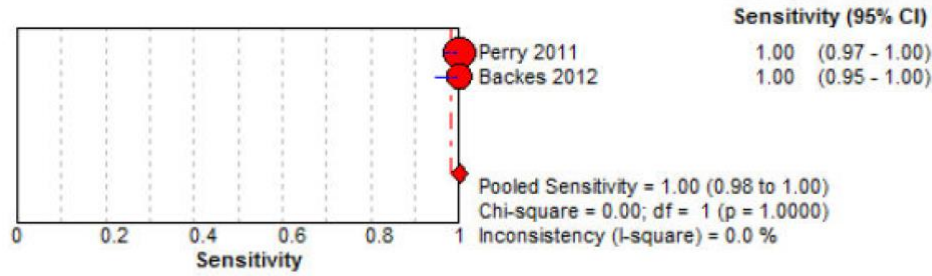




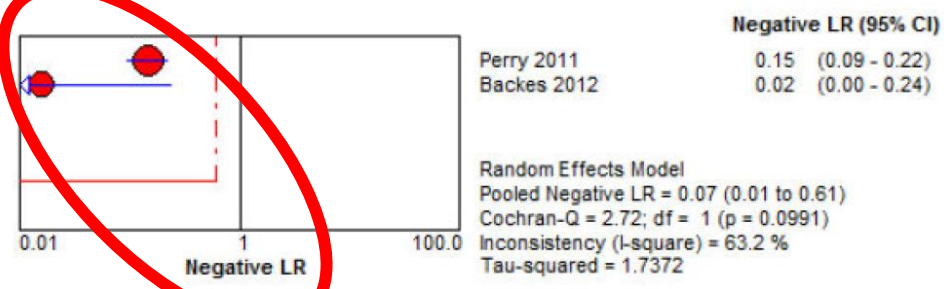
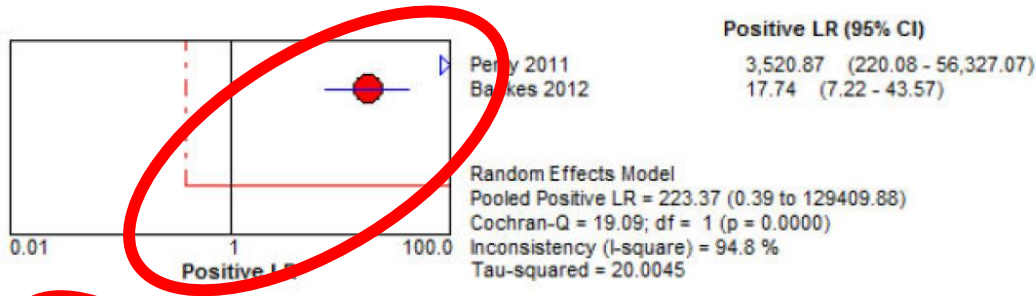
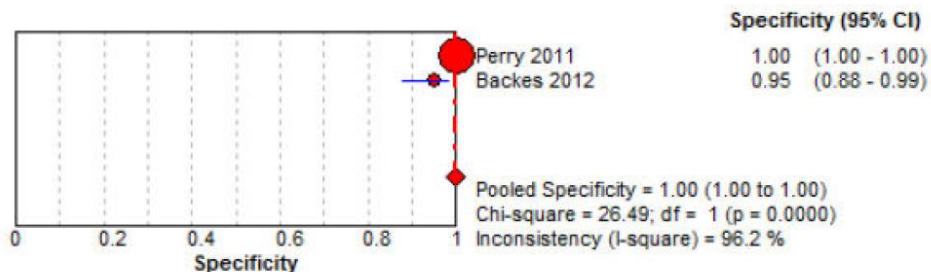
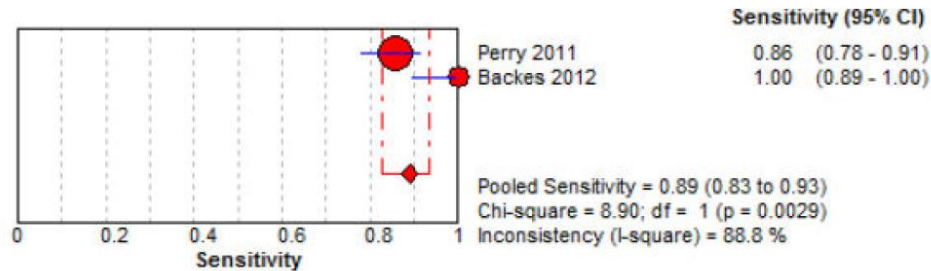
**E se la faccio  
cosa mi aspetto?**



**CT Under 6 hours**



**CT Over 6 hours**



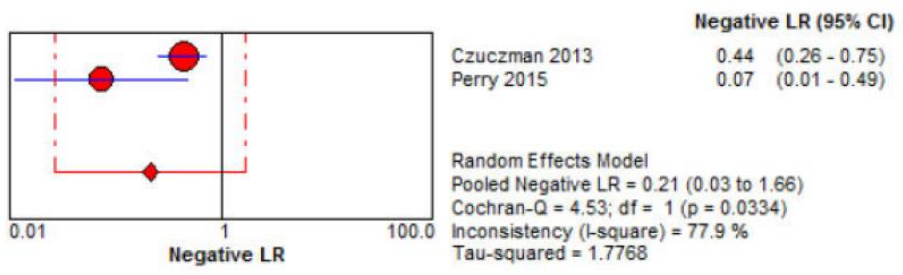
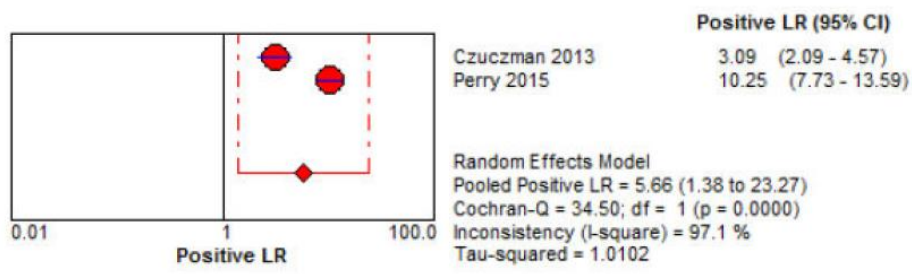
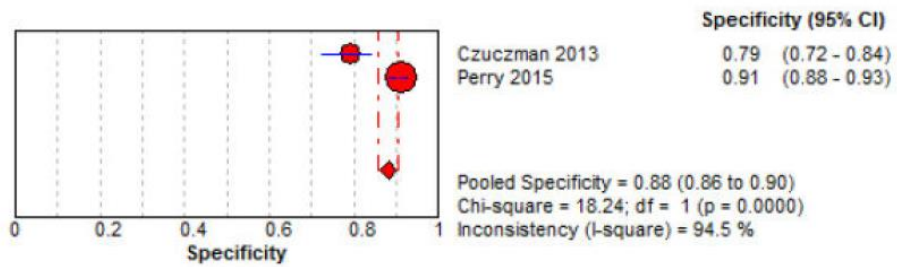
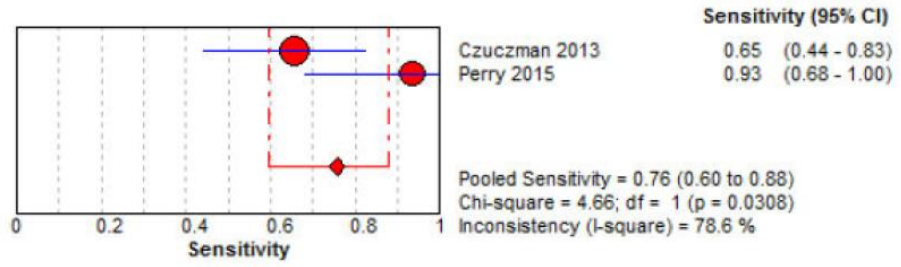
CT smdc	LR +	LR-	95% CI
< 6h	230	0.01	6.0-8700 0-0.04
CT - > 6 h		0.07	0.01-0.61



# E poi?



**CSF RBC >1000 x 10<sup>6</sup>/L**



<b>Evaluated Characteristic</b>	<b>Likelihood Ratio (95% CI)</b>
CSF analysis: RBC count $\geq 1000 \times 10^6/L$	5.7 (1.4–23.0)
CSF analysis: RBC count $< 1000 \times 10^6/L$	0.21 (0.03–1.7)
Visible xanthochromia	Present: 24.67 (12.13–50.14)
	Absent: 0.22 (0.09–0.54)



# PL

- Timing ( $> 6h$  -  $< 2$  sett)
- GR o xantocromia
- Se xantocromia, come determinarla?
- Rischi/benefici
- NNT?





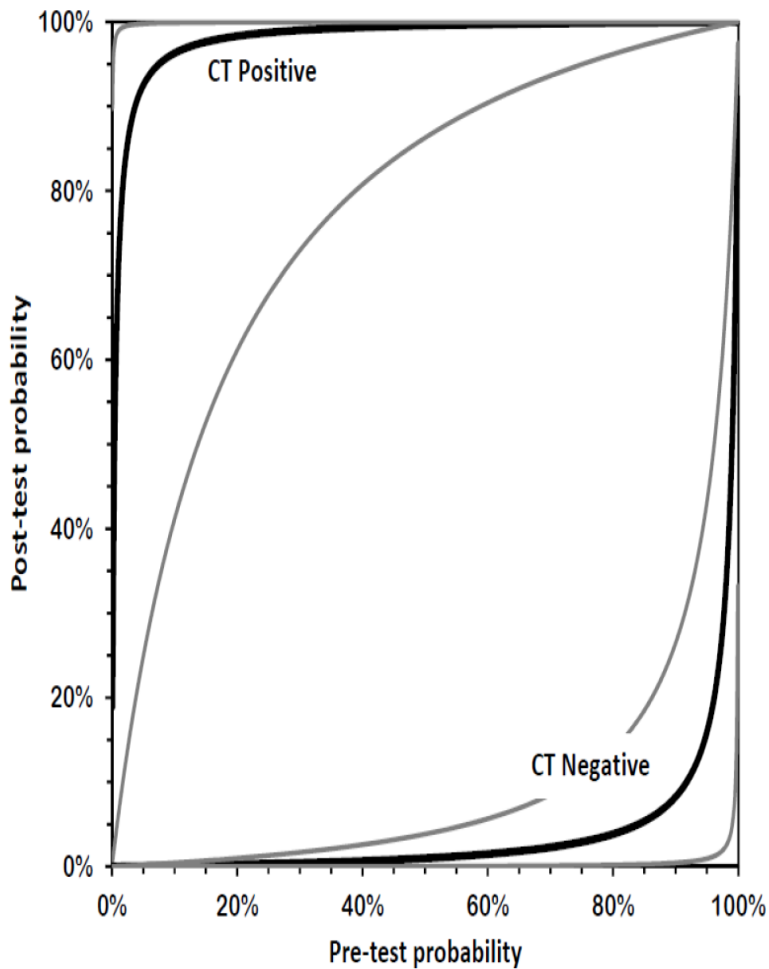
We found that, by incorporating the **risks and benefits** of both testing and continued investigation into the decision analysis, the **benefits of LP** are unlikely to outweigh the harm across a wide range of reasonable estimates of pre-test disease prevalence and given the limited diagnostic accuracy of the CSF analysis.

Christopher R. Carpenter

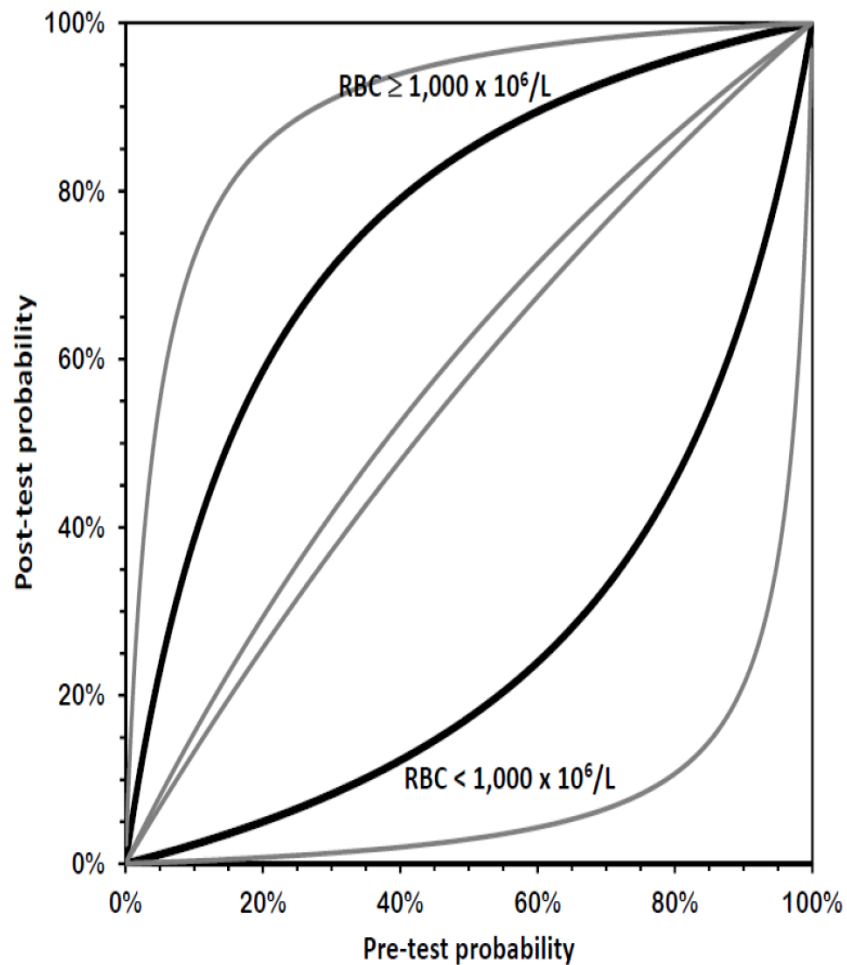
Acad Emerg Med. 2016 September



Unenhanced Computed Tomography Within 6 hours of Headache Onset



Lumbar Puncture: RBC in final tube



# An Observational Study of 2,248 Patients Presenting With Headache, Suggestive of Subarachnoid Hemorrhage, Who Received Lumbar Punctures Following Normal Computed Tomography of the Head

David Sayer, MRCS\*, Ben Bloom, FRCEM, Katalin Fernando, MD, Stuart Jones, FRCPath, Sally Benton, FRCPath, Shumontha Dev, FRCEM, Sathish Deverapalli, MBBS, and Tim Harris, FRCEM

ACADEMIC EMERGENCY MEDICINE 2015;22:1267–1273 © 2015

In patients presenting to the emergency department with acute severe headache, **LP** to diagnose or exclude SAH after negative head CT has a **very low** diagnostic yield, due to low prevalence of the disease and uninterpretable or inconclusive samples.

A **clinical decision rule** may improve diagnostic yield by selecting patients requiring further evaluation with LP following nondiagnostic or normal noncontrast CT brain imaging.

# CLINICAL DECISION RULE

## Rule 1

Investigate if  $\geq 1$  high-risk finding is present:

- 1) Age  $\geq$  40 years
- 2) Neck pain or stiffness
- 3) Witnessed loss of consciousness
- 4) Onset during exertion



# CLINICAL DECISION RULE

## Rule 2

Investigate if  $\geq 1$  high-risk finding is present:

- 1) Age  $\geq 45$  years
- 2) Arrival by ambulance
- 3) Vomiting ( $\geq 1$  episode)
- 4) Diastolic blood pressure  $\geq 100$  mm Hg



# CLINICAL DECISION RULE

## Rule 3

Investigate if  $\geq 1$  high-risk finding is present:

- 1) Age 45-55 years
- 2) Neck pain or stiffness
- 3) Arrival by ambulance
- 4) Systolic blood pressure  $\geq 160$  mm Hg



# Ottawa SAH rule

## Ottawa SAH Rule

- For alert patients older than 15 years with new severe nontraumatic headache reaching maximum intensity within 1 hour
- Not for patients with new neurologic deficits, previous aneurysms, SAH, brain tumors, or history of recurrent headaches ( $\geq 3$  episodes over the course of  $\geq 6$  months)
- Investigate if 1 or more high-risk variables present:
  - Age greater than or equal to 40 years
  - Neck pain or stiffness
  - Witnessed loss of consciousness
  - Onset during exertion
  - Thunderclap headache (instantly peaking pain)
  - Limited neck flexion on examination

Michael K. Abraham, MD, MS,  
Wan-Tsu Wendy Chang, MD\* Emerg Med Clin N Am 34 (2016)



## Diagnostic Accuracy

**Sens. %                      Spec.                      LR +                      LR -**

### Rule 1

98 (95-100)                      28 (25-30)                      1.36 (1.31-1.41)                      0.06 (0.01-0.22)

### Rule 2

95 (90-98)                      31 (28-33)                      1.37 (1.30-1.45)                      0.15 (0.07-0.34)

### Rule 3

97 (92-99)                      36 (33-38)                      1.50 (1.43-1.58)                      0.09 (0.03-0.23)

### Ottawa SAH Rule

100 (97-100)                      15 (14-17)                      1.18 (1.15-1.2)                      0.02 (0.00-0.39)



Validation of **SAH clinical decision rules** offers the opportunity to more accurately risk-stratify ED headache patients in order to identify subsets most likely to benefit from post-CT LP, CTA, or no further testing.

Christopher R. Carpenter

Acad Emerg Med. 2016 September



# e oltre?




## CLINICAL GUIDELINES FOR THE EMERGENCY DEPARTMENT EVALUATION OF SUBARACHNOID HEMORRHAGE

William J. Meurer, MD,\* Brian Walsh, MD,† Gary M. Vilke, MD,‡ and Christopher J. Coyne, MD‡

The Journal of Emergency Medicine, Vol. 50, No. 4, pp. 696–701, 2016  
Copyright © 2016 Elsevier Inc.

**Recommendation: CTA** is a reasonable strategy to consider for excluding aneurysmal SAH in select patients (in hospitals where CTA is available). It may be an appropriate alternative in those patients at **higher risk** for SAH after a **negative NCCT** and in those situations where a diagnostic **LP is either refused** by the patient or the results of the **LP are equivocal**.



# Subarachnoid haemorrhage guidelines and clinical practice: a cross-sectional study of emergency department consultants' and neurospecialists' views and risk tolerances

*BMJ Open* 2016;**6**:e012357.

J Lansley,<sup>1,2</sup> C Selai,<sup>3</sup> A S Krishnan,<sup>2</sup> K Lobotesis,<sup>4</sup> H R Jäger<sup>5</sup>

Divergence from recognised procedures for SAH investigation is often criticised and attributed to a **lack of knowledge** of guidelines.

This study indicates that divergence from guidelines may be explained by **alternative risk-benefit** appraisals made by doctors with their patients.

Guideline recommendations **may gain wider acceptance** if they accommodate the requirements of the doctors and patients using them.

# SCENARIO 1

"worst ever headache"

insorta tipo fulmine a ciel

sereno

TAC cerebrale e/o

Puntura lombare

col

Val. neurologica urg

ali

e/o

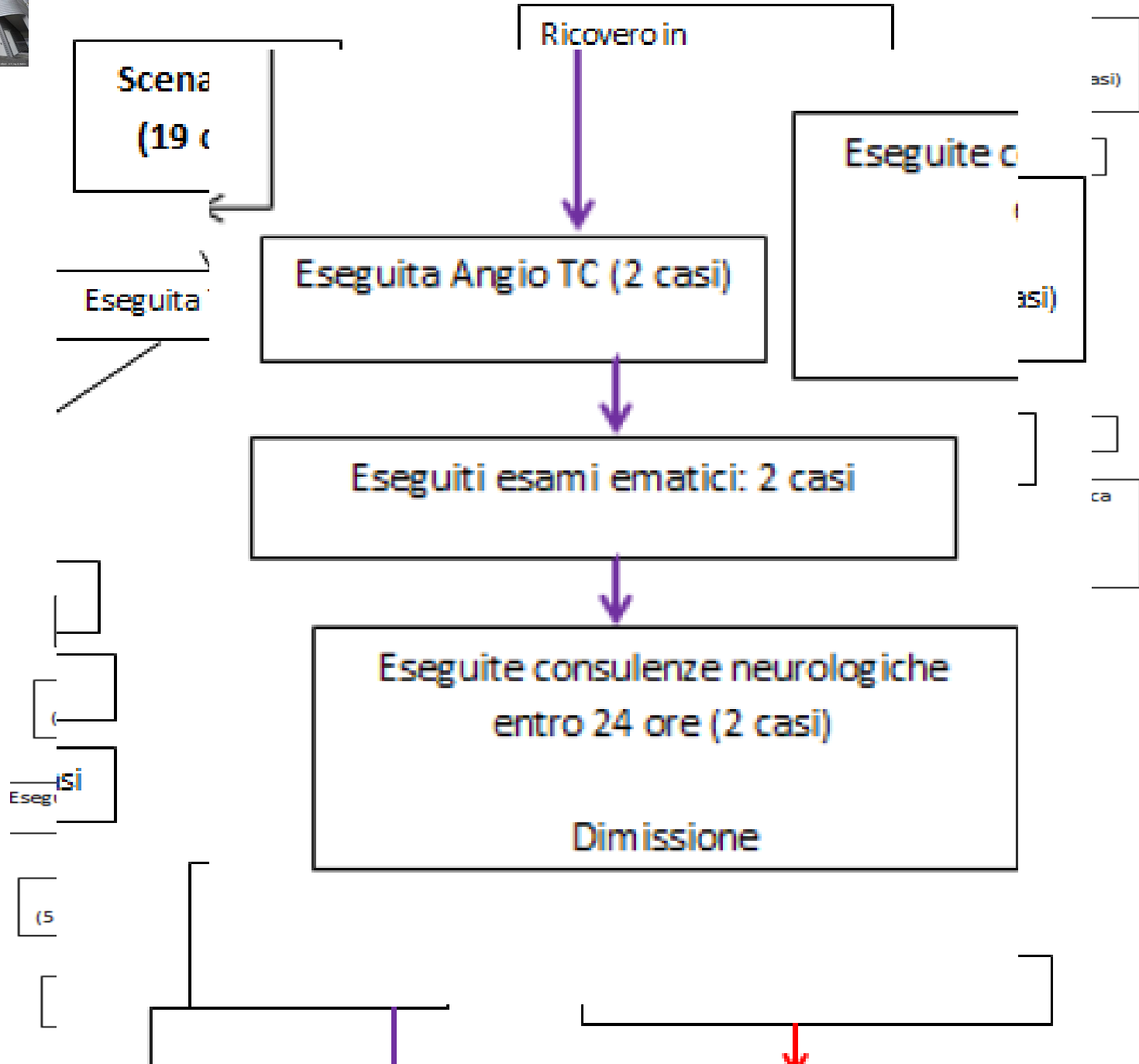
con vomito o sincope all'esordio





Scenario 1

Neurochirurgia (5 casi)



# SCENARIO 2

cefalea severa

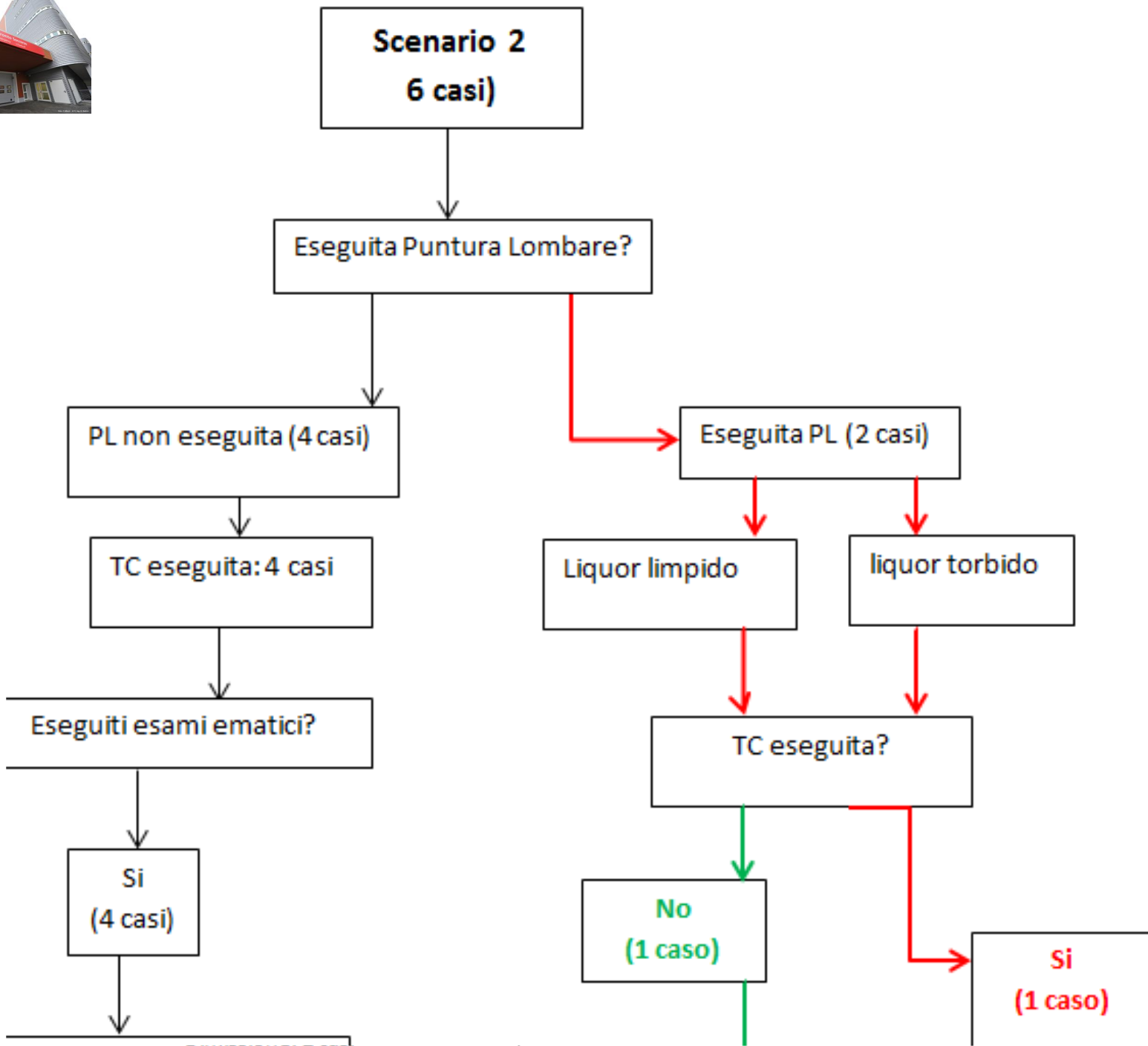
TAC CEREBRALE

e

PUNTURA LOMBARE

rigor nucale







## SCENARIO 3

no storia di  
cefalea

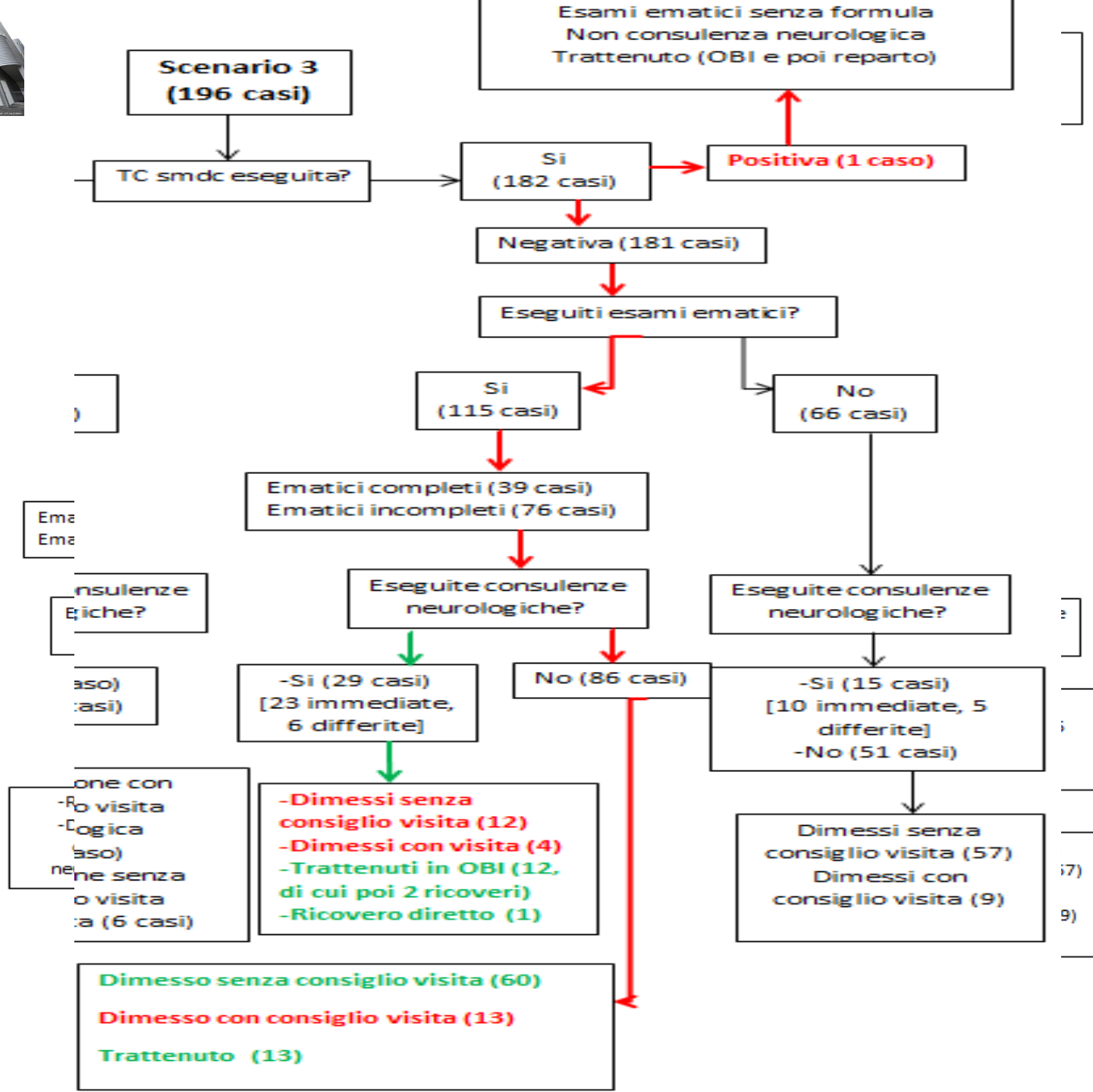
**TAC CEREBRALE**

**Val. indici di flogosi**

**Val. neurologica (7 gg) e  
successivo ev. follow up**

**Ingravescente**



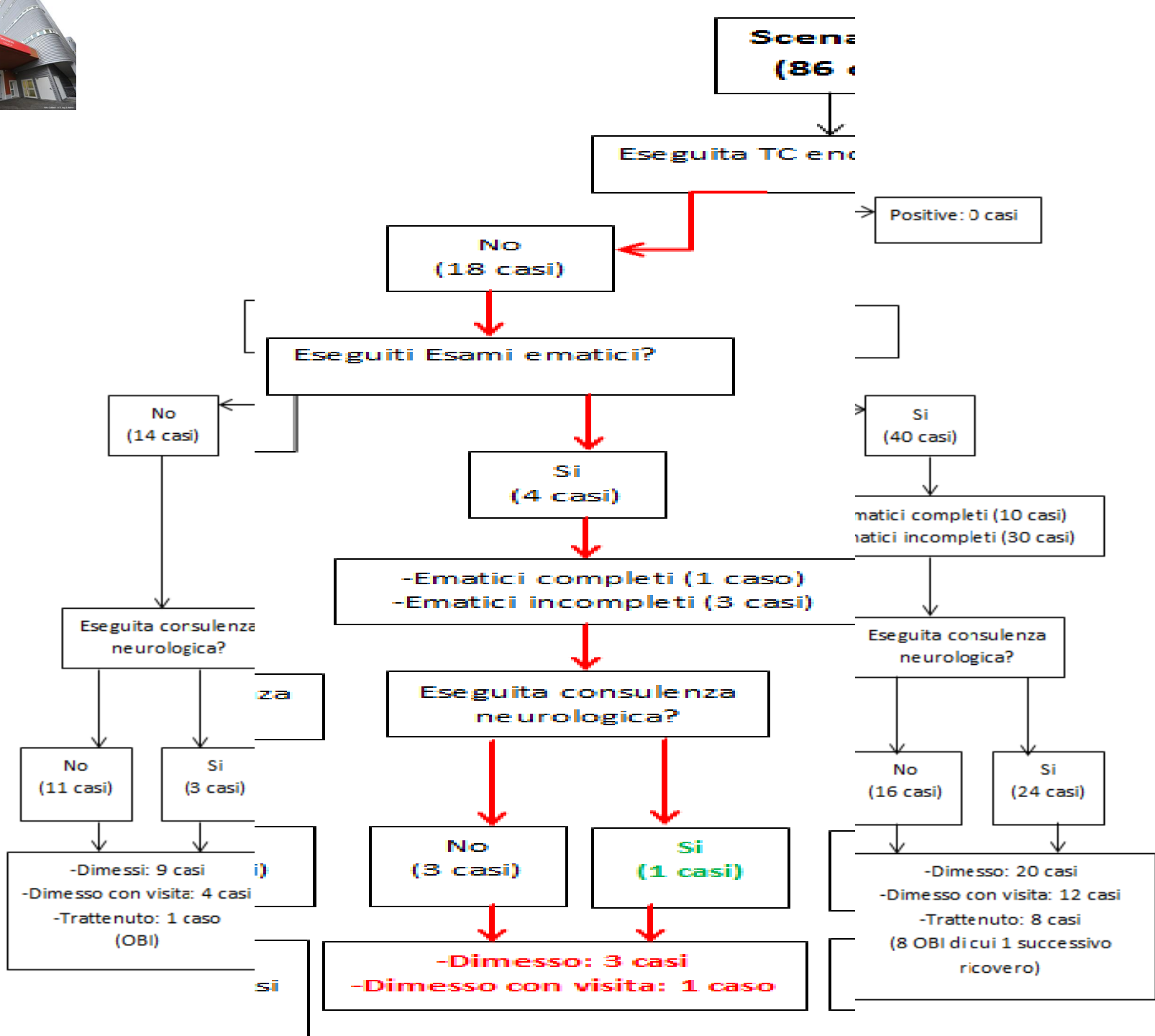


# SCENARIO 4

Val. parametri vitali  
Follow up presso  
ambulatorio cefalee

intensità, durata e  
sintomi associati





# Considerazioni ( un poco amare)

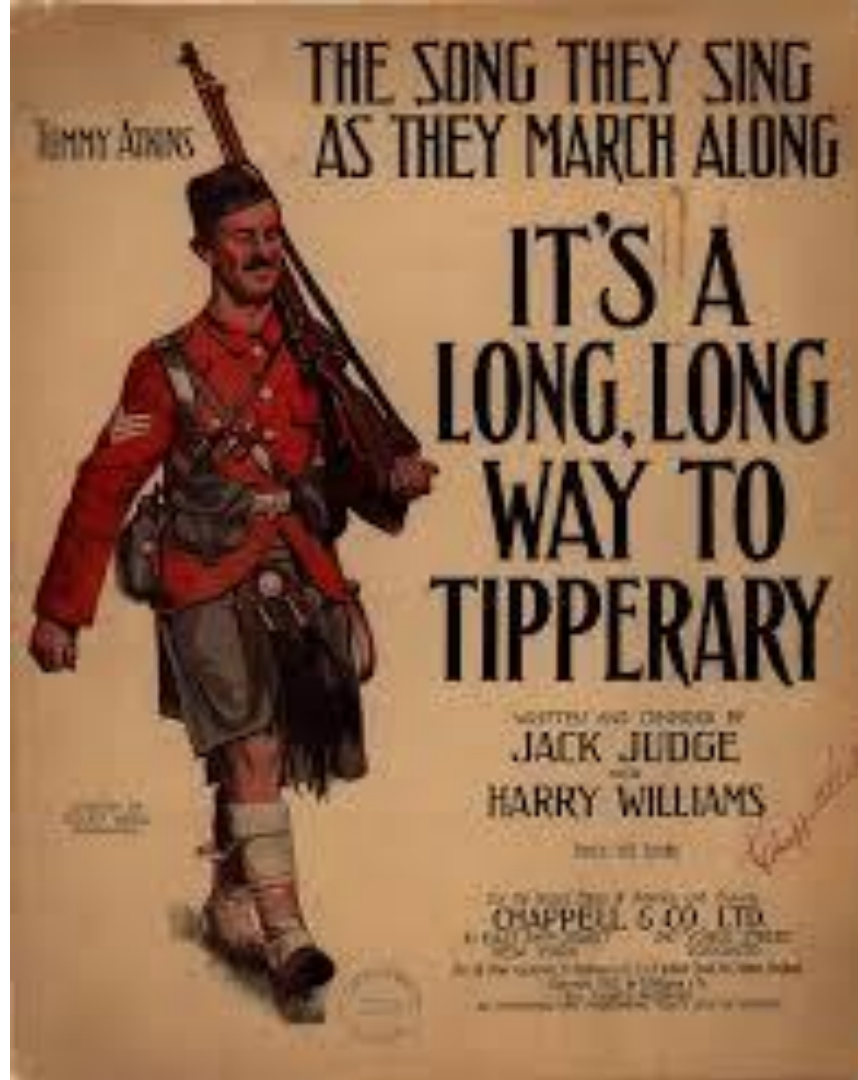
Pochi tra i pazienti hanno eseguito in modo preciso e completo gli iter diagnostici presenti all'interno del protocollo DIACEF

- 42 , 11.83%.

I pazienti che hanno comunque eseguito un iter sufficiente ad escludere le principali cause

- 129 , 36.34%.





possiamo / dobbiamo  
fare meglio





**medico di PS**



# Headache in the Emergency Department Avoiding Misdiagnosis of Dangerous Secondary Causes

Ramin R. Tabatabai, MD\*, Stuart P. Swadron, MD, FRCPC

Emerg Med Clin N Am 34 (2016) 695–716





# SITUAZIONI AD ALTO RISCHIO IN ED : 1

## ○ CEFALEA + INSORGENZA IMPROVVISA / SEVERA

- "thunderclap headache"
- ESA.
- dissezione carotidea, trombosi dei seni venosi
- + *sintomi focali o dolore unilaterale al collo* = dissezione carotidea
- + *dolore oculare e turbe del visus*, : glaucoma angolo acuto
- apoplezia ipofisaria, PRES, encefalopatia ipertensiva



## SITUAZIONI AD ALTO RISCHIO IN ED: 2

### ○ CEFALEA + DIFETTI FOCALI + ALTERATO STATO MENTALE

- Da aumento delle ICP: neoplasie, tossici (CO), cause vascolari acute (stroke - F > M, diss. carot.).
- Con sintomi ANTERIORI (dolore unilaterale al collo e al volto - ant-, s. di Horner, alterazioni retiniche): dissezione di carotide.
- Con sintomi POSTERIORI (dolore unilaterale al collo e al volto - postr-, vertigini): dissezione di carotide o vertebrale.

## SITUAZIONI AD ALTO RISCHIO IN ED: 2 BIS

- **IMPORTANTE:** controllo dei nn cranici:
  - **II**: ischemia cerebrale, arterite temporale, patologia oculare
  - **III**: MAV comunicante posteriore ( il 90% di ESA da MAV posteriore hanno questo deficit). NB: Se trauma cranico ernia transtentoriale.
  - **VI**: sensibile a aumento della ICP
  - Associazione combinata **III, IV e VI**: patologia severa seno cavernoso.



## SITUAZIONI AD ALTO RISCHIO IN ED: 3

### ○ CEFALEA + IMMUNOCOMPROMISSIONE

- Sospetto di patologia intracranica  
( + 24-36 % vs normale)
- CAUSE INFETTIVE
  - meningite criptococcica, toxoplasmosi: HIV
  - batteri e funghi : trapiantati
- CAUSE NON INFETTIVE ( linfomi)



# SITUAZIONI AD ALTO RISCHIO IN ED: 4

## ○ CEFALEA + ETA' AVANZATA

- ALTO RISCHIO DI CAUSE SECONDARIE: EMORRAGIE, TRAUMI OCCULTI, ARTERITE A CELLULE GIGANTI, NEOPLASIE.
- > 50 aa 4 VOLTE INCIDENZA DI CAUSE SECONDARIE VS GIOVANI
- > 65 AA INCIDENZA DI CAUSE SECONDARIE PERICOLOSE > 15%.



# SITUAZIONI AD ALTO RISCHIO IN ED: 5

## ○ CEFALEA + COAGULOPATIA

- IPER:

- trombofilia, farmaci

- IPO:

- malattia epatica, piastrinopatia, malattia ematologica

- TAO/NAO, antitrombotici, eparina



# SITUAZIONI AD ALTO RISCHIO IN ED: 6

## ○ CEFALEA + FEBBRE

- Meningoencefalite da infezione SNC
- Cefalea 87%
- Rigidità nucale 83%
- Febbre 77%
- Disturbo di vigilanza ( $GCS < 14$ ) 69%



# SITUAZIONI AD ALTO RISCHIO IN ED: 8

## CEFALEA+DISTURBI VISIVI

### EMICRANIA

- AURA
- Insorge in 5-20 ' e scompare in 60
- Coinvolge i colori
- Scintille
- Scotomi

### CAUSE SECONDARIE

- Perdita improvvisa di visus monoculare, amaurosi o deficit campimetrici parziali





## SITUAZIONI AD ALTO RISCHIO IN ED: 9

### ○ CEFALEA + PERDITA DI COSCIENZA

- Sempre preoccupante
- DD: sincope o convulsione
- Da indagare se sincope vera (5% ESA esordio con sincope)



# Bastano quattro scenari



# algoritmo

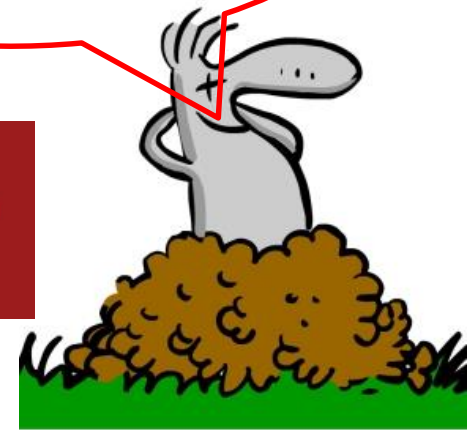


# take home message



Questo è un dannato lavoro, ma qualcuno deve pur farlo!!

←Emergency



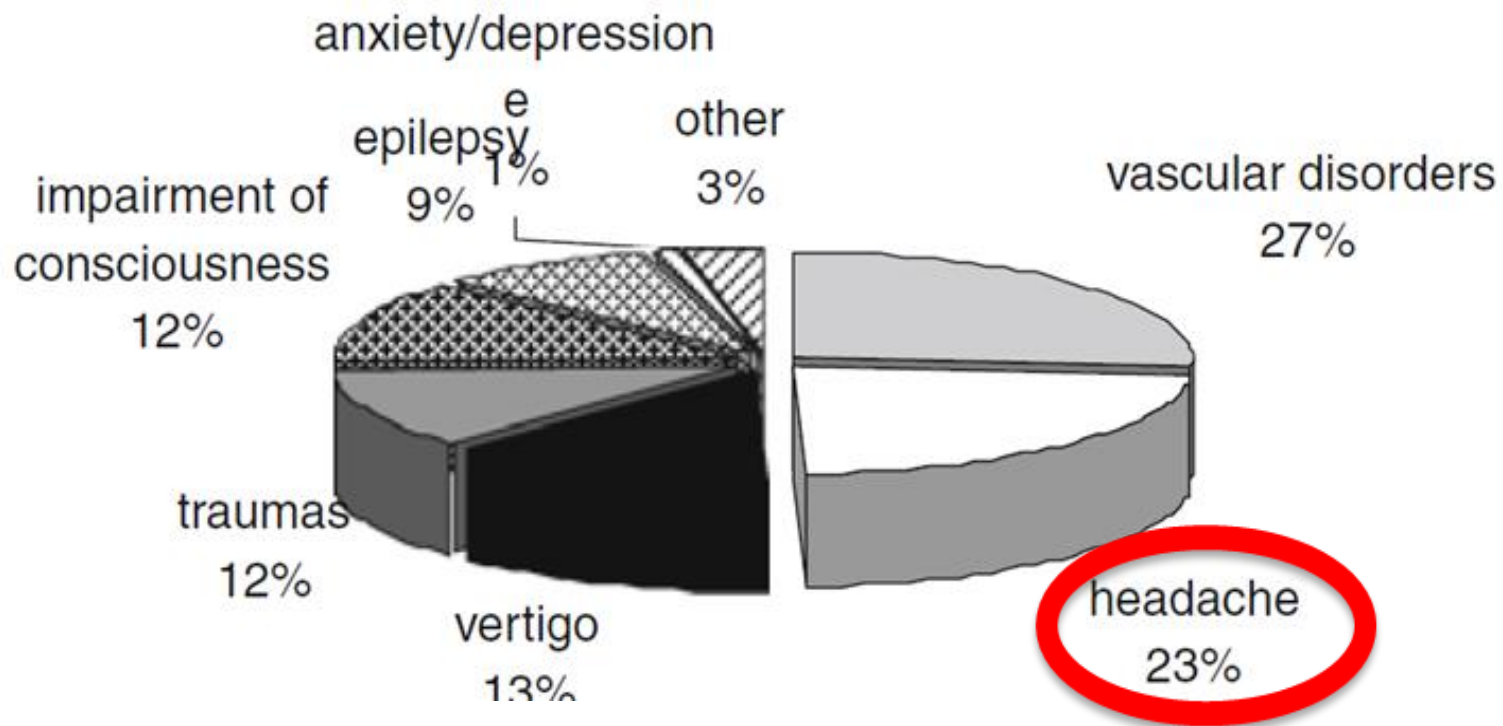
# we need help !



# The role of emergency neurology in Italy: outcome of a consensus meeting for a intersociety position

Giuseppe Micieli · Fabrizio A. De Falco · Domenico Consol  
Domenico Inzitari · Roberto Sterzi · Gioacchino Tedeschi ·  
Danilo Toni

Neurol Sci (2012) 33:297–304



Cardiology and Emergency Medicine: United We Stand, Divided We Fall

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The Cleveland Clinic Foundation  
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Cardiology and Emergency Medicine:  
United We Stand, Divided We Fall

See related article, p. 122

[Gibler WB, Topol EJ, Holroyd B, Armstrong PW. Cardiology and emergency medicine: united we stand, divided we fall. *Ann Emerg Med.* February 2002;39:164-167.]

... of cardiovascular medicine in the  
... reasoning number of  
... and possible  
... the issue

**NEUROLOGY AND EMERGENCY MEDICINE:  
United we stand  
Divided we fall**

... ACS,  
... for cardiac  
... to the current  
... include serial 12-lead ECG  
... surveillance, serial troponin testing, antithrombin and



Grazie per la  
vostra infinita  
pazienza!

